REPORT SDL4680
SEPTEMBER 2026

SPECIFICATION FOR THE TREATMENT OF MINESHAFTS

for land at
CLIFFE LANE, GOMERSAL

Prepared for
KEEPMOAT HOMES WEST YORKSHIRE LIMITED

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SITE:	CLIFFE LANE, GOMERSAL		
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Drawing No.	Title	Scale
SDL4680/SP/01	Site Location Plan	1:25,000
SDL4680/SP/02	Mine Entry Location Plan	1:1,000

1. INTRODUCTION

Sirius Drilling Limited (Sirius) have been commissioned by Keepmoat Homes (Yorkshire West) Limited (Keepmoat) to prepare a specification for the investigation and treatment of two recorded mine entries at their proposed development site off Cliffe Lane, Gomersal.

It is understood that Keepmoat intend to develop the site with residential properties, associated carriageways and landscaped areas.

A Geoenvironmental Appraisal Report has been prepared for the site by Lithos, which confirmed the presence of two recorded mine entries at the site. The investigation also confirmed the site is underlain by the Middleton Little Coal and Middleton Main Coal seams; however, these are at such a depth that workings within the seams do not pose a risk to the proposed development.

It is proposed that the two recorded mine entries will be probe drilled to confirm the full depth nature of the backfill. It is then proposed to undertake stabilisation of the backfill by drilling and reverse stage pressure grouting. Should the probe drilling encounter any staging or voids within the shaft backfill, further assessment of the remedial treatment may be required, in consultation with the Mining Remediation Authority.

A plan showing the recorded positions of the two mine entries is enclosed within Appendix A.

On completion of the drill and grout programme, a validation report containing copies of borehole records, procedures followed during the works, the results of validation boreholes and pressure tests, and a record of any deviation from this specification will be produced and issued to the client and all other relevant parties, including the local authority.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview

Location	The site is located in the Gomersal district, c. 8km southeast of Bradford city centre. A site location plan is provided as Drawing No. SDL4680/SP/01 within Appendix A.
National Grid Reference	420300, 426340
Topography and Features	The site comprises an irregular shaped parcel of land which slopes down to the south at a typical angle of 1 in 12, although locally steeper slopes are present. A small pond and fenced area used as a smallholding is present in the south west corner of the site.
Approximate Site Area	3.8 Hectares.
Current Land Use	The site comprises grassed fields, in places crossed by hedgerows with occasional mature trees and fencing along the boundaries.
Adjacent Land Uses	The site is bound to the south, east and west by residential properties and occasional farm or stable buildings. Ferrand Lane forms the northern boundary with open fields and farmland beyond.

3. GEOLOGICAL SETTING

A summary of available published geological information is provided in Table 3.1 below.

Table 3.1 Geological Summary

Sources of Information	BGS 1:50,000 scale geological map (Huddersfield, Sheet 77, 2003). BGS 1:10,000 scale geological maps (Birstall, Sheet SE22NW, 1999)
Made Ground	None indicated on the BGS plans.
Drift Geology	No superficial deposits are indicated on the BGS plans.
Solid Geology	Solid strata underlying the site comprises the Lepton Edge Rock, a named sandstone unit within the Pennine Lower Coal Measures Formation (PLCMF) and Lower Coal Measures strata which comprise undifferentiated mudstones, siltstones, sandstones, coal seams and

	seatearths.
Mining and Quarrying	**Coal Seams:** The Middleton Little Coal is shown to outcrop in the northwest of the site, dipping to the southeast and underlying the central and eastern site areas. The seam has a recorded thickness of 0.30 to 0.70m in the area. The Middleton Main Coal underlies the Middleton Little with a parting of approximately 20m. The seam has a recorded thickness of between 0.70 and 1.40m. **Coal Mining:** A large part of the site is noted to be in a Development High Risk Area due to the presence of mine entries and probable unrecorded shallow mine workings. **Mine Entries:** There are two recorded mine entry (MRA ref. 420426-005 & 006) within the site boundary, located in the central southern area in close proximity. Review of the MRA online interactive viewer indicates a further two recorded mine entries within c. 100m of the eastern boundary. **Opencast Coal & Quarries:** There are no quarries or recorded opencast sites within 250m of the site.

4. PREVIOUS INTRUSIVE INVESTIGATIONS

4.1. General

The Geoenvironmental Appraisal Report prepared by Lithos in April 2026 comprised of a review a previous reports and published information, as well an intrusive investigation and Coal Mining Risk Assessment.

