



TECHNICAL NOTE: GROUND GAS RISK ASSESSMENT

**UK Greetings
Bretton Park
Dewsbury**

Reference

6359-JPG-XX-XX-RP-G-0604-S2-P01

Date

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CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

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DOCUMENT HISTORY

Revision	Date	Revision Details	Status	Author(s)	Approved
P01	18.11.2025	First Issue	Information	EJS	JBW



1.0 BACKGROUND

The following consultation response, dated 28 October 2025, has been received from Kirklees Council Environmental Health (Pollution & Noise Control) in relation to planning application (2025/91202):

"Appendix E (of JPG's Phase 2 Geo-environmental Investigation report referenced 6359-JPG-XX-XX-RP-G-0603-S2-P01 and dated April 2025) presents the gas data, showing gas monitoring over six visits in 5 positions: 2 rotary boreholes (BHRC101 and BHRC102) and window sample boreholes WS102 to WS104. Peak methane 0.2% v/v, peak carbon dioxide at 4.2% v/v whilst pressure did not fall below 1000, during the 5 week period of monitoring pressures were recorded between 968 to 1009 mb, the consultant describes pressures as "rising locally but falling regionally" on several occasions. The consultant has classified the site as Characteristic Situation Level 1. We question this conclusion as no evidence has been provided that monitoring was undertaken during periods of falling pressure at the site. We also have concerns that the main building which communicates with the proposed extension has been fitted with CS2 gas protection (see validation letter, condition 7, application 2008/93935), we require this to be considered during gas risk evaluation."

2.0 JPG RESPONSE

2.1 Site Remediation

The CS2 classification for the main building was based on pre-remediation ground gas risk assessment carried out by FWS Consulting in 2004 for the much wider site area. Following this gas monitoring and assessment, the site was remediated during which time made ground has been removed from site (hotspots) or bioremediated and general earthworks carried out. Ground gas was not reassessed post remediation. Had this been carried out it is likely improved results would have been observed.

Ground gas has been assessed during the 2025 investigation on a building-specific basis with monitoring wells targeting the footprint of the proposed office building.

2.2 Atmospheric Pressure Trend

A pressure trend graph has been produced using tools available online specific to the Dewsbury area using atmospheric pressure data corresponding to the JPG monitoring period¹, this is presented in Figure 1.

¹ [Historical Weather API](#) | [Open-Meteo.com](#)

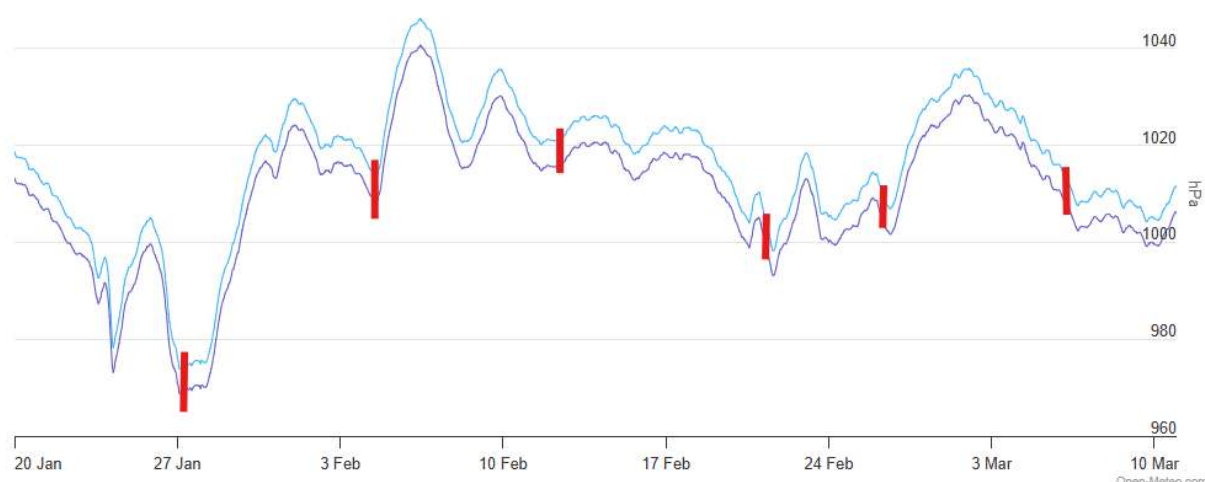


Figure 1: Atmospheric Pressure Trend with Monitoring Events
(Red lines indicate the actual monitoring events, light blue line sea level pressure and dark blue surface pressure)

From the graph it is evident that the first, fourth, fifth and sixth monitoring visits were carried out during periods of falling barometric pressure.

