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1. Introduction

Planning permission is being considered for the development of a detached dwelling at the above location subject to the mining legacy risks been fully realised and mitigated from on site, if necessary. Cape Site Services has now undertaken this work via an intrusive site investigation of 4 boreholes, the location of which is outlined on plan no. 00305/B – as attached and illustrated in appendix 5.2.

2. Scope of the Report

The mining legacy risks to the development are as follows:

- Instability from shallow underground coal workings in the Newhill seam
- Uncharted mine entries
- Fugitive gas emissions

As such, these risks need to be properly determined to ensure sound stability for the development. A borehole investigation consisting of 4 holes was deemed a reasonable level of investigation in the outset regarding potential void migration given the scale and nature of development combined with the available geological and mining information. A watching brief would also be implemented for any signs of mine entries.

It should be noted that this investigation is focused mainly on determining stability from potential shallow historic coal workings and will only provide limited information regarding the risks of uncharted mine entries. A good level of detail should be obtained to provide a more informed opinion as to fugitive gas risks.

3. Site Investigation

3.1 Methodology

Prior to the intrusive site investigation, a search for utilities was undertaken both via online data providers and physically on site using a Cable Avoidance Tool (CAT). Boreholes were marked out with tape measure from boundary lines as illustrated on plan no. 00305/B outlined in appendix 5.2. As part of the mine entry watching brief, a pre survey was undertaken with no visible evidence of any uncharted mine entries. The process for the intrusive coal seam investigation is outlined via the system chart in appendix 5.4.

An investigation utilising a tracked Beretta Rotary Drill Rig equipped with 2m long 75mm diameter drill rods was deemed appropriate in this instance along with water flush techniques to analyse returns and minimise any risks associated with mine gas emissions and spontaneous

combustion. Gas monitoring equipment would be employed during works for risks associated with Methane, Carbon Monoxide, Oxygen and Carbon Dioxide. Prior agreement had been secured for these works from the Coal Authority -permit ref: 25967 – as attached for reference in appendix 5.5.

Considering the geological/mining details boreholes were decided to be taken to either 1m below the base of the Newhill coal seam/workings or to 20m if not encountered.

The works were to be supervised by the Drilling Engineers Mr. S. Fish and Mr I. Wiles, and overseen by the Principal Engineer Mr. M. Lyons.

3.2 Interpretation of Findings

Drilling log sheets are detailed in appendix 5.3. Boreholes 1, 3 and 4 proved 1.0m of fill material, with borehole 2 proving 1.7m of fill. Hole no. 3 proved 0.5m of clay beneath the 1m of fill, whilst all other holes proved brown sandstone bedrock with interbedded mudstone. Strata then transitioned into a grey silty mudstone, below which an intact coal seam was encountered at: 7.1m deep in BH1, 6.4m deep in BH2, 6.6m deep in BH3 and 7.2m deep in BH4. The coal seam was proved to be up to 1.2m in thickness which is consistent with being the 'Newhill' coal seam. Firm grey silty mudstone was then proved below the Newhill coal seam.

No signs of underground shallow workings or unstable ground were encountered at any of the four borehole locations, with water flush maintained throughout drilling. Had the holes travelled through coal pillars associated with historic shallow pillar and stall type mining, we would have expected an element of loss of flush from the weakening of lateral support to the strata through settlement and weathering. No fugitive gases were detected at any point during the drilling operations.

The logs appear to match well at the same elevation which would infer no signs of any geological faulting between the borehole locations.

4. CONCLUSIONS AND RECOMMENDATIONS

- 1) Although the Newhill coal seam lies within an influencing depth of the proposed development, the four boreholes undertaken have proved stable ground conditions with no shallow coal workings in the areas investigated; approximately the four corners of the proposed footprint area - given current designs/layouts. At such a relatively shallow depth and considering the findings/maintenance of flush, along with past mining information for this seam, it is very unlikely that historic underground mining has taken place. However, slight risks will always remain for such in areas not covered by this investigation. Usual foundations could be considered with the appointed Building Control department (taking into account the fill/clay), although some element of strengthened foundations (such as strengthened strip footings for example) may be considered prudent to further reduce any

slight shallow mining risks. Regulators should be consulted for their agreement of any such proposals prior to development taking place.

- 2) No signs of any mine entries were observed during the investigation, however slight risks are always present within the exposed coalfield for discovering such features. Watching briefs would be prudent during future ground works for any associated signs of either an old mine shaft or adit. The Coal Authority should be notified where any such feature is suspected.
- 3) No fugitive gases were encountered, and given the findings the risk of such to impact on development is considered low.