Intrusive investigations undertaken by Lithos comprised the drilling of 11 No. rotary open hole boreholes and 25 machine dug trial pits.

4.2. Summary of Relevant Findings

"The Mining Remediation Authority holds records of two known mine entries located within the site's boundary. There are no further details regarding shaft diameter or depth of bedrock.

The MRA discourage development over or adjacent to shafts. The recommended no build zone around deep shafts is usually defined by a line drawn up at 45o from the top of the shaft, where it intercepts rock head.

The shafts here are likely in excess of 50m deep and probably associated with mining of the Silkstone and Whinmoor Coal Seams. At this stage, it is proposed that each shaft be located via trial trenching. Assuming they have been backfilled and rockhead is present at relatively shallow depth (<3m or so), it should be acceptable to treat each one by construction of a suitable reinforced concrete cap at rockhead.

At both shaft locations bedrock is likely lie within 3m of ground level. Consequently, these shafts should be capped at or below rockhead. The cap should be a least twice the internal diameter of the shaft and be designed by a competent structural engineer. Detailed cap design is beyond the scope of this report but should also include gas venting measures.

Localised Made ground was encountered around the two recorded mine entries (MRA ref's. 420426-005 & -006) and in TP101. The Made Ground comprised a veneer of Made Ground Topsoil (300mm thick - slightly sandy Clay with gravel of mixed lithologies, coal and clinker) over Granular Made Ground (to 0.6m depth - clayey gravel of coal, mudstone, sandstone and clinker.

Within the footprint of the two mine entries (Shaft 005 & Shaft 006), Shaft Backfill was encountered, which extends to depths of greater than 3.0m (likely to some or full thickness of the shafts) and which comprises Gravel of mudstone and occasional brick, coal and sandstone.

Rockhead was encountered in trial pits from between 1.8m and 3.0m depth and typically comprised medium strong Sandstone.

The Middleton Little Coal is absent beneath this site – likely either very thin, of washed out in the immediate area. The Middleton Main Coal is present from as shallow as 17.6m depth;

- *The coal has a typical seam thickness of up to 1.4m.*
- *5 of 7 probeholes to the Middleton Main encountered evidence of workings (although evidence in two probeholes was 'tentative').*
- *A sufficient thickness of competent cover is present above the Middleton Main Coal Seam to mitigate the risks posed to surface stability and the proposed development*

The mine entries were located during the 3rd party ground investigation and Lithos re-exposed both entries to confirm their exact position and allow for the features to be surveyed in.

Excavation encountered a veneer of Made Ground Topsoil over Shaft Backfill (sandy slightly clayey Gravel of mudstone and occasional siltstone, brick and coal) which extends down the shaft to greater than the depth of excavation (up to 3.0m). With depth, the Shaft Backfill includes a portion of mudstone cobbles.

Mine entry ref. -005 was found to be unlined and circular in shape with a diameter of 1.7m (at 3.0m depth). The surveyed position of the centre of Shaft -005 is 420280.39E / 426311.11N 141.018mAOD.

Mine entry ref. -006 was found to be unlined; previous excavation made the shape and diameter difficult to determine but it appeared to be roughly circular in shape and about 2.0m in diameter. The surveyed position of the centre of Shaft -006 is 420270.00E / 426322.00N 139.440mAOD."

4.3. Outline of Required Treatment Works

It is proposed that full depth probing and treatment by reverse staged pressure grouting is undertaken. Based on the surveyed dimensions of the two shafts it is anticipated that treatment will be undertaken via a single central borehole with a second 'test' borehole completed using the same procedures. Treatment will be undertaken in accordance with CIRIA C758D.

The layout of the mine entries is indicated on Drawing No. SDL4680/SP/02 in Appendix A.

5. CONSTRUCTION DESIGN MANAGEMENT REQUIREMENTS

5.1. General

The Drilling and Grouting Contractor (the 'Contractor) will be supplied with details of all known underground services prior to commencement of the Contract. It shall be the Main Contractor's responsibility to confirm that each borehole is clear of all underground services, above ground services, equipment and property prior to commencing operations.

The Contractor shall be responsible for preparing and providing a Method Statement and Risk Assessment for the works, and for gaining a Permit to undertake the work from the Mining Remediation Authority, prior to commencing operations. No works shall commence without obtaining Permission from the Mining Remediation Authority.

