

Environmental  
Geotechnical  
Specialists



# LETTER REPORT

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**Rogers Geotechnical Services Ltd**  
Offices 1 & 2 Barncliffe Business Park, Near Bank, Shelley, Huddersfield, HD8 8LU  
☎ 01484 604354      Company No. 5130864

Our Ref C4791/24/E/7325  
21<sup>st</sup> January 2025

2-4 Chapel Hill,  
Upper Hopton,  
Mirfield,  
West Yorkshire,  
HD1 3BA



**For the attention of Nik Gill,**

Dear Nik,

Ref: 14 Firth Street, Huddersfield, West Yorkshire, HD1 3BA.

Further to our completion of the fieldworks undertaken on the 13<sup>th</sup> December 2024, we have now completed the gas monitoring and present our findings.

### Desk Study and Planning Consultation

The client intends to extend the existing building by creating an additional two floors. The building is to remain as residential and will retain the existing basement, albeit the basement shall be used as a communal kitchen and sitting area. A Phase 1 report was completed by JNP Group in October 2023, reference B25558-JNP-XX-XX-RP-G-1001P01, and was subsequently submitted to Kirklees Council for review.

A consultation was issued by the Environmental Health team on 25<sup>th</sup> March 2024, reference WK/202407036. The team are in general agreement with the desk study that the site is in a low environmental risk area, albeit there is a risk of ground gas due to the alluvium below the site. The JNP report recommended internal gas monitoring of the existing basement and that the basement is tanked to prevent ingress of potentially contaminated ground water. As such, a planning condition was raised for a phase 2 report to be completed to consider the potential ground water and gas risks.

### Investigation

Further to discussions with the client, it was reasoned that monitoring standpipes be installed to gain an understanding of the ground gas and water regime of the area. As such, three boreholes were sunk using hand-held windowless sampling equipment. These boreholes were located to the courtyard area in order to compromise the integrity of the existing structure. The cores were undertaken in 1m lengths at a diameter of approximately 47mm. The recovered cores were sealed and returned to the laboratory for logging and subsequent testing. The soils were described in general accordance with BS5930: 2015+A1: 2020, and full descriptions are given on the windowless sample records which are presented in Appendix 2. Also included on these records are the core diameters and percentages of core recovered.

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## Standpipe Monitoring

Monitoring standpipes were installed in all boreholes (BH1 to BH3) to 1.8m and 2.0m depth, the locations of which are provided on the site plan presented as Appendix 1 of this report. The installation details are shown on the appropriate borehole record of that report. Visits were made to the site between the 9<sup>th</sup> and 20<sup>th</sup> January 2025. The results of this work are tabulated below with the full gas monitoring sheets and calibration documents presented in Appendix 3.

Table 1: Gas Monitoring								
Location	Date	CH <sub>4</sub> (%)	CO <sub>2</sub> (%)	O <sub>2</sub> (%)	Flow (l/hr)	Barometric Pressure (mb)	Water Level (m)	Standpipe Depth (m)
BH1	09.01.2025	0.1	0.1	21.3	0.1	↑ 1000	-	2.00
	13.01.2025	0.1	0.1	20.8	0.1	→ 1031	-	
	17.01.2025	0.1	0.1	20.1	0.1	→ 1023	-	
	20.01.2025	0.1	0.1	21.3	0.1	↓ 1008	-	
BH2	09.01.2025	0.1	0.1	21.6	0.1	↑ 1000	-	1.80
	13.01.2025	0.0	0.1	20.6	0.1	→ 1031	-	
	17.01.2025	0.1	0.1	21.0	0.2	→ 1023	-	
	20.01.2025	0.1	0.1	21.2	0.1	↓ 1008	-	
BH3	09.01.2025	0.1	0.1	21.6	0.1	↑ 1000	-	1.90
	13.01.2025	0.0	0.1	20.9	0.1	→ 1031	-	
	17.01.2025	0.0	0.1	20.9	0.2	→ 1023	-	
	20.01.2025	0.1	0.1	20.0	0.1	↓ 1008	-	

↑ rising pressure

↓ falling pressure

→ steady pressure

The monitoring was undertaken using a Geotechnical Instruments (UK) Ltd. GA5000 (serial No G503524) which was last calibrated on the 25<sup>th</sup> October 2024.

