



Haigh Huddleston & Associates

Civil & Structural Engineering Consultants

Firth Buildings, 99 - 101 Leeds Road, Dewsbury, WF12 7BU

t 01924 464342 f 01924 450662 e martin@haighhuddleston.co.uk

Our Ref: E22/7944/JF/004

06th October 2023

(Email Only)

FAO Helen Davies

Binks Executive Homes Limited
Cawthorne House
19 Tivy Dale
Cawthorne
Barnsley
S75 4EJ

Dear Madam,

Re: Proposed development at Moor Lane, Gomersal

Further to the intrusive site investigation works detailed in the Haigh Huddleston & Associates Geo-Environmental Ground Investigation report (Ref: E22/7944/R002 Dated: August 2023), gas testing was undertaken at the above development to confirm if ground gas migration from shallow mine workings beneath the site would adversely affect the development.

Kindly note that this letter only addresses issues with regards to ground gas migration affecting properties. It must be read in conjunction with the aforementioned report. For the preparation of this letter, the following best practice guidance has been taken into account:

- BS8485:2015+A1:2019 "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings";
- BS8576:2013 "Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds (VOCs)";
- CIRIA "Assessing Risks Posed by Hazardous Ground Gases to Buildings", report C665, 2007;
- CIRIA "The VOCs Handbook. Investigating, Assessing and Managing Risks from Inhalation of VOCs at Land Affected by Contamination", report C682, 2009;
- CL:AIRE "A Pragmatic Approach to Ground Gas Risk Assessment", report ref. RB17, November 2012;
- NHBC "Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present", report version 04, March 2007.

Four boreholes were drilled to depths of 30m beneath the site. In addition to this, three boreholes were drilled to 3.0m and installed with gas monitoring standpipes consisting of 1m of plain pipe at the surface and 2m of slotted pipe. The standpipes were constructed with lockable covers, backfilled with single size gravels and sealed with bentonite.

Six rounds of gas monitoring were undertaken between 23rd June 2023 and 26th September 2023 using a Gas Data GFM 436. The results are tabulated in the Appendix to the rear of this letter.

The gas monitoring was undertaken over a range in barometric pressure between 997mb and 1007mb. Three out of the six readings were carried out under falling barometric pressure. The air pressure on 29th August 2023 was recorded as a sharp fall, with the barometric pressure falling 5mb over an 8-hour period. However, the air pressure on 23rd June 2023 was recorded as equalised, with the barometric pressure remaining the same over an 8-hour period.

On site, no methane was detected. Carbon dioxide values were found between 0.1 and 2.4% with oxygen levels between 16.8 and 21.3%. The reduced oxygen levels coincide with the slightly higher carbon dioxide readings. No flow rates were detected throughout the duration of the monitoring. Due to no flow rates being detected throughout the duration of the visits, a preliminary value of 0.1 shall be used in the GSV calculation.

Discussions

Kindly note that, due to less than 1% of existing properties being above the radon action level within this area, **NO Radon Protection Measures are required for this development.**

Consulting CIRIA C665, the GSV value corresponds to the site being characterised as **Green**. The GSV value is obtained by multiplying the maximum gas concentration by maximum steady borehole flow rate (Where a peak flow rate is recorded at the start of the monitoring session, this can be discounted due to the artificially high pressure within the standpipe).

i.e. Carbon Dioxide - $0.024 \times 0.1 = 0.0024$ l/hr.

