



GEO-ENVIRONMENTAL CONSULTING

BEK Geo-Environmental Consulting

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Our Ref: BEK/22080/240109/LH

9th January 2024

FAO Heath Broadbent

LANCET HOMES

168-170 Washway Road

Sale

M33 6RH

Intrusive Coal Mining Risk Assessment – Land off Mossylea Close, Rochdale

BEK Enviro (BEK) has been commissioned by Lancet Homes to carry out a Coal Mining Risk Assessment Letter Report for a parcel of land located off Mossylea Close, Middleton, Rochdale (hereafter referred to as 'the site') to assess the risks from subsidence associated with historical coal mining at the site.

Background

The site is occupied by a roughly rectangular shaped plot of land of approximately 0.77 ha. The site is a field covered with grass, rough vegetation, brambles and some shrubs and trees.

Planning permission is being sought for the redevelopment of the site for residential use with 29 Residential properties all with private gardens.

The proposed site layout is presented on MPSL Planning & Design Ltd. drawing entitled 'Illustrative Layout, Mossylea Close, Rochdale' (Ref: 20042/02/Rev E, dated July 2022), an extract of which is presented in Figure 1 below.



Figure 1: Proposed Development Layout



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Previous Site Investigation

BEK has sought site investigation information from the BGS website, however, there are no boreholes located within 250 m of the site.

BEK has recent carried out site investigation works at the site. The investigation consisted of the excavation of 9 trial pits to a maximum depth of 4.0 m bgl and drilling of 5 window sample boreholes to a maximum depth of 5.45 m bgl.

The site investigation proved topsoil overlying clay with sand lenses across the site. The bedrock was not encountered during the investigation.

Previous Desktop Coal Mining Risk Assessment

The site is located within a Coal Authority (CA) defined coal mining consultation area.

The CA operates a risk-based approach to the assessment of potential instability issues associated with future development of land located within the pre-defined Coal Authority Consultation Area. This risk-based approach divides the potential risk into Development Low Risk Areas and Development High Risk Areas.

Low Risk Sites are deemed to be land where coal mining has taken place, however it was at such depth not to pose a risk to new development and it therefore contains no known recorded risks and as such no further assessment is required.

For Low Risk Sites, the Coal Authority state that 'there is no need for you to submit any coal mining information with your planning application and The CA will not be consulted by the LPA'.

High Risk Sites are deemed to be landholdings located within an area known to contain legacy risks that include:

- Mine entries (shaft or Adit);
- Shallow Coal Workings (recorded and probable);
- Workable coal seam outcrops;
- Mine gas sites and areas;
- Recorded coal mining related hazards;
- Geological features (fissures and break lines); and,
- Former surface mining sites (sometimes using historic opencast extraction methods).

Coal Mining Information

To determine if a site may have unrecorded or recorded coal mine workings requires a consideration of a wide range of information and BEK has completed a review of relevant information in relation to potential coal mining activities.



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The coal seams dip towards the east/south-east and this is reflected in the Coal Authority Interactive map where the 'Development High Risk Area' is located beneath the central and southern parts of the site (see Figure 2).



Figure 2: Development High Risk Area

The Development High Risk Area will be associated with a coal outcrop that crosses the central part of the site (see Figure 3). Given the location of the outcrop, the bedrock (and the coal seam) dips to the south and this is reflected in the Development High Risk Area being to the south of the coal outcrop.

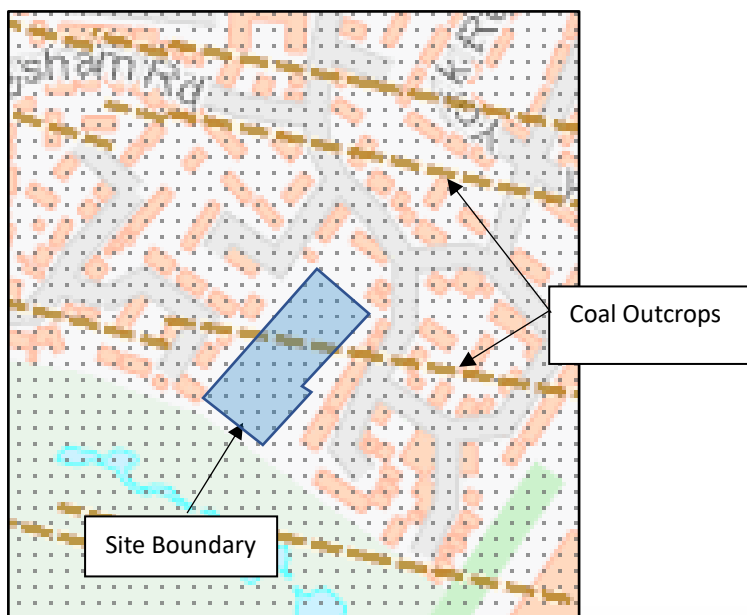


Figure 3: Coal Outcrops



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Additional information for the Coal Authority confirms that there are no known mine shafts/adits located within close proximity to the site and no other areas of concern regarding historic mine workings.

