

NYMNP

14/02/2024

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Wednesday 14 February 2024

Dear Rob

ENVIRONMENT AGENCY LETTER RA/2024/146697/01-L01 DATED 26 JANUARY 2024 (ref NYM/2023/0873/CVC) – ANGLO AMERICANS' RESPONSE

This letter sets out the response of Anglo American Woodsmith Limited to a request for clarification from the Environment Agency, as referenced above. For each issue, the Environment Agency's request is presented in blue text with the Anglo American response following in black text.

Planning condition 88 – Hydrogeological Risk Assessment – Ladycross Plantation

The Ground Water & Surface Water Monitoring Scheme covers most of Condition 88 relating to groundwater with the following exceptions, which are not addressed:

1. "A protocol for the removal and replacement of any existing monitoring points" – no reference to removal or replacement of existing monitoring points for Phase 8 works
2. "Monitoring of groundwater levels and spring flows" – Section 3.6 on monitoring spring flows is missing
3. "Details of the method and frequency with which monitoring results will be shared with the MPA and the Environment Agency" – this is not covered by section 4 and details need to be provided

The points raised by the Environment Agency have been addressed as follows:

1. The Groundwater and Surface Water Monitoring Scheme has been amended to include clarification that no boreholes monitoring locations are planned to be removed, however a procedure for the removal of a borehole is included for completeness in Section 4 of the report.
2. Section 3.6 of the Groundwater and Surface Water Monitoring Scheme has been amended to include clarification that no change in flow rates to surface water systems, including offsite abstraction points and springs, is anticipated and as a result spring monitoring will remain as detailed in the Phase 7 Groundwater and Surface Water Monitoring Scheme.

3. Section 5 of the Groundwater and Surface Water Monitoring Scheme provides both the details of how compliance with reporting requirements will be achieved and the frequency with which the reports will be produced. An updated Remedial Action Plan is also provided in further support of the application to discharge conditions for the Phase 8 works.

Planning Condition 93 – CEMP – Phase 8 Ladycross Plantation Construction Environmental Management Plan

The above document states “As part of the Phase 8 works, there is no requirement to excavate topsoil or subsoil on site”. The applicant should discuss the potential for unexpected contaminated soils or groundwater from drilling works to satisfy the condition “A protocol to deal with contaminated ground, should this be encountered, to ensure protection of water resources”.

Additional information is now provided in Section 10 of the Construction Environmental Management Plan

We trust that this response addresses the points of clarification raised by the Environment Agency and that the application to partially discharge conditions relating to Phase 8 works at Ladycross can now be approved. If you have any further questions, please do not hesitate to contact us.

Yours sincerely

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**WOODSMITH PROJECT
(788.5030)**

**CONSTRUCTION
ENVIRONMENTAL
MANAGEMENT PLAN – PHASE 8
– LADYCROSS PLANTATION /
40-STS-LC-2100-EN-PL-00036**

Revision	Date of issue	Prepared by	Checked by	Approved by	Changes
F (PLA)	09/02/2024	E Castro	C Thomas	C Eddington	Revision in accordance with client's requirements

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1. INTRODUCTION

1.1. PURPOSE OF THE DOCUMENT

In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to the North York Moors National Park Authority (NYMNP) 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.

Anglo American is constructing a Mineral Transport System (MTS) tunnel, as part of the wider Woodsmith Project. The tunnel will be used to transport polyhalite from the Woodsmith Mine site to the Material Handling Facility (MHF) at Wilton, Teesside. Safe and efficient construction and operation of the tunnel requires the construction of a shaft at Ladycross Intermediate Shaft Site (Ladycross) to provide access to the tunnel.

This Construction Environmental Management Plan (CEMP) has been prepared on behalf of Anglo American for the Phase 8 Works at Ladycross (as described in **Section 1.2** below).

This CEMP has been prepared to discharge condition 93. Subsequent CEMPs will be prepared for future phases of works. This CEMP covers work carried out in Phase 8.

Table 1 - 1 Condition NYMNP-93: Construction Environment Management Plan

NYMNP-93 Description	Compliance with Condition NYMNP 93
<p>Prior to the commencement of each Phase of Construction in accordance with the approved Phasing plan at either Doves Nest Farm or Lady Cross Plantation, an updated CEMP shall be based on the approved Construction Method Statement (CMS) and should be submitted and approved in writing by the MPA in consultation with the Environment Agency in respect of the area concerned.</p>	<p>This version of the CEMP is for Phase 8 as defined in Section 1.2 below.</p> <p>Earlier versions of the CEMP were produced for preceding works.</p>
<p>The size, location and design of any site compounds, including how any potentially polluting materials will be stored to minimise the risk of pollution</p>	<p>Section 3 and Section 11</p> <p>Phase 8 Construction Method Statement</p>
<p>An incident Response Plan to deal with any pollution that may occur during the course of construction;</p>	<p>Section 12</p>

NYMNP-93 Description	Compliance with Condition NYMNP 93
A protocol to deal with contaminated ground, should this be encountered, to ensure protection of water resources;	Section 10
Details of how surface water run-off shall be passed through a settlement facility of settlement facilities prior to being discharged into any watercourse or soakaway;	Section 9.1
Plant and wheel washing including that it shall only be carried out in a designated area of hard standing at least 10 metres from any watercourse or surface water drain and that washings shall be collected in a sump, with settled solids removed regularly and water recycled and reused where possible;	Section 3.10
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 glare from in-site lighting;	Section 3.6
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	Section 4
The provision of a Dust Management Plan relating to Phase 1 of the construction period (earthworks and bund formation) and Polyhalite handling and stockpiling to include dust generation modelling so as to identify	Section 6 Phase 8 Emissions to Atmosphere Construction Phase Dust Management Plan

NYMNP-93 Description	Compliance with Condition NYMNP 93
<p>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 PM₁₀ 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>	
<p>In the event that there is insufficient clay with the Lady Cross Plantation site to form 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 environmental would be avoided;</p>	<p>Phase 8 Construction Environment Management Plan</p>
<p>How the requirements of the approved CEMP will be disseminated to all relevant</p>	<p>Section 2.2</p>

NYMNP-93 Description	Compliance with Condition NYMNP 93
staff/contractors throughout the construction period;	
The location of the site notice board;	Section 2
A scheme for parking, loading, unloading during construction;	Section 4 Phase 6 Construction Traffic Management Plan
A scheme for security and lighting during construction;	Section 3.1 and 3.6
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 3.8
Contingency proposals for if fuel cannot be delivered for the generators, e.g. due to adverse weather;	Section 3.8
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 run-off;	Section 11
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	Section 7 Attachment C – Precautionary Method of Working

NYMNPA-93 Description	Compliance with Condition NYMNPA 93
shall be adhered to thereafter. The PMWSP 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;	
Alarms fitted to mobile plant and vehicles for the purposes of warning pedestrians of their movements;	Section 5

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

Table 1 – 2 Additional relevant conditions

Condition	Topic	Compliance with Condition
NYMNPA-18	Noise and Vibration Management	Section 5 Phase 8 Noise and Vibration Management Plan
NYMNPA-34	Construction Traffic Management	Section 4 Phase 6 Construction Traffic Management Plan
NYMNPA-42	Access Arrangements	Section 3 Previous Phase 2 Construction Environment Management Plan and Phase 8 Construction Method Statement
NYMNPA-52	Protected Species	Section 7.1 Phase 3 Protected Species Management Plans
NYMNPA-57	Landscape and Ecological Management	Section 7.3 Phase 3 Landscape and Ecological Management Plan

Condition	Topic	Compliance with Condition
NYMNPA-59	External Lighting	Section 3.6
NYMNPA-65	Temporary boundary treatments	Section 3
NYMNPA-68	Temporary Structures	Section 3 Phase 8 Construction Method Statement
NYMNPA-70	Vegetation retained & clearance	Section 7.2 Construction Phase Arboricultural Method Statement
NYMNPA-76	Soil Management Plan	Section 10 Phase 3 Soil Management Plan
NYMNPA-88	Hydrogeological Risk Assessment	Section 9 Phase 8 Hydrogeological Risk Assessment
NYMNPA-90	Groundwater Management	Section 9
NYMNPA-92	Plant and Vehicle Management	Section 4 Phase 8 Construction Vehicle and Plant Management Plan
NYMNPA-95	Written scheme of Archaeological Investigation	Section 8 Phase 2 Written Scheme of Investigation for an Archaeological Watching Brief

This document details only the additional activities required for Phase 8 at Ladycross associated with the Anglo American Woodsmith Project. Updates to this plan will be prepared for subsequent phases and following any design or method changes. 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. SCOPE OF WORKS

The Phase 8 Scope of Works is as follows:

- Drilling of an exploratory Borehole;
- Temporary Installation and use of drilling rig and ancillaries;
- Decommissioning of Borehole.

The scope of works covered by this document comprises drilling of an exploratory horizontally drilled directional (HDD) Borehole. The Eskdale Anticline through which the Tunnel Drive between Ladycross and Woodsmith Mine passes includes areas of rock containing faults. The HDD works are to assess these structures, on a precautionary basis, for ground conditions, including groundwater and the very low risk of encountering low volumes of natural gas, prior to tunnel boring activities.

The borehole will be initially 500mm in diameter and cased to circa 11mbgl, the casing will be cemented into place. Secondary drilling activities and casing, again from surface, will be at a diameter of 300mm inside of the primary casing, the secondary borehole will then be cased to approximately 145mbgl and 42m into the Whitby Mudstone Formation aquitard, sealing the upper aquifers. The HDD activities will continue as open hole boring at a diameter of 175mm to a maximum depth of 350mbgl and a distance of approximately 4km parallel to the tunnel alignment. All horizontal drilling activities will be undertaken below all abstractions and vulnerable aquifers.

Decommissioning of the borehole is to be undertaken once the TBM has passed the end of the maximum extent of the borehole; at circa 4km from the Ladycross intermediate site. The duration for monitoring of the borehole during TBM Drive 3 is predicted to take circa 12 months. Monitoring of the borehole will be undertaken until the borehole is sealed from approximately 305mbgl to 2mbgl.

A site layout is shown in **Image 1** below.

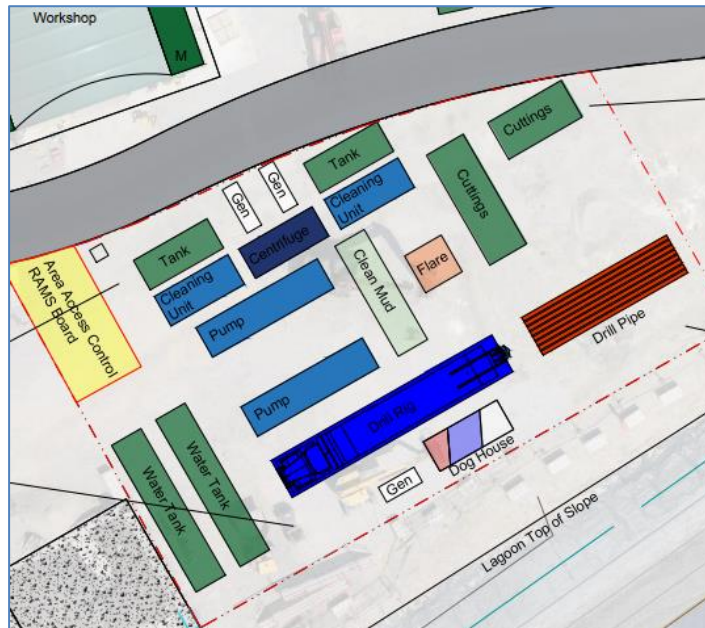


Image 1 –Site layout

1.3. SCOPE OF THIS DOCUMENT

This CEMP details how the Phase 8 works will be planned, monitored and managed in an environmentally responsible manner. The document outlines the management framework for the environmental requirements, commitments, and performance targets associated with the planning and implementation of Phase 8 of the project.

The CEMP refers to several management plans, which have been prepared to discharge a number of planning conditions. Collectively these plans incorporate all mitigation measures relevant to Phase 8.

The Phase 8 CEMP should also be read together with the documentation listed below. Information in these documents is summarised in this CEMP where appropriate:

- Phase 8 Construction Vehicle & Plant Management Plan (40-STS-LC-2100-LG-PL-00010)
- Phase 6 Construction Traffic Management Plan (40-STS-LC-2100-LG-PL-00007)
- Phase 8 Noise & Vibration Management Plan (40-STS-LC-2100-EN-PL-00038)
- Phase 3 Landscape and Ecological Management Plan (40-STS-LC-2100-EN-PL-00014)
- Phase 8 Emissions to Atmosphere (40-STS-LC-2100-EN-PL-00039)
- Phase 3 Surface Water Management Plan (40-STS-LC-2100-PA-PL-20102)
- Phase 8 Construction Method Statement (40-STS-LC-2100-CN-MS-00009)

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- Phase 8 Remedial Action Plan (40-STS-LC-2100-EN-PL-00044)
 - Phase 2 Archaeological Watching Brief Written Scheme of Investigation (40-COT-LC-8324-EN-PL-00002)
 - Phase 3 Soil Management Plan (40-STS-LC-2100-EN-PL-00007)
 - Phase 8 Hydrogeological Risk Assessment (40-STS-LC-2100-EN-RA-00005)
 - Phase 7 Surface Water Drainage Scheme (40-STS-LC-2100-PA-22-20123)
 - Construction Phase Dust Management Plan (40-STS-LC-2100-EN-PL-00015)
 - Construction Phase Arboricultural Method Statement (40-STS-LC-21-CN-MS-00003)
 - Phase 8 Construction and Operation Groundwater and Surface Water Monitoring Scheme (40-STS-LC-2100-EN-PL-00037)
 - Phase 8 Phasing Plan (40-STS-LC-2100-PA-22-20124)
 - Phase 8 Hard & Soft Landscaping (40-STS-LC-2100-PA-22-20125)
 - Phase 8 General Arrangement (40-STS-LC-2100-PA-22-20126)

This CEMP will remain a live document, being reviewed and updated in consultation with the appointed contractor(s) or sub-contractor(s) as required. Each of these updated CEMPs will be submitted to NYMNPAs for approval prior to the start of each phase of works.

2. ENVIRONMENTAL MANAGEMENT FRAMEWORK

2.1. STRUCTURE OF RESPONSIBILITIES

This CEMP addresses those environmental matters within the responsibility of Anglo American and the Contractors engaged on its behalf to deliver the Phase 8 construction works. While overall responsibility for compliance with environmental requirements will remain with Anglo American, the Contractors working on site are accountable for undertaking the works in line with the requirements of this CEMP as well as all legal and other requirements imposed via permits and licenses.

2.2. TRAINING, AWARENESS AND COMPETENCE

2.2.1. INTERNAL COMMUNICATION

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.

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 works.

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 Phase 6 works will be identified. Details of where sustainable approaches to works activities 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.

2.2.2. EXTERNAL COMMUNICATIONS

Anglo American 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) see **Attachment A**.

The CSEF includes provision for a quarterly Liaison Group Forum meeting, which are open to members of the public to attend.

2.3. MONITORING OF COMPLIANCE

All Phase 8 construction works will be supervised by the Contractor's managerial staff with the support of members of their teams on a daily basis. The Contractor's managerial staff will receive a briefing from the Contractor's Environmental Manager to ensure that they are aware of the environmental requirements. The briefing will also ensure that they are able to assess whether the environmental requirements are being implemented properly.

Procedures relating to environmental management and monitoring of environmental performance identified within the CEMP will be subject to inspections by the Contractor at least once every week, with oversight and audit by the Anglo American Environmental Team. Records of inspections, audits and overall environmental performance will be submitted to Anglo American.

2.4. COMPLAINTS PROCEDURE

The implementation of the systems and procedures to protect the environment will effectively reduce or remove the risk of an environmental incident and/or exceedance of established thresholds. However, complaints may still be received and in this event the Complaints Procedure will be implemented, as detailed in **Attachment B**.

3. DESCRIPTION OF SITE

The following section seeks to address the requirements of planning conditions 65 and 68, providing details for the site's temporary boundary treatments, temporary compounds and structures that will be used as part of Phase 8 works. Most of the site set-up will have been completed as part of the previous phases of works. Only small changes will be made to the existing site set-up as detailed in the below sections.

3.1. FENCING AND SECURITY OF THE SITE

Perimeter fencing will be installed around the phase 8 works area as a demarcation zone. Site access and controls established in previous phases will be utilised for site access and security during the Phase 8 works. Further controls for site access are detailed in the Phase 8 CMS.

3.2. SITE LAYOUT AND COMPOUNDS

The site layout and compounds are detailed in the Phase 8 Ladycross Plantation General Arrangement Plan and the Phase 8 Construction Method Statement (CMS).

The working platform built during Phase 3 works was designed and constructed to withstand of the loadings of part of the plant and equipment associated with the Phase 8 works. The laydown area adjacent to the cuttings pit/muck bin area will be regraded with stone to accommodate the drilling equipment associated to Phase 8 works. More details about the pre-commencement works are shown in the Phase 8 CMS.

3.3. AREAS OF HARDSTANDING

3.3.1. CONCRETE/SLABS

To facilitate the install of temporary units for the Phase 8 works, additional concrete slabs will be required dependent on load capacities. Existing concrete pads / slabs will be utilised where practicable, the below provides details of maximum concrete slabs required during the Phase 8 works:

- A concrete pad will be constructed next to the muck bin to place the drilling mud recycling equipment. Total surface area 25m², length 5m and width 5m.

The above dimensions are indicative sizes and are subject to change based upon final design requirements.

3.3.2. STONE / AGGREGATE HARDSTANDING

Additional stone hardstanding will be placed on the existing laydown area which will be redefined as the drilling pad to withstand the loadings of the plant and equipment associated with the Phase 8 works. The total approximate surface area to be regraded will be 2250m², length 75m, width 30m.

3.4. EXTERNAL TEMPORARY STRUCTURES

As part of the Phase 8 scope of works various external structures and ancillaries will be installed in preparation for drilling operations. Further details are set out below.

3.4.1. INITIAL DRILLING RIG

An initial drilling rig (Geax EK75) or similar will be set up and erected on the drilling pad to drill a hole up to approximately 11 metres below surface. Neat cement plug will be placed at the bottom of the casing and the annulus will subsequently be cemented to surface using tremie pipes. The height of the initial drilling is 13.65m as shown in Image 2.

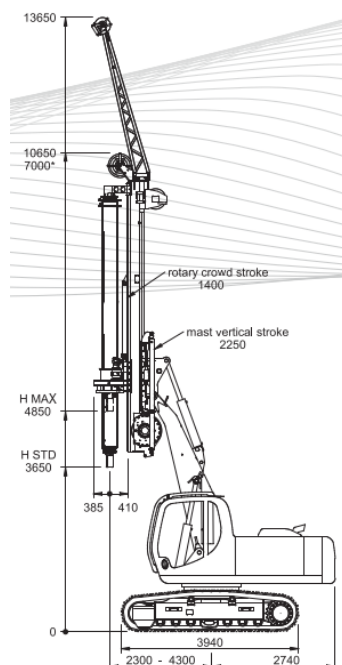


Image 2 – GEAX EK75 Auger

3.4.2. DRILLING RIG

The Speedstar Drilling Rig will be used to carry out the directional drilling to total depth. The drilling rig mast is approximately 15.5m high as shown in **Image 3**.



Image 3 – Speedstar Drilling Rig

3.4.3. DRILLING MUD RECYCLING SYSTEM

The cuttings generated at the development face are displaced by direct circulation which requires a drilling fluid (mud) to be pumped at high velocity and pressure down through the drill string and flowing up the annulus of the bored hole. This process requires that the drilling fluid remain relatively clean (light) to maximise the efficiency with which cuttings are displaced and to minimise the wear and tear on the mud pumps and drilling tools. The mud recycling system is responsible for removing the solids and fines from the drilling fluid allowing it to be recirculated.

The mud recycling system will consist of:

- Centrifuge– shown in Image 4
- Fluid reclamation system – shown in Image 5



Image 4 – Centrifuge



Image 5 – Fluid Reclamation System

3.4.4. *EMERGENCY SAFETY DEVICE FOR MITIGATION OF GASEOUS HYDROCARBON*

A safety device (Gas separator and flare) will be installed to mitigate emissions and minimise risks for the workforce in the event of hitting gaseous hydrocarbon during drilling operations. The dimensions of the emergency device are detailed in the **Table 3-1** below.

Table 3 - 3 Dimensions – Emergency Safety Device for mitigation of gaseous hydrocarbon

Equipment	Dimensions
Gas Separator	6m (height) x 2.50m (width) x 2.5m (depth)
4" Single Flare Skid	8m (height) x 2.2m (width) x 2m (depth), diameter: 4 inches

The emergency safety device to be installed will ensure that waste gases will combust cleanly and efficiently by eliminating smoke and minimising noise and visible flame. An enclosure structure will be erected around the emergency safety device as an additional measure of noise attenuation. An indicative image of the device is shown in **Image 6**.



