

## Millhouse Green Intrusive Coal Mining Assessment September 2021



Millhouse Green  
Intrusive Coal Mining Assessment

**Document Control**

**Project:** Millhouse Green Intrusive Coal Mining Assessment

**Client:** Edward Dillingham

**Job Number:** RBG250

Prepared and Issued by Ross Blake BSc MSc FGS, Engineer. Signed :



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<b>Contents Page</b>	
<b>Disclaimer.....</b>	<b>4</b>
<b>Introduction.....</b>	<b>4</b>
Aims and Scope .....	4
Terms and Conditions.....	4
Constraints and Limitations.....	4
Sources of information .....	5
<b>Site Details.....</b>	<b>5</b>
Site Location and Description.....	5
Proposed Development.....	5
<b>Existing Information .....</b>	<b>5</b>
Desk Based Coal Mining Risk Assessment .....	5
<b>Intrusive Coal Mining Ground Investigation .....</b>	<b>6</b>
<b>Interpretation of Findings.....</b>	<b>6</b>
<b>Conclusions and Recommendations.....</b>	<b>7</b>

**APPENDIX CONTENTS**

<b>Appendix A</b>	<b>Exploratory Hole Location Plan</b>
<b>Appendix B</b>	<b>Trench Photographs</b>
<b>Appendix C</b>	<b>Rotary Borehole Logs</b>
<b>Appendix D</b>	<b>Coal Permit To Disturb</b>

## Intrusive Coal Mining Assessment

### Disclaimer

This report was produced by **RB Geotechnical** for Edward Dillingham (The client), for the specific purpose of an Intrusive Coal Mining Investigation at the site of proposed residential development at Century Works, Millhouse Green in Sheffield, South Yorkshire. This report may not be used by anyone else other than the client without their express permission. In any event, **RB Geotechnical** accepts no liability for any costs, liabilities or losses arising from the use of reliance upon the contents of this report by anyone other than the client

## Introduction

**RB Geotechnical** was commissioned by the client to carry out an Intrusive Investigation for the Land at Millhouse Green in Sheffield, South Yorkshire. The purpose of this assessment is to satisfy planning conditions for the proposed development of one new detached house.

### Aims and Scope

The principal aims of this Intrusive Coal Mining Assessment is to interpret the information obtained from an intrusive ground investigation carried out on the site on 2<sup>nd</sup> September 2020.

Upon assessing the above information, this report will give recommendations as to whether any form of remedial works will be required to alleviate the risk posed by any (if encountered) mine workings or evidence of mine workings.

The mining legacy risks to the development are as follows:

- Instability from shallow underground coal workings
- Instability from one known mine entry
- 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 3 holes to maximum depths of 30m 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 unrecorded 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.

### Terms and Conditions

This report has been prepared for Mr Edward Dillingham in support of a planning application relating to the proposed development at Millhouse Green.

### Constraints and Limitations

This report is intended for Mr Edward Dillingham for the purpose of assisting them in assessing the site for possible coal mine workings and a mine entry.

**RB Geotechnical** has endeavoured to assess all information provided to them. The report includes summaries of information from external sources and cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon. The recommendations summarised in this report relate to the current development proposal for a block of stables. Any substantial changes to the intended

## Intrusive Coal Mining Assessment

use of the site may require a reassessment of the implications of the risks identified and a review of the findings.

The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.

It should be noted that although every effort has been made to ensure the accuracy of the data obtained from the investigation, the possibility exists for variations in ground conditions between and around the borehole locations.

### Sources of information

The following sources were used for this assessment:

- Rotary Open Hole Borehole Logs, September 2021 – Appendix C; and
- **RB Geotechnical** Coal Mining Risk Assessment, Land off Manchester Road, Millhouse Green, RBG222, March 2021.

Although every effort has been made to ensure the accuracy of any of the third-party information contained herein, no checks have been carried out to ensure the accuracy of information obtained from third parties and no liability can be accepted for any errors or misinterpretation of the third-party information where it has been incorporated into this report.

## Site Details

### Site Location and Description

The proposed development site is situated to the West of the existing warehouse buildings and the area of rough hardstanding with a small mound, off Manchester Road in Millhouse Green, situated to the West of Barnsley, South Yorkshire. The site is currently occupied by a large detached house, with a driveway and grassed gardens. The National Grid Reference for the centre of the site is 421251, 402618.

### Proposed Development

The site is intended for demolition of this large house, with two new residential dwellings built in its place.

## Existing Information

### Desk Based Coal Mining Risk Assessment

The Coal Authority Interactive Viewer indicates that the site is in a 'Development High Risk Area' which means that the site is in an area where one or more recorded coal mining related features which have the potential for instability or a degree of risk to the surface from the legacy of coal mining operations. It also indicates that the site is in an area of Recorded Shallow Coal Mine Workings, with coal outcrops mapped on site.

The Coal Authority (CA) report indicates that the site is in an area that could be affected by underground mining in 1 seam of shallow coal. The site is also stated to be in an area where a mine entry point is identified (in the North East of the site).

The Coal Authority (CA) Mine Entry Interpretative Report indicates that the exact location of the mine entry points on the site are situated away from the current building and any proposed buildings.