The key issues are associated with the coal outcrop that cross the site and the outcrops to the north which dip to the south and beneath the site.

Coal Mining Risk Assessment

The Coal Authority interactive map indicates that the site is located in a Coal Mining consultation zone with 'Development High Risk Areas' across the central/southern parts of site and another area to the north. As the bedrock dips to the south, the coal seams will extent beneath the site from the northern outcrops.

Considering the proposed construction of a residential properties across the whole site, a more detailed assessment will be required to determine risks associated with subsidence due to historic mine workings.

A desk-based assessment cannot conclude with certainty the extent of the coal mining risks on site and it is recommended that intrusive investigation works are undertaken on site.

Desktop Coal Mining Risk Assessment – Recommendations

In order to determine if subsidence could be an issue for the construction of the residential dwellings, it is recommended that 3 rotary open-hole boreholes are drilled to a depth of 30 m. The borehole locations will need to consider the proposed locations of the new builds as well as the defined 'Development High Risk Area'.

The aim of the boreholes is to confirm the presence or otherwise of coal seams at shallow depth below the site and to establish if they contain mine workings. If mine workings are confirmed to be absent, or beyond an influencing depth of the surface development, it is unlikely that special foundation measures will be required.

However, if mine workings are confirmed to be present within an influencing depth of the surface development, it is likely that special foundations (reinforced strips/semi rafts) and/or ground stabilisation by grouting will be required.

A Coal Authority 'Permit to Drill' will be required prior to the commencement of site investigation at the site. This report should finalise the scope of the mitigation measures needed (if any) to ensure the development is safe from coal mining related ground instability.



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Intrusive Coal Mining Risk Assessment

Following receipt of the Permit to Drill from the Coal Authority (Permit 27677, see Annex B), BEK instructed the drilling of three rotary boreholes on 13th December 2023. The purpose of the investigation was to drill into the bedrock to in excess of 30 m bgl to determine the presence of any voids due to mine workings within the site.

The boreholes were located by BEK with consideration to several factors including site conditions and access, possible extent of the coal mine workings (based on information on CA website), dip of strata and development layout. The approximate locations of the borehole are presented in Figure 4.

The drilling was carried out by Geoinvestigate Ltd using Geoinvestigate's Microdrill® with water flush as this carries a low risk of causing explosion or creating, releasing or causing hazardous gases to move upwards into nearby occupied buildings. Gas monitoring was also carried out during drilling (no methane or carbon dioxide detected) and boreholes were sealed when drilling was complete.



Figure 4: Rotary Borehole Locations



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The ground conditions encountered within the boreholes are presented on the borehole records in Annex A and summarised below:

Location	Description
Borehole R1	Turf onto Brown DRIFT to 30 m. Probable boulder clay with occasional sandstone cobbles. Occasional dense sand inclusions from 13.50 m.
Borehole R2	Turf onto Brown DRIFT to 35.6 m. Probable boulder clay with occasional sandstone cobbles. Occasional dense sand inclusions from 14.80 m. Grey MUDSTONE from 35.6 to 40 m.
Borehole R3	Turf onto Brown DRIFT to 30 m. Probable boulder clay with occasional sandstone cobbles. Occasional dense sand inclusions from 12.20 m.

Two of the rotary boreholes (R1 and R3) encountered Drift from the surface to the base of the boreholes at 30 m. Borehole R2 encountered drift to 35.6 m with rockhead at 35.6 to the base of the borehole at 40 m.

The rockhead comprised of grey mudstone which was only encountered within Rotary Borehole R2 at a depth of 35.6 m to the base at 40 m. Coal was not encountered within any of the rotary boreholes drilled at the site during the BEK site investigation.

No voids, broken ground or loss of flush were recorded during the site works.

No Groundwater was encountered.