Image 6 – Emergency Safety Device for Gaseous Hydrocarbon Mitigation

3.5. UTILITIES

3.5.1. WATER SUPPLY

Raw water to facilitate drilling operations will be serviced by a 4" Yorkshire Water potable water supply. The potable water will provide services to both welfare facilities and for site process use.

Bottled water dispensers will be provided for site staff. Where required, dust suppression bowsers will also periodically be topped up via the water supply. Temporary tanks may be utilised for storage of water for site specific operations.

3.5.2. ELECTRICAL SUPPLY

A three-phased 415V electrical supply was installed during Phase 4 to power site operations. Where practical the main supply will power the Phase 8 activities.

Additional generators will be installed in Phase 8 to provide power where it is not practical to use the existing mains supply. Details of the additional generators are described in the Phase 8 CMS and Phase 8 Emissions to Atmosphere.

Where standalone generators are required, these will be super silent and installed in a manner to reduce noise impacts on local receptors. Further details for generators are supplied in the Phase 8 Emissions to Atmosphere. Practices to reduce noise impacts will include but not be limited to:

- Procurement of super silent generators with reduced noise impact,

- Positioning of generators during installation, and
- Noise attenuation fencing/panels installed around generators, where required.

3.6. WELFARE FACILITIES

New welfare facilities will be installed in the north-western part of site, as part of Phase 7 works. It is expected that the new welfare will be installed prior to commencement of Phase 8 works.

3.7. LIGHTING

The Phase 8 works will be illuminated, when necessary, through temporary, task-specific directional lighting. The drilling operations area will be fitted with discreet lighting for safe access and egress. Shutters on welfare buildings will be shut after nightfall to reduce light spill. Phase 8 works will be 24/7 works.

On-site exterior lighting will apply the following principles which will ensure that impacts on wildlife are minimised in accordance with 'Artificial Lighting and Wildlife' guidance¹:

- Task lighting will be used where appropriate,
- Lighting will be directed downwards (0 to 20 degrees where possible), with all beam angles below 70°,
- Lighting will be kept as low as is safe and practicable for the works taking place and kept at a maximum height of 4m,
- Lights will be switched off when not in use or will be motion sensor controlled,
- 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, and
- All lighting will be directed to avoid light spill on to the perimeter woodland.

Where additional temporary lighting is required to provide a safe working area and access and egress, it will be installed in line with the above procedures, where possible aiming to limit upward light spill, and utilising warm spectrum LED's.

3.8. MATERIAL STORAGE

The type of material stored on site will determine the storage methodology adopted. Fuel and chemical storage areas will be located as far from all open drains and watercourses as

practicable, with at least 10m from these locations. In addition, the storage areas will not be located near any open excavation of natural ground. Additional storage requirements will be implemented based upon the associated manufacturers Material Safety Data Sheet (MSDS).

The areas in which hazardous substances are stored will be clearly demarcated and within appropriate containerised units with integrated secondary containment.

All fuel will be stored within the onsite fuel tank installed during Phase 3 works. Specific areas on site will be designated for materials storage.

All non-polluting materials will be stored in designated areas, with surface water run-off draining to adjacent filter drains, surface swales and surface water drainage as detailed in **Section 10**. Penstocks and hydraulic brakes have been installed within the surface water drainage network, which will be closed in the event of a spill or detection of other contaminants. Details of site drainage and penstock locations are detailed in the Phase 3 Surface Water Management Plan and Phase 7 Surface Water Drainage Scheme.

Table 3 - 1 Material storage for Phase 8 works.

Material	How it will be stored
Concrete (Wagon / truck loads)	Bulk concrete will be delivered and used straight from the concrete wagon.
Diesel / Petrol (Bulk storage)	Bulk storage of diesel/petrol will be stored in a designated refuelling area installed as part of Phase 3 works. A towable bowser with secondary containment will be utilised for refuelling of large plant. The bowser will be stored in an appropriate demarcated location.
Oils and greases (Plant maintenance and site operations)	Oils and greases will be stored in appropriate containers in segregated areas of site (COSHH container and workshops). COSHH assessment and MSDS will be assessed for further storage requirements.
Bentonite (small bags 25kg)	Small bags of bentonite will be stored on pallets with appropriate weatherproofing in a designated area away from high trafficked zones.

Material	How it will be stored
Chemicals/Drilling additives	Chemicals and drilling additives will be stored within appropriate container within the on-site COSHH containers and following MSDS guidance.

3.9. FUEL OIL STORAGE AND REFUELLING ON SITE

3.9.1. STORAGE

Fuel will be stored within/on the refuelling area provided as part of Phase 3 works, it will be stored in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001, as follows:

Secondary containment will be provided for all surface oil and diesel tanks:

- For a single tank, the secondary containment will be at least 110% of the maximum storage capacity; and
- For two or more tanks in one secondary containment system, the secondary containment will be at least 110% of the biggest tank's maximum storage capacity or 25% of the total maximum storage capacity of all the tanks, whichever is the greater.

Storage must be more than 10m away from any watercourse or the surface drainage system. Static fuel tanks (such as those linked to generators) will be sited on sealed, level ground adjacent to the generators. All fuel bowsers will have tanks with integrated secondary containment that holds a minimum of 110% of the volume of the inner tank.

Spill kits will be stored adjacent to the storage areas and relevant staff will be trained in the use of such equipment in the event that spillages occur.

3.9.2. REFUELLING

All replenishment of tanks and containers and all re-fuelling of vehicles, plant and equipment shall take place within bunded, impervious hardstanding where practical. The refuelling area built during Phase 3 works will be utilised to refuel all site mobile plant. A double bunded tank will be used for the storage of diesel and a further bunded IBC unit will be used to contain AdBlue. Toolbox talks regarding refuelling processes will be briefed to all relevant personnel.

For larger or stationary plant such as the drilling rig, pumps and generators, refuelling will be carried out in-situ on site. The following control measures will be implemented during refuelling processes:

- Supervision of all fuel deliveries;

- Checks carried out on delivery of fuels to ensure correct fuel is delivered;
- Ensure all valves on a bunded tank or secondary containment is closed when not in use;
- Any static fuel bowsers are fitted with automatic cut-off or trigger nozzles; and
- Never leave vehicle or plant unattended during refuelling.

Heavy plant undergoing in-situ refuelling will be located on the drill pad area.

3.10. SITE HOUSEKEEPING

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 include:

- Keeping the site tidy;
- Segregating waste and removing it from site regularly;
- Maintaining all site facilities, including welfare facilities;
- Maintaining site roads, ensuring internal roads and those surrounding the site are kept clean;
- Ensuring plant and vehicles on site are well maintained;
- Ensuring all materials are stored appropriately;
- Undertaking regular inspections of all areas of the site to ensure housekeeping requirements are being fully implemented; and
- Ensuring that detailed records of these inspections, their findings and any mitigation required are kept.

The Site Supervisor will monitor the cleanliness of the road daily to ensure that it is free of dirt and debris. Road sweepers will be deployed to clean the roads as necessary, under instruction of the Site Supervisor/Manager.

3.11. WHEEL WASHING FACILITIES

The wheel washing facilities constructed as part of Phase 3 works will be utilised for wheel cleaning of all HGVs and plant exiting site onto the public highways. Traffic will be routed one way to ensure all vehicles required use the wheel washing facilities.

Regular maintenance of the wheel washing facility will be carried out in accordance with the manufacturers servicing specification. The washings shall be collected in a sump, with settled solids removed regularly and water recycled and reused where possible.

4. TRAFFIC

4.1. CONSTRUCTION TRAFFIC MANAGEMENT PLAN

The Phase 6 Construction Traffic Management Plan (CTMP) (40-STC-LC-2100-LG-PL-00007) outlines control measures implemented for the Phase 8 works. This contains a range of general measures for the management of transport including:

- High occupancy travel for employees, including car-sharing, minibus pick up and utilising a parking area outside of the NYMNPA as a transport hub, and
- All vehicles travelling to site using the designated routes only.

The CTMP also contains a Highway Communication Plan, which outlines how communication with the public, the planning and local authorities, and any other stakeholders will be undertaken.

The CTMP also specifies prohibited routes for construction vehicles. To support this, Prohibitive and Directional Signage will be shared with all delivery drivers. This signage was installed prior to the commencement of Phase 2 of the project as part of the Phase 1 Highway works and will be maintained throughout the activity period for Phase 8.

4.2. PARKING, LOADING AND UNLOADING

4.2.1. *PARKING AND LOADING*

4.2.1.1 **PARKING**

Parking will only be permitted within designated car parking areas and drivers will be required to display permits while parking on site. No access to the site by foot is permitted. A peak of up to 50 employees will be on site during Phase 8.

4.2.1.2 **LOADING AND UNLOADING**

Loading and unloading of deliveries and materials on site will take place in designated areas dependent on works.

Approximately 10 Abnormal Indivisible Loads (AIL) are expected during the Phase 8 works. Deliveries will be staggered throughout the duration of the Phase 8 works to reduce the number of AIL operating on the A171 and Egton Road between Lockwood Beck Site and Ladycross.

4.2.2. ACCESS

All construction traffic will use the existing main access road to access site. The access road is appropriately sized to allow for three HGVs to queue. In addition to the physical measures proposed, to prevent traffic having to wait on the highway or the potential for multiple to meet at the site access, the contractor will be required to provide a banksman and schedule deliveries and shift times.

Security will be stationed at the site access gates and all drivers will be required to have completed the appropriate driver induction before entering site. Access will only be authorised for deliveries / vehicles booked in for the day and with the appropriate access documentation. All deliveries will follow the onsite one-way traffic controls. Where required a banksman will be provided by the contractor if reversing or manoeuvring of vehicles is required.

In addition to assisting the contractor to manage the total numbers of daily HGV movements, the requirement for planning and scheduling deliveries will also assist the contractor in ensuring that deliveries can be spread throughout the working day.

The contractor will also be required to schedule shift times to try and avoid employees arriving and departing at the same time and to schedule deliveries outside of these hours.

5. NOISE AND VIBRATION

5.1. NOISE AND VIBRATION MANAGEMENT PLAN

The imposed noise limits for the Ladycross Plantation are 55dB LAeq¹hr during the day and 42dB LAeq¹hr in the evening (07:00-19:00 and 19:00-07:00 respectively). The Phase 8 works will comply with these limits. Noise monitoring will be carried out for the full duration of the Phase 8 works. A Phase 8 Noise and Vibration Management Plan (NVMP) (40-STS-LC-2100-EN-PL-00038) has been produced and provides further details regarding the mitigation, monitoring and controls to be implemented during the Phase 8 works.

6. AIR QUALITY AND DUST MANAGEMENT PLAN

During the Phase 8 works dust suppression measures will include:

- Damping down of road surfaces, road sweeping and potentially vehicle wheel washing will be utilised across the works area, as appropriate,
- Site fencing, barriers and other areas of dust accumulation will be kept clean using water spraying where there is the risk of dust accumulation. Any run-off will be filtered via the site surface water drainage system,
- Materials that have the potential to create dust problems will be removed unless they are to be re-used on site. Where possible these will be covered or contained in a fenced area,
- Seeding of all topsoil and subsoil bunds,
- Burning of waste materials will be prohibited,
- Pollutant emissions from potential flaring of gaseous hydrocarbon to be mitigated by ensuring complete and efficient combustion, and
- Plant and vehicles used on site will be well maintained to minimise pollutant emissions.

6.1. DUST MANAGEMENT PLAN

Measures and controls to minimise dust emissions from Phase 8 are provided in the Construction Phase Dust Management Plan (DMP) submitted as part of Phase 3 to partially discharge condition 93. Daily inspections and monitoring will be undertaken by the contractors, in accordance with this procedure. Some of the dust management mitigation identified in the DMP is detailed in **Table 6-1** below. The Phase 8 Emissions to Atmosphere and Phase 8 CTMP provides further detail regarding the air quality and dust mitigation to be adopted during the Phase 8 works.

Table 6 - 1 Dust Mitigation

Source / Activity	Mitigation Measures
Construction Traffic	<ul style="list-style-type: none"> • Implement speed limit on internal roads • Dust suppression used on roads when dust emissions noted • Provide wheel washes to reduce dust on public highways • Sheeting of vehicles carrying dust generating materials

Source / Activity	Mitigation Measures
	<ul style="list-style-type: none">• Regular maintenance of vehicles and plant
Compound Areas	<ul style="list-style-type: none">• Ensure areas used for welfare facilities and vehicle management (loading and unloading) are constructed of hardstanding• Sweeping / dampening down areas of hardstanding when required
Storage Areas	<ul style="list-style-type: none">• Grass seeding temporary earth bunds until re-use• Profiling stockpiles of dust generating materials• Covering dust generating materials, if practical• Dampening down facilities for stockpiles
Drilling operations	<ul style="list-style-type: none">• Dust suppression in areas of noted emissions• Background dust monitoring to assess impacts• Covering dust generating materials, if practical• Regular maintenance of vehicles and plant• Sweeping / dampening down areas of hardstanding when required

7. NATURE CONSERVATION

7.1. PROTECTED SPECIES AND PRECAUTIONARY METHOD OF WORKING FOR SITE CLEARANCE

Protected Species Management Plans (PSMPs) were produced for reptiles, birds, bats, badgers and water voles to partially discharge condition NYMNPA-52 for Phase 3. These remain applicable for the Phase 8 works, and the accompanying Precautionary Methods of Working will be applied. The measures detailed in these PSMPs will be implemented in Phase 8.

7.2. VEGETATION CLEARANCE

An assessment by competent persons and consultation with the Project Ecologist will determine if any works impact on the peripheral tree line. Appropriate measures will be followed as outlined in the Arboricultural Method Statement (AMS) prior to any works commencing.

In the event trees require removal, pre-commencement checks for protected species will be carried out 48 hours prior to felling works. Further checks will be undertaken at three-day intervals while works are ongoing to ensure nesting birds have not returned.

7.3. LANDSCAPING AND ECOLOGICAL MANAGEMENT

A Landscape and Ecological Management Plan (LEMP) was produced during Phase 3 works to partially discharge condition NYMNPA-70. Drilling operations that will be undertaken within the Phase 8 works requires no variation to the Phase 3 LEMP.

8. ARCHAEOLOGY

According to the Phase 8 scope of works the potential for interaction with archaeology is negligible. The principles set out in the Phase 2 Written Scheme of Investigation (WSI) will be applied to archaeology encountered during the Phase 8 works.

9. HYDROGEOLOGY, WATER QUALITY AND DRAINAGE

9.1. SURFACE WATER MANAGEMENT

As part of the Phase 8 works the full site surface water drainage network installed during the Phase 3 works will be adopted for surface water management on site. The scope of works for Phase 8 has been reviewed and it was concluded that no review is required to the existing Phase 3 Surface Water Management Plan (SWMP) which provides further detail regarding the control measures and mitigation which will be adopted during the Phase 8 works. Surface water will be managed in accordance with the Phase 7 Surface Water Drainage Scheme.

While surface water runoff is captured by the oil interceptor installed as part of Phase 3 works, additional mitigation controls may be implemented around the drill pad to segregate potential polluted surface water runoff if necessary.

9.2. GROUNDWATER MANAGEMENT

The following section seeks to address the requirements of planning conditions 88 and 90, providing details for managing shallow groundwater during the Phase 8 works.

Groundwater will be (HRA) and Phase 8 Construction and Operation Groundwater and Surface Water Monitoring Scheme. Gaseous hydrocarbon monitoring will be undertaken during Phase 8 works to determine chemical impact on the groundwater quality in Ravenscar Group aquifers and potential gaseous hydrocarbon migration through the exploratory borehole. Location of monitoring points is provided in the Phase 8 (HRA). The frequency of the monitoring is stated in the Phase 8 Construction and Operation Groundwater and Surface Water Monitoring Scheme.

Any short term ingress water from either shallow groundwater or surface water sources will be managed by pumping. Water will be pumped into the site drainage network and managed in accordance with the Water Abstraction and Impounding (Exemptions) Regulations 2017 and the Phase 7 Surface Water Drainage Scheme.

Remedial actions will remain in accordance with the Phase 8 Remedial Action Plan (RAP).

To mitigate any pollution migration from drilling operations and fuel refuelling a membrane HDPE liner or similar will be installed underneath the designated drill pad area. To protect the integrity of the liner two layers of sand will be placed at the bottom and at the top to avoid stone penetration and subsequent damage. For further details refer to the Phase 8 Construction Method Statement (CMS) and Phase 8 General Arrangement Drawing.

9.3. SILT AND POLLUTANT MANAGEMENT

Silt and pollutant management remain as per the Phase 3 SWMP.

10. SOILS AND CONTAMINATED LAND

As part of the Phase 8 works, there is no requirement to excavate topsoil or subsoil on site.

10.1. CONTAMINATED LAND

It is not anticipated that any contaminated land would be encountered during the Phase 8 Works. Should contaminated land or ground that appears to be contaminated be discovered then works will stop. Any spoil removed will be kept separate. Chemical testing will be carried out to determine the classification and waste status. A conceptual model and risk assessment will be carried out to ensure protection of water courses as detailed in the “Environment Agency Managing and reducing land contamination: guiding principles (GPLC)”.

The processes by which contaminated land is identified and investigated are outlined in the “Environment Agency Land Contamination Risk Management (LCRM) document” (which is recognised as current best practice), CIRIA C552 - Contaminated Land Risk Assessment – A Guide to Good Practice, 2001 and BS 10175:2011+A2:2017- Investigation of potentially contaminated sites – Code of practice.

11. MATERIALS AND WASTE

A range of materials and waste materials will be stored on site, and these will be stored in a designated area on site. The areas used for storage of material have been planned to avoid excessive handling of material and to facilitate loading and unloading. Details of the measures taken to reduce potential pollution are detailed in **Sections 11.1 – 11.4**.

11.1. Waste Minimisation

Waste management practices will ensure that the waste will be managed in accordance with the Environmental Protection Act 1990 Part II: (Duty of Care); The Waste (England & Wales) Regulations 2011; and the Environmental Permitting (England & Wales) Regulations 2016 Waste Duty of Care requirements are met.

The national hierarchy for waste will be used as reference for management of all wastes produced on site:

Reduce: we will seek to minimise waste through design

Re-use: Wherever possible we will utilise waste exemptions to enable waste to be re-used both on and off-site.

Recycle: We will recycle material wherever technically, environmentally and economically practicable.

Recover: We will look to recover energy and material from waste (digestion, incineration, gasification etc.)

Dispose: We will look to avoid the disposal of waste to landfill and only use disposal as a last resort. Wastes will be minimised through adoption of the following procedures:

- Appropriate procurement of materials (volumes, and options to use recycled materials);
- Use of 'Just in Time' delivery of raw materials to ensure that raw materials (aggregate etc.) are not wasted or lost to the environment;
- Operation of a take-back scheme for excess materials when possible; and
- Adoption of energy management practices minimising use of plant and fuels.

11.2. MATERIALS AND WASTE STORAGE

Details of generic materials and waste stored on site are provided in the Phase 3 CEMP and are applicable for Phase 8.

Additional storage measures for materials used in Phase 8 not covered by previous CEMPs are detailed in **Section 3.8**.

11.3. LIQUID WASTE MATERIAL

11.3.1. DRILLING MUDS

Sludges will be produced during the drilling operations. The sludges will be pumped to a sludge tank for holding. A licensed waste contractor will carry out collection and disposal of sludges where required.

11.3.2. OILY WASTES FROM DRILLING

In the event of hitting gaseous hydrocarbon a mixture of low-boiling hydrocarbon liquids obtained by condensation of the vapours of these hydrocarbon constituents might be generated. A licensed waste contractor will carry out collection and disposal of oily waste where required.

11.3.3. WATER TREATMENT PLANT SLUDGES

Waste sludges will be produced during the operation of the onsite Water Treatment Plant (WTP). The sludges will be pumped to a sludge tank for holding. A licensed waste contractor will carry out collection and disposal of sludges where required.

11.3.4. OIL INTERCEPTOR (OILS AND WATER)

The oil interceptor will undergo regular maintenance and servicing based upon the specification outlined in the supplier guidelines and manuals. The silt removed from the silt trap will be collected and disposed by a licensed waste contractor. The oil will be collected and disposed by a licensed waste contractor.

11.3.5. CESSPIT FOUL SLUDGES

The cesspits installed as part of previous phases will undergo regular maintenance and servicing based upon the specification outlined in the supplier guidelines and manuals.

The foul sludge will be emptied from the tanks on a routine basis based upon site footfall and supplier recommendations. The tanks are fitted with high level alarms as an additional layer of safety.

12. INCIDENT AND EMERGENCY PLANNING

Potential environmental issues and emergencies are considered as part of the project planning, and the appropriate prevention and control measures put into place. These measures are communicated to all people working on the project including subcontractors through the site induction and toolbox talks.

The emergency contacts list and drainage plan/ site plan (including the location of spill kits) will be posted on notice boards. Spill kits will be located within the stores in the site compound, at strategic points around the site and within all working vehicles. Vehicles will carry enough spill kit to clean up the amount of diesel/ oils they are carrying.

All employees will be instructed to bring any environmental incidents they identify to the immediate attention of Site Management, after first taking what steps to contain/ remediate the incident (without putting the health and safety of themselves or others at risk).