This report and future development proposals should be submitted to the regulators for their approval prior to any works taking place.

I trust that this satisfies your requirements, however please do not hesitate to contact myself at any time for further clarification or advice.

Yours Sincerely,

M Lyons

M. Lyons
Consultant Mining Engineer
BSc CSci MIMMM

Enc.

THIS SITE INVESTIGATION INTERPRETATIVE REPORT IS BASED ON AND LIMITED TO THE INFORMATION IN MY RECORD AT THE TIME THE ENQUIRY IS ANSWERED. It is based on my professional opinion in line with the guidelines set out in CIRIA Special Publication 32 - "Construction Over Abandoned Mine Workings." The opinion may be overruled by Government Authorities based on other information not in my record. Further site investigations may be undertaken which would supersede the factual findings of this investigation. Copyright in this report belongs to M.A.Lyons. All rights are reserved and unauthorised use is prohibited. Copyright is not transferred to external parties by possession of this report, however, those for whom the report is compiled have the right to use it. If any unauthorised third party comes into possession of this report, they rely upon it entirely at their own risk and the author does not owe them any Duty of Care or Skill.

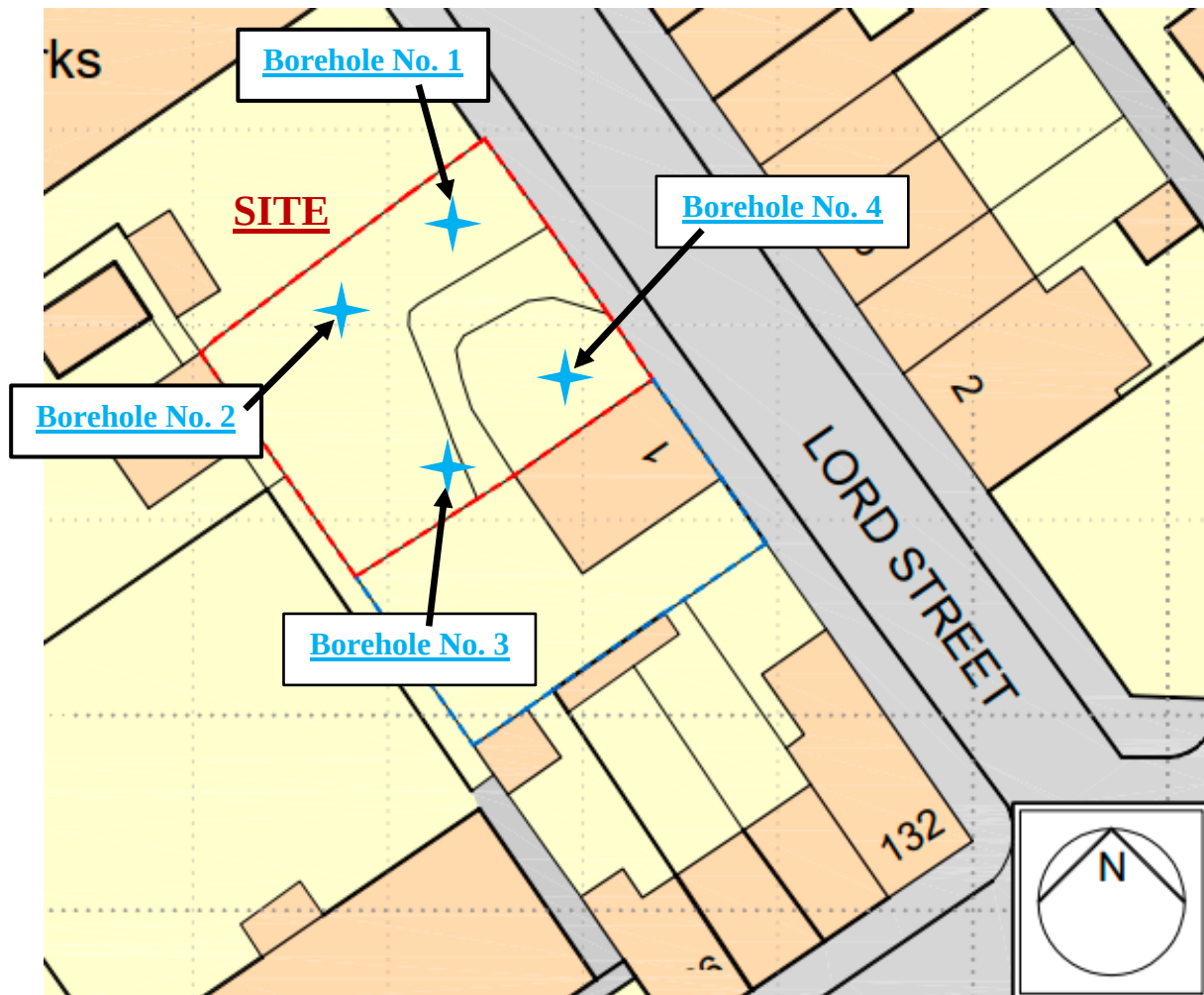
5 Appendix

5.1 References

- 5.1.1 CIRIA C758D ‘Abandoned mine workings manual’.
- 5.1.2 British Standards Institution: BS 5930:2015 ‘Code of practice for ground investigations’ BSI 2015.
- 5.1.3 British Standards Institution: BS EN ISO 14688-1: 2002 + A1 2013 ‘Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 1 - Identification and Description. BSI 2013.
- 5.1.4 British Standards Institution: BS EN ISO 14689-1: 2003 ‘Geotechnical Investigation and Testing – Identification and Classification of Rock – Part 1 – Identification and Description. BSI 2003. Incorporating Corrigendum No. 1 February 2007.
- 5.1.5 British Standards Institution: BS 10175 ‘The Investigation of Potentially Contaminated Sites. Codes of Practice’. BSI 2011+A1 2013.
- 5.1.6 British Standards Institution: BS EN ISO 22476-3: 2005 + A1 2011 ‘Geological Investigating and Testing. Field Testing. Standard Penetration Test’.
- 5.1.7 British Standard 1377:1990 Parts 1-9 ‘Methods of Test for Soils for Civil Engineering Purposes’.