The BGS GeoIndex shows the site to be underlain by bedrock of the Pennine Lower Coal Measures, Sandstone, Mudstone and Siltstone. Geological maps, shows a coal seam (36 Yard Coal), mapped directly beneath the site. A fault is mapped running directly through the centre of the site, from East to

## Intrusive Coal Mining Assessment

West, with another fault mapped from approximately 50m to the East of the site, trending in a North to South direction. Historical maps show the site to be situated within the vicinity of Bullhouse Colliery, with airshafts shown on the site. A number of collieries and pits are mapped within 250m of the site boundary, throughout the historical maps. Upon inspecting online sources available, the Bullhouse Colliery was a busy colliery, where underground mining was carried out.

A Phase II Intrusive investigation was therefore recommended in order to carry out an assessment of the potential for unrecorded mine workings and the presence of a mine entry on the site.

### Intrusive Coal Mining Ground Investigation

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 the plan outlined in appendix A. As part of the mine entry watching brief, a pre survey was undertaken with no visible evidence of any unchartered mine entries.

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 to be filled and sealed as soon as possible with bentonite upon termination. Prior agreement had been secured for these works from the Coal Authority -permit ref: 22377 – as attached for reference in appendix D.

The recorded mine shaft (CA. Ref: 421402-006) and trenches were marked out with tape measure from boundary lines as illustrated on the plan outlined in appendix A. A small 3 tonne tracked excavator was utilised for the trenching exercise to investigate the position/condition of the known mine entry; working from a platform and having personnel harnessed and tethered for H&S risks regarding potential shaft collapse.

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.

### Interpretation of Findings

Borehole Logs are shown in Appendix C. Borehole number 1 in the south proved around 300mm of topsoil above relatively soft orange/brown clay, containing sandstone lumps to 5.5m deep. Firm sandstone bedrock was then recorded below this to 11m deep, transferring to a dark grey mudstone to 30m deep with no coal encountered.

Borehole number 2 in the north proved around 800mm of topsoil/fill/ash above relatively soft orange/brown clay, containing sandstone lumps to 3m deep. Firm sandstone bedrock was then recorded below this to 8m deep, transferring to a dark grey mudstone to 30m deep with no coal encountered.

Borehole number 3 centrally within the site proved around 1.8m of topsoil/fill/ash (with some cable and wire encountered) above relatively soft orange/brown clay, containing sandstone lumps to 3.5m deep. Firm sandstone bedrock was then recorded below this to 9m deep, transferring to a dark grey mudstone to 30m deep with no coal encountered.

## Intrusive Coal Mining Assessment

Water flush was maintained in all holes with no signs of coal seam, underground shallow workings, or unstable ground. 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.

Given the findings no further holes were deemed necessary regarding the shallow coal mining position.

Details of the trenching exercise are summarised in the following table; photograph images can be seen in appendix B.

Trench No.	NGR	Details
1	421239/402634	Colliery waste/fill to 1.8m – old single railway sleeper obstruction at base; natural ground/bedrock not determined; no sign of mine entry.
2	421246/402631	Colliery waste/fill to 2.3m; natural ground/bedrock not determined; no sign of mine entry.
3 (Shaft Plan Position)	421247/402636	Colliery waste/fill to 2.3m; natural ground/bedrock not determined; no sign of mine entry.
4	421252/402635	Colliery waste/fill to 1.4m; natural ground (orange clay) determined; no sign of mine entry.

## Conclusions and Recommendations

- Given the nature of the geology and target coal seam/s no further drilling or associated works are deemed necessary and the site can be regarded as stable from the shallow mining perspective. As such the development can proceed with usual foundation designs in line with the appointed building control officer at the time of development. Some design considerations around the presence of fill material and soft clays are likely to be required. It should be noted that other features at shallow depth in areas not covered by this investigation should not be ruled out.
- No signs of the known mine entry were observed during the investigation. The shaft cap (if present) is expected to lie beneath the fill material at depth. Further investigation involving larger equipment to reach greater depths could be undertaken, otherwise it would be advisable to stand the proposed dwellings outside of the 20m radius zone from the plan position of the shaft. Certain development inside this zone, such as hard standings/driveways are likely to require an element of geo-grid matting for safe construction designs, depending on the Coal Authorities requirements. Watching briefs would be prudent during future ground works for any associated signs of other unrecorded mine entries. The Coal Authority should be notified where any such feature is suspected.
- Given the findings it is unlikely that the property is affected by geological faulting, however associated watching briefs during future ground/foundation works would be recommended for signs of weak ground or fissured sandstone, with appropriate strengthening/treatment considerations if any is suspected/encountered.

## Intrusive Coal Mining Assessment

- No fugitive gases were encountered during the investigation, although given the nearby mine shaft and known relatively shallow coal workings, a potential pathway for such emissions will be present particularly considering the known areas of fill material. Preventative measures (such as a suitable ground gas methane membrane and/or positive ventilation zones) would be recommended within foundation designs. All suitable safety precautions should be employed during any future ground works involving deep excavations.