Environmental Emergency Preparedness Plans (EEPP) have been prepared specifying the actions to be undertaken in the event of an environmental emergency or a breach of the measures set out in the EIA. The EEPP will be displayed on all site notice boards. In accordance with the EEPP, the Contractor's Environmental Manager will be notified of environmental incidents.

13. RELATED DOCUMENTS AND REFERENCES

Phase 8 Construction Method Statement (40-STS-LC-2100-CN-MS-00009)

Phase 8 Construction Vehicle & Plant Management Plan (40-STS-LC-2100-LG-PL-00010)

Phase 6 Construction Traffic Management Plan (40-STS-LC-2100-LG-PL-00007)

Phase 8 Noise & Vibration Management Plan (40-STS-LC-2100-EN-PL-00038)

Phase 8 Emissions to Atmosphere (40-STS-LC-2100-EN-PL-00039)

Phase 8 Hydrogeological Risk Assessment (40-STS-LC-2100-EN-RA-00005)

Phase 8 Construction and Operation Groundwater and Surface Water Monitoring Scheme (40-STS-LC-2100-EN-PL-00037)

Phase 8 Remedial Action Plan (40-STS-LC-2100-EN-PL-00044)

Phase 8 Phasing Plan (40-STS-LC-2100-PA-22-20124)

Phase 8 Hard & Soft Landscaping (40-STS-LC-2100-PA-22-20125)

Phase 8 General Arrangement (40-STS-LC-2100-PA-22-20126)

Phase 7 Surface Water Drainage Scheme (40-STS-LC-2100-PA-22-20123)

Phase 3 Landscape and Ecological Management Plan (40-STS-LC-2100-EN-PL-00014)

Phase 3 Surface Water Management Plan (40-STS-LC-2100-PA-PL-20102)

Phase 2 Archaeological Watching Brief Written Scheme of Investigation (40-COT-LC-8324-EN-PL-00002)

Phase 3 Soil Management Plan (40-STS-LC-2100-EN-PL-00007)

Construction Phase Dust Management Plan (40-STS-LC-2100-EN-PL-00015)

Construction Phase Arboricultural Method Statement (40-STS-LC-21-CN-MS-00003)

14. DEFINITIONS AND ABBREVIATIONS

NYMNPA – North York Moors National Planning Authority

MTS – Mineral Transport System

CEMP – Construction Environmental Management Plan

HGV – Heavy Goods Vehicle

EIA – Environmental Impacts Assessment

PMWSP – Precautionary Method of Working Standard Procedures

CSEF – Community Stakeholder Engagement Framework

ANPR – Automatic Number Plate Recognition

AMS – Arboricultural Method Statement

MSDS – Material Safety Data Sheet

COSHH – Control of Substances Hazardous to Health

IBC – Intermediate Bulk Container

PSMP – Protected Species Management Plan

RPZ – Root Protection Zone

WSI – Written Scheme of Investigation

WTP – Water Treatment Plant

EEPP – Environmental Emergency Preparedness Plan

AIL – Abnormal Indivisible Loads

15. ATTACHMENTS

ATTACHMENT A – Community Stakeholder Engagement Framework

ATTACHMENT B – Complaints Procedure

ATTACHMENT C – Precautionary Method of Working



ATTACHMENT A - COMMUNITY STAKEHOLDER ENGAGEMENT FRAMEWORK



Community and Stakeholder Engagement Framework

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Community and Stakeholder Engagement Framework

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Community and Stakeholder Engagement Framework

1 Purpose and Scope

1.1 Background

The Company takes its responsibility to the local area very seriously and is committed to taking an active and positive role in the local community. This means minimising the potential adverse impacts on people living and working in the area, making a meaningful contribution to the social and economic well-being of the area, keeping the community informed as the project develops and responding quickly to questions and concerns.

There is widespread interest in the Company's Woodsmith Project (the Project) at local, regional and national levels. This is demonstrated by the ongoing media and stakeholder enquiries, as well as the levels of participation during the planning consultations and at Company events.

Anglo American (the Company) successfully engaged the community and other key stakeholders during the planning period and has continued to do so beyond, gaining widespread support for the Project. This has helped to provide the Company with a social license to operate. Maintaining this throughout the construction period is important to the successful delivery of the Project and is a key objective of the Company's board and management team.

1.2 Purpose

This Community and Stakeholder Engagement Framework (CSEF or the Framework) aims to set out a clear communications approach during the construction period which, when implemented correctly, can help to maintain the Project's social license to operate.

1.3 Scope

The Framework sets out an approach to community and stakeholder communications during the construction period. It outlines the overall strategy, identifies the main stakeholder groups and details the engagement objectives and activities. Stakeholders have been identified as those groups in the local area who have the potential to be impacted by construction, and as such does not include wider corporate stakeholders such as investors or customers.

The Framework sets out the roles and responsibilities of the Company and the principle construction contractors for implementing and managing its delivery.

1.4 Standards and compliance

The Framework is in compliance with planning obligations relating to community and stakeholder engagement including: producing a communications plan; the establishment of the Liaison Group Forum and Traffic Management Liaison Group; notification to neighbours of construction activities, particularly in relation to noise; dealing with complaints and initiatives to promote local benefits.

It is not within the scope of this plan to include engagement with the planning authorities and other statutory bodies in relation to the compliance with planning obligations and further environmental requirements, other than those specifically regarding community engagement.

1.5 Document review

The Company is committed to regularly reviewing its approach. This is the fifth time this document has been updated since the off-site highways improvement works were undertaken on the main transport route and construction started at Woodsmith, Ladycross Plantation, Lockwood Beck and Wilton. The principles of the Framework therefore remain unchanged, with the addition of the good practice learnt over the last five years.

The Framework will be reviewed on annual basis by the General Manager External Affairs and Corporate Relations Director, in consultation with the land, environment and planning team, and updated as necessary. It will be distributed to the list shown in section 1.6. Lessons learnt will be adopted into the working practices of the social performance team under the direction of the Corporate Relations Director.

1.6 Distribution list

- North York Moors National Park Authority
- North Yorkshire County Council
- Principle contractors

2 Engagement Strategy

2.1 Rationale

The strategy is based on the principle that the local community and key stakeholders should be kept informed of developments and in advance of them occurring. The failure to communicate often leads to a communications vacuum and this in turn leads to misinformation and rumours which is unhelpful for all stakeholders.

Similarly, providing channels for feedback to the Company in the first instance, including direct contact with the community relations team, allows local people or spokespeople to be engaged in matters that might affect them. Since construction started on the off-site highways works over five years ago, the vast majority of questions or concerns about the Project have come directly to the Company. This demonstrates the importance of developing and maintaining relationships 'on the ground'.

Keeping people informed is not just about notification of physical activities during the construction period, but is also about allowing a channel for feedback that might raise an issue or local knowledge that the Company or its contractor teams were not aware of. It also enables a channel to promote the benefits of the Project as well as engaging in other positive public relations activities.

Any materials that are prepared for public consumption to explain parts of the construction work are designed and drafted in a manner that promotes the understanding of works or issues in as clear and straightforward manner as possible.

2.2 Approach

1. Conduct pre-briefings for key events or activities

Providing clear information before each phase of works commences at the Project sites detailing what construction will involve, when it will take place and the measures to limit impacts. Since

construction started this has included newsletters, mailouts, direct face-to-face meetings, drop-in events, public meetings, press releases and notices in the local media.

2. Have effective ongoing management of local communications

Providing ongoing updates about construction progress and establish mechanisms that enable concerns to be raised and acted upon. This includes participation in the various liaison groups and clear processes to manage incoming queries or complaints. These have worked well since construction started. The Company also operates a 24-hour community helpline.

3. Community benefit initiatives

Undertaking and promoting regular initiatives that deliver community benefits such as education schemes and employment and business opportunity information sessions. These have been ongoing since construction started and have been well received by the community.

Further details on the methodology for pre-briefings, ongoing management and community benefits initiatives are available in sections 4.2 – 4.4.

3 Stakeholder Identification

Stakeholder groups have been identified and engaged as the Project has developed and can be broadly categorised as follows:

1. Site neighbours

Residential neighbours and/or landowners, businesses and organisations close to the individual construction sites. This also includes those directly affected in other areas such as those living close to key transport corridors or junctions. Approximately 70 households have been identified as 'site neighbours' to the Woodsmith, Ladycross Plantation and Lockwood sites and regular contact has been maintained since construction commenced. In addition, links with the neighbourhood of Dormanstown have been established since construction commenced at the Wilton site.

2. Community representatives

This group includes elected representatives of the community including parish and town councils, local authority officers and councillors, and local MPs.

3. Interest groups

Business networks, environmental bodies, other local clubs and groups.

4. Education Institutions

This includes local schools, colleges, universities and other training providers.

5. Media

A wide range of online, print and broadcast outlets and journalists are considered key stakeholders.

6. General public

The wider public as accessed through media channels, the website, social media or site signage etc.

A register has been developed for each Project site for of these broad groups, which is reviewed and updated. Stakeholder engagement takes into account the needs of vulnerable and disadvantaged groups, making sure that information about the Project is accessible and people are able to contact the

Company and receive a prompt response. This is ensured by utilising a broad range of engagement channels, as set out in section 4, and holding public events in accessible venues.

4 Engagement Methodology

This section sets out how community and stakeholder communications will be handled.

4.1 Identify stakeholders

The broad stakeholder groups have been identified, together with specific stakeholders relevant to each of the construction sites that are most likely to be impacted by the works. This includes landowners and local residents in close proximity to the sites.

4.2 Pre-briefings for key events

Before each phase of construction starts, or before a specific construction activity that has the potential to impact stakeholders, it is important to provide information to the local community. For the purpose of this Framework these stages are defined as “construction events” (these are listed in Appendix 1). Each construction event triggers the requirement for pre-briefing activities. The level of pre-briefing activity will vary, taking into account the extent of the local impact anticipated.

The pre-briefing information will include details about what construction will involve and how people can contact the Company if they have questions or concerns. Reassurance will be given that measures will be taken to limit adverse impacts to an acceptable level and that planning conditions and other requirements are in place to ensure that this happens. As a minimum, the pre-briefing activities will include:

- Letters – Letters and or emails should be sent to those that are likely to be immediately affected. This might include neighbouring residents or households and businesses on access routes. As a courtesy, the same information will be sent to the local Parish Council, borough and county councillors covering those areas.
- Visits and phone calls – In addition to letters, affected households and businesses will be visited, or at the very least receive a telephone call.

For construction activities that are more significant, in terms of their potential for stakeholders to be affected, the Company will use the following pre-briefing methods. The precise details and extent of pre-briefing will be a matter of judgement and as a result of discussions between the contractor and the Company and, where appropriate, the planning authorities. Activities may include:

- Newsletter / Leaflet – A short summary newsletter or leaflet about the works will be made distributed, including local noticeboards and community facilities.
- Exhibitions / Open days – In the case of certain key events, such as the main shaft sinking, it will be appropriate to inform local residents and the wider general public through open days prior to works starting. This includes further information on exhibition boards and will be attended by key personnel from the Company and contractors, who are be able to respond to queries and provide reassurance on potential concerns. Ten of these sessions have taken place since construction started.

- **Press release** – If appropriate (often where a wider audience is potentially affected or interested in the works planned) then a press release will be prepared detailing the key facts. Any press release needs to be signed off by the Company in a timeframe that makes sure newspaper deadlines are met. Where possible, coverage should always appear in the week prior to the proposed activities beginning. The local media has been particularly useful in instances where the community beyond the immediate site neighbours could be affected, such as public highways disruption.
- **Website updates** – Details of key events are uploaded to the Company website. Some works may also require more detailed information and documents to be uploaded.
- **Social media updates** – The Company will control its social media accounts. As above, the contractor will be expected to provide the relevant details to the Company in a timely fashion so the relevant information can be released through its social media channels.
- **Stakeholder briefings** – In some circumstances specific stakeholders will be individually briefed to inform them of key events. This may include elected representatives, local authority officers or interest groups. The Company will take the lead on such matters and will involve contractors where appropriate.

4.3 Ongoing management

Local residents and stakeholders will continue to be engaged throughout construction (i.e. general updates in addition to those covered under ‘key events’ in appendix 1). This will enable the Company to provide regular updates of the Project’s progress, and that it is being delivered in accordance with planning consents and any other Company commitments. Alternatively, if the Project is not progressing as expected it is important that stakeholders are provided with an explanation and reassurance that corrective measures will be implemented.

In addition, on-going engagement will include a range of communication channels that enable stakeholders to raise issues and ask questions and for the Company to respond to these.

4.3.1 Liaison Group Forum

The Liaison Group Forum (LGF) was established prior to the commencement of construction and has met quarterly. It is chaired by the Company and its membership includes representatives from the National Park Authority, parish and town councils and wider community stakeholder representation as appropriate. The meetings take place in community venues, such as village halls, close to the Woodsmith site and are open to the general public to attend and to ask questions.

The purpose of the group is to facilitate liaison between local stakeholders about construction, providing updates about progress, and to enable issues and concerns to be raised and resolved.

4.3.2 Industrial Business Group

The Industrial Business Group (IBG) was established to facilitate liaison between the businesses based at Wilton International and residents from the neighbourhoods in close proximity of the site.

Meetings are held bi-monthly and attended by the major businesses on the site, local councillors and residents. The Company joined the group once construction started on the Wilton site.

4.3.3 Traffic Management Liaison Group

The purpose of this group is to facilitate liaison between local authorities and other interested stakeholders in regard to construction traffic. The group, which meets quarterly, oversees the management and monitoring of the Construction Traffic Management Plan (CTMP) and is chaired by the Company. The meetings take place after the LGF meetings, on the same day and venue, with traffic issues raised by the LGF addressed by the group.

There is representation from the National Park Authority, highways authorities, local authorities, the police and other stakeholders as invited.

4.3.4 24-hour community helpline

To ensure that there are accessible points of contact for the local community and wider stakeholders a 24-hour community helpline has been established, which is delivered by a specialist contractor. In addition there is a community email address, which is managed by the Company.

4.3.5 Regular briefings and updates

Key individuals and organisations are regularly briefed and updated. Similarly to pre-briefings for key events, updates are communicated through the following channels:

- Public meetings and presentations – Parish council and town council meetings are regularly attended, together with presentations to local interest groups.
- Site visits and meetings – visits to the Project sites for key stakeholders have been an effective way to communicate site activity and progress. In addition, drone footage of the project sites is regularly used to show progress and is used in Project presentations and on the Company's website.
- Press releases – the print and broadcast media are utilised extensively to communicate with the wider community and at a regional and national level.
- Newsletters, website and social media – regular updates produced throughout construction via the website, leaflets, newsletters, social media and publications relating to specific issues, such as careers. Videos, including footage of the sites and interviews with key Project personnel have also been an effective tool.

4.4 Community benefit initiatives

The Company has made a number of commitments to benefit the local area during construction such as providing employment and supply chain opportunities, training schemes, school outreach programmes and funding community projects. It is important that these are implemented and widely promoted so that the community and stakeholders are aware that the Company's commitments are being delivered. The activities and initiatives, some of which are planning obligations in the S106 agreements, are outlined below:

- Funding to Scarborough Borough Council and Redcar and Cleveland Council to identify and prepare local people for employment opportunities.
- Funding to raise awareness of science, technology, engineering and maths (STEM) related careers in schools in North Yorkshire and Redcar and Cleveland.

- Targets specified in the S106 agreement - take on 50 apprentices, recruit 15 local students on the Company's Undergraduate Programme and train 300 adults.
- Quarterly employment opportunity sessions to promote job opportunities to local people and meet the buyer events for local businesses.
- Education outreach initiatives, careers events and presentations.
- Funding community projects through the Woodsmith Foundation.

4.5 Dealing with complaints

The Company aims to respond promptly to complaints and concerns, ensuring that issues are investigated and resolved as quickly as possible. The Company's approach is detailed in its Complaints Procedure – see Appendix C.

5 Roles and Responsibilities

This section provides a framework that identifies responsibilities for the delivery and management of community and stakeholder engagement, focusing on roles of the Company and the principle construction contractors. The Company will be responsible for all community and stakeholder engagement during construction, supported by each construction contractor as required.

5.1 Anglo American

The Company will be responsible for:

- Identifying key stakeholders likely to be impacted by the works.
- Undertaking pre-briefing activities before construction starts such as:
 - Open Days / exhibitions as appropriate.
 - Producing information outlining what is involved, impacts and mitigation, contact information, etc.
 - Direct correspondence with neighbours and landowners about construction events
- Liaison with the planning authorities and community representatives, including chairing the Liaison Group Forum and Traffic Management Liaison Group.
- Media relations.
- Manage the complaints procedure.
- Producing project newsletters, social media and updating the website.
- Direct engagement and briefings with key stakeholders including local residents, community representatives and interest groups.

5.1.1 Social performance team

The Company's social performance team is responsible for implementing the Framework in liaison with others in the Company as appropriate.

The Company's Corporate Relations Director has overall responsibility for all company communications and external relations. The Corporate Relations Director chairs the Liaison Group Forum.

The General Manager External Affairs, reporting to the Corporate Relations Director, manages the implementation of the approach detailed in the Framework. The Local Liaison Officer, Social Programmes Manager and Education Programme Manager report to the GM External Affairs, and are further supported by the EA to the Corporate Relations Director.

The social performance team work closely with other departments in the Company in the implementation of the Framework, particularly the land, environment and planning team as well as the project development team. They assist in providing relevant information, investigating and resolving complaints, and attending Company events and public meetings as required. The Company's Logistics Manager chairs the Traffic Management Liaison Group.

5.2 Construction Contractors

Having developed and maintained positive relationships with key local stakeholders since the Project was launched in 2011, Anglo American takes the lead role in all community and stakeholder engagement. Each of the construction contractors will be required to support the Company's stakeholder engagement approach as follows:

- Provide expected durations of phases or work, their potential impact on the local community and mitigation measures where required.
- Provide details of any expected public transport diversions, delays, planned road closures, impacts on highways, interrupted access for residents/ businesses, or other expected community disruption.
- Participate in employment opportunity sessions, meet the buyer events, and education outreach events as required.
- Cooperate with Anglo American in media events and provide information to the Company for publications, the website, newsletters, etc.
- Adherence to Anglo American's communications protocols and guidelines.
- Attend the liaison groups, parish/town council meetings and assisting Anglo American as required.
- Ensure that all sub-contractors comply with stakeholder and community relations requirements.

Appendix A – Construction Events

The following provides a list of construction events which trigger the requirement for pre-briefing activities, as outlined in section 4.2. The list is not exhaustive and there may be other events or activities not listed here that could be classified as construction events as a result of discussions between the Company and its contractors.

The construction events for the purposes of this Framework are:

- Any significant geotechnical investigation or drilling works
- Main Woodsmith Mine shaft sink
- Main Lockwood Beck shaft sinking
- Main Ladycross Plantation shaft sinking
- MHF construction
- Harbour construction
- Other construction activities with the potential to affect stakeholders including site neighbours or road users in regard to noise, light, disruption to the public highway, etc. Examples include an abnormal load arriving to site or a short period of piling.

Appendix B – Engagement Activities Summary

The table below provides an ‘at a glance’ overview of the main community and stakeholder engagement activities, together with the respective roles of Anglo American and contractors.

	Pre-briefing activities	Ongoing management	Community benefit initiatives
Anglo American	<ul style="list-style-type: none"> Establish Liaison Group Forum and Traffic Management Liaison Group Project update newsletter Media, website update, social media Briefings with site neighbours, landowners, community representatives and other key stakeholders as identified Produce leaflet detailing upcoming construction activities Send letters to stakeholders likely to be immediately affected Hold public open days / exhibitions 	<ul style="list-style-type: none"> Chair Liaison Group Forum and Traffic Management Liaison Group Attend the Industrial Business Group Manage 24-hour community helpline and croppnutrients.info@angloamerican.com Attend parish and town council meetings quarterly Regular updates to site neighbours, landowners, community representatives and interest groups Site visits Media, website update, social media Manage complaints procedure 	<ul style="list-style-type: none"> Training targets and promotion of initiatives funded by the S106 Promote activities of the Sirius Minerals Foundation Organise meet the buyer events Organise regular employment opportunity sessions Deliver education outreach programmes
Construction Contractor	<ul style="list-style-type: none"> Provide information to Anglo American to be used in leaflets, letters, web content, etc., as required Attend public open days/exhibitions and meetings with stakeholders as required 	<ul style="list-style-type: none"> Attend liaison groups, parish council and other meetings as required Provide information to support ongoing community and stakeholder relations Participate in media events as required Adherence to complaints procedure, media protocol and crisis response procedure 	<ul style="list-style-type: none"> Involvement in community benefit initiatives as required

Community engagement is tracked across these three elements. Activities and complaints are reported in the Company’s annual Responsible Business Report. Minutes of the Liaison Group Forum, which includes community engagement as a standing agenda item, are published on the Company’s website.

By being proactive in building and maintaining relationships in the community, the Company is always receiving feedback about its performance. This helps to inform the Company on what it could be doing better, enables it to respond quickly to concerns and pre-empt them in the future and is an important part of annual review of the Framework.