Previously reported 'locally rising' pressures were based on site observations only (atmospheric pressures at the beginning and end of the monitoring visit) and are not considered representative of the actual atmospheric trend, as the atmospheric pressure trend should consider the days leading up to the monitoring visit as well as the conditions during the monitoring visit, the entries have now been updated.

The updated ground gas monitoring sheets are provided in Appendix A of this report.

2.3 Worst-Case Pressure

Further to the publication of Ground Gas Solutions (GGS) white paper and 'worst case atmospheric conditions' calculator this year², further assessment and interpretation of the atmospheric conditions during the monitoring period has been undertaken.

Site-specific data has been input into the worst-case threshold calculator produced by GGS, see Appendix B. The output confirms 'very low' pressure conditions to be less than 992.6mb during the months of monitoring on site (January to March) and 'low' pressure conditions to be between 992.6mb and 1006.6mb). The first monitoring visit therefore captured very low pressure conditions (968mb – 969mb), and the fourth and fifth monitoring visits captured low pressure conditions (997mb – 998mb and 1001mb – 1003mb respectively). On this basis, the further assessment of atmospheric pressure trend confirms that the ground gas monitoring has been carried out during periods of low and very low pressure.

² GGSWP03 Atmospheric Pressure and a Simplified Approach to Determine Worst-Case Conditions for Ground Gas Monitoring in the UK, 2025, GGS Limited, <https://ggs-uk.com/>



3.0 CONCLUSIONS

The further assessment provides evidence that the ground gas monitoring specific to the new building, which is structurally separate from the adjacent building, has been carried out during worst case atmospheric pressure conditions (low and very low pressure) for the site. On this basis, the assessment of ground gas concentrations and flow rates confirms that CS1 is appropriate for the new building.



Appendix A Gas Monitoring Records

GAS AND GROUNDWATER MONITORING RESULTS

Site: UK Greetings, Bretton Park Way, Dewsbury

Job No: 6359

Client: UK Greetings

Visit No: 1

Date: 27/01/2025



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour			
BH	% lcl	%v/v	%	% lcl	%v/v	%	ppm	ppm	%	Peak	Steady	(m) bgl	
BHRC101	0.1	0.1	1.9	0.1	0.1	1.9	5	118	16.7	0.0	0.0	5.10	23.45
BHRC102	0.1	0.1	0.2	0.1	0.1	0.2	0	2	21.1	0.0	0.0	4.95	23.45
WS102	0.1	0.1	0.1	0.1	0.1	0.1	0	0	21.3	0.0	0.0	Dry	4.50
WS103	0.2	0.2	0.1	0.2	0.2	0.1	0	0	20.9	0.1	0.1	Dry	4.70
WS104	0.1	0.1	0.8	0.1	0.1	0.8	0	0	20.9	0.0	0.0	Dry	4.80
Ambient Concentration (% volume):				CH ₄	0.2	%v/v	CO ₂			0.1	%v/v		
Barometric Pressure:		Start	968	O ₂	20.8	%v/v	Monitoring Equipment:				GA5000		
		End	969				Serial Number of Equipment:				G505491		
Barometric Pressure Trend:			Falling				Date of Last Calibration:				14.Jan.2025		
Weather:			Overcast				Operator:				AJS		
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:		JBW		Approved:		JBW					

GAS AND GROUNDWATER MONITORING RESULTS

Site: UK Greetings, Bretton Park Way, Dewsbury
Job No: 6359 **Client:** UK Greetings
Visit No: 2 **Date:** 04/02/2025



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour		(m) bgl	
	% lsl	%v/v	%	% lsl	%v/v	%	ppm	ppm	%	Peak	Steady		
BHRC101	0.0	0.0	1.7	0.0	0.0	1.7	2	2	17.8	0.1	0.1	5.30	23.30
BHRC102	0.0	0.0	0.1	0.0	0.0	0.1	2	1	20.6	0.1	0.1	5.15	22.90
WS102	0.0	0.0	0.1	0.0	0.0	0.1	2	1	20.3	0.0	0.0	Dry	4.50
WS103	0.0	0.0	0.2	0.0	0.0	0.2	2	1	20.4	0.2	0.2	Dry	4.70
WS104	0.0	0.0	1.2	0.0	0.0	1.2	2	1	20.0	0.2	0.2	Dry	4.80
Ambient Concentration (% volume):				CH ₄	0.1	%v/v	CO ₂			0.1	%v/v		
Barometric Pressure:		Start	1008	O ₂	20.8	%v/v	Monitoring Equipment:					GA5000	
		End	1009				Serial Number of Equipment:					G505491	
Barometric Pressure Trend:		Rising					Date of Last Calibration:					14.Jan.2025	
Weather:		Overcast					Operator:					EJS	
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:		JBW			Approved:		JBW				