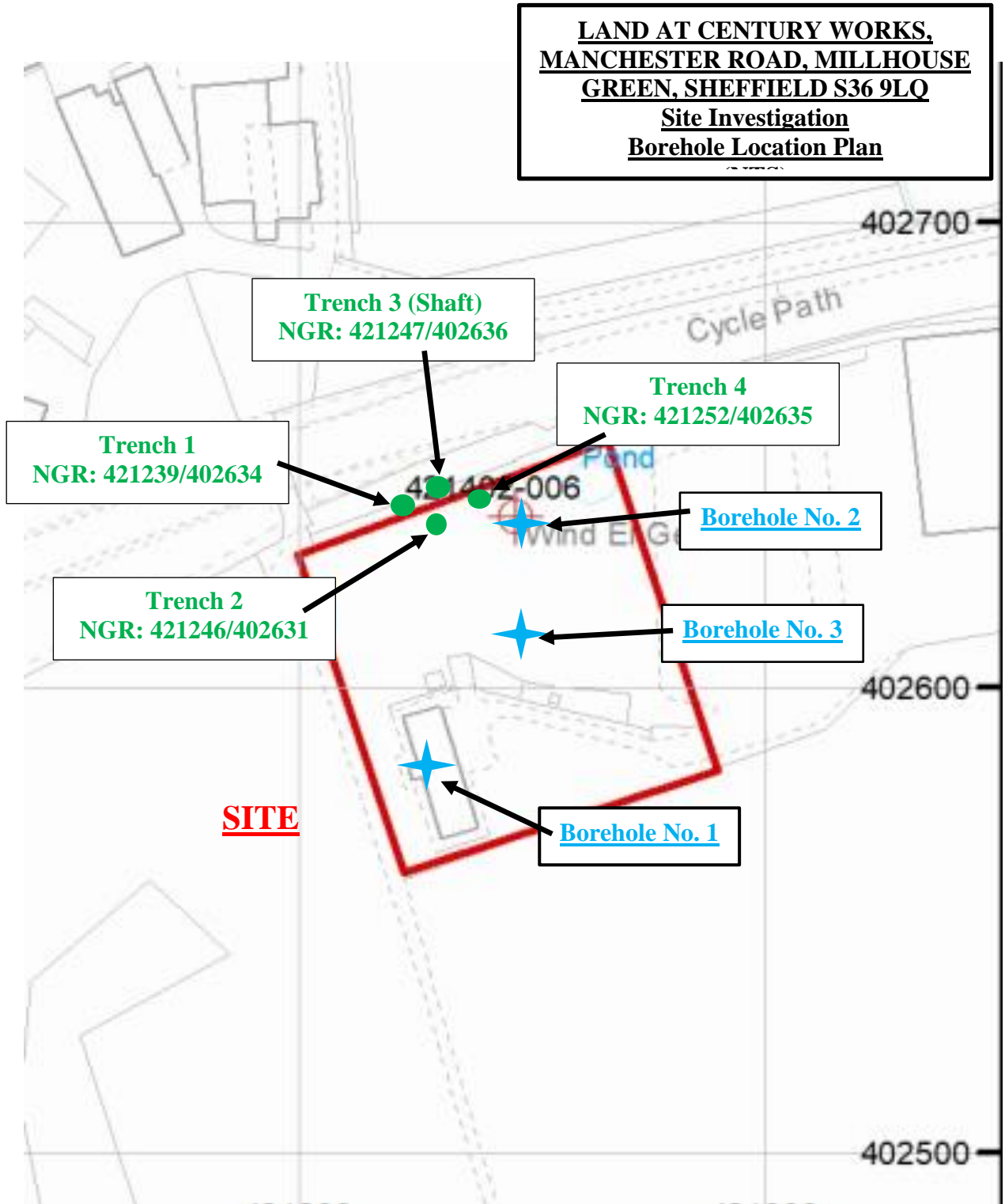
## Intrusive Coal Mining Assessment

**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'.

**Appendices**

Appendix A – Exploratory Hole Location Plan



Intrusive Coal Mining Assessment

Appendix B – Trench Photographs



Intrusive Coal Mining Assessment



Intrusive Coal Mining Assessment



Intrusive Coal Mining Assessment

**Trench 4**  
**NGR: 421252/402635**





**Appendix D - Coal Authority Permit**



The Coal  
Authority

## Permit to Enter or Disturb Coal Authority Interests

**Permit 22592**

**Name and Address of Permit Holder:**

*Lyons CMC  
44 Grange Road  
Woodlands  
Doncaster  
DN6 7PZ*

**Site Location:**

*Land off  
Manchester Road  
Millhouse Green  
Barnsley  
S36 9LQ*

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

*Ground Investigation by three boreholes to 30m to determine presence of shallow mine workings, location of one mine entry by excavation (421402-006)*

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, CH<sub>4</sub>, CO<sub>2</sub>, O<sub>2</sub> 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: Stuart Brown Granted Date: 23/08/2021

For and on behalf of The Coal Authority

*Nominated Representative: Stuart Brown, Permitting Manager;  
The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG  
Tel: 01623 637450; E-Mail: [permissions@coal.gov.uk](mailto:permissions@coal.gov.uk)*