

**Mr Rob Agus
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**CAPE SITE SERVICES
COAL MINING & GEOTECHNICAL
CONSULTANCY**

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Date: 26th April 2019
Your ref: (S74 8JR)
My Ref: SI 00208

FOR THE ATTENTION OF MR ROB AGUS

Dear Sir,

**COAL MINING RISK INTERPRETATION REPORT – FOLLOWING THE SITE
INVESTIGATION FOR PROPOSED RESIDENTIAL DEVELOPMENT AT LAND ADJACENT
44 WILKINSON ROAD, ELSECAR, BARNSELY S74 8JR**

I am pleased to supply the following report for the above named project and trust that this satisfies your requirements. 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

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1. Introduction

Planning permission is being considered for the development of two detached dwellings 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 3 boreholes, the locations of which are outlined on plan no. 00208/B – as illustrated in appendix 5.2.

2. Scope of the Report

The mining legacy risks to the development are as follows:

- Instability from shallow coal workings in the Kents Thin coal seam
- Geological faulting
- 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 between 2 to 6 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 and fault displacements within the strata.

Considering a thickness of the Kents Thin coal seam of up to around 0.8m, along with the fact that no other workable seam is expected to interact below the Kents Thin seam horizon (local evidence indicates the deeper Kents Thick seam to be at a depth and thickness that should not affect the surface be it worked or otherwise), boreholes were decided to be taken to either the base of the coal/workable strata or to a maximum of 15m.

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. 00208/B outlined in appendix 5.2, where boreholes to investigate the coal seam are marked as 'BH'. 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 Baretta Rotary Drill Rig equipped with 2m long 100mm diameter drill rods was deemed appropriate in this instance along with water flush technique 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. Any boreholes emitting a dangerous level of methane would be terminated and sealed immediately. All holes were filled and sealed with bentonite immediately upon termination. Appropriate permission for these works were agreed with the Coal Authority – permit ref: 17599.

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

All three boreholes proved similar section of natural strata with no real indications of the expected geological faulting. A thickness of ‘Topsoil and Fill’ was proved of around 0.6m deep to weathered sandstone bedrock in the region of 2m in thickness. Firm strata of sandstones and mudstones were then proved of around 6m in section above an intact coal seam recorded as 700mm in thickness. The coal encountered was considered very poor or ‘dirty’ quality with intermittent bands of dark mudstone being apparent. Given the local geological and mining information it was considered that this was indeed the Kents Thin seam and therefore holes were terminated in the firm mudstone underlying the coal at 15m deep. Given the encountered depths and nature of the coal, three holes were deemed an adequate level of information.

No evidence of any mine workings, collapsing ground, loss of flush or fugitive gases were noted during the works and drilling in the sandstones/mudstones above and below the coal was very firm throughout.

4. CONCLUSIONS AND RECOMMENDATIONS

- 1) Although what is considered to be the Kents Thin coal seam lies beneath the property at a relatively shallow depth, no associated workings were noted in this investigation and given the depth of the coal in consideration of its thickness and the strong sandstones mudstones above, it is very unlikely that any underground workings would exist to compromise stability for the proposals. As such, no further investigation or treatment works of the shallow coal is deemed necessary.
- 2) Although geological faulting was anticipated on the site the boreholes showed no indications of any associated vertical displacements within the strata. However, considering the limitations of this borehole exercise it cannot be categorically concluded that geological faulting is not present within the site in areas not covered by this investigation. As such it may be prudent to undertake some trenching investigations, maybe as part of future foundation enabling works, in a south-west to north-easterly direction (roughly left to right as looked at from the road). This should provide more

conclusive evidence of any specific lines of weak faulted areas that may require treatment or strengthened foundations either in localised areas or throughout the footprint. Alternatively of course the trenching may prove no such areas in which case, and with appropriate consultations with the appointed building control department and structural engineers, normal footings could be utilised onto the firm bedrock. If there is any uncertainty as to ground conditions then further professional advice would be recommended.

- 3) 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.
- 4) No fugitive gases were encountered, and given the geology the risk of such is considered low. Having said this should there be any exceptionally deep excavations taking place then suitable health and safety precautions should be employed during the works with regard to possible methane emissions from the coal or for oxygen depletion/asphyxiation. In the unlikely event that methane is detected or suspected then a methane barrier within foundations would be required.

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

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5 Appendix

5.1 References

- 5.1.1 CIRIA Special Publication No 32 ‘Construction Over Abandoned Mine Workings’.
- 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



5.3 Drilling log sheets

CAPE SITE SERVICES
COAL MINING & GEOTECHNICAL
CONSULTANCY

Daily Return (Drilling)

Sheet No.	1
Date	Monday 08/04/2019
Contract Name	Mr. R. Agus
Contract No.	208
Working Day No.	1

Hole No.	Depth (m)	Casing (m)	Dia (mm)	Angle	From (m)	To (m)	Description
BH1	15.00	1.00	100	Vertical	0	0.60	Grass topsoil fill
					0.60	2.70	Sandstone brown weathered
	No loss of flush; no gas detected;				2.70	4.00	Sandstone brown silty
				4.00	7.00	Mudstone grey brown with sandstone bands	
				7.00	9.10	Mudstone grey	
					9.10	9.80	Coal very dirty with black mudstone
					9.80	15.0	Mudstone grey silty
BH2	15.00	1.00	100	Vertical	0	0.80	Grass topsoil fill
					0.80	2.20	Sandstone brown weathered
	No loss of flush; no gas detected;				2.20	4.20	Sandstone brown silty
				4.20	7.20	Mudstone grey brown with sandstone bands	
				7.20	9.40	Mudstone grey	
					9.40	10.10	Coal very dirty with black mudstone
					10.10	15.0	Mudstone grey silty
BH3	15.00	1.00	100	Vertical	0	0.60	Grass topsoil fill
					0.60	2.50	Sandstone brown weathered
	No loss of flush; no gas detected;				2.50	4.30	Sandstone brown silty
				4.30	7.40	Mudstone grey brown with sandstone bands	
				7.40	9.20	Mudstone grey	
					9.20	9.90	Coal very dirty with black mudstone
					9.90	15.0	Mudstone grey silty
					Crew (Wiles) S. Fish M. Lyons		Plant Beretta Rotary
3	45.00	3.00	Sheet Total				
0	0.00	0.00	Previous Sheet Total				
3	40.00	3.00	Cummulative Total				

Signed: *M Lyons*

Date: 08/04/2019

5.4 Site Investigation Process

Borehole Site Investigation (SI) Process Guide (Shallow Underground Coal Workings)

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