Appendix C – Complaints Procedure

This procedure outlines the Company's standards in handling complaints and the process of managing complaints from receipt through to resolution. The procedure has been updated to take into account the lessons learnt during the first two years of construction.

1 Standards for Handling Complaints

- All complaints will be treated seriously, fairly and with courtesy;
- Complaints will be responded to quickly – we will acknowledge a receipt of a complaint straight away wherever possible;
- We will investigate and aim to resolve complaints within a maximum of three days, making sure that initial feedback is provided within one day; and
- We publish information about complaints, with the identity of the complainant kept confidential, to the Liaison Group Forum and in the Company's annual Responsible Business Report.

2 Stages of the Complaints Procedure

2.1 Receipt of complaint

The vast majority of complaints are received directly by the Anglo American community relations team through a variety of channels, e.g. directly to a team member, via the general cropnutrients.info@angloamerican.com email, social media, parish council meetings or the 24-hour community helpline. Relationships with the regulatory authorities are well established and complaints received by them are forwarded to the Company's community relations team to investigate.

The team aim to acknowledge a complaint straight away and ascertain the relevant details as soon as possible.

Occasionally a complaint is made directly to a Project site. In this instance the community relations team will be informed and further communication with the complainant managed by them.

2.2 Investigation

In all cases the community relations team will notify the Anglo American site manager, the environment team and the logistics team (where complaints are related to traffic). The site manager will lead the investigation, delegating where appropriate and liaise with the relevant contractor. All relevant personnel will be kept updated.

If remedial action is required this will be implemented as quickly as possible in consultation with the environment and planning team, community relations team and others as appropriate.

2.3 Feedback

The community relations team will feedback to the complainant within a maximum of three days, with initial feedback given within one day. Further details will be sought from the complainant if required.

The complainant will be given the details of any remedial action taken and have the opportunity to discuss the outcome of the investigation with the community relations team, who will involve others as appropriate. If further relevant information comes to light, the complaint will be investigated again.

2.4 Log and Review

Complaints are logged and reported to the next Liaison Group Forum (LGF) meeting. The minutes of LGF meetings are published on the Company's website.

Complaints are reviewed to establish whether action can be taken to reduce the likelihood of similar complaints in the future, and whether the way in which the complaint was dealt with could be improved.

ATTACHMENT B – COMPLAINTS PROCEDURE

Complaints Procedure

Document Number: 40-SMP-GE-0000-PU-PR-00001

Document Verification				
Revision	Date	Prepared by	Approved by	Reason for Issue
0	22/03/2019	M. Parsons	G. Edmunds	Issued for Use
1	17/12/2020	M. Parsons	G. Edmunds	Issued for Use

Complaints Procedure

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Complaints Procedure

This procedure outlines the Company's standards in handling complaints and the process of managing complaints from receipt through to resolution. The procedure has been updated to take into account the lessons learnt during the first three and half years of construction.

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- All complaints will be treated seriously, fairly and with courtesy;
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ATTACHMENT C – PRECAUTIONARY METHOD OF WORKING

Precautionary Method of Working (PMoW) for Site Clearance (Ecology)

The Precautionary Method of Working (PMoW) for site clearance predominantly relates to the protection of reptiles and nesting birds which may be present within the development site although requirements for otters and badgers have also been included for completeness.

General overview

The construction site manager will ensure that anyone undertaking construction works on the site (including sub-contractors) is made aware of the potential for the site to support nesting birds, common reptile species and other protected species, where to expect them, their protected status and the procedure (see below) to follow in the unlikely event that nesting birds or common reptiles are discovered during works. Where applicable this advice will be given through site inductions, ecological tool box talks or similar.

Should any nesting birds, reptiles or other species be discovered during construction, which are likely to be effected by the development, works will cease immediately. The construction site manager will then seek the advice of a suitably qualified and experienced ecologist and works will only proceed in accordance with the advice they provide.

Reptiles

Within the development's construction zone the following methods of working will be adopted:

- All clearance works will be undertaken when reptiles are likely to be fully active i.e. during the period March/April to September/October inclusive, but this is weather and temperature dependent;
- Where clearance works cannot be undertaken within this period, additional surveys and/or mitigation measures may be required to confirm the absence of reptiles prior to clearance works, and a suitably qualified ecologist (the project ecologist) should be on site during the works to inspect areas immediately prior to clearance;
- Clearance of dry stone walls, logs, brash, stones, rocks, or piles of similar debris will be undertaken carefully and by hand and supervised by a suitably qualified ecologist;
- Clearance of tall vegetation (any vegetation over 150mm) should be undertaken using a hand held strimmer or brush cutter with all cuttings raked and removed the same day. Cutting will only be undertaken in a phased way which may either include:
 - Cutting vegetation to a height of no less than 30mm, clearing no more than one third of the site in anyone day or;
 - Cutting vegetation over three consecutive days to a height of no less than 150mm at the first cut, 75mm at the second cut and 30mm at the third cut;
- Following removal of tall vegetation using the methods outlined in above remaining vegetation will be maintained at a height of 30mm through regular mowing or strimming to discourage common reptiles from returning;

- Ground clearance of any remaining low vegetation (if required) and any ground works will only be undertaken following the works as above;
- Any trenches left overnight will be covered or provided with ramps to prevent reptiles from becoming trapped and enable escape; and
- Any building materials such as bricks, stone etc. will be stored on pallets to discourage reptiles from using them as shelter. Any demolition materials will be stored in skips or small containers rather than in piles on the ground.

Nesting Birds

Within the development's construction zone the following methods of working will be adopted:

- Vegetation clearance that is required will be undertaken outside of the breeding bird season (i.e. the works will be undertaken between September and February);
- Any demolition work that is required will be undertaken outside of the breeding bird season (i.e. between the works will be undertaken September and February);
- Where clearance works or demolition works cannot be undertaken out with this period, additional surveys may be required to verify absence of breeding birds prior to clearance works and an ecologist should be on site during the works to inspect areas immediately prior to clearance, or at least no less than 24 – 48 hours before the works commence. The area of inspection should extend for at least 500m from the area of works;
- Where felling outside the breeding season is not possible a sensitive felling methodology will be implemented, involving the identification of specific areas to be felled, followed by surveys for occupied nests (or nests being built) being carried out by a suitably qualified ecologist (the project ecologist) undertaken a maximum of 24 - 48 hours prior to the commencement of works) and extending over an area of at least 500m from the area of works;
- If active birds' nests are found within the following distances from site, the area should be roped off and no works should be undertaken in these exclusion areas until the birds have fledged and the nests are empty:
 - Common crossbill - 150m;
 - Nightjar - 500m;
 - Goshawk - 150m; and
 - All other species - 10m.
- Alternatively, liaison with Natural England may be undertaken to agree the approach to working within the exclusion zones of the nest sites specified above.

Other Protected Species

Within the development's construction zone the following methods of working will be adopted:

- Dust minimisation methodologies will be implemented and adhered to at all times;
- Construction lighting will be directed away from areas of retained habitat wherever possible;
- Pollution prevention controls will be implemented and adhered to at all times; and
- All excavations will be covered every night to reduce the risk of otters, badgers or any other species falling into the excavations and becoming stranded or if this is not possible then a means of enabling their escape will be provided.



**WOODSMITH PROJECT
(788.5030)**

**CONSTRUCTION AND
OPERATION GROUNDWATER
AND SURFACE WATER
MONITORING SCHEME –
PHASE 8 – CONDITION 88 /
40-STS-LC-2100-EN-PL-00037**

Revision	Date of issue	Prepared by	Checked by	Approved by	Changes
G (PLA)	13/02/2024	John Allison	Carl Thomas	Charles Eddington	Revision in accordance with client's requirements

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1. INTRODUCTION

1.1. GENERAL BACKGROUND

In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to the North York Moors National Park Authority (NYMNP) 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.

This document details the hydrological, hydrogeological and ecological monitoring to be undertaken from commencement of the Phase 8 works at the Ladycross Plantation Site, as defined in **Section 1.2** below.

1.2. PHASE 8 SCOPE OF WORKS

The Phase 8 Scope of Works is as follows:

- Drilling of an exploratory Borehole;
- Temporary Installation and use of drilling rig and ancillaries;
- Decommissioning of Borehole.

The scope of works covered by this document comprises drilling of an exploratory horizontally drilled directional (HDD) Borehole. The Eskdale Anticline through which the Tunnel Drive between Ladycross and Woodsmith Mine passes includes areas of rock containing faults. The HDD works are to assess these structures, on a precautionary basis, for ground conditions, including groundwater and the very low risk of encountering low volumes of natural gas, prior to tunnel boring activities.

The borehole will be initially 500mm in diameter and cased to circa 11mbgl, the casing will be cemented into place. Secondary drilling activities and casing, again from surface, will be at a diameter of 300mm inside of the primary casing, the secondary borehole will then be cased to approximately 145mbgl and 42m into the Whitby Mudstone Formation aquitard, sealing the upper aquifers. The HDD activities will continue as open hole boring at a diameter of 175mm to a maximum depth of 350mbgl and a distance of approximately 4km parallel to the tunnel alignment. All horizontal drilling activities will be undertaken below all abstractions and vulnerable aquifers.

Decommissioning of the borehole is to be undertaken once the TBM has passed the end of the maximum extent of the borehole; at circa 4km from the Ladycross intermediate site. The duration for monitoring of the borehole during TBM Drive 3 is predicted to take circa 12 months. Monitoring of the borehole will be undertaken until the borehole is sealed from approximately 305mbgl to 2mbgl.

1.3. COMPLIANCE WITH CONDITIONS

This document is required to partially discharge condition NYMNPA-88 as stated in the planning permission Ref. no NYM/2017/0505/MEIA. **Table 1-1** details where the relevant information has been provided within this report.

Table 1-1 – Summary of planning condition 88 and where the relevant details are provided in the report.

NYMNPA Condition 88 Description	Compliance with Condition NYMNPA 88
The scheme shall include:	
Groundwater quality and level triggers	Section 3.4.4
Surface water quality triggers, including those necessary to protect the health of the River Esk Pearl Mussel beds	Section 3.7.5
Details of the number, type and location of monitoring points	Section 3.3.2, Section 3.4.2, Section 3.5.2, Section 3.6.2, Section 3.7.2 and Section 3.8.2
A protocol for the removal and replacement of any existing monitoring points	Section 3.4.2
Details of the frequency with which monitoring points will be monitored during construction and operation	Section 3.3.3, Section 3.4.3, Section 3.5.3, Section 3.6.3, Section 3.7.3 and Section 3.8.3
A list of the ground and surface water determinants to be tested for	Section 3.5.4 and Section 3.7.4
Monitoring of groundwater levels and spring flows	Section 3.6 and Section 3.4
Monitoring of groundwater quality against ground water triggers	Section 3.5.5
Decommission and replacement of existing monitoring points	Section 4
A scheme of periodic review and refinement of the monitoring regime to take account of any approved changes to site layout/design, construction methods and monitoring data	Section 5
A protocol for notifying the MPA of any breach of the trigger levels, including the timing of any such notification	Section 5
Details of the method and frequency with which monitoring results will be shared with the MPA and the Environment Agency	Section 5

This document should be read together with the following documents:

- Phase 8 Remedial Action Plan (40-STC-LC-2100-EN-PL-00044)
- Phase 8 Hydrogeological Risk Assessment (40-STC-LC-2100-EN-RA-00005)
- Phase 3 Surface Water Management Plan (40-STC-LC-2100-PA-PL-20102)

-
- Phase 7 Ground Water Surface Water Monitoring Scheme (40-STS-LC-2100-EN-PL-00033)
 - Phase 7 Surface Water Drainage Scheme (40-STS-LC-2100-PA-22-20123)

2. SITE DETAILS

The site details remain the same as previous phases. For information with regards to site geology, receptors and historic information refer to previous Groundwater and Surface Water Monitoring Schemes (GWSWMSs) along with the historic Hydrogeological Baseline Report (FWS, September 2014).

3. MONITORING

3.1. GENERAL

In the following sections, the requirements for undertaking ground and surface water monitoring are presented in terms of the monitoring locations, frequency of monitoring, determinants to be analysed for, trigger values and reporting procedures. This document amends the previous monitoring scheme presented for the Phase 7 GWSWMS (40-STS-LC-2100-EN-PL-00033), to incorporate revised monitoring practices.

The monitoring requirements have been determined specifically to enable monitoring of Phase 8 activities. The following sections present details of the scope, data requirements, frequency and trigger values (where appropriate) to be adopted for monitoring the following elements:

- Meteorology,
- Groundwater,
- Springs,
- Surface Water,
- Gaseous Hydrocarbons

Ground and surface water trigger levels, comprising 'Control' and 'Compliance' values, have been set to enable evaluation of whether the works have an adverse impact on water resources, in accordance with Environment Agency guidance:

- The Control Trigger values are an early warning system designed to draw attention to the development of adverse trends in the monitoring data that may suggest the mitigation measures incorporated into the Phase 8 Works are not working as anticipated. These values have been derived from the baseline data, and where the baseline data is less than the detection limit, the Control Trigger value has been set at the detection limit.
- The Compliance Trigger values are defined as the levels at which significant adverse environmental effects have occurred, i.e. if compliance value for a specific receptor has been breached there is pollution occurring. These values have been derived from current Statutory Instruments, where available. Where the detection limit is greater than the Statutory Instrument value, the Compliance Trigger value have been set at the detection limit.

3.2. CHANGES TO EXTERNAL OFFSITE MONITORING (TRACER UNITS)

Due to the small diameter and low volumes of grout associated with this phase of works, there is still no requirement to monitor groundwater levels associated with leaching of grout into the aquifers associated with drilling activities. Monitoring was undertaken throughout grouting activities (27 May 2023) and for a sustained period after completion of grouting activities. It has been shown that no leaching of grout was experienced in the aquifers as a result of grouting activities, due to the two external grout rings (that were installed as an environmental curtain). Monitoring of BH01 (and associated vibrating wire piezometers) will continue to be undertaken in order to monitor groundwater levels associated with the immediate proximities of the shaft installation and surrounding proximities of the exploratory borehole.

Details of changes to the GWSWMS are shown in **Table 3-1**.

Table 3-1 Changes made to the monitoring requirements for Phase 8 works,

Section	Changes
3.3 Meteorology	No changes, monitoring remains the same as detailed in the Phase 4 GWSWMS.
3.4 Groundwater Levels	Frequency of groundwater level monitoring at particular onsite boreholes will revert back to a weekly basis until the Tunnel Boring Machine passes the end of the drill string. All other groundwater levels monitoring will remain consistent with the Phase 7 GWSWMS.
3.5 Groundwater Quality	No changes. Monitoring remains the same as detailed in the Phase 7 GWSWMS.
3.6 Spring Water Quality and Levels	No changes. No monitoring required as previously detailed in the Phase 7 GWSWMS.
3.7 Surface Water Quality	No changes. Monitoring remains the same as detailed in the Phase 7 GWSWMS.

3.3. METEOROLOGY

3.3.1. OBJECTIVES

To provide rainfall and evapotranspiration information to confirm water balance inputs and outputs.

3.3.2. SCOPE OF MONITORING

Meteorological monitoring will be undertaken of the following parameters from the automated permanent weather station located at Ladycross Plantation.

3.3.3. METEOROLOGICAL DATA

Meteorological monitoring will consist of:

- Rainfall (mm),
- Evapotranspiration (mm),
- Temperature (°C),
- Wind Speed (km/hr) and Direction, and
- Barometric Pressure (m/bar).

3.3.4. MONITORING FREQUENCY

The monitoring frequency will be set for 15-minute intervals for all parameters and will be continually uploaded to the web portal via a data logger.

3.3.5. ASSESSMENT AND COMPLIANCE LEVELS

Not required, information obtained will confirm water balances and influences on shallow groundwater activity.

3.4. GROUNDWATER LEVEL MONITORING

3.4.1. OBJECTIVES

1. Demonstrate that construction activities, in the vicinity of the working platform, and bored shaft cause no adverse long-term impacts on water levels within the Superficial Deposits, Scalby Formations, Scarborough Formations, Cloughton / Saltwick Formations.
2. Provide continual data to aid with tunnelling works. Off-site boreholes are monitored to demonstrate that the TBM causes no adverse long-term impacts on groundwater levels along the whole length of the tunnel drive.

3.4.2. MONITORING LOCATIONS

From the design layout of the Phase 8 works, monitoring of construction stage boreholes with response zones within the Superficial Deposits, Scalby, Scarborough, Cloughton / Saltwick aquifers will be undertaken as summarised below, for which the monitoring well positions are shown in **Attachment A**

- Groundwater levels will be monitored within the superficial deposits (non-aquifer) using the series of monitoring wells detailed in **Table 3-2**. The wells are orientated to monitor water levels both up and down hydraulic gradient of the working site area. To compare soil moisture conditions in comparison with baseline conditions.
- Groundwater levels will be monitored within the Scalby Formation, the Long Nab and Moor Grit (Secondary A Aquifer) using the series of monitoring wells detailed in **Table 3-2**. The wells are orientated to monitor water levels both up and down hydraulic gradient of the working site area.
- Groundwater levels will be monitored within the Scarborough Formation (Secondary A Aquifer) using the series of monitoring wells detailed in **Table 3-2**. The wells are orientated to monitor water levels both up and down hydraulic gradient of the working site area.
- Groundwater levels will be monitored within the Cloughton / Saltwick Formation (Secondary A Aquifer) using the series of monitoring wells detailed in **Table 3-2**. The wells are orientated to monitor water levels both up and down hydraulic gradient of the working site area.

During the Phase 1 access works, BH401 was decommissioned due to the location of the access road.

During the Phase 3 construction works, BH413A, BH413B and BH413C were commissioned to allow for the construction of the working platform. Boreholes 34_BH04, 34_BH06 and 34_BH07 were installed as replacement monitoring boreholes.

As part of the Phase 7 construction works, 34_BH03 and 34_BH06 are to be decommissioned to allow for the extension of the welfare, office and parking facilities. No replacement boreholes are required for the purposes of groundwater quality and groundwater level monitoring.

Table 3-2 Groundwater Monitoring Boreholes ID, location, and geological description

Monitoring Well ID	NGR Coordinates	Geology and description
BH402 BH403 BH405 BH406 BH407 BH408	481737, 507534 481807, 507620 481218, 507701 481452, 507744 481590, 507886 481423, 507919	Monitor potential changes in the groundwater levels within the superficial deposits.
BH401A BH402A BH405A BH406A BH407A BH408A	481571, 507474 481738, 507552 481221, 507693 481442, 507743 481583, 507881 481414, 507916	Monitor potential changes in the groundwater levels within the Scalby Formation (Long Nab and/or Moor Grit Member).
BH401B BH402B 34_BH07 ¹	481572, 507470 481736, 507547 481673, 507627	Monitor potential changes in the groundwater levels within the Scarborough Formation.
BH401C BH402C 34_BH04 ¹	481576, 507473 481730, 507540 481635, 507638	Monitor potential changes in the groundwater levels within the Cloughton Formation.

Note¹ Additional monitoring boreholes installed during the 2022 GI works and will replace the BH413 series. 34_BH04 installed into the Cloughton / Saltwick Formation.

3.4.3. MONITORING FREQUENCY

A relatively small excavation of the exploratory borehole constitutes the Phase 8 works. Therefore, a reduced risk on the groundwater environment has been evaluated based upon the associated activities within the Phase 8 scope.

A continuation of the groundwater level monitoring approach will be carried out using a dip meter from all boreholes listed in **Table 3-2**.

Monthly monitoring of groundwater levels will be conducted during Phase 8. Monitoring will continue to be monthly during this period if no continual impacts are observed as a result of shaft sinking operations. However, weekly monitoring of the following boreholes will be undertaken during the drilling works of the exploratory borehole, as shown in **Table 3-2a**. This will be as a measure of best practice done to ensure the Phase 8 works do not have an adverse impact on groundwater levels, though this is not anticipated to be the case.

Monitoring Well ID	NGR Coordinates	Geology and description
BH401A BH402A	481571, 507474 481738, 507552	Monitor potential changes in the groundwater levels within the Scalby Formation (Long Nab and/or Moor Grit Member).
BH401B BH402B 34_BH07 ¹	481572, 507470 481736, 507547 481673, 507627	Monitor potential changes in the groundwater levels within the Scarborough Formation.
BH401C BH402C 34_BH04 ¹	481576, 507473 481730, 507540 481635, 507638	Monitor potential changes in the groundwater levels within the Cloughton Formation.

Note¹ Additional monitoring boreholes installed during the 2022 GI works and will replace the BH413 series. 34_BH04 installed into the Cloughton / Saltwick Formation.

Periodic reviews will be carried out during the Phase 8 works and will determine any changes required to frequency and type of monitoring. Any details of changes to the monitoring scheme will be communicated to the Mineral Planning Authority (MPA).