## Gas Concentrations

With respect to ground gas, the results of the monitoring visits undertaken for the site indicated maximum levels of methane as 0.1%. Concentrations of carbon dioxide were found to be 0.1%, in association with oxygen levels of between 20.0% and 21.6%. It should be appreciated that on non-contaminated sites there is generally about 20% by volume of oxygen, associated with low levels of carbon dioxide. In addition, a maximum flow rate of 0.2 litres per hour was recorded and will be employed in the following calculations.

The principal driving force for initiating the movement of gas in the ground is a change in barometric pressure. The most onerous gas condition on a site is usually observed on days of low or falling barometric pressure. It has been noted that measurements undertaken solely during high pressure conditions may be of lesser value. At this site the readings undertaken to date were at atmospheric pressures of between 1000mb and 1031mb. It should be noted that a notable period of falling pressure occurred during the monitoring period.

In order to establish the gas screening value (GSV) for carbon dioxide or methane, the maximum gas concentration (expressed as a decimal) is multiplied by the borehole flow rate (l/hr). In this case 0.1% (0.001) methane was recorded along with 0.1% (0.001) carbon dioxide, in association with a maximum flow rate of 0.2 l/hr. This results in a GSV of 0.0002 for methane and a GSV of 0.0002 l/hr for carbon dioxide.



In accordance with Table 8.5, *Modified Wilson and Card classification* of the CIRIA report C665, *Assessing risks posed by ground gasses to building*, the site may be characterised as *Characteristic Situation Level 1*. It is therefore considered that there is a very low risk of harm to end users and site operatives and no special precautionary measures are required in accordance to Table 8.6, *Typical scope of gas protection measures*, of CIRIA report C665.

With regard to the number of monitoring visits required reference is made to Tables 5.5a and 5.5b of CIRIA report C665 (2007)<sup>1</sup>. Accepting that the proposed development is of moderate sensitivity (flats) and that the generation potential is very low, these tables suggest that 6 readings could be undertaken over a period of 2 months. However, in this case a total of 4 monitoring visits were undertaken over a 1 month time period, at which point monitoring was terminated because it was determined that sufficient monitoring had taken place. Indeed, the development foundation structure is already in place and as per the JNP desk study, the site is considered to represent a low environmental risk.

In this context, it should be noted that the gas screening value threshold for Characteristic Situation level 2, is <0.07 l/hr. Assuming the flow rate remains constant at 0.2l/hr the gas concentration would need to exceed 3500% to move into the next risk band, which is not possible. Moreover, by keeping the concentration constant, the flow rate would need to increase to 70 l/hr which represents a 3400% increase. It is considered that these increases are not feasible given the flow rates and gas concentrations encountered. In addition, the most recent reading was undertaken during a period of falling pressure which represents the most onerous conditions.

In addition to the above, groundwater has not been recorded during the investigation or within the standpipe monitoring period.

### Conceptual Ground Model and Risk Assessment

The preliminary risk assessment has been evaluated with reference to the following ratings and definitions:

**N/A** - A source-pathway-receptor linkage is not considered to exist and therefore a risk assessment is not required.

**Low** - A pollution linkage is unlikely and/or the likelihood of harm occurring is low and of minor consequence.

**Moderate** - The linkage exists but the likelihood of harm occurring is not considered to be significant although remedial action may be necessary

**High** - The linkage exists and the available data indicates that significant harm may be caused and remedial action could be necessary.



**Table 2: Conceptual Site Model and Site-Specific Risk Assessment**

Pathways	Receptor	Linkage Present	Risk Rating	Notes
Migration of hazardous gases via permeable strata	Operative	No - low concentrations of methane and carbon dioxide have been found to be present at the site (assuming <i>Characteristic Situation Level 1</i> ).	Low	No special precautionary measures are deemed to be required.
	End User		Low	
	Neighbours		Low	

**Remediation Strategy for Ground Gas**

It is not considered that any remediation will be required at this site as low concentrations of ground gases, along with there being no historic ground gas incidents, means that there is a very low risk of harm at this site. In addition, it is expected that the existing basements will have been waterproofed to some degree which will act as a low level barrier.