All works shall be carried out in accordance with the Construction Design Management (CDM) Regulations current at the time of the contract, and the Contractor's Method Statement and Risk Assessment, as agreed with the Mining Remediation Authority, and where applicable, with BDW's Health and Safety Plan.

6. SUPERVISING GEOENVIRONMENTAL ENGINEER

6.1. General

Sirius Drilling Limited shall appoint a suitably experienced and qualified Geoenvironmental Engineer (GE) to supervise the works as required, and to provide support and advise on relevant matters.

The GE shall attend site as required to ensure that the requirements of this strategy are complied with. The responsibilities of the GE shall include, but not be limited to, the following:

- Liaison with Keepmoat and statutory bodies in relation to the treatment works;
- Supervision and quality control of the works;
- Implementation of contingency measures if unexpected conditions are found during the works;
- Review of site records and test results as they become available and make comment and act upon those results accordingly; and,
- Production of a validation report, covering the treatment of the mine workings and mine shafts.

7. GENERAL SPECIFICATION

7.1. Constituent Materials for Grouting

Water shall be from the mains supply or other source approved by the GE and supplied by the Client.

Cement shall be CEM II 32.5, conforming to BS EN 197-1: 2011.

PFA complying with BS EN 12715: 2000 shall be conditioned hopper ash, or dry powder ash, or a type suitable as a constituent for grout and obtained from an approved supplier.

Sand shall generally comply with BS882 and be of a grading suitable for use in the Contractor's plant and approved by the GE.

Pea gravel shall comply with BS882 and be of grading approved by the GE.

Thixotropic admixtures shall be bentonite, or another admixture approved by the GE.

7.2. Storage and Use of Materials

Storage of materials shall be such as to prevent contamination and deterioration. Cement shall be kept in a dry location, and the sequence of deliveries recorded so that cement can be used in rotation.

PFA shall be stored within a pre-defined area and will be kept dampened to mitigate against fugitive dust.

7.3. Grouting Plant

The Contractor shall submit to the GE for approval, details of the proposed method of mixing and pumping of grout to the injection points, together with the means of monitoring grouting pressures and the quantities injected.

The materials shall be introduced into the mixer via approved methods.

The grout mixer shall be capable of producing a homogenous mix, all particles being thoroughly wetted without segregation.

7.4. Grout Mixes

With consideration to the future use of the area, the material shall generally consist of a PFA: cement grout which should be mixed in the proportions of to 10:1 PFA:cement.

The mixes shall produce cubes with crushing strengths of not less than 1.0 MN/m^2 at 28 days (Note: a 7-day test is performed to indicate that the 28-day strength is achievable a 7-day value of about 0.4MN/m^2 would probably be considered on target).

Where excessive lateral flow of grout is anticipated or when voids greater than 500mm are encountered, the GE may instruct or agree to the addition of sand or pea gravel to the mix in accordance with CIRIA C758D. The specified grout mix shall have the minimum water content consistent with effective pumping.

The actual proportions to be used initially for the various grouts shall be agreed with the GE paying due regard of the conditions met in drilling and the results of any trial grouting carried out before work commences.

7.5. Grout Properties and Testing

With water / (cement and PFA) ratios generally in the range of 0.4 to 0.45, (including the moisture in the aggregates), the mixes proposed should produce pumpable grout with flowability readings of between 300 to 600mm, when measured in a meter of the “Colcrete” type.

The sample for the flowability test shall be obtained by the grouting Contractor at the point of injection i.e. from the end of the tremie pipe.

A minimum of two flowability tests per week shall be performed by the Contractor as directed by the GE.

High-bleed grouts shall be avoided. Bleed capacity should be limited to 5% maximum unless agreed otherwise with the GE.

A minimum of two bleed capacity tests shall be performed by the Contractor per shift or as directed the GE. The sample of grout for the test shall be taken from the point of injection i.e. the end of the tremie pipe.

Bleed capacity shall be measured in a clear plastic or glass graduated cylinder which has an internal diameter not less than 50mm and with a volume of approximately 1000ml. After placing

the grout, a cover shall be placed over the cylinder to avoid evaporation. Bleed capacity shall be read at hourly intervals for neat cement grout, and readings should continue for not less than 3 hours. For PFA:cement grouts readings should continue for not less than 6 hours.