GAS AND GROUNDWATER MONITORING RESULTS

Site: UK Greetings, Bretton Park Way, Dewsbury
Job No: 6359 **Client:** UK Greetings
Visit No: 3 **Date:** 12/02/2025



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour			
BH	% lsl	%v/v	%	% lsl	%v/v	%	ppm	ppm	%	Peak	Steady	(m) bgl	
BHRC101	0.0	0.0	1.8	0.1	0.0	1.8	0	1	18.1	0.2	0.2	5.60	23.30
BHRC102	0.0	0.0	1.2	0.1	0.0	1.0	0	0	21.0	0.3	0.3	5.20	22.90
WS102	0.0	0.0	1.0	0.1	0.0	0.4	0	0	19.1	0.1	0.1	Dry	4.50
WS103	0.0	0.0	0.4	0.1	0.0	1.5	0	0	20.9	0.1	0.1	Dry	4.70
WS104	0.0	0.0	1.5	0.1	0.0	1.2	0	0	19.4	0.3	0.3	Dry	4.80
Ambient Concentration (% volume):				CH ₄	0.0	%v/v	CO ₂			0.1	%v/v		
Barometric Pressure:		Start	996	O ₂	20.8	%v/v	Monitoring Equipment:				GA5000		
		End	998				Serial Number of Equipment:				G505491		
Barometric Pressure Trend:			Rising				Date of Last Calibration:				14.Jan.2025		
Weather:			Overcast				Operator:				EJS		
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:		JBW			Approved:		JBW				

GAS AND GROUNDWATER MONITORING RESULTS

Site: UK Greetings, Bretton Park Way, Dewsbury
Job No: 6359 **Client:** UK Greetings
Visit No: 4 **Date:** 21/02/2025



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe	
	Peak		Steady			Highest	Highest	Lowest						
	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour				
BH	% lsl	%v/v	%	% lsl	%v/v	%	ppm	ppm	%	Peak	Steady	(m) bgl		
BHRC101	0.0	0.0	2.8	0.0	0.0	2.8	3	3	16.7	0.3	0.3	5.60	23.30	
BHRC102	0.0	0.0	0.1	0.0	0.0	0.1	3	1	21.5	0.0	0.0	5.40	22.90	
WS102	0.0	0.0	0.1	0.0	0.0	0.1	3	1	20.0	0.2	0.2	Dry	4.50	
WS103	0.0	0.0	0.1	0.0	0.0	0.1	3	1	21.0	0.0	0.0	Dry	4.70	
WS104	0.0	0.0	0.6	0.0	0.0	0.6	3	1	20.9	0.0	0.0	Dry	4.80	
Ambient Concentration (% volume):				CH ₄	0.0	%v/v	CO ₂			0.0	%v/v			
Barometric Pressure:		Start	997	O ₂	20.4	%v/v	Monitoring Equipment:				GA5000			
		End	998					Serial Number of Equipment:				G505491		
Barometric Pressure Trend:		Falling						Date of Last Calibration:				14.Jan.2025		
Weather:		Overcast						Operator:				EJS		
Key		Remarks												
NR - Not Recorded NA - Not Applicable														
		Checked:		JBW			Approved:		JBW					

GAS AND GROUNDWATER MONITORING RESULTS

Site: UK Greetings, Bretton Park Way, Dewsbury
Job No: 6359 **Client:** UK Greetings
Visit No: 5 **Date:** 26/02/2025



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour			
BH	% lsl	%v/v	%	% lsl	%v/v	%	ppm	ppm	%	Peak	Steady	(m) bgl	
BHRC101	0.0	0.0	3.2	0.0	0.0	3.2	2	2	16.60	0.1	0.1	5.60	23.30
BHRC102	0.0	0.0	0.1	0.0	0.0	0.1	2	1	21.30	0.2	0.2	5.45	22.90
WS102	0.0	0.0	0.3	0.0	0.0	0.3	2	1	20.70	0.2	0.2	Dry	4.50
WS103	0.0	0.0	0.4	0.0	0.0	0.4	2	0	21.30	0.4	0.4	Dry	4.70
WS104	0.0	0.0	1.9	0.0	0.0	1.9	2	0	19.70	0.2	0.2	Dry	4.80
Ambient Concentration (% volume):				CH ₄	0.1	%v/v	CO ₂			0.1	%v/v		
Barometric Pressure:		Start	1001	O ₂	20.0	%v/v	Monitoring Equipment:				GA5000		
		End	1003				Serial Number of Equipment:				G505491		
Barometric Pressure Trend:			Falling				Date of Last Calibration:				14.Jan.2025		
Weather:			Overcast				Operator:				EJS		
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:		JBW			Approved:		JBW				