**References**

- British Standards Institution (2013), BS 8576 Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds.
- British Standards Institution (2015 +A1:2019) BS8485: *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*, B.S.I., London.
- CIRIA Report C665, *Assessing risks posed by ground gasses to building*.

We trust that this information is of interest and should you have any other requirements do not hesitate to contact us.

For Rogers Geotechnical Services Ltd,

Yours Faithfully,

**Steven Hale** BSc FGS  
Geo-environmental Technician



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## Appendix 1

### Site Plan

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## Appendix 2

### Borehole Records

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# Borehole Log

Borehole No.

**BH01**

Sheet 1 of 1

Project Name: 14 Firth Street

Project No.  
C4791/24/E/7325

Co-ords:

Hole Type  
WLS

Location: Huddersfield, West Yorkshire, HD1 3BA

Level:

Scale  
1:25

Client: Carbon Ltd

Dates: 13/12/2024

Logged By  
SH

Well	Water Strikes	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)				
						0.10			MADE GROUND (Concrete). (Drillers notes).
				47	25				
						47	65	1.00	
						2.00			End of Borehole at 2.00m

Remarks





# Borehole Log

Borehole No.

**BH02**

Sheet 1 of 1

Project Name: 14 Firth Street

Project No.  
C4791/24/E/7325

Co-ords:

Hole Type  
WLS

Location: Huddersfield, West Yorkshire, HD1 3BA

Level:

Scale  
1:25

Client: Carbon Ltd

Dates: 13/12/2024

Logged By  
SH

Well	Water Strikes	Samples and In Situ Testing				Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)				
				47	90	0.10		MADE GROUND (Concrete). (Drillers notes). MADE GROUND (Brown, silty, fine to coarse SAND).	
				47	50	1.10		MADE GROUND (Grey, clayey, silty, gravelly, fine to coarse SAND. Gravel is angular to sub-angular and fine to coarse of brick, concrete and sandstone).	
						1.80		End of Borehole at 1.80m	

Remarks





# Borehole Log

Borehole No.

**BH03**

Sheet 1 of 1

Project Name: 14 Firth Street

Project No.  
C4791/24/E/7325

Co-ords:

Hole Type  
WLS

Location: Huddersfield, West Yorkshire, HD1 3BA

Level:

Scale  
1:25

Client: Carbon Ltd

Dates: 13/12/2024

Logged By  
SH

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
				47	50		0.10		MADE GROUND (Concrete). (Drillers notes).	
				47	65				MADE GROUND (Grey, silty, fine to coarse SAND).	
							1.90		End of Borehole at 1.90m	

Remarks



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## Appendix 3

# Gas Monitoring Sheets and Calibration Documents

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# CERTIFICATION OF CALIBRATION



PJLA  
Calibration

No. 66916



Date Of Calibration: 25-Oct-2024

Certificate Number: G503524\_10/36927

Issued by: QED Environmental Systems Inc.

As received Barometric Pressure recorded at: 23.2 °C/73.7 °F

As received gas check readings are only recorded if the instrument is received in a working condition.  
Where the instrument is received damaged no reading can be taken.

Date of Issue : 26 Oct 2024

Approved By Signatory

Linda Ostrowski  
Laboratory Inspection

The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Calibration Instance: 118

IGC Instance: 118

Page 4 of 4 | LP015LNANIST-1.1

[www.qedenv.com](http://www.qedenv.com) (800) 624-2026 [info@qedenv.com](mailto:info@qedenv.com)

QED Environmental Systems Inc. 2355 Bishop Circle West, Dexter, MI 48130

# CERTIFICATION OF CALIBRATION

Date Of Calibration: 25-Oct-2024

Issued by: QED Environmental Systems Inc.



No. 66916



Certificate Number: G503524\_10/36927

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Calibration Instance: 118

IGC Instance: 118

Page 2 of 4 | LP015LNANIST-1.1

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