The Contractor shall prepare two sets of test cubes of grout per week, or as directed by the GE.

Each cube shall be of 100mm side, or as agreed with the GE, and shall be taken from the grout at the point of injection i.e. the end of the tremie pipe.

At the instruction of the GE, the Contractor shall arrange for them to be tested by crushing at 7 and 28 days in accordance with BS1881.

The testing shall be carried out by an independent laboratory or as agreed with the GE. The results of all testing shall be supplied to the GE within 5 days of receipt of results from the laboratory.

As stated previously mixes shall produce cubes with crushing strengths of not less than 1.0 MN/m^2 at 28 days.

If the GE considers the results of the test indicate that a change of mix proportions is required, the Contractor shall make such modifications as the GE may direct.

7.6. Stabilisation Procedures for Treatment of Mine Shafts

The recorded mine entries or any unrecorded mine shafts which are encountered during the works shall be stabilised in accordance with the recommendations given in the NCB handbook 'The Treatment of Disused Mine Shafts and Adits.' and CIRIA C758D.

All work on or about old mine shafts must be carried out from a safety platform of adequate dimensions that will span the potential collapse zone and support the crew and equipment should a catastrophic failure of the shaft occur.

Prior to work commencing on any mine shaft, the area will be inspected to ensure that the safe movement of heavy equipment can proceed. This will be carried out by a competent, experienced person who will be securely fastened to the surface by means of a full body harness anchored a minimum of 10.0m away from the shaft perimeter.

In the unlikely event that any shaft is found to be open from the surface, then it shall be backfilled with graded material by others. Any such material will be introduced directly into the shaft from the surface utilising equipment such as a 360 excavator or conveyor.

If the shaft is backfilled, then reversed stage pressure grouting of the infill material will be undertaken. Such treatment is achieved by a combination of permeation grouting and low-pressure compaction grouting of the infill material which forms an enhanced bond between the infill and the shaft lining / country rock.

Treatment will therefore be undertaken in the following manner.

A safety platform comprising rigid steel and wooden shaft frame will be mounted over the shaft mouth to ensure that any slumping of the shaft infill will not jeopardise the stability of the drilling rig and the safety of the crew.

Once the safety frame is in place, the drill rig will be positioned over the shaft to allow the sinking of a centrally located borehole through fill material.

To confirm the exact location of the mine shaft, a series of trial boreholes may be required, penetrating superficial deposits to confirm the presence of rockhead. If, following trial boring, the central point of the shaft cannot be accessed from the safety platform, then the safety platform shall be repositioned to allow appropriate access.

Treatment will involve the drilling of a single borehole to the base of the shaft and at least six metres into natural strata. This is to ensure that no “staging” is present within the shaft and that the actual shaft base has been reached. Shaft staging would typically be encountered within the first 50.0m below ground within shafts although no hard or fast rules can be applied to this. Staging can be a problem if, over time, it deteriorates to such an extent that catastrophic failure of the infill material occurs.

On completion of the first borehole temporary steel casing or oversized drill rods will be inserted into the borehole. This casing \ oversized rods form the basis of the reversed stage pressure grouting technique.

The grouting operation will commence on completion of the borehole and will involve direct injection down the borehole under pressure through the drill rods or casing in ascending 3.0m stages.

The grout will possess water: solids ratio of no more than 40% giving an approximate compressive strength of 1.0 MN/m^2 @ 28 days.

Grout will be mixed by loading hopper conditioned PFA and bagged Cement directly into the mixer via a front-loading shovel and by hand. Water supplied from the approved water source will then be added to the mix to produce grout of the correct consistency.

The grout mixer will be capable of producing a homogenous mix, with all particles being thoroughly wetted without segregation occurring.

The grout will be mixed and injected using a 50mm diaphragm pump operating at around 100 psi and will be pumped via 50mm reinforced grout hoses into borehole. This will continue until either a maximum pressure is reached, or refusal of grout occurs. A length of casing will then be extracted, and the process repeated until the complete length of the shaft has been treated.

Should any significant thickness of permeable / granular fill be present on site, grouting may need to be terminated at the level of the base of such material.

If any significant voids are encountered during the operation, a grout - pea gravel mix will be introduced into the borehole to restrict excessive movement of grout. However, should any major mining feature such as roadways running off the shaft be suspected these may require investigation and treating separately from the shaft.