3.4.4. GROUNDWATER LEVEL CONTROL AND COMPLIANCE TRIGGER VALUES

The GWL (Groundwater Levels) Control Trigger Values determined for the Superficial Deposits, Scalby, Scarborough and Cloughton / Saltwick formation in the area of the Site have been derived using the following methodology:

Control Trigger Values = mean baseline value – 2 × standard deviation of baseline data¹

Note¹ The monitoring undertaken during the Ground Investigation works showed potential for suppressed groundwater levels within the Scarborough and Cloughton Formations during drilling activities. Following on from the completion of the pre-grout works, recovery towards baseline levels is observed. No long-term impacts on groundwater levels have been noted.

The GWL Compliance Trigger Values determined for the Superficial Deposits, Scalby, Scarborough and Cloughton formation in the area of the Site have been derived using the following methodology:

Compliance Trigger Values = mean baseline value – 3 × standard deviation of baseline data¹

Note¹ The monitoring undertaken during the Ground Investigation works showed potential for suppressed groundwater levels within the Scarborough and Cloughton Formations during drilling activities. Following on from the completion of the pre-grout works, recovery towards baseline levels is observed. No long-term impacts on groundwater levels have been noted.

The above methodology was adopted for the monitoring wells where a comprehensive baseline was available. It was noted from the baseline during the summer months and periods of dry weather large fluctuations in GWL were observed in the superficial deposits and Scalby Formations. Further baseline data has been collected and captures further fluctuations with seasonal trends.

The Phase 8 and preceding HRA's identified that the works will have a negligible impact on strata used for abstractions below the Cloughton Formation, the Saltwick was identified as low sensitivity with no active abstractions within this geology. The Ground Investigation works along with baseline monitoring has advised on appropriate exceedance values for the newly installed boreholes.

Table 3-3 VWP installations in 34_BH01

VWP ID	Depth of install (mbgl)	Geology
34_BH01_1	12	Scarborough Formation
34_BH01_2	37	Cloughton Formation
34_BH01_3	53	Cloughton Formation
34_BH01_4	76	Cloughton / Saltwick Formation
34_BH01_5	111.5	Saltwick Formation
34_BH01_6	118.5	Saltwick Formation

3.4.4.1 Superficial Deposits

Table 3-4 - Control and compliance trigger levels for monitoring wells in the Superficial Deposits based on baseline data from 2020-2022.

MONTH	CONTROL (mAOD)						COMPLIANCE (mAOD)					
	BH402	BH403	BH405	BH406	BH407	BH408	BH402	BH403	BH405	BH406	BH407	BH408
Jan	195.98	201.47	205.01	204.80	207.98	209.25	195.51	200.74	204.75	203.68	207.01	208.44
Feb	195.13	201.56	205.01	206.64	207.70	209.13	194.34	200.88	204.75	206.27	206.87	208.13
Mar	194.36	202.79	205.01	206.95	208.98	209.36	193.60	202.72	204.75	206.73	208.86	208.88
Apr	193.55	202.14	204.75	206.44	208.42	209.44	192.44	201.98	204.69	206.13	208.09	208.62
May	193.73	202.01	204.82	207.00	208.60	210.37	192.82	201.55	204.51	206.86	208.50	210.17
Jun	193.95	201.87	204.62	205.95	208.14	210.16	193.57	201.52	204.40	205.52	207.75	209.90
Jul	193.48	201.93	204.33	205.63	208.13	209.76	192.67	201.66	203.98	205.23	207.85	209.28
Aug	193.63	202.02	204.17	204.74	207.94	209.66	192.94	201.89	204.01	204.13	207.68	209.15
Sep	193.63	201.64	204.01	205.67	208.04	209.32	192.93	201.35	203.93	205.50	207.79	208.72
Oct	194.45	201.82	205.37	205.03	207.91	209.26	193.73	201.42	205.27	204.37	207.63	208.62
Nov	195.78	201.82	205.37	205.93	208.09	209.08	195.43	201.42	205.27	205.42	207.64	207.76
Dec	196.39	202.72	205.01	207.25	208.59	209.09	196.19	202.65	204.75	207.16	207.96	208.04

3.4.4.2 Scalby Formation

Table 3-5 - Control and compliance trigger levels for monitoring wells in the Scalby Formation based on baseline data from 2020-2022

MONTH	CONTROL (mAOD)						COMPLIANCE (mAOD)					
	BH401A	BH402A	BH405A	BH406A	BH407A	BH408A	BH401A	BH402A	BH405A	BH406A	BH407A	BH408A
Jan	187.74	194.18	204.70	205.58	207.58	196.42	185.59	193.35	204.62	205.31	206.93	192.70
Feb	188.10	194.15	204.41	205.39	207.05	196.45	186.06	193.23	204.21	205.05	206.04	192.73
Mar	189.26	194.27	204.58	205.70	207.43	196.59	187.65	193.18	204.46	205.52	206.61	192.67
Apr	189.99	195.15	204.09	205.62	208.20	197.03	188.66	194.62	203.81	205.49	207.84	193.81
May	191.33	194.97	204.12	205.57	208.74	195.46	191.23	194.32	203.71	205.39	208.40	192.37
Jun	188.04	193.30	203.96	204.82	207.07	195.27	186.07	192.13	203.66	204.38	206.40	192.07
Jul	187.76	193.20	203.49	204.30	206.95	196.93	186.03	192.51	203.14	203.83	206.49	193.55
Aug	188.81	194.01	203.32	204.39	206.79	196.87	187.25	193.84	202.99	203.99	206.44	193.41
Sep	189.25	192.83	203.19	204.20	206.90	196.17	187.87	192.31	202.95	203.87	206.65	192.86
Oct	188.72	192.60	202.69	203.86	206.86	199.09	187.07	191.60	202.10	203.34	206.60	196.16
Nov	188.49	193.60	203.14	203.95	206.58	202.03	186.89	192.83	202.61	203.28	206.04	199.90
Dec	188.55	195.18	204.81	205.65	207.74	196.14	186.93	194.87	204.76	205.45	207.26	192.28

3.4.4.3 Scarborough Formation

Table 3-6 - Control and compliance trigger levels for monitoring wells in the Scarborough Formation based on baseline data from 2020-2022

MONTH	CONTROL (mAOD)			COMPLIANCE (mAOD)		
	BH401B	BH402B	34_BH07	BH401B	BH402B	34_BH07
Jan	184.33	183.54	183.542	184.10	183.49	183.49
Feb	185.02	183.21	177.23	184.94	182.88	176.77
Mar	185.02	183.87	183.872	184.91	183.74	183.74
Apr	185.11	183.96	183.962	185.05	183.89	183.89
May	184.56 ¹	183.90	183.902	184.38 ¹	183.80	183.8
Jun	184.56	183.85	183.852	184.38	183.81	183.81
Jul	185.05	183.71	183.712	185.01	183.62	183.62
Aug	184.64	183.43	183.432	184.53	183.30	183.3
Sep	184.54	183.31	183.312	184.47	183.23	183.23
Oct	184.35	183.08	183.082	184.24	182.91	182.91
Nov	184.05	183.08	183.082	183.82	182.91	182.91
Dec	184.05	183.79	183.792	183.82	182.91	182.91

¹ Limited or no baseline data available, values based upon neighbouring months.

3.4.4.4 Cloughton / Saltwick Formation

Table 3-7 - Control and compliance trigger levels for monitoring wells in the Cloughton Formation based on baseline data from 2020-2022

MONTH	CONTROL (mAOD)			COMPLIANCE (mAOD)		
	BH401C	BH402C	34_BH04	BH401C	BH402C	34_BH04
Jan	183.47	183.05	143.84	183.39	182.79	142.81
Feb	183.70	183.70	143.91	183.62	183.62	142.44
Mar	183.67	183.71	147.29	183.50	183.60	147.21
Apr	183.81	183.79	147.29	183.74	183.72	147.14
May	183.36	181.88	147.29	183.16	180.90	147.07
Jun	183.36	183.69	147.29 ¹	183.16	183.65	147.07 ¹
Jul	183.42	183.54	148.93	183.22	183.44	148.73
Aug	183.13	182.66	148.98	182.93	182.06	148.85
Sep	183.02	182.87	148.17	182.80	182.67	147.99
Oct	183.04	181.66	147.91	182.92	180.55	147.75
Nov	183.04	181.66	147.36	182.92	180.55	147.13
Dec	184.30	183.09	147.36 ¹	184.27	183.02	147.13 ¹

¹ Limited or no baseline data available, values based upon neighbouring months.

3.5. GROUNDWATER QUALITY MONITORING

3.5.1. OBJECTIVES

From the results of the Hydrogeological Risk Assessment, the objectives of the groundwater quality monitoring are:

- Determine whether the previously completed phases of works and proposed Phase 8 works have an adverse chemical impact on the groundwater quality in the superficial deposits, Scalby, Scarborough, Cloughton / Saltwick aquifers.
- Determine if adverse chemical impact on groundwater quality of shallow aquifers is due to onsite pollution of surface water run-off from the Phase 8 works.

3.5.2. MONITORING LOCATIONS

Groundwater quality sampling will be undertaken at locations up hydraulic gradient and down hydraulic of the potentially polluting activities associated with the Phase 8 works.

As such, groundwater quality will be monitored in the superficial deposits, Scalby, Scarborough, Cloughton / Saltwick aquifers using a series of monitoring wells both up and down gradient of the development areas detailed in **Table 3-2**.

3.5.3. MONITORING FREQUENCY

All construction activities will be managed in accordance with the Phase 8 Construction Environmental Management Plan (CEMP). Monthly monitoring will continue throughout the Phase 6 lagoon restoration works and for three months post the completion of these works. Monitoring frequency will change to quarterly after this period if no long-term exceedances are observed from the monthly monitoring schedule.

Monitoring of groundwater quality will continue for a minimum period of six months following completion of the Phase 6 works and until it has been demonstrated that no significant variance from the Control Trigger Values or exceedance above the Compliance Limits detailed below has been detected.

In the event significant exceedances are identified during Phase 8 works, additional rounds of monitoring at an increased frequency will be undertaken to help define extent, where appropriate.

3.5.4. GROUNDWATER QUALITY DATA

The baseline suite of analysis will include both onsite water analysis and laboratory testing, as detailed below. The suite of determinants will be carried out in accordance with the suite identified during baseline and is a continuation of previous phases of work.

Presented below are details of the onsite monitoring and of the sampling and laboratory testing that will be undertaken to obtain the groundwater quality data for the Phase 8 works. All chemical analysis will be undertaken by a MCERTS accredited laboratory.

3.5.4.1 Onsite Water Analysis

On site monitoring, using appropriately calibrated field equipment, will be undertaken for the following determinants:

- pH,
- Temperature,
- Electrical Conductivity, and
- Total Dissolved Solids.

3.5.4.2 Sampling

Prior to sampling of the up and down gradient boreholes, each well will be developed by pumping and either purged to three well volumes or the establishment of stable pH and conductivity readings (typically three consecutive field measurements of +/- 0.1 pH units and +/-250 µS/cm) to ensure the groundwaters sampled are representative of the surrounding groundwater quality.

Unfiltered samples will be collected in two 1-litre coloured glass jars, and one 100 ml vial and as required by the laboratory, to complete the specified testing suites.

3.5.4.3 Laboratory Analysis

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

- pH,
- Conductivity,
- Metals (including Aluminium, Boron, Cadmium, Calcium, Chromium III, Chromium VI, Copper, Iron (total and dissolved), Lead, Magnesium, Manganese, Nickel, Potassium, Sodium and Zinc)
- Chloride,

- Sulphate,
- BTEX (Benzene, Toluene, Ethylbenzene and Xylene),
- Speciated Polycyclic Aromatic Hydrocarbons, and
- Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) (Aliphatic/Aromatic split).

3.5.5. GROUNDWATER QUALITY CONTROL AND COMPLIANCE TRIGGER VALUES

Groundwater Quality (GWQ) Control Trigger Values have been set for all monitoring well locations (as detailed in **Table 3-2**, above) for the determinants to be analysed by consideration of the baseline groundwater quality level range and typical variation. The Control Trigger value has been set at a value equivalent to the mean baseline value plus 2 x the Standard Deviation for that dataset. The GWQ Compliance Trigger Value has been set at the equivalent Drinking Water Standard (DWS), Environmental Quality Standard (EQS) or the baseline value determined where the current baseline value 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.

3.5.5.1 Superficial Deposits

Table 3-8 Control and compliance trigger quality levels for monitoring wells in the Superficial Deposits based on baseline data from 2020-2022

Determinants	LOD	Units	Control	Compliance	Source
Aliphatic C10-C12	1	µg/l ⁻¹	-	300	DWS
Aliphatic C12-C16	1	µg/l ⁻¹	-	300	DWS
Aliphatic C16-C21	1	µg/l ⁻¹	-	1	LOD
Aliphatic C21-C35	1	µg/l ⁻¹	-	1	LOD
Aliphatic C5-C35	10	µg/l ⁻¹	-	300	Combined DWS
Aliphatic C5-C6	0.1	µg/l ⁻¹	-	15000	DWS
Aliphatic C6-C8	0.1	µg/l ⁻¹	-	15000	DWS
Aliphatic C8-C10	0.1	µg/l ⁻¹	-	300	DWS
Aluminium, Dissolved	10	µg/l ⁻¹	1550	2100	Max Baseline
Anthracene	0.01	µg/l ⁻¹	0.34	0.47	LOD / EQS
Aromatic C10-C12	1	µg/l ⁻¹	-	90	DWS
Aromatic C12-C16	1	µg/l ⁻¹	-	90	DWS
Aromatic C16-C21	1	µg/l ⁻¹	-	90	DWS
Aromatic C21-C35	1	µg/l ⁻¹	-	90	DWS
Aromatic C5-C35	10	µg/l ⁻¹	-	300	Combined WHO
Aromatic C5-C7	0.1	µg/l ⁻¹	-	10	DWS
Aromatic C7-C8	0.1	µg/l ⁻¹	-	700	DWS
Aromatic C8-C10	0.1	µg/l ⁻¹	-	300	DWS
Benzene	1	µg/l ⁻¹	-	10	EQS
Benzo(a)pyrene	0.01	µg/l ⁻¹	0.11	0.15	EQS
Benzo(b)fluoranthene	0.01	µg/l ⁻¹	1	2	Max Baseline
Boron, Dissolved	12	µg/l ⁻¹	105	150	Max Baseline
Cadmium, Dissolved	0.03	µg/l ⁻¹	1.3	1.8	Max Baseline
Calcium, Dissolved	0.09	mg/l ⁻¹	365	485	Max Baseline
Chloride	0.1	mg/l ⁻¹	-	250	DWS
Chromium III, Dissolved	1	µg/l ⁻¹	5.7	7.9	Max Baseline

Determinants	LOD	Units	Control	Compliance	Source
Chromium VI, Dissolved	7	µg/l ⁻¹	-	7	LOD
Conductivity	1	µS/cm	570	625	Max Baseline
Copper, Dissolved	0.4	µg/l ⁻¹	12	15	Max Baseline
Ethylbenzene	1	µg/l ⁻¹	-	300	WHO
Fluoranthene	0.01	µg/l ⁻¹	1.1	1.6	Max Baseline
Iron, Dissolved	5.5	µg/l ⁻¹	2965	3910	Max Baseline
Iron, Total	5.5	µg/l ⁻¹	268000	346000	Max Baseline
Lead, Dissolved	0.09	µg/l ⁻¹	8.5	11.5	Max Baseline
Magnesium, Dissolved	0.02	µg/l ⁻¹	13	15	Max Baseline
Manganese, Dissolved	0.22	µg/l ⁻¹	3850	5200	Max Baseline
Nickel, Dissolved	0.5	µg/l ⁻¹	16	21	Max Baseline
PAH Total	0.2	µg/l ⁻¹	13	18	Max Baseline
pH			-	6 to 9	EQS
Potassium, Dissolved	0.08	mg/l ⁻¹	16.5	18.5	Max Baseline
Sodium, Dissolved	0.07	mg/l ⁻¹	25	34	Max Baseline
Sulphate as SO4	0.1	mg/l ⁻¹	40	250	Max Baseline / DWS
Toluene	1	µg/l ⁻¹	-	74	EQS
TPH Ali/Aro Total	10	µg/l ⁻¹	128	173	Max Baseline
Xylene	1	µg/l ⁻¹	-	30	DWS
Zinc, Dissolved	1.3	µg/l ⁻¹	133	181	Max Baseline

3.5.5.2 Scalby Formation

Table 3-9 - Control and compliance trigger quality levels for monitoring wells in the Scalby Formation based on baseline data from 2020-2022

Determinants	LOD	Units	Control	Compliance	Source
Aliphatic C10-C12	1	µg/l ⁻¹	-	300	DWS
Aliphatic C12-C16	1	µg/l ⁻¹	-	300	DWS
Aliphatic C16-C21	1	µg/l ⁻¹	45	62	Max Baseline
Aliphatic C21-C35	1	µg/l ⁻¹	71	99	Max Baseline
Aliphatic C5-C35	10	µg/l ⁻¹	147	300	Max Baseline / Combined DWS
Aliphatic C5-C6	0.1	µg/l ⁻¹	-	15000	DWS
Aliphatic C6-C8	0.1	µg/l ⁻¹	-	15000	DWS
Aliphatic C8-C10	0.1	µg/l ⁻¹	-	300	DWS
Aluminium, Dissolved	10	µg/l ⁻¹	1230	1650	Max Baseline
Anthracene	0.01	µg/l ⁻¹	-	0.11	EQS
Aromatic C10-C12	1	µg/l ⁻¹	-	90	DWS
Aromatic C12-C16	1	µg/l ⁻¹	-	90	DWS
Aromatic C16-C21	1	µg/l ⁻¹	-	90	DWS
Aromatic C21-C35	1	µg/l ⁻¹	-	90	DWS
Aromatic C5-C35	10	µg/l ⁻¹	-	300	Combined DWS
Aromatic C5-C7	0.1	µg/l ⁻¹	-	10	DWS
Aromatic C7-C8	0.1	µg/l ⁻¹	-	700	DWS
Aromatic C8-C10	0.1	µg/l ⁻¹	-	300	DWS
Benzene	1	µg/l ⁻¹	-	10	EQS
Benzo(a)pyrene	0.01	µg/l ⁻¹	0.11	0.15	Max Baseline
Benzo(b)fluoranthene	0.01	µg/l ⁻¹	0.08	0.11	Max Baseline
Boron, Dissolved	12	µg/l ⁻¹	75	90	Max Baseline
Cadmium, Dissolved	0.03	µg/l ⁻¹	1.5	1.8	Max Baseline
Calcium, Dissolved	0.09	mg/l ⁻¹	365	485	Max Baseline
Chloride	0.1	mg/l ⁻¹	60	250	Max Baseline
Chromium III, Dissolved	1	µg/l ⁻¹	3.5	5	Max Baseline
Chromium VI, Dissolved	7	µg/l ⁻¹	-	7	LOD
Conductivity	1	µS/cm	670	830	Max Baseline

Determinants	LOD	Units	Control	Compliance	Source
Copper, Dissolved	0.4	µg/l ⁻¹	32	45	Max Baseline
Ethylbenzene	1	µg/l ⁻¹	-	300	DWS
Fluoranthene	0.01	µg/l ⁻¹	-	0.11	Max Baseline
Iron, Dissolved	5.5	µg/l ⁻¹	9400	12100	Max Baseline
Iron, Total	5.5	µg/l ⁻¹	865400	1100000	Max Baseline
Lead, Dissolved	0.09	µg/l ⁻¹	2.8	3.7	Max Baseline
Magnesium, Dissolved	0.02	µg/l ⁻¹	50	75	Max Baseline
Manganese, Dissolved	0.22	µg/l ⁻¹	3700	4800	Max Baseline
Nickel, Dissolved	0.5	µg/l ⁻¹	150	210	Max Baseline
PAH Total	0.2	µg/l ⁻¹	1.6	2.5	Max Baseline
pH			-	6 to 9	EQS
Potassium, Dissolved	0.08	mg/l ⁻¹	30	45	Max Baseline
Sodium, Dissolved	0.07	mg/l ⁻¹	75	90	Max Baseline
Sulphate as SO ₄	0.1	mg/l ⁻¹	120	250	Max Baseline / DWS
Toluene	1	µg/l ⁻¹	-	74	EQS
TPH Ali/Aro Total	10	µg/l ⁻¹	175	250	Max Baseline
Xylene	1	µg/l ⁻¹	-	30	DWS
Zinc, Dissolved	1.3	µg/l ⁻¹	210	280	Max Baseline

3.5.5.3 Scarborough Formation

Table 3-10 - Control and compliance trigger quality levels for monitoring wells in the Scarborough Formation based on baseline data from 2020-2022