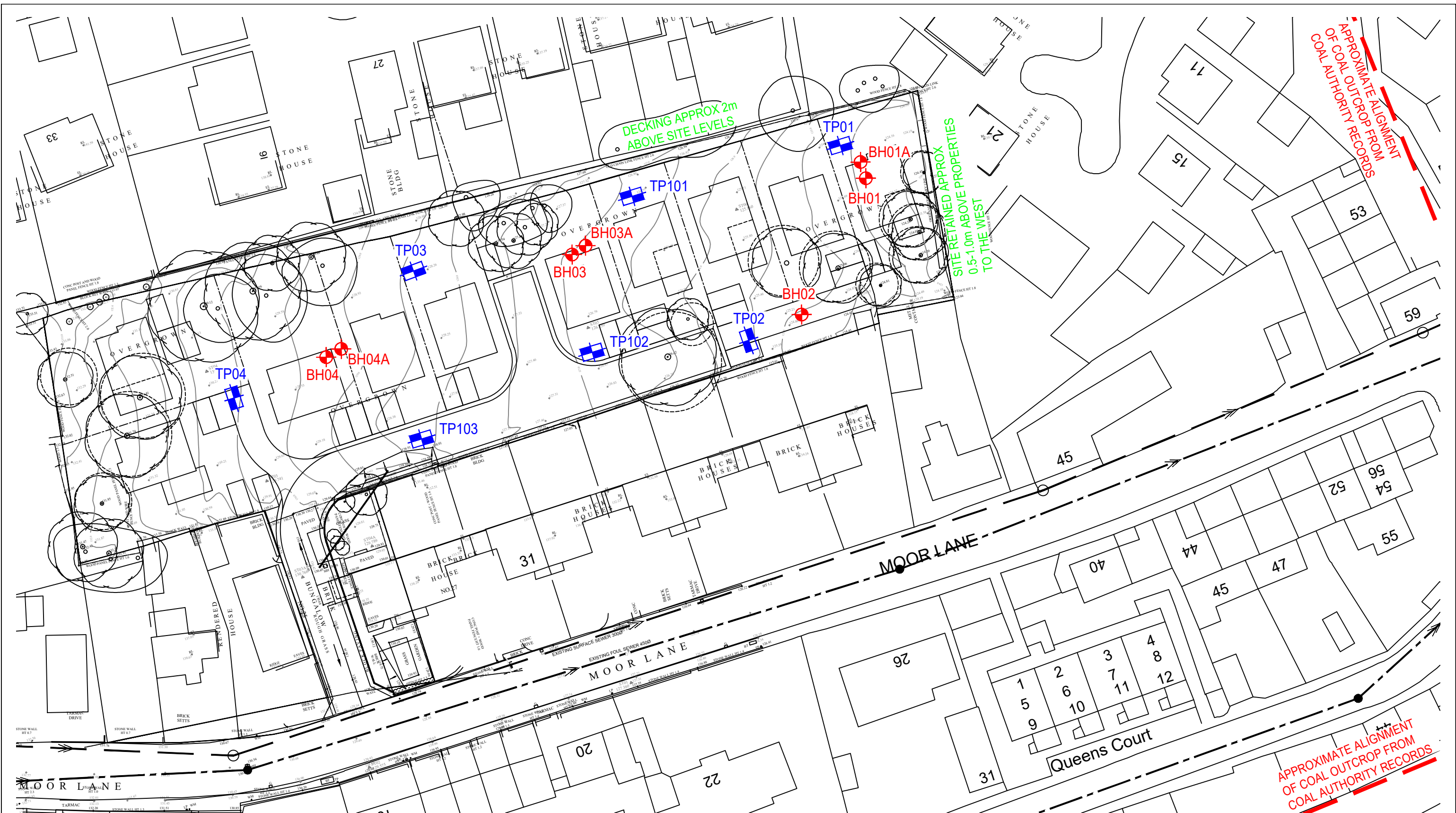
The low level of carbon dioxide recorded, and no methane indicates that the site may be classified as CS1 by BS 8485:2105 Table 2. Therefore, we can confirm that **NO Gas Protection Measures are required for this development.**

We hope that the above is sufficient for your requirements. However, should you have any queries please do not hesitate to contact me direct.

Yours sincerely,

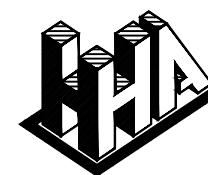
~
JAMES FARRAR. HND

Appendix



- SOAKAWAY LOCATION
- TRIAL PIT LOCATION
- PROPOSED BOREHOLE LOCATION

BOREHOLE LOCATIONS SUBJECT TO CHANGE DEPENDENT ON ACCESS AROUND SITE AND FINDINGS WITHIN BOREHOLES.



Haigh Huddleston & Associates

Civil Structural Engineering Consultants

Firth Buildings, 99 - 101 Leeds Rd, Dewsbury, WF12 7BU t 01924 464342 f 01924 450662
e martin@haighhuddleston.co.uk

Client	Binks Executive Homes			
Project	Moor Lane, Gomersal			
Detail	Proposed Borehole Plan			
Scale	Dwn	Chkd	Date	Dwg No.
1:500@A3	MD		Apr'23	E22/7944/03/02A