Records of location and treatment work, including borehole records, plans and details of grout takes shall be provided to the GE within 48 hours of completion of the works.

7.7. Services

The Contractor shall take all necessary precautions, including making all reasonable liaison with the Client, to ascertain the positions and depths of underground services and drains passing through the site, making full allowance for working around and protecting live services and drains.

When introducing grout into any borehole the Contractor shall ensure by regular inspections throughout the day that the grout is not entering adjacent drains, services, culverts and ducts. In the event that any such leakage is detected, the Contractor shall immediately suspend the grouting operations and commence to remove any accumulated grout.

7.8. Records

The Contractor shall prepare, and keep available for inspection on site, plans showing the positions of all boreholes and daily drilling records (see below), together with the total amounts of grout injected.

The plans shall be updated daily in conformity with the Records noted below. On completion of the works, the Contractor shall give fair copies of the plans and sections to the GE within one week of completion of the programme of grouting.

As works proceed, the Contractor shall maintain separate daily records for drilling, for grouting and for materials and plant received in a form to be approved by the GE. The daily records signed by the Contractor's agent shall be submitted each day to the GE for his agreement. The Contractor shall provide one copy of the agreed record for the GE's retention and keep a further copy available for inspection on site.

Daily drilling records shall be provided for each borehole and contain the following information:

1. Job title and location
2. Borehole reference number
3. Date
4. Contractor's name
5. Plant in use, crew members and hours worked
6. Method of boring or drilling
7. Type, diameter and depth of casing used
8. Diameter and depth of hole at the beginning and end of each working day or shift
9. Loss of any flushing medium during drilling
10. Standing time, with reason, or time lost overcoming obstructions
11. Details of underground services located
12. Details of any settlement or ground heave
13. Daily and cumulative length drilled
14. Depth to each major change of stratum
15. Description, with identification, of the stratum and whether it is intact or broken

16. Each depth at which groundwater is encountered (if apparent), the depth to which it rose, and any steps taken to stop the flow

17. Depths at which any samples are taken

18. Details and results of any permeability tests instructed by the RE

19. Details of any voids or suspected workings

20. Details of any emissions of gas, water, etc.

21. Depth of completed borehole

Daily grouting records shall be provided for each borehole and contain the following information:

1. Job title and location

2. Borehole reference number

3. Date

4. Contractor's name

5. Plant in use, crew members and hours worked

6. Details of type of injection grout-line dimensions and length of standpipes inserted

7. Type of grout mix and volumetric quantity injected including total quantity by weight by each type of grouting material introduced

8. Grout pressures recorded, with the corresponding depths

9. The results of all flow and bleed tests

10. Details of casing abandoned

11. Details of grouting materials delivered to the site and a running total of each of the materials delivered

12. The nature, frequency and results of all inspections of services to check for grout penetration

13. Details of all stoppages or delays and any other relevant information

The daily records of materials and plant received shall show, in particular, that day's quantities by weight of each type of material and cumulative quantities. With the daily records, the Contractor shall submit to the GE copies of receipts or invoices for all materials delivered and he shall keep them on site until the Works are complete.

Notwithstanding the information listed above, the Contractor shall provide any other information required by the GE.

On completion of the drill and grout programme, the GE shall prepare a validation report containing copies of borehole records, a borehole location plan, procedures followed during the works, the results of validation boreholes and pressure tests, and a record of any deviation from this specification.

8. REGULATORY APPROVALS

This Specification is considered suitable and appropriate based on the findings of the site investigation. This Specification will be submitted to the Mining Remediation Authority by Sirius as part of the permit application process. However, it cannot be guaranteed to gain regulatory approval and, therefore, should be passed to the any other appropriate regulatory authorities and/or other organisations for their comment and approval prior to commencing any works on site.

APPENDIX A

FIGURES, DRAWINGS AND PLATES



NOTES

SITE BOUNDARY

MINE ENTRY LOCATION

REVISION		BY	DATE
0	>>	>>	>>
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

SIRIUS
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CLIENT

KEEPMOAT HOMES LIMITED

SITE

CLIFFE LANE GOMERSAL

DRAWING TITLE

MINE ENTRY LOCATION PLAN

DRAWING NO.	REVISION NO.
SDL4680/SP/02	0
DRAWN BY	**APPROVED BY**
NJI	JCC
DATE	**SCALE**	**PAPER SIZE**
SEPTEMBER 2026	1:1,000	A3