5.2 Borehole Location Plan No. 00305/B

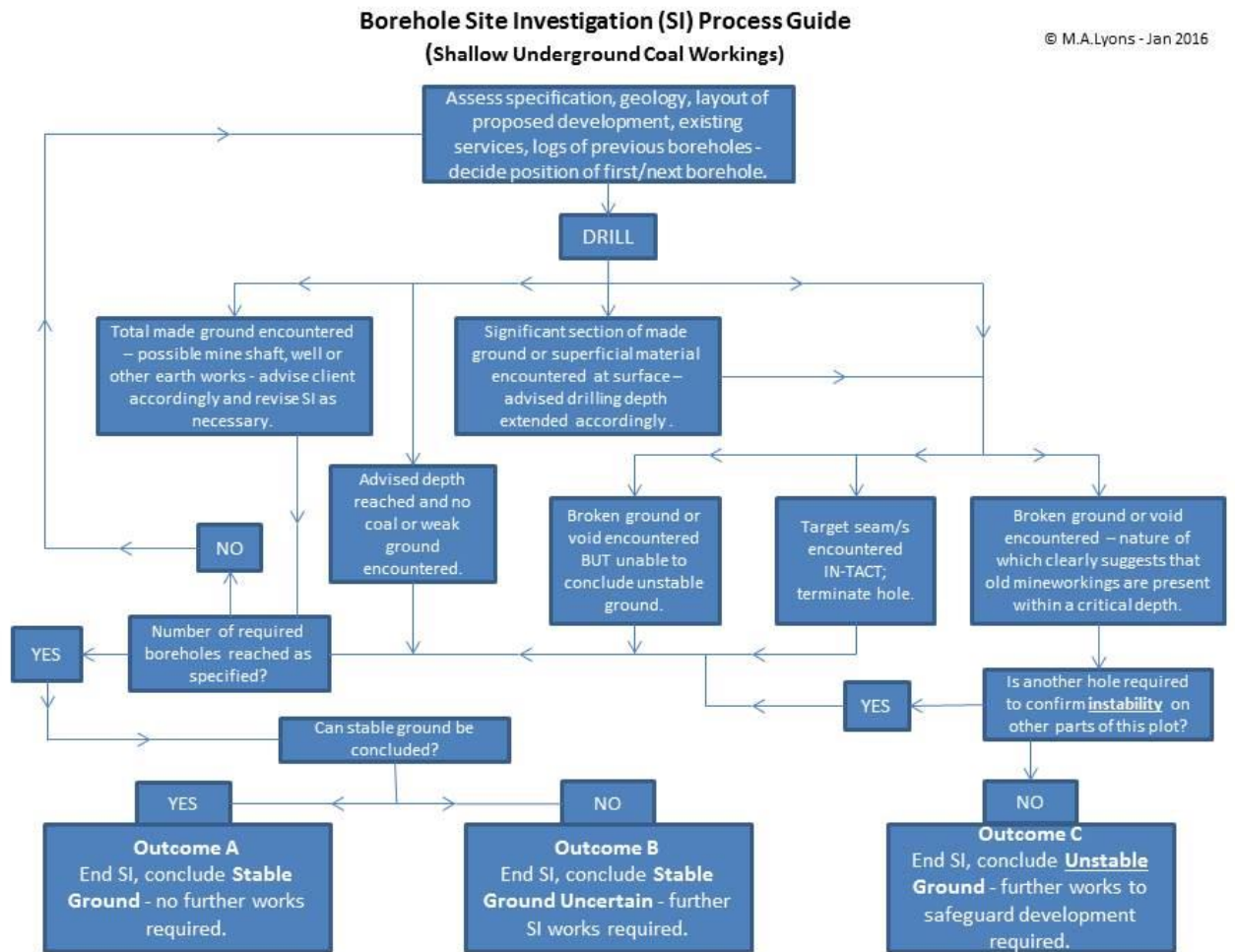
LAND ADJACENT 1 LORD STREET, HOYLE
MILL, BARNSELY S71 1HZ



5.3 Drilling log sheets

Client: Mark Lyons	Site: Land Adj, 1 Lord Street, Hoyle Mill, Barnsley, S71 1HZ		Cape Site Services unit 2, rear of Castle Buildings Carlton Road, Barnsley, S71 3HX	
Date: 15/12/22	Method: water flush	Permit No: 25967		
Driller: Ian Wiles			Driller Assistant: richard hawkins, Simon Fish	
Drillers Signature:			Page No:	
Measurements In Meters				
BH No:	FROM	TO	THICKNESS	DESCRIPTION
1				
	0	1	1	Fill
	1	2	1	Sandstone brown mudstone interbedded
	2	4	2	Mudstone brown/grey with sandstone bands
	4	7.1	3.1	Mudstone grey silty
	7.1	8.2	1.1	Coal
	8.2	15	6.8	Mudstone grey silty
2				
	0	1.7	1.7	Fill
	1.7	3.3	1.6	Sandstone brown mudstone interbedded
	3.3	4.5	1.2	Mudstone grey with sandstone bands
	4.5	6.4	1.9	Mudstone grey silty
	6.4	7.6	1.2	Coal
	7.6	9	1.4	Mudstone grey silty
3				
	0	1	1	Fill
	1	1.5	0.5	Clay
	1.5	2.3	0.8	Sandstone brown mudstone interbedded
	2.3	4.2	1.9	Mudstone grey with sandstone bands
	4.2	6.6	2.4	Mudstone grey silty
	6.6	7.7	1.1	Coal
	7.7	9	1.3	Mudstone grey silty
4				
	0	1	1	Fill
	1	1.9	0.9	Sandstone brown mudstone interbedded
	1.9	4	2.1	Mudstone grey with sandstone bands
	4	7.2	3.2	Mudstone grey silty
	7.2	8.3	1.1	Coal
	8.3	9	0.7	Mudstone grey silty

5.4 Site Investigation Process