Determinants	LOD	Units	Control	Compliance	Source
Aliphatic C10-C12	1	µg/l ⁻¹	-	300	DWS
Aliphatic C12-C16	1	µg/l ⁻¹	-	300	DWS
Aliphatic C16-C21	1	µg/l ⁻¹	-	300	DWS
Aliphatic C21-C35	1	µg/l ⁻¹	-	1	LOD
Aliphatic C5-C35	10	µg/l ⁻¹	32	300	Max Baseline / Combined DWS
Aliphatic C5-C6	0.1	µg/l ⁻¹	-	15000	DWS
Aliphatic C6-C8	0.1	µg/l ⁻¹	-	15000	DWS
Aliphatic C8-C10	0.1	µg/l ⁻¹	-	300	DWS
Aluminium, Dissolved	10	µg/l ⁻¹	330	440	Max Baseline
Anthracene	0.01	µg/l ⁻¹	-	0.1	EQS
Aromatic C10-C12	1	µg/l ⁻¹	-	90	DWS
Aromatic C12-C16	1	µg/l ⁻¹	-	90	DWS
Aromatic C16-C21	1	µg/l ⁻¹	-	90	DWS
Aromatic C21-C35	1	µg/l ⁻¹	-	90	DWS
Aromatic C5-C35	10	µg/l ⁻¹	-	300	Combined DWS
Aromatic C5-C7	0.1	µg/l ⁻¹	-	10	DWS
Aromatic C7-C8	0.1	µg/l ⁻¹	-	700	DWS
Aromatic C8-C10	0.1	µg/l ⁻¹	-	300	DWS
Benzene	1	µg/l ⁻¹	-	10	EQS
Benzo(a)pyrene	0.01	µg/l ⁻¹	-	0.01	EQS
Benzo(b)fluoranthene	0.01	µg/l ⁻¹	-	0.01	EQS
Boron, Dissolved	12	µg/l ⁻¹	25	32	Max Baseline
Cadmium, Dissolved	0.03	µg/l ⁻¹	0.28	0.36	Max Baseline
Calcium, Dissolved	0.09	mg/l ⁻¹	110	130	Max Baseline
Chloride	0.1	mg/l ⁻¹	90	250	Max Baseline
Chromium III, Dissolved	1	µg/l ⁻¹	1.4	1.9	Max Baseline
Chromium VI, Dissolved	7	µg/l ⁻¹	-	7	LOD
Conductivity	1	µS/cm	690	850	Max Baseline

Determinants	LOD	Units	Control	Compliance	Source
Copper, Dissolved	0.4	µg l ⁻¹	6.7	9.3	Max Baseline
Ethylbenzene	1	µg l ⁻¹	-	300	DWS
Fluoranthene	0.01	µg l ⁻¹	-	0.01	LOD
Iron, Dissolved	5.5	µg l ⁻¹	5650	7400	Max Baseline
Iron, Total	5.5	µg l ⁻¹	1500000	2000000	Max Baseline
Lead, Dissolved	0.09	µg l ⁻¹	0.4	1.3	Max Baseline / EQS
Magnesium, Dissolved	0.02	µg l ⁻¹	12	15	Max Baseline
Manganese, Dissolved	0.22	µg l ⁻¹	510	600	Max Baseline
Nickel, Dissolved	0.5	µg l ⁻¹	17	20	Max Baseline
PAH Total	0.2	µg l ⁻¹	-	0.2	LOD
pH			-	6 to 9	EQS
Potassium, Dissolved	0.08	mg l ⁻¹	2.3	2.8	Max Baseline
Sodium, Dissolved	0.07	mg l ⁻¹	19	22	Max Baseline
Sulphate as SO4	0.1	mg l ⁻¹	15	250	Max Baseline / DWS
Toluene	1	µg l ⁻¹	-	74	EQS
TPH Ali/Aro Total	10	µg l ⁻¹	24	33	Max Baseline
Xylene	1	µg l ⁻¹	-	30	DWS
Zinc, Dissolved	1.3	µg l ⁻¹	20	25	Max Baseline

3.5.5.4 Cloughton / Saltwick Formation

Table 3-11 - Control and compliance trigger quality levels for monitoring wells in the Cloughton Formation based on baseline data from 2020-2022

Determinants	LOD	Units	Control	Compliance	Source
Aliphatic C10-C12	1	µg l ⁻¹	-	300	DWS
Aliphatic C12-C16	1	µg l ⁻¹	-	300	DWS
Aliphatic C16-C21	1	µg l ⁻¹	18	25	Max Baseline
Aliphatic C21-C35	1	µg l ⁻¹	5	7.5	Max Baseline
Aliphatic C5-C35	10	µg l ⁻¹	75	300	Max Baseline / Combined DWS
Aliphatic C5-C6	0.1	µg l ⁻¹	-	15000	DWS
Aliphatic C6-C8	0.1	µg l ⁻¹	-	15000	DWS
Aliphatic C8-C10	0.1	µg l ⁻¹	-	300	DWS
Aluminium, Dissolved	10	µg l ⁻¹	610	820	Max Baseline
Anthracene	0.01	µg l ⁻¹	-	0.1	EQS
Aromatic C10-C12	1	µg l ⁻¹	-	90	DWS
Aromatic C12-C16	1	µg l ⁻¹	-	90	DWS
Aromatic C16-C21	1	µg l ⁻¹	-	90	DWS
Aromatic C21-C35	1	µg l ⁻¹	-	90	DWS
Aromatic C5-C35	10	µg l ⁻¹	-	300	Combined DWS
Aromatic C5-C7	0.1	µg l ⁻¹	-	10	DWS
Aromatic C7-C8	0.1	µg l ⁻¹	-	700	DWS
Aromatic C8-C10	0.1	µg l ⁻¹	-	300	DWS
Benzene	1	µg l ⁻¹	-	10	EQS
Benzo(a)pyrene	0.01	µg l ⁻¹	-	0.01	EQS
Benzo(b)fluoranthene	0.01	µg l ⁻¹	-	0.01	EQS
Boron, Dissolved	12	µg l ⁻¹	53	75	Max Baseline
Cadmium, Dissolved	0.03	µg l ⁻¹	1.5	2	Max Baseline
Calcium, Dissolved	0.09	mg l ⁻¹	300	400	Max Baseline
Chloride	0.1	mg l ⁻¹	50	250	Max Baseline
Chromium III, Dissolved	1	µg l ⁻¹	2.5	3.5	Max Baseline

Determinants	LOD	Units	Control	Compliance	Source
Chromium VI, Dissolved	7	µg/l ⁻¹	-	7	LOD
Conductivity	1	µS/cm	550	750	Max Baseline
Copper, Dissolved	0.4	µg/l ⁻¹	1.2	1.6	Max Baseline
Ethylbenzene	1	µg/l ⁻¹	-	300	DWS
Fluoranthene	0.01	µg/l ⁻¹	-	0.04	Max Baseline
Iron, Dissolved	5.5	µg/l ⁻¹	2900	3900	Max Baseline
Iron, Total	5.5	µg/l ⁻¹	150000	200000	Max Baseline
Lead, Dissolved	0.09	µg/l ⁻¹	3.2	4.4	Max Baseline / EQS
Magnesium, Dissolved	0.02	µg/l ⁻¹	15	20	Max Baseline
Manganese, Dissolved	0.22	µg/l ⁻¹	860	1150	Max Baseline
Nickel, Dissolved	0.5	µg/l ⁻¹	10	15	Max Baseline
PAH Total	0.2	µg/l ⁻¹	10	14	Max Baseline
pH			-	6 to 9	EQS
Potassium, Dissolved	0.08	mg/l ⁻¹	125	200	Max Baseline
Sodium, Dissolved	0.07	mg/l ⁻¹	110	150	Max Baseline
Sulphate as SO ₄	0.1	mg/l ⁻¹	12	250	Max Baseline / DWS
Toluene	1	µg/l ⁻¹	-	74	EQS
TPH Ali/Aro Total	10	µg/l ⁻¹	55	75	Max Baseline
Xylene	1	µg/l ⁻¹	-	30	DWS
Zinc, Dissolved	1.3	µg/l ⁻¹	95	120	Max Baseline

3.6. SURFACE WATER

3.6.1. OBJECTIVES

The purpose of the surface water monitoring strategy is to detect chemical and physical impacts on surface waters within Cat Scar Beck and Cold Keld Beck caused by the ongoing construction works, so that appropriate remedial measures can be adopted should potentially detrimental impacts arise.

Due to the small diameter and casing specifications of the exploratory borehole in this Phase of work it is not anticipated that there will be an effect on groundwater flows. This means there will likely be no change in flow rates to surface water systems including offsite abstraction points and springs as stated in **Section 6.4 Risk Assessment** of the Phase 8 HRA (40-STS-LC-2100-EN-RA-00005). As a result of this spring monitoring will remain unnecessary as previously detailed in the Phase 7 GWSWMS (40-STS-LC-2100-EN-PL-00033).

From the results of the Revised Hydrogeological Risk Assessment and the Surface Water Drainage Scheme, potential impacts on Cat Scar Beck that could arise from the then completed and ongoing construction works, and therefore require evaluation by the surface water monitoring strategy include:

- Chemical pollution in the form of hydrocarbon (fuel, hydraulic oil, lubricant oil) spillage or leakage from construction plant and silt/particulate suspended solids entering surface water drainage via runoff and discharging into controlled waters.
- Chemical pollution in the form of cementitious materials from construction works entering the surface water drainage via runoff or pre-grouting works and discharging into controlled water.
- Physical impacts of the groundwater and surface water discharges to the surface water outfall system on Cat Scar Beck by causing siltation, scour or erosion of the stream bed.
- The outfall locations at Cold Keld Beck (LCSW3) will be monitored. However, as the outfalls do not lie within the catchment area of the Ladycross Site works, the impact of works is negligible, control and compliance trigger values will not be set for these monitoring locations.

3.6.2. MONITORING LOCATIONS

To meet the above objectives, the surface water monitoring locations have been designed to provide:

1. Further baseline data for Cat Scar Beck,
2. Early monitoring of surface water drainage within the onsite construction activities, and

3. Monitoring of surface water outfalls at downstream compliance points prior to discharge to Cat Scar Beck.

From the design layout of the Phase 8 Works, monitoring of the construction stage discharges up and down stream of the surface water drainage outfall points will be undertaken as summarised in **Table 3-13** and **Attachment A**.

Table 3-13 – Surface Water Monitoring Locations

ID	X	Y	Description
LCSW1	481868	507673	Upstream monitoring location of unnamed tributary A running along South-East boundary of site
LCSW2	481633	507421	Downstream monitoring location Highway drainage, outfall for site surface water
LCSW3	481344	507542	Discharge to Cold Keld Beck from drain culvert
LCSW4	481641	507460	Downstream monitoring location of unnamed tributary A running along South-East boundary of site.
LCSW5	481600	507440	Monitoring location upstream of LCSW2, outfall for site surface drainage

3.6.3. MONITORING FREQUENCY

Surface water quality samples will be undertaken on a monthly basis for laboratory analysis at monitoring location LCSW3. The other monitoring locations will continue to be sampled on a bi-weekly frequency or at frequencies detailed in site related discharge permits. Field measurements will be undertaken on a weekly basis for the parameters outlined in **Section 3.5.4.1**. Where no flow is observed at the monitoring location, this will be stated as part of the reporting procedure.

Monitoring of surface water quality shall continue for a minimum period of three months following completion of the Phase 6 Works and until it has been demonstrated that no significant variance from the Control Trigger Values has occurred and no exceedance above the Compliance Trigger Values detailed below has been detected.

3.6.4. SURFACE WATER DATA

To meet with the surface water monitoring objectives, the minimum baseline suite of analysis will include onsite analysis, sampling and laboratory testing.

The suite of determinants to be analysed to evaluate construction related pollution will include the specific Contaminants of Concern (CoC) associated with the Phase 8 Works.

3.6.4.1 Sampling

During the sampling visits, surface water sampling of the downstream monitoring points will be collected first, to minimise disturbed sediment impacting on the results. These samples are to be taken from sections of fast flowing water, where possible. In the event no flow is observed this will be stated.

Unfiltered samples will be collected in two litre coloured glass jars, and one 100 ml vial, or as required by the laboratory to complete the specified testing suites.

3.6.4.2 Onsite Monitoring

Visual inspection will be undertaken of the construction works surface water drainage systems 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.

3.6.4.3 Laboratory Analysis

All chemical analysis will be undertaken by an MCERTS accredited laboratory. From the expected potentially polluting activities associated with Phase 8 Works the CoC that are to be analysed will include:

- pH,
- Conductivity,
- Suspended Solids,

- Free ammonia (NH₃),
- Chloride,
- Sodium,
- Sulphate,
- Aluminium,
- BTEX (Benzene, Toluene, Ethylbenzene and Xylene),
- Speciated Polycyclic Aromatic Hydrocarbons, and
- Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) (Aliphatic/Aromatic split).

Flow rates will not be quantified; however, consideration will be made of climatic conditions, particularly after high runoff storm events.

3.6.5. SURFACE WATER QUALITY CONTROL AND COMPLIANCE TRIGGER VALUES

Surface Water Quality (SWQ) Control Trigger Values have been set for all of the determinants to be analysed for by consideration of the baseline surface water quality testing undertaken to date from Cat Scar Beck. The SWQ Control Trigger Value have been derived using the following methodology:

Control Trigger Values = mean baseline value + 2 × standard deviation of baseline data¹

Note¹ The monitoring undertaken thus far during pre-commencements and early site establishment and construction works has demonstrated that 2 standard deviations is most appropriate considering the natural variation observed in the monitoring baseline data.

The Compliance Value has been set at the appropriate Environmental Quality Standard (EQS), DWS or the baseline value where this exceeds the EQS value using the below methodology:

Compliance Trigger Values = mean baseline value + 3 × standard deviation of baseline data¹

Note¹ The monitoring undertaken thus far pre-commencements and early site establishment and construction works has demonstrated that 3 standard deviations is most appropriate considering the natural variation observed in the monitoring baseline data.

Where the analytical detection limit (MRV), EQS or DWS has been adopted as the Compliance Trigger Value, then no Control Trigger Value is included, as presented below in **Table 3-12**.

Table 3-14 – Surface Water Monitoring Control and Compliance Trigger Levels

Determinants	LOD	Units	Control	Compliance	Source
Aliphatic C10-C12	1	µg l ⁻¹	-	300	Max Baseline / WHO DWQ
Aliphatic C12-C16	1	µg l ⁻¹	-	300	Max Baseline / WHO DWQ
Aliphatic C16-C21	1	µg l ⁻¹	-	300	Max Baseline
Aliphatic C21-C35	1	µg l ⁻¹	250	350	Max Baseline
Aliphatic C5-C35	1	µg l ⁻¹	250	350	Max Baseline
Aliphatic C5-C6	0.1	µg l ⁻¹	-	15000	WHO DWQ
Aliphatic C6-C8	0.1	µg l ⁻¹	-	15000	WHO DWQ
Aliphatic C8-C10	0.1	µg l ⁻¹	-	300	WHO DWQ
Alkalinity as CaCO ₃ (Automated)	10	mg l ⁻¹	150	300	Max Baseline
Aluminium, Dissolved	10	µg l ⁻¹	2780	3500	Max Baseline
Ammoniacal Nitrogen as N	0.015	mg l ⁻¹	2.1	2.9	Max Baseline
Anthracene	0.01	µg l ⁻¹	-	0.1	EQS
Aromatic C10-C12	1	µg l ⁻¹	-	90	WHO DWQ
Aromatic C12-C16	1	µg l ⁻¹	-	90	WHO DWQ
Aromatic C16-C21	1	µg l ⁻¹	20	90	Max Baseline / WHO DWQ
Aromatic C21-C35	1	µg l ⁻¹	10	90	Max Baseline / WHO DWQ
Aromatic C5-C35	10	µg l ⁻¹	25	300	Max Baseline / WHO DWQ
Aromatic C5-C7	0.1	µg l ⁻¹	-	10	WHO DWQ
Aromatic C7-C8	0.1	µg l ⁻¹	-	700	WHO DWQ
Aromatic C8-C10	0.1	µg l ⁻¹	-	300	WHO DWQ
Benzene	1	µg l ⁻¹	-	10	EQS
Benzo(a)pyrene	0.01	µg l ⁻¹	-	0.05	Max Baseline
Benzo(b)fluoranthene	0.01	µg l ⁻¹	-	0.05	Max Baseline
Boron, Dissolved	12	µg l ⁻¹	75	100	Max Baseline
Cadmium, Dissolved	0.03	µg l ⁻¹	0.33	3	Max Baseline / WHO DWQ
Calcium, Dissolved	0.09	mg l ⁻¹	80	90	Max Baseline
Chloride	0.1	mg l ⁻¹	60	250	Max Baseline / EQS
Chromium III, Dissolved	1	µg l ⁻¹	5	50	Max Baseline / DWD
Chromium VI, Dissolved	7	µg l ⁻¹	-	7	LOD
Conductivity	1	µS/cm	650	800	Max Baseline
Copper, Dissolved	0.4	µg l ⁻¹	4.65	5.6	Max Baseline
Ethylbenzene	1	µg l ⁻¹	-	300	WHO
Fluoranthene	0.01	µg l ⁻¹	0.06	0.08	LOD
Iron, Dissolved	5.5	µg l ⁻¹	1900	2400	Max Baseline
Iron, Total	5.5	µg l ⁻¹	7500	10000	Max Baseline
Lead, Dissolved	0.09	µg l ⁻¹	10.6	14.9	Max Baseline
Magnesium, Dissolved	0.02	µg l ⁻¹	14.5	18	Max Baseline
Manganese, Dissolved	0.22	µg l ⁻¹	120	150	Max Baseline
Nickel, Dissolved	0.05	µg l ⁻¹	13.7	15.4	Max Baseline
Nitrate as NO ₃	5	mg l ⁻¹	15	50	Max Baseline / WHO DWQ
PAH Total	0.2	µg l ⁻¹	0.6	0.9	Max Baseline
pH			-	6 to 9	EQS
Potassium, Dissolved	0.08	mg l ⁻¹	55	80	Max Baseline
Sodium, Dissolved	0.07	mg l ⁻¹	110	150	Max Baseline
Sulphate as SO ₄	0.1	mg l ⁻¹	225	300	Max Baseline / DWS

Determinants	LOD	Units	Control	Compliance	Source
Suspended Solids	5	mg ^l ⁻¹	90	120	Max Baseline
Toluene	1	µg ^l ⁻¹	-	74	EQS
TPH Ali/Aro Total	10	µg ^l ⁻¹	153	220	Max Baseline
Xylene	1	µg ^l ⁻¹	-	30	DWS
Zinc, Dissolved	1.3	µg ^l ⁻¹	120	180	Max Baseline

3.7. GASEOUS HYDROCARBON MONITORING

3.7.1. OBJECTIVES

From the results of the Hydrogeological Risk Assessment, the objectives of the gaseous hydrocarbon monitoring are:

- Determine whether the proposed Phase 8 works have an adverse chemical impact on the groundwater quality in Ravenscar Group aquifers.
- Determine the chemical composition, flow, volume and pressure of any gaseous hydrocarbons (following BS 8576:2013 guidance) that may potentially migrate through the exploratory borehole, as stated in the Phase 8 Hydrogeological Risk Assessment (HRA).

3.7.2. MONITORING LOCATIONS

The location of the gaseous hydrocarbon sampling will be undertaken at the exploratory borehole via a gas valve, as detailed in the Phase 8 Construction Environmental Management Plan (CEMP).

3.7.3. MONITORING FREQUENCY

All construction activities will be managed in accordance with the Phase 8 Construction Environmental Management Plan (CEMP). Initial monitoring will comprise daily checks for 1 week post drilling activity to develop a/any baseline. Monitoring will be undertaken on an as required basis once a base line has been assessed and where practicably and safely appropriate, following BS 8576:2013 guidance.

3.7.4. GASEOUS HYDROCARBON QUALITY DATA

The baseline suite of analysis will include both onsite analysis and laboratory testing, as detailed below. The suite of determinants will be carried out in accordance under BS 8576:2013 guidance.

3.7.4.1 Onsite Analysis

On site monitoring, using appropriately calibrated field equipment, will be undertaken for the following determinants:

- Flow rate
- Pressure
- Temperature

3.7.4.2 Sampling

Samples will be collected regularly as required and where practicably and safely appropriate. Samples will be collected using 2no. 1.4L canister as required by the ISO17025 accredited laboratory to provide a representative and sufficient sample size for hydrocarbon speciated analysis.

3.7.4.3 Laboratory Analysis

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

- Bulk Gas
- Determination of C1 - C7 Hydrocarbons
- Odorant Gas Analysis
- TPH in Gas samples
- Volatile Organic Compounds (VOC's)

4. DECOMISSION AND REPLACEMENT OF EXISTING MONITORING POINTS

As Part of Phase 8 Works no boreholes or monitoring locations are planned to be removed. In the event there is a requirement to remove any borehole the MPA will be informed. Works will be undertaken in accordance with current guidance and best practice (Environment Agency, 2012) and will adopt one of the three decommissioning options detailed in **Table 4-1**.