SITE:	Moor Lane, Gomersal	
CLIENT:	Binks	
JOB NO:	7944	
SHEET NO:	1	

GAS MONITORING RESULTS

	GAS CONCENTRATIONS												FLOW DATA				Qhg per borehole		WELL AND WATER DATA				A Pressure (mB)	Comments	
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Oxygen (%v/v)		H2S (ppm)	CO (ppm)	Hex (%)	PIDCf ()	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Response Zone				
	Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady					Steady	Peak											
AIR	ND	ND	ND	ND	ND	ND	20.8	20.8	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	NR	NR	NR	NR	1006	Time: 1:15	Date: 23.06.23	
BH04A	ND	ND	ND	ND	0.7	0.7	18.4	18.4	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0007	1.50	3.00	1.0-1.50	1006			
BH03A	ND	ND	ND	ND	ND	ND	21.1	21.1	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	NR	1.15	3.00	1.0-1.15	1007		Cloudy, Warm, Dry	
BH01A	ND	ND	ND	ND	2.4	2.4	16.8	16.8	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0024	2.10	3.00	1.0-2.10	1007	Equalised A.P		
AIR	ND	ND	ND	ND	ND	ND	21.3	21.3	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	NR	NR	NR	NR	999	Time: 2:00	Date: 07.07.23	
BH04A	ND	ND	ND	ND	0.6	0.6	20.4	20.4	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0006	1.90	3.00	1.0-1.90	1000			
BH03A	ND	ND	ND	ND	ND	ND	21.3	21.3	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	NR	1.60	3.00	1.0-1.60	1000		Sunny, Dry, Warm	
BH01A	ND	ND	ND	ND	2.4	3.4	18.2	18.2	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0024	2.30	3.00	1.0-2.30	999	Falling A.P		
AIR	ND	ND	ND	ND	ND	ND	21.1	21.1	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	NR	NR	NR	NR	1002	Time: 2:00	Date: 26.07.23	
BH04A	ND	ND	ND	ND	0.6	0.6	20.2	20.2	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0006	2.00	3.00	1.0-2.00	1002			
BH03A	ND	ND	ND	ND	0.1	0.1	20.9	20.9	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0001	1.60	3.00	1.0-1.60	1002		Cloudy, Dry, Warm	
BH01A	ND	ND	ND	ND	2.3	2.3	17.9	17.9	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0023	2.40	3.00	1.0-2.40	1001	Falling A.P		
AIR	ND	ND	ND	ND	ND	ND	21.2	21.2	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	NR	NR	NR	NR	1002	Time: 11:45	Date: 09.08.23	
BH04A	ND	ND	ND	ND	0.3	0.3	20.5	20.5	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0003	2.20	3.00	1.0-2.20	1002		Cloudy, Dry, Warm	
BH03A	ND	ND	ND	ND	0.1	0.1	20.9	20.9	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0001	1.70	3.00	1.0-1.70	1002		Equalised A.P	
BH01A	ND	ND	ND	ND	2.2	2.2	17.6	17.6	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0022	2.10	3.00	1.0-2.10	1002	From 1002 - 1001mB over 8 hour period		
AIR	ND	ND	ND	ND	ND	ND	21.0	21.0	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	NR	NR	NR	NR	998	Time: 1:30	Date: 29.08.23	
BH04A	ND	ND	ND	ND	0.5	0.5	20.1	20.1	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0005	1.90	3.00	1.0-1.90	998		Cloudy, Dry, Warm	
BH03A	ND	ND	ND	ND	0.1	0.1	21.0	21.0	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0001	1.30	3.00	1.0-1.30	997		Falling A.P	
BH01A	ND	ND	ND	ND	2.3	2.3	17.7	17.5	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0023	2.00	3.00	1.0-2.00	997	From 1001 - 996mB over 8 hour period		
AIR	ND	ND	ND	ND	ND	ND	20.9	20.9	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	NR	NR	NR	NR	1003	Time: 2:30	Date: 26.09.23	
BH04A	ND	ND	ND	ND	0.6	0.6	20.3	20.3	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0006	1.80	3.00	1.0-1.80	1003		Sunny, Dry, Warm	
BH03A	ND	ND	ND	ND	ND	ND	20.9	20.9	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	NR	1.30	3.00	1.0-1.30	1003		Equalised A.P	
BH01A	ND	ND	ND	ND	2.4	2.4	17.0	17.0	ND	ND	0.000	1.0	ND	ND	ND	ND	NR	0.0024	2.00	3.00	1.0-2.00	1003	From 1003 - 1003mB over 8 hour period		

ND - Not detected

NR - Not recorded

NB: where no flow (ND) recorded Qhg values are calculated using equipment limit of detection (0.1 l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

-
-
-