Conclusions & Recommendations

A desk-based assessment of the risks from coal mine subsidence indicated that the bedrock beneath the site is known to be coal seam bearing strata and as such may have been mined for coal reserves in the past. The BEK Desktop Coal Mining Risk Assessment report includes a qualitative assessment of the potential risks from coal mining and concludes that site investigation works are required to quantify the potential risks.

Three rotary open hole boreholes drilled at the site with two of the boreholes encountered drift from the surface to the base of the boreholes at 30 m. Rockhead comprising of grey mudstone was encountered within rotary borehole R2 at a depth of 35.6 m to the base of the borehole at 40 m. Coal was not encountered within any of the rotary boreholes drilled at the site during the BEK site investigation. No voids, broken ground or loss of flush were recorded during the site works.

There were no voids or coal seams encountered during drilling and based on the available site investigation information the development is not at risk from subsidence due to historic coal mine workings and no remediation/foundation precautions are considered necessary.



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I trust the above is satisfactory. Should you require anything further please do not hesitate to contact the undersigned.

Yours sincerely

Michael Buckley

BSc (Hons) MSc MEnvSci CEnv

Intrusive Coal Mining Risk Assessment – Land off Mossylea Close, Rochdale

Revision	Comments	Date	Revised By	Checked By



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ANNEX A

Borehole Records



GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22080	DATE 13th December 2023
PROJECT NAME Land off Mossylea Close, Roch	DRILLING METHOD Rotary open borehole
CLIENT Lancet Homes	BOREHOLE NO BH1
	SHEET 1/3

COMPLETION
COMMENTS Casing to 2 m. Full flush returned. No gas detected. No voids encountered

Depth (m)	Samples/ Test	Field Records	Graphic Log	Material Description	Additional Observations	Elevation (m)
2				TURF/Brown DRIFT - Probable boulder clay with occasional sandstone cobbles		2
4						4
6						6
8						8
10						10
12						12
14				> Occasional dense sand inclusions from 13.50 m		14
16						16
18						18
20						20
22						22
24						24
26						26
28						28
30				Termination Depth at: 30.0 m		30



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GEO-ENVIRONMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 22080	DATE 13th December 2023
PROJECT NAME Land off Mossylea Close, Roch	DRILLING METHOD Rotary open borehole
CLIENT Lancet Homes	BOREHOLE NO BH2
	SHEET 2/3

COMPLETION
COMMENTS Casing to 2 m. Full flush returned. No gas detected. No voids encountered

Depth (m)	Samples/ Test	Field Records	Graphic Log	Material Description	Additional Observations	Elevation (m)
2				TURF/Brown DRIFT - Probable boulder clay with occasional sandstone cobbles		2
4						4
6						6
8						8
10						10
12						12
14				> Occasional dense sand inclusions from 14.80 m		14
16						16
18						18
20						20
22						22
24						24
26						26
28						28
30						30
32						32
34						34
36						36
38						38
40				Termination Depth at: 30.0 m		40



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PROJECT NUMBER 22080	DATE 13th December 2023
PROJECT NAME Land off Mossylea Close, Roch	DRILLING METHOD Rotary open borehole
CLIENT Lancet Homes	BOREHOLE NO BH3
	SHEET 3/3

COMPLETION
COMMENTS Casing to 2 m. Full flush returned. No gas detected. No voids encountered

Depth (m)	Samples/ Test	Field Records	Graphic Log	Material Description	Additional Observations	Elevation (m)
2				TURF/Brown DRIFT - Probable boulder clay with occasional sandstone cobbles		2
4						4
6						6
8						8
10						10
12				> Occasional dense sand inclusions from 12.20 m		12
14						14
16						16
18						18
20						20
22						22
24						24
26						26
28						28
30				Termination Depth at: 30.0 m		30



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ANNEX B

Coal Authority Permit to Drill



The Coal
Authority

Permit to Enter or Disturb Coal Authority Interests

Permit 27677

Name and Address of Permit Holder:

*Brookhouse Group Limited
Prospect House
168-170 Washway Road
Altrichcham
M33 6RH*

Site Location:

*Land off
Mossy Lea Close
Middleton*

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

Ground investigation by three boreholes to 30m

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, H₂S 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: Paul Hobson Granted Date: 27 November 2023

For and on behalf of The Coal Authority

Nominated Representative: Paul Hobson, Permitting Manager;

The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG

Tel: 01623 637450; E-Mail: permissions@coal.gov.uk



The Coal
Authority

Granted Permit Boundary

Permit Ref: 27677

Permit Boundary:



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