Table 4-1 Summary of options for the removal and replacement of monitoring wells

Option	Condition	Methodology
Option 1	In boreholes where there is more than 1m or less of plain pipework	Grout up standpipe from the base to 1.5m below ground level (bgl). Remove headworks and plain pipe from 0-1mbgl. Remove the gravel pack and slotted pipework from 1.0-1.5mbgl and replace with a bentonite/grout plug. Replace upper section 0-1.0mbgl with appropriate topsoil/arising mix.
Option 2	In boreholes where there is greater than 1m of plain pipework	Grout up standpipe from the base to 1m below ground level. Remove headworks and plain pipe from 0-1mbgl and replace with appropriate topsoil mix.
Option 3	In boreholes located on land that may be ploughed	Where boreholes are located on land that may be ploughed then guidance recommends that installations are removed to a minimum of 2.0 mbgl. Grout up standpipe from base to 2 mbgl. Remove headworks and plain pipe from 0-2mbgl. Remove the gravel pack and slotted pipework from 2.0-2.5m and replace with a bentonite/grout plug. Replace upper section 0-2.0mbgl with appropriate topsoil/arising mix.

On completion of the decommissioning, a report of work undertaken will be prepared.

5. REPORTING REQUIREMENTS

In compliance with Condition 88 of planning permission NYM/2014/0676/MEIA, should any monitoring result exceed those Control and Compliance Trigger Values set out within this document, the Local Planning Authority and the Environment Agency will be informed as soon as practicable, and the approved Remedial Action shall be implemented in accordance with the Remedial Action Plan. Reports will be produced on a monthly basis that include:

- Summary of monthly activities,
- Summary of meteorological data,
- Comparison of monitoring data to control and compliance Trigger Values,
- Analysis of baseline data and review of control values,
- Review of any remedial actions taken,
- Conclusions, and
- Recommendations for remedial actions where relevant.

On completion of any remedial action, a record of the measures implemented, and their effectiveness will be reported to the relevant parties.

Quarterly summary reports will review the monthly monitoring reports, and review the adopted Control Trigger Values, and where necessary, suggest amendments.

Remedial actions will remain in accordance with the Phase 8 Remedial Action Plan (RAP).

6. REFERENCES

DEFRA. (2014). *Water Framework Directive implementation in England and Wales: new and updated standards to protect the water environment*. GOV.UK.

Environment Agency. (2012). *Good practice for decommissioning redundant boreholes and wells*. Environment Agency.

FWS. (September 2014). *Hydrogeological Baseline Report of the Lady Cross Plantation, North Yorkshire*. FWS Consultants LTD.

WHO. (2017). *Guidelines for drinking-water quality: fourth edition incorporating the first addendum* (Fourth Edition ed.). World Health Organization.

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7. DEFINITIONS AND ABBREVIATIONS

DWS – Drinking Water Standards

EQS – Environmental Quality Standards

HRA – Hydrogeological Risk Assessment

GWSWMS – Groundwater and Surface Water Monitoring Scheme

CoC – Contaminants of Concern

LOD – Limit of Detection

GWL – Groundwater Level

CEMP – Construction Environment Management Plan

GWQ – Groundwater Quality

SWQ – Surface Water Quality

VOC – Volatile Organic Compounds

TPH – Total Petroleum Hydrocarbon

8. ATTACHMENTS

ATTACHMENT A – MONITORING LOCATIONS

ATTACHMENT B – SPRING MONITORING LOCATIONS

ATTACHMENT C – SPRING AND ABSTRACTION LOCATIONS



ATTACHMENT A – MONITORING LOCATIONS

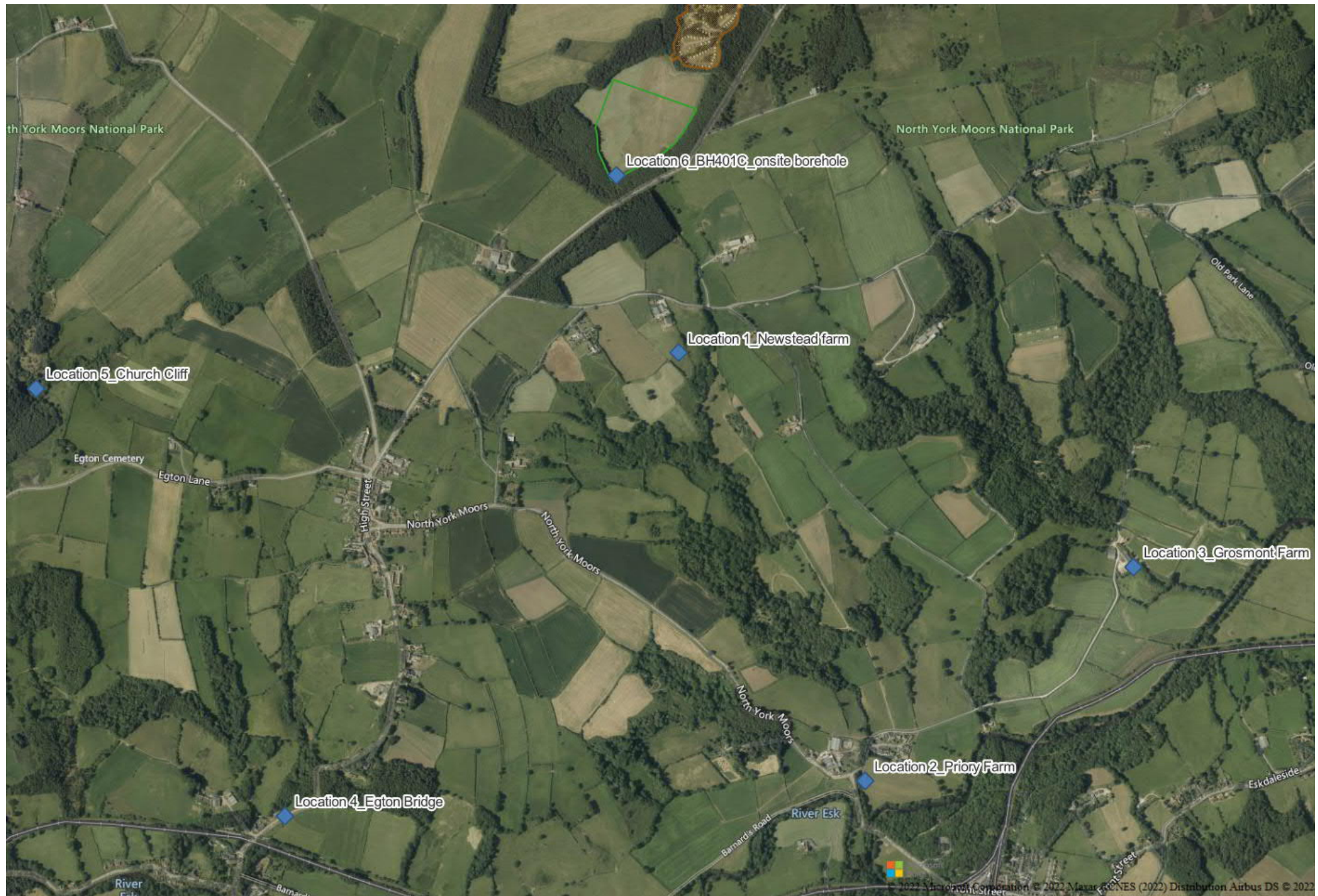
Legend

- Site Boundary
- ◆ SW monitoring Location
- ▲ GW monitoring boreholes 2022





ATTACHMENT B – SPRING MONITORING LOCATIONS



North York Moors National Park

North York Moors National Park

Location 6_BH401C_onsite borehole

Location 1_Newstead farm

Location 5_Church Cliff

Egton Cemetery

Egton Lane

High Street

North York Moors

North York Moors

North York Moors

Location 3_Grosmont Farm

Location 2_Priory Farm

Location 4_Egton Bridge

River Esk

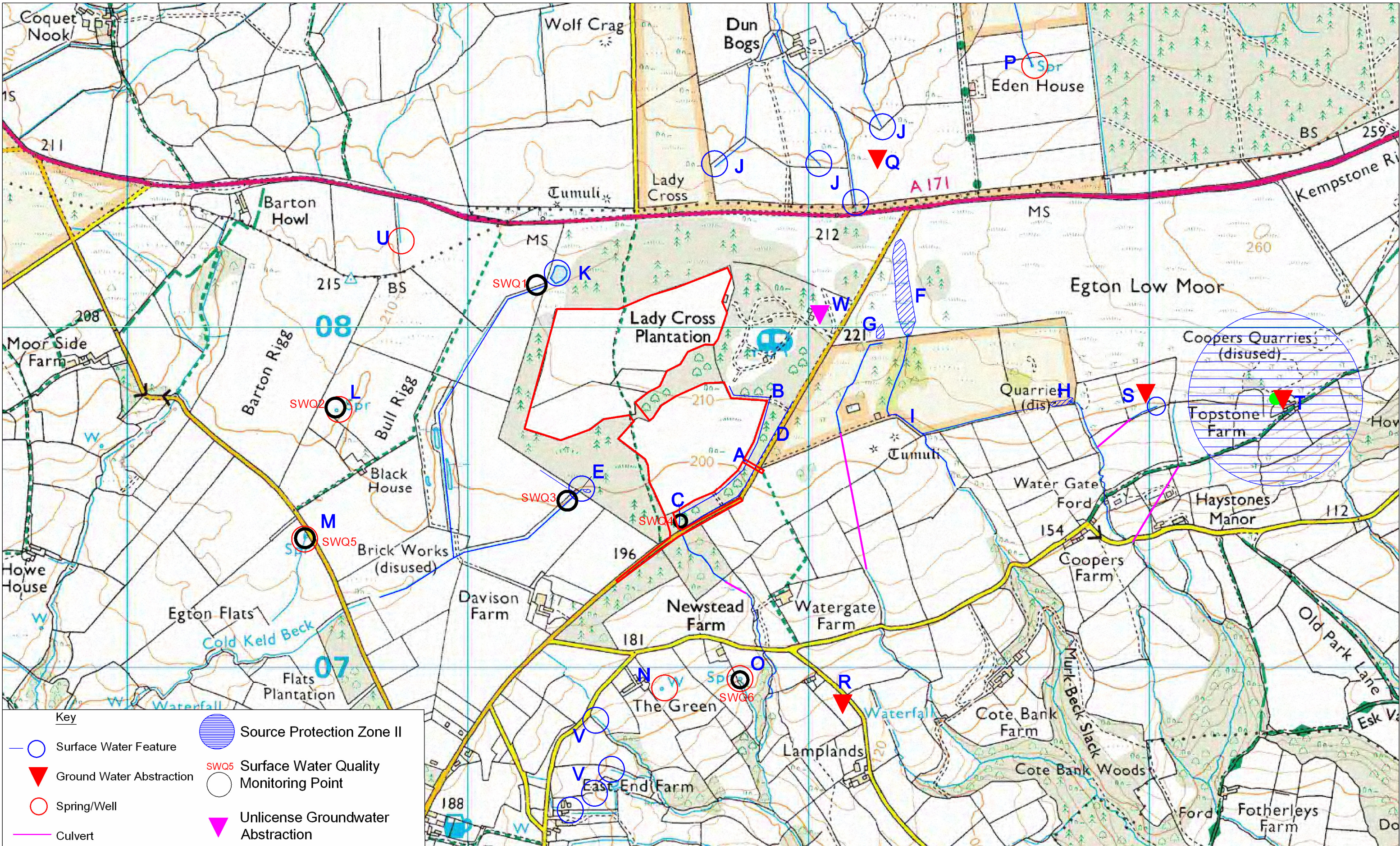
Barnardis Road

Eskdaleside

River Esk



ATTACHMENT C – SPRING AND ABSTRACTION LOCATIONS



Key	
	Surface Water Feature
	Ground Water Abstraction
	Spring/Well
	Culvert
	Source Protection Zone II
	Surface Water Quality Monitoring Point
	Unlicense Groundwater Abstraction

DRAWING NUMBER
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DRAWING TITLE
HYDROLOGICAL AND HYDROGEOLOGICAL FEATURES -
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CLIENT
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**WOODSMITH PROJECT
(788.5030)**

**REMEDIAL ACTION PLAN -
PHASE 8 - NYMNPA
CONDITION 89 - LADYCROSS
PLANTATION /
40-STS-LC-2100-EN-PL-00044**

Revision	Date of issue	Prepared by	Checked by	Approved by	Changes
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1. INTRODUCTION

1.1. GENERAL BACKGROUND

In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to the North York Moors National Park Authority (NYMNP) 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.

This Remedial Action Plan (RAP) has been prepared on behalf of Anglo American PLC (Anglo American) for the Phase 8 works at Ladycross Plantation Intermediate Shaft Site (as described in Section 1.3 below) and provides an update to the previous Phase 4 Remedial Action Plan. It details the remedial actions to be undertaken when required as a result of the exceedance of trigger values identified for surface water and groundwater level and quality, in accordance with the Hydrogeological Risk Assessment (HRA) and Groundwater and Surface Water Monitoring Scheme (GWSWMS) for the Phase 8 works.

1.2. PURPOSE OF THIS DOCUMENT

The purpose of this Remedial Action Plan is to support the partial discharge of planning conditions as detailed in (NYM/2017/0505/MEIA). Specifically, its purpose is to:

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

This document forms part of the STRABAG Environmental Management System (EMS) for the project, which is certified to ISO 14001:2015 standards.

This document should be read together with the following documents:

- Phase 8 Construction & Operation Groundwater and Surface Water Monitoring Scheme (40-STS-LC-2100-EN-PL-00037)
- Phase 8 Hydrogeological Risk Assessment (40-STS-LC-2100-EN-RA-00005)
- Phase 3 Surface Water Management Plan (40-STS-LC-2100-PA-PL-20102)

1.3. PREVIOUS WORKS PHASES

This Phase 8 RAP continues on from the earlier version (40-STC-LC-2100-EN-PL-00017) which provided a monitoring and remedial strategy up to and including Phase 4 works activities. There was no requirement to update the Phase 4 RAP through the following Phases;

Phase 5

- Mobilisation of shaft sinking contractors, including installation of shaft sinking equipment and shaft platform civils and infrastructure;
- Construction of foreshaft, including secant piling;
- Drilling of pilot borehole;
- Sinking of proposed MTS shaft via blind bore drilling method;
- Installation of the shaft lining;
- Grouting of shaft annulus and dewatering;
- Revised design to security cabin; and
- Addition of showers to existing welfare.

Phase 6

- Installation of shaft infrastructure including tally hut, communications and ventilation fan;
- Installation and use of temporary cable laying sub-bases, winch and emergency rescue winch;
- Installation of Alimak and associated infrastructure;
- Backfill of the Lagoon;
- Installation and use of temporary shaft head house and associated services;
- Installation and use of grout plant and associated services;
- Installation of emergency back-up generators; and
- Construction of temporary overflow car park including tarmac hardstanding for an additional 10 car parking spaces.

Phase 7

- Soft landscaping of lagoon and other areas;
- Installation of double-stacked containers for acoustic and visual screening;
- Creation of temporary top spoil and sub soil screening stockpiles;
- Replacement welfare facilities and associated parking;

-
- Installation of hardstanding areas; and
 - Erection of lattice communication mast.

Phase 8 works comprises:

- Drilling of an exploratory Borehole;
- Temporary Installation and use of drilling rig and ancillaries;
- Decommissioning of Borehole.

A site plan is provided separately.

2. COMPLIANCE CONDITIONS

This document is required to partially discharge condition NYMNP-89. This planning condition states that:

Table 2-1 NYMNP Discharge Condition No 89 – Remedial Action Plan

NYMNP Description	Compliance with Condition NYMNP 89
<p>Prior to the commencement of development at Ladycross Plantation, 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 Schemes are exceeded, shall be submitted to and approved in writing by the MPA in consultation with the Environment Agency.</p>	<p>This Phase 8 Remedial Action Plan</p>
<p>Should any monitoring result 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 practicable, and the approved Remedial Action Plan shall thereafter be implemented as soon as practicable.</p>	<p>Section 4 Phase 8 Construction & Operation Groundwater and Surface Water Monitoring Scheme</p>
<p>Following remedial action, monitoring in accordance with the Construction and Operation Phase Ground and Surface Water Monitoring Scheme will be undertaken in accordance with a 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.</p>	<p>Section 5 Phase 8 Construction & Operation Groundwater and Surface Water Monitoring Scheme</p>

3. RESPONSIBILITIES AND CONTACTS

3.1. PARTIES RESPONSIBLE FOR IDENTIFYING AND INVESTIGATING A TRIGGER VALUE EXCEEDANCE

Table 3-1 identifies the individuals and their contact information for the parties responsible for identifying and investigating a Trigger Value exceedance.

Table 3-1 Summary of Parties Responsible for Identifying and Investigating a Trigger Exceedance

Contact Name	Position	Company	Contact Details	Responsibility
Robert Staniland	Anglo American Environment and Permitting Manager	Anglo American PLC	robert.staniland@angloamerican.com	Coordination of Environmental Activities within the Development
Charlotte Bell	Environment & Permitting Technical Officer		charlie.bell@angloamerican.com	Coordination of environmental activities within the site, reporting on monitoring and advising and recording of remedial actions.
Declan Maguire	Worley Construction Lead		declan.maguire@worley.com	Co-ordination of Construction activities within the Development
Mark Pooleman	Anglo American Area Manager Tunnel		Mark.pooleman @angloamerican.com	
Charles Eddington	STRABAG Environment Manager	STRABAG AG	charles.eddington@strabag.com	Undertaking and reporting environmental monitoring, investigating exceedances, advising on remedial actions, and coordinating with construction teams
Efrain Castro	STRABAG Environment Advisor		efrain.castro@strabag.com	
John Allison			john.allison@strabag.com	

4. PROCEDURE FOR EVALUATING EXCEEDANCES IN TRIGGER VALUES – GROUNDWATER AND SURFACE WATER

4.1. MONITORING SCHEME

A GWSWMS has been prepared detailing the monitoring requirement for the Phase 8 works. The document details groundwater and surface water monitoring to be undertaken during the Phase 8 works to ensure that physical or chemical impacts resulting from proposed site works are within acceptable ranges.

The Control and Compliance Trigger Values used to assess these data are stated in the GWSWMS.

Where exceedances to the Trigger Values occur, the procedure to evaluate and record the remedial actions required, will be as set out in this Remedial Action Plan.

Where an exceedance of the Control and Compliance Trigger Values occurs, the following four stage procedure will be carried out to evaluate and record the remedial actions required: -

- **Stage 1** - Inspection / Monitoring Appraisal
- **Stage 2** - Consultation with Project Manager and Planning of Remedial Actions
- **Stage 3** – Implementation of Remedial Actions
- **Stage 4** – Reporting

The following sections detail the specific assessment procedures that will be undertaken, with regard to the individual groundwater monitoring programme, and the remedial actions that will be considered.

Section 5 presents details of the reporting procedures that will be adopted to record the assessment, design and implementation of the remedial actions determined necessary.

4.2. GROUNDWATER LEVELS

4.2.1. GROUNDWATER LEVEL ASSESSMENT PROCEDURE

Attachment A details the procedure for assessing exceedances of groundwater level control and compliance values at the groundwater monitoring points during the Phase 8 works. It presents a summary of the sequence of activities for each stage, details are provided below.

4.2.2. MONITORING APPRAISAL

The purpose of the groundwater level monitoring strategy is to detect physical effects during the Phase 8 works on groundwater levels within the Secondary A Aquifers that could impact on the flows from the springs and licensed abstractions within the vicinity of the site. In the event of an adverse impact being detected, the objective of this appraisal is to determine the cause, so that appropriate remedial measures can then be adopted should the impacts be attributed to the Phase 8 works.

Groundwater Levels will be monitored in the superficial deposits to identify potential variations in soil moisture conditions in comparison with baseline conditions. Groundwater levels will also be measured within the Scalby, Scarborough and Cloughton formations. The series of monitoring wells located up and down hydraulic gradient of the Phase 8 works, details of monitoring locations are included within the GWSWMS.

Table 4-1 Groundwater Monitoring Boreholes ID, location, and geological description

Monitoring Well ID	NGR Coordinates	Geology and description
BH402 BH403 BH404 BH405 BH406 BH407 BH408	481737, 507534 481807, 507620 481868, 507778 481218, 507701 481452, 507744 481590, 507886 481423, 507919	Monitor potential changes in the groundwater levels within the superficial deposits.
BH401A BH402A BH404A BH405A BH406A BH407A BH408A BH413A ¹	481571, 507474 481738, 507552 481859, 507778 481221, 507693 481442, 507743 481583, 507881 481414, 507916 481546, 507567	Monitor potential changes in the groundwater levels within the Scalby Formation (Long Nab and/or Moor Grit Member).
BH401B BH402B BH404B BH413B ¹ 34_BH07 ²	481572, 507470 481736, 507547 481863, 507768 481547, 507573 481673, 507627	Monitor potential changes in the groundwater levels within the Scarborough Formation.

Monitoring Well ID	NGR Coordinates	Geology and description
BH401C	481576, 507473	Monitor potential changes in the groundwater levels within the Cloughton Formation. Decommissioned Phase 7 ³ VWP depths and formations as Table 4-2
BH402C	481730, 507540	
BH404C	481861, 507774	
BH413C ¹	481553, 507569	
34_BH04 ²	481635, 507638	
34_BH06 ²	481607, 507648	
34_BH01	481574, 507545	

Note¹ Due to the location of the BH413 series of boreholes were decommissioned as part of Phase 3 grouting activities.