GAS AND GROUNDWATER MONITORING RESULTS

Site: UK Greetings, Bretton Park Way, Dewsbury
Job No: 6359 **Client:** UK Greetings
Visit No: 6 **Date:** 06/03/2025



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour		(m) bgl	
	% lcl	%v/v	%	% lcl	%v/v	%	ppm	ppm	%	Peak	Steady		
BHRC101	0.0	0.0	4.2	0.0	0.0	4.2	2	1	14.9	0.1	0.1	5.59	23.30
BHRC102	0.0	0.0	0.8	0.0	0.0	0.3	1	1	19.9	0.1	0.1	5.47	22.90
WS102	0.0	0.0	0.6	0.0	0.0	0.6	1	1	19.1	0.5	0.5	Dry	4.50
WS103	0.0	0.0	0.4	0.0	0.0	0.4	1	0	20.2	0.0	0.0	Dry	4.70
WS104	0.0	0.0	2.6	0.0	0.0	2.5	2	0	18.6	0.1	0.1	Dry	4.80
Ambient Concentration (% volume):				CH ₄	0.0	%v/v	CO ₂			0.1	%v/v		
Barometric Pressure:		Start	1004	O ₂	20.9	%v/v	Monitoring Equipment:					GA5000	
		End	1006	Serial Number of Equipment:					G505491				
Barometric Pressure Trend:		Falling		Date of Last Calibration:					14.Jan.2025				
Weather:		Sunny		Operator:					DMH				
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:		JBW			Approved:		JBW				



Appendix B Worst-Case Atmospheric Conditions

Input the site co-ordinates in C6 & C7 or copy and paste as values

Latitude

53.675905

Longitude

-1.6187748

Worst-case annual threshold for your site

1.15

millibar/hr

0.32

±

Input the month relevant to the assessment (1-12) in K8

Latitude

53.675905

Longitude

-1.6187748

Month

1

Worst-case monthly threshold for your site

1.66

millibar/hr

0.11

±

Using your site specific data, worse-case thresholds are calculated using the average rate of change over an 8-hour reference period (see example graph tab). The average annual worst-case threshold for the UK is a rate of fall at 1.15 millibar per hour. The worse-case threshold is based on an annual average or by month for the inputted geographical location. Uncertainty ± is based on the average standard deviation for annual or monthly calculations across all UK locations.

For your site atmospheric pressure can also be categorised into:

>

<

Very high

1031.9

High

1021.7

1031.9

Normal Range

1006.6

1021.7

Low

992.6

1006.6

Very Low

992.6

Average

1013.8



Press for calculation following any changes to input values. Press to clear removes output values only.

Notes:
Very high to very low atmospheric pressure is based on the inputted geographical location and uses the 95th, 75th, 25th and 5th percentiles from hourly annual data from the climate normal period (1991-2020). All values are an annual representation of what can be considered to be very high to very low pressure. There will be seasonal and monthly variance which is not accounted for. The calculation for the normal atmospheric pressure range uses the interquartile range. Inverse Distance Weighted interpolation is used to calculate worse case thresholds for the rate of falling atmospheric pressure and very high to very low pressure for the inputted geographical location.

For the UK, using an average of all percentiles from each location (n 101) over the climate normal period (1991-2020), atmospheric pressure can be categorized as follows:

- Very high >1032 millibars
- High >1022 <1032 millibars
- Normal >1006 <1022 millibars
- Low >992 <1006 millibars
- Very low <992 millibars

Average atmospheric pressure from all locations is 1013.48 millibars. The standard mean sea level pressure for the UK defined by The Met Office is 1013.25 millibars [<https://www.metoffice.gov.uk/weather/learn-about/weather/how-weather-works/high-and-low-pressure>].

Note all values are rounded for clarity.
See Appendix K2 in GGS' White Paper for additional information on the methodologies used.
[Atmospheric Pressure and a Simplified Approach to Determine Worst-Case Conditions for Ground Gas Monitoring in the UK, 2024, Ground Gas Solutions Limited, <https://ggs-uk.com/>]

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