5.5 Coal Authority Permit



The Coal
Authority

Permit to Enter or Disturb Coal Authority Interests

Permit 25967

Name and Address of Permit Holder:

*TMR Williams Properties Ltd
5 Bateman Close
Cudworth
Barnsley
S72 8BS*

Site Location:

*Land Adj
1 Lord Street
Hoyle Mill
Barnsley
S71 1HZ*

This certificate hereby grants the above named Permit Holder a Permit to carry out:-

Ground investigation by four boreholes to 15m to determine ground conditions within the Authority's interests at the identified site location above as shown on the Grant Permit Boundary (overleaf) for the period of **12 months** from the granted date shown below. *The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Permit Holder's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.*

Conditions:

- *Manned entry (i.e.) into mine entries/workings is strictly prohibited.*
- *Water flush*
- *Gas Monitoring CO, CH₄, CO₂, O₂ at borehole and rig*
- *Operators undertaking the work must be in possession of this certificate and the Permit boundary plan at the time of works*
- *Appropriate borehole sealing without delay and to withstand site level changes*

Signed: Izaak Hayes Granted Date: 12/12/2022

For and on behalf of The Coal Authority

*Nominated Representative: Izaak Hayes, Permitting Manager;
The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG
Tel: 01623 637147; E-Mail: permissions@coal.gov.uk*