Note² Additional monitoring boreholes installed during the 2022 GI works replaced the BH413 series.

Note³ 34_BH06² were decommissioned as part of Phase 7 works.

34_BH01 was installed during the 2022 GI works and includes six vibrating wire piezometers situated to measure groundwater levels. **Table 4-2** (below) provides depth and formation information.

Table 4-2 VWP installations in 34_BH01

VWP ID	Depth of install (mbgl)	Geology
34_BH01_1	12	Scarborough Formation
34_BH01_2	37	Cloughton Formation
34_BH01_3	53	Cloughton Formation
34_BH01_4	76	Cloughton / Saltwick Formation
34_BH01_5	111.5	Saltwick Formation
34_BH01_6	118.5	Saltwick Formation

Manual dip groundwater levels will be measured on a monthly basis and where continuous loggers are installed will be collated on a monthly basis. The results will be compared with baseline data and the control and compliance trigger levels to identify any exceedances.

4.2.3. *PLANNING REMEDIAL ACTIONS*

The recorded breach of any trigger values will be evaluated by the Environmental Engineer or nominated competent person(s) with the Project Manager to determine the cause of the breach and the appropriate course of remedial action that will be taken.

A breach of the groundwater level Trigger Values for individual boreholes will be assessed in conjunction with the rainfall data for the preceding period, to ascertain whether the breach is due to natural climatic conditions or as a result of the Phase 8 works.

The Trigger Value exceedance will be classed as either:

- A natural (non-site related) exceedance of the Control Trigger Value caused by natural variations in rainfall (i.e. low rainfall).
- An exceedance of the Control Trigger Value caused by the Phase 8 works.
- An exceedance of the Control Trigger Value caused by offsite works.

Where the exceedance is found to be caused by either natural or unrelated to site works, no further remedial actions will be required.

The remedial actions will be designed specific to the degree in exceedance (i.e. physical change in groundwater levels), the location where the exceedance was recorded, and the likely cause of this breach in Trigger Values.

4.2.4. *IMPLEMENTING REMEDIAL ACTIONS*

Where remedial actions are specified by the Environmental Engineer or nominated competent person(s), related to a breach in Trigger Values, they will be advised to the Director of Operations, the Environment Manager and the Regulators and implemented by the Project Manager and Parties (as detailed in **Section 3.1**).

Remedial actions for a prolonged exceedance of the Compliance Trigger Value will be considered in association with exceedances of any quantitative spring flows.

4.3. GROUNDWATER QUALITY

4.3.1. *GROUNDWATER QUALITY ASSESSMENT PROCEDURE*

Attachment B details the procedure for assessing exceedances of groundwater quality control and compliance values at the groundwater monitoring points during the Phase 8 works. It presents a summary of the sequence of activities and respective timescales for each stage, for which details are provided below.

4.3.2. MONITORING APPRAISAL

The purpose of the monitoring strategy is to detect chemical impacts on groundwater quality within the Secondary A Aquifers during the Phase 8 works. The objective of this appraisal is to determine causation and implement appropriate remedial measures, where possible, prior to impacts occurring that may be attributable to Phase 8 works. As detailed in the Hydrogeological Risk Assessment, the principal potential cause of pollution from the construction works is expected from surface water runoff in the Shaft Platform and compound areas.

Groundwater quality sampling and geochemical analysis will be undertaken at locations both up and down hydraulic gradient of receiving aquifers. Sampling will be conducted at the monitoring locations listed in **Table 4-1**.

Analytical testing in the field will consist of pH, temperature, electrical conductivity and total dissolved solids. Samples will be analysed at the laboratories in accordance with the monitoring suite detailed in the GWSWMS.

4.3.3. PLANNING REMEDIAL ACTION

The recorded breach of any trigger values will be evaluated by the Environmental Engineer or nominated competent person(s) with the Project Manager to determine the cause of the breach and the appropriate course of remedial action that will be taken.

A breach of the groundwater quality Trigger Values for individual boreholes will be assessed in conjunction with the ongoing site activities and external site activities, to ascertain whether the breach is a result of the Phase 8 works or external factors.

The Trigger Value exceedance will be classed as either:

- An exceedance of the Control Trigger Value caused by the Phase 8 works.
- An exceedance of the Control Trigger Value caused by offsite works.

Where the exceedance is found to be caused by either natural or unrelated to site works, no further remedial actions will be required.

An on-site related breach of the Groundwater Quality Control Trigger Values in the up hydraulic gradient boreholes may require an adjustment to Control Trigger values in line with the revised baseline conditions. Records of any changes and reasons will be kept for subsequent review.

The remedial actions will be designed specific to the degree in exceedance (i.e. chemical change in groundwater quality), the location where the exceedance was recorded, and the likely cause of this breach in Trigger Values.

4.3.4. IMPLEMENTING REMEDIAL ACTIONS

Where remedial actions are specified by the Environmental Engineer or nominated competent person(s), related to a breach in the Groundwater Quality Control or Compliance Trigger Values, they will be advised to the Director of Operations, the Environment Manager and the Regulators and implemented by the Project Manager and Parties (as detailed in **Section 3.1**).

Remedial actions for a breach of Groundwater Quality Control Trigger Values may include, but not be limited to, temporarily increasing monitoring frequency to weekly, remediation of spillage site and a change in site construction practices as detailed in the Construction Environmental Management Plan (CEMP) to prevent future re-occurrence of construction related pollution.

Where the breach of the Groundwater Quality Compliance Trigger Value occurs down hydraulic gradient of the site, remedial actions may include modelling and installation of additional groundwater monitoring wells to evaluate the magnitude of impact at the site boundary and at the nearest down hydraulic gradient receptor. If the results of that modelling and additional monitoring show that an adverse impact will or is occurring in breach of the Compliance Trigger Value at the groundwater receptor, then groundwater remediation of the pollution source will be considered.

4.4. SURFACE WATER QUALITY AND STREAM GEOMORPHOLOGY

4.4.1. SURFACE WATER QUALITY ASSESSMENT PROCEDURES

Attachment C presents the procedure for assessing breaches of surface water quality (SWQ) Trigger Control and Compliance Trigger Values during the Phase 8 works.

It presents a summary of the sequence of activities and respective timescales for each stage, for which details are provided below.

4.4.2. MONITORING APPRAISAL

The purpose of the surface water quality (SWQ) monitoring strategy is to detect chemical and physical impacts on Cat Scar Beck and Cold Keld Beck during the period of the Phase 8 works. Any increase toward Triggers will be evaluated to mitigate against future impacts. The objective of this appraisal is to determine causation and implement appropriate remedial measures, where possible, prior to impacts occurring that may be attributable to Phase 8 works.

Monitoring up and down stream of the surface water drainage outfall points will be undertaken as summarised in **Table 4-3** and shown in **Attachment D**.

Table 4-3 Details of surface water monitoring locations

ID	X	Y	Description
LCSW1	481868	507673	Upstream monitoring location of unnamed tributary A running along South-East boundary of site
LCSW2	481633	507421	Downstream monitoring location Highway drainage, outfall for site surface water
LCSW3	481344	507542	Discharge to Cold Keld Beck from drain culvert
LCSW4	481616	507460	Outfall from clay drainage pipe into unnamed tributary A
LCSW5	481600	507440	Monitoring location upstream of LCSW2, outfall for site surface drainage

Generic sample points for surface water quality monitoring are shown in the above table, where appropriate testing will be carried out at other locations along Cold Keld Beck and Cat Scar Beck in order to source apportion any abnormalities.

The surface water quality monitoring will be undertaken weekly through the Phase 8 works. 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 also be collected and analysed in line with the analysis suite set out in the GWSWMS.

SWQ Control and Compliance Trigger Values are presented in the GWSWMS.

The surface water drainage system will be inspected on a daily basis to ensure that it is in good working order.

This will include, as appropriate, inspection of the swales, filter drains and associated catch pits, ponds, oil separators and silt fences. 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 activities, as determined from a visual site inspection of the operations, and the meteorological conditions, to identify the cause of a specific breach.

4.4.3. PLANNING REMEDIAL ACTIONS

The recorded breach of the any SWQ Control and Compliance Trigger Values and changes in geomorphological conditions i.e. bank degradation will be conducted along as part of SWQ monitoring.

The findings of inspections will be evaluated by the Environmental Engineer in consultation with the Project Manager to determine the cause of the breach and the appropriate course of remedial action that will be taken.

4.4.4. *IMPLEMENTING REMEDIAL ACTIONS*

Where remedial actions are specified by the Environmental Engineer or nominated competent person(s), related to a breach in the SWQ Control and/or Compliance Trigger Values, they will be advised to the Director of Operations, the Environment Manager and the Regulators and implemented by the Project Manager and Parties (as detailed in **Section 3.1**).

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 Groundwater and Surface Water Management Scheme.

Remedial actions for a breach of SWQ Control Trigger Values or due to an adverse change in the geomorphology of the stream may include, but not be limited to, maintenance or extension to swales, addition of check dams and silt fencing, clearance of filter drains and associated catch pits, implementation of silt fences, maintenance of ponds, and maintenance of oil separators.

Remedial actions for a breach of the Compliance Trigger Value or due to an adverse change in the geomorphology of the stream may include, but not be limited to, the above remedial actions, but may also include implementation of additional emergency surface water management measures including the use of additional tankering off of contaminant waters, hay/heather bales, Siltbuster and silt fences to reduce silt migration, the use of absorbent spill pads and booms to contain and absorb hydrocarbon contamination, and temporarily closing the penstock in the attenuation pond.

As required, a Siltbuster or equivalent water treatment system will be used as a control measure to reduce silt migration.

A site-based log will be kept detailing monitoring data of pH, flow rates, turbidity of the discharge. Regular inspections of the water treatment system will be carried out to ensure the unit is not adding pollutants and contamination to the water discharged. Further details of the monitoring / operations are detailed in the Phase 3 Surface Water Management Plan.

5. REPORTING

All exceedances of Control and Compliance Trigger Values and remedial actions that are implemented will be reported monthly to Anglo American. This report will detail the exceedance that occurred, the weekly construction activities and antecedent meteorological conditions, the results of the site inspection, the established cause of the exceedance in Trigger Values and the remedial action specified together with the timescale for it to be implemented.

Where exceedances to Trigger Values are identified, associated with the site works a record of the data and site observations will be issued on receipt of results of the event. Where visual evidence of a significant change in stream flows, cloudy discharge or elevated turbidity or pH readings are identified associated with the works, the inspection report and remedial action specified will be issued to those identified in **Section 3.1** within 48 hours of that exceedance.

On completion of the remedial action, a record of the measures implemented, and their effectiveness will be reported to the relevant parties. The Anglo American Construction Manager or Environment and Permitting Manager will provide a copy of the report.

A cumulative report detailing the assessment of monitoring and inspection results for groundwater, surface water and associated spring flushes will be compiled on an annual basis. The report will record any exceedances in Control and Compliance Trigger Values, or visually identified impacts observed and any associated remedial actions.

Following remedial action, details of further monitoring will 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.

6. RELATED DOCUMENTS AND REFERENCES

PHASE 8 HYDROGEOLOGICAL RISK ASSESSMENT - 40-ST5-LC-2100-EN-RA-00005

PHASE 8 CONSTRUCTION & OPERATION GROUNDWATER & SURFACE WATER MONITORING
SCHEME - 40-ST5-LC-2100-EN-PL-00037

7. DEFINITIONS AND ABBREVIATIONS

NYMNPA - North York Moors National Park Authority

RAP - Remedial Action Plan

HRA - Hydrogeological Risk Assessment

MTS - Mineral Transport System

GWSWMS – Groundwater and Surface Water Monitoring Scheme

8. ATTACHMENTS

ATTACHMENT A – TRIGGER VALUE EXCEEDANCE OF GROUNDWATER LEVELS

ATTACHMENT B – TRIGGER VALUE EXCEEDANCE OF GROUNDWATER QUALITY

ATTACHMENT C – TRIGGER VALUE EXCEEDANCE OF SURFACE WATER QUALITY

ATTACHMENT D – MONITORING LOCATIONS

ATTACHMENT A - TRIGGER VALUE EXCEEDANCE OF GROUNDWATER LEVELS

Procedure	Responsibility	Control Value Breach	Compliance Value Breach
Monitoring / Inspections	Environmental Advisor / Officer	A review of the construction activities within the area of the site and the meteorological conditions, up to and during the period of exceedance. An assessment will be made to determine if the breach of ground water level trigger is a caused by: natural climatic variation due to seasonal abnormal rainfall, site works, or offsite related activities.	A review of the construction activities within the area of the site and the meteorological conditions, up to and during the period of exceedance. An assessment will be made to determine if the breach of ground water level trigger is a caused by: natural climatic variation due to seasonal low rainfall, site works, or offsite related activities
Consultation with Project management and Planning of Remedial Actions	Environmental Advisor / Environmental Officer / Project Manager	Evaluate findings of monitoring in conjunction with spring flow rates, groundwater levels in the superficial deposits, Scalby Formation, Scarborough Formation and Cloughton Formation to determine the cause and effects of the change in baseline conditions. From this data evaluate whether a future breach in Compliance Values is likely to occur in the future and design an appropriate course of remedial action, if required.	Evaluate findings of monitoring in conjunction with spring flow rates, groundwater levels in the superficial deposits and ecological monitoring, to determine the cause and effects of the change in baseline conditions. Design an appropriate course of remedial action. As an example, in the case of grout/cementitious contaminants, all grouting works should be stopped immediately. Instream/spring mitigation such as silt fencing and heather baling should be used to arrest further contamination.
Implementation of Remedial Actions	Environmental Advisor / Environmental Officer / Project Manager / Environmental Manager	If the change in the groundwater level below the Control Trigger value has arisen from an adverse impact by the site works, details of the Remedial Actions necessary to prevent continued adverse impact will be specified.	If the change in the groundwater level below the Compliance Trigger value has arisen from an adverse impact by the site works, details of the Remedial Actions necessary to prevent continued impact will be specified.
Reporting	Environmental Advisor / Environmental Officer	Report to include details of exceedance, monitoring, and remedial actions	Report to include details of exceedance, monitoring, and remedial action

ATTACHMENT B - TRIGGER VALUE EXCEEDANCE OF GROUNDWATER QUALITY

Procedure	Responsibility	Control Value Breach		Compliance Value Breach	
		Groundwater Quality at up hydraulic gradient BH's	Groundwater Quality at down hydraulic gradient BH's	Groundwater Quality at up hydraulic gradient BH's	Groundwater Quality at down hydraulic gradient BH's
Monitoring / Inspections	Environmental Advisor / Officer	A review of activities up hydraulic gradient of the site area or site compound, as appropriate, will be undertaken to identify potential sources of contamination impacting on baseline groundwater quality.	<p>A review of the construction activities within the catchment area of the site compound, as appropriate, will be undertaken considering the data up to and during the period of exceedance and of the meteorological conditions during the period of the breach.</p> <p>A visual inspection of the ongoing construction works will be carried out. Inspection of oil separators will be undertaken for hydrocarbon breaches.</p>	A review of activities up hydraulic gradient of the site compound, as appropriate, will be undertaken to identify potential sources of contamination impacting on baseline groundwater quality.	<p>A review of the construction activities within the catchment area of the site compound, as appropriate, will be undertaken considering the data up to and during the period of exceedance and of the meteorological conditions during the period of the breach.</p> <p>A visual inspection of the ongoing construction works will be carried out. Inspection of oil separators will be undertaken for hydrocarbon breaches.</p>
Consultation with Project management and Planning of Remedial Actions	Environmental Advisor / Environmental Officer / Project Manager	Evaluate findings of monitoring to determine the cause of the change in baseline groundwater quality and design the appropriate course of remedial action, if required.	Evaluate findings of monitoring to determine the cause of the change in groundwater quality and design the appropriate course of remedial action, if required.	Evaluate findings of monitoring to determine the cause of the change in baseline groundwater quality and design the appropriate course of remedial action if required.	Evaluate findings of monitoring to determine the cause of the change in groundwater quality and design the appropriate course of remedial action if required. As an example, in the case of grout/cementitious contaminants, all grouting works should be stopped immediately. Instream/spring mitigation such as silt fencing and heather baling should be used to arrest further contamination.

Procedure	Responsibility	Control Value Breach		Compliance Value Breach	
		Groundwater Quality at up hydraulic gradient BH's	Groundwater Quality at down hydraulic gradient BH's	Groundwater Quality at up hydraulic gradient BH's	Groundwater Quality at down hydraulic gradient BH's
Implementation of Remedial Actions	Environmental Advisor / Environmental Officer / Project Manager / Environmental Manager	<p>Continued monitoring of BHs to monitor plume movement through site.</p> <p>Consideration of up hydraulic gradient contamination in assessing down hydraulic gradient groundwater.</p> <p>Increase in monitoring frequency until levels return to baseline.</p>	<p>Remediation of site spillages</p> <p>Maintenance clearance of filter drains to the shaft platform areas, maintenance of oil separator, maintenance of construction vehicles</p> <p>Changes to working practices (CEMP).</p> <p>Increase in monitoring frequency until levels return to baseline.</p>	<p>Continued monitoring of BHs to monitor plume movement through site and installation of additional groundwater monitoring wells, where appropriate.</p> <p>Consideration of up hydraulic gradient contamination source in assessing down hydraulic gradient groundwater quality.</p> <p>Increase in monitoring frequency until levels return to baseline.</p>	<p>Remediation of site spillages</p> <p>Maintenance clearance of filter drains to the shaft platform areas, maintenance of oil separator, maintenance of construction vehicles</p> <p>Changes to working practices (CEMP).</p> <p>Modelling and installation of additional groundwater monitoring wells to demonstrate that there is no impact occurring at the site boundary and the nearest down hydraulic gradient water supply receptor. If the results of that modelling or monitoring of additional boundary monitoring wells show that an impact on the groundwater is occurring or has the potential to occur, then remediation of the groundwater pollution will be considered.</p>
Reporting	Environmental Advisor / Environmental Officer	Report to include details of exceedance, monitoring, and remedial actions		Report to include details of exceedance, monitoring, and remedial actions.	

ATTACHMENT C - TRIGGER VALUE EXCEEDANCE OF SURFACE WATER QUALITY

Procedure	Responsibility	Control Value Breach	Compliance Value Breach
		Surface Water Quality and Stream Geomorphology	Surface Water Quality and Stream Geomorphology
Monitoring / Inspections	Environmental Advisor / Officer	<p>A review will be undertaken of the construction activities within the catchment area of the site, as appropriate, up to and during the period of exceedance and of the meteorological conditions during the period of the breach.</p> <p>The visual inspection of the ongoing construction works will include inspection of oil separators for hydrocarbon breaches, inspection of surface drainage and outfalls for evidence of cloudy discharges and to provide a record of the turbidity value recorded, geomorphological inspection for evidence of erosion, geotechnical failure, sediment accumulation, vegetation change, pollution and discolouration and construction litter.</p>	<p>A review will be undertaken of the construction activities within the catchment area of the site, as appropriate, up to and during the period of exceedance and of the meteorological conditions during the period of the breach.</p> <p>The visual inspection of the ongoing construction works will include inspection of oil separators for hydrocarbon breaches, inspection of surface drainage and outfalls for evidence of cloudy discharges and to provide a record of the turbidity value recorded, geomorphological inspection for evidence of erosion, geotechnical failure, sediment accumulation, vegetation change, pollution and discolouration and construction litter.</p>
Consultation with Project management and Planning of Remedial Actions	Environmental Advisor / Environmental Officer / Project Manager	Evaluate findings of monitoring to determine the cause of the physical or chemical change in surface water conditions and design the appropriate course of remedial action, if required.	Evaluate findings of monitoring to determine the cause of the physical or chemical change in surface water conditions and design the appropriate course of remedial action, if required.
Implementation of Remedial Actions	Environmental Advisor / Environmental Officer / Project Manager / Environmental Manager	<p>Changes to working practices including implementation of silt fences and hay /heather bales.</p> <p>Maintenance clearance of filter drains to the shaft platform areas, maintenance of oil separator, and maintenance of construction vehicles.</p> <p>Changes to working practices (CEMP).</p>	Implementation of additional emergency surface water management measures including hay/heather bales, silt busters and silt fences, absorbent spill pads and boons, environmentally friendly coagulant, or additional oil separators.

Procedure	Responsibility	Control Value Breach	Compliance Value Breach
		Surface Water Quality and Stream Geomorphology	Surface Water Quality and Stream Geomorphology
		Implementation of additional surface water management measures, such as additional filter drains, or oil separators.	<p>In the case of grout/cementitious contaminants, all grouting works should be stopped immediately. Instream/spring mitigation such as silt fencing and heather baling should be used to arrest further contamination.</p> <p>Maintenance clearance of filter drains to site road, oil separators and of construction vehicles.</p> <p>Changes to working practices (CEMP)</p>
Reporting	Environmental Advisor / Environmental Officer	Report to include details of exceedance, inspection, and remedial actions	Report to include details of exceedance, inspection, and remedial actions

ATTACHMENT D – MONITORING LOCATIONS

