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Our Ref: P10913/GAL
Date: 14th August 2025

Sammons Architectural Ltd
10 Cawdry Buildings
Fountain Street
Leek
Staffordshire
ST13 6JP
By email only

Attention of Richard Gilman

Dear Richard,

Re: Gas Addendum Letter Report for Bones Lane, Cheddleton, Leek

The gas monitoring programme at the above site is now complete. The assessment below supersedes the information in the Ground Investigation Letter Report (P10913-GIR, dated July 2025) and should be submitted to the regulatory bodies for approval.

The Phase I desk study identified the following potential sources of ground gas:

- Off-site infilled sandstone quarry (east and west of the site boundary).
- Potential made ground.

The site is not in an area where radon protective measures are required.

The subsequent Phase II ground investigation confirmed the absence of any made ground, and no viable source of ground gas was identified.

As the proposed land use has been classified as low sensitivity (commercial / industrial), five 35mm diameter gas/water monitoring standpipes have been installed across the site development area. The standpipes have been installed in the window sample boreholes (WS02 - WS06 inclusive), with response zones in the natural strata due to the absence of made ground.

To confirm potential liabilities, four gas monitoring visits have been carried out between the 16th June and the 11th July 2025, to assess the risk posed to the end user from potentially harmful ground gases. The monitoring visits were generally undertaken weekly. Atmospheric pressure



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ranged between 981mb and 1001mb, with three of the readings recorded during steady atmospheric pressures and one recorded during a period of falling atmospheric pressure.

A gas monitoring location plan is presented in Appendix A, with the gas monitoring results presented in Appendix B.

Borehole	Response Zone (m begl) / Strata	Contamination	No. of Monitoring Visits	Methane (%v/v)	Carbon Dioxide (%v/v)	Oxygen (%v/v)	Flow (l/hr)	Groundwater Depth (m)
WS02	1.0-2.0 / NS	None	4	0.0	0.7-1.1	18.6-20.6	0.0	1.4-2.0
WS03	1.0-2.0 / NS	None	4	0.0	0.9-1.8	18.3-20.2	0.0	1.9-2.3
WS04	1.0-3.0 / NS	None	4	0.0	0.9-1.9	18.4-20.2	0.0	2.1-ND
WS05	1.0-3.0 / NS	None	4	0.0	0.0-0.2	19.2-20.8	0.0	ND
WS06	1.0-3.0 / NS	None	4	0.0	0.8-1.5	18.3-20.1	0.0 - 0.1	ND
Notes: NS = Natural Strata. ND – Not Detected. Atmospheric Pressure: 981mb-1001mb.								

Ground Gas Risk Assessment

The primary guidance document to determine if gas protection measures are required is BS8485:2015+A1:2019. This uses hazardous gas flow rates (Q_{hg}), which are gas concentrations multiplied by borehole flow rates, to derive a Gas Screening Value (GSV) for the site. The gas regime is then determined based on the GSV and other factors including gas concentrations, flow rates, atmospheric conditions, water levels and the likely sources of the observed gas concentrations.

In summary no methane has been detected, whilst carbon dioxide of up to 1.9%v/v and oxygen as low as 18.3%v/v has been recorded.

A maximum steady state gas flow rate of 0.1l/hr has been recorded and this will be used in the following assessment. As the methane concentrations have been consistently below the monitor's lower limit of detection, a default methane concentration of 0.1%v/v have been used in the following assessment.

Using a maximum flow rate of 0.1l/hr and a default maximum methane concentration of 0.1%v/v, a Q_{hg} of 0.0001l/hr has been calculated for methane. Using the same flow rate, the maximum steady state carbon dioxide concentration of 1.9%v/v equates to a Q_{hg} of 0.0019l/hr. On this basis, the GSV for the site is determined as 0.0019l/hr.

As the maximum concentration of methane is <1%v/v, the maximum concentration of carbon dioxide is <5%, and the maximum GSV is <0.07l/hr, the site has been assessed as 'Characteristic Situation 1' or CS1 as outlined in BS8485:2015+A1:2019, for which gas protection measures are not required. This is in line with the sites conceptual site model.

It should be noted that falling pressure (worst case condition) has been recorded during one of the monitoring visits undertaken.

Therefore, it is considered that gas protection measures for methane or carbon dioxide are not required for the new development. In addition, the desk study risk assessment determined that no radon gas protection measures are required.

This assessment confirms that contained in the Ground Investigation Letter Report dated July 2025.

Groundwater

Groundwater was recorded from just above the top of the mudstone bedrock in three exploratory hole locations only, at depths of between 2.1m and 2.7m begl.

Four groundwater monitoring visits have been conducted between the 16th June and the 11th July 2025, as part of the monitoring programme. In summary, standing water was recorded in three of the installations at one time or another, varying between 1.4m begl (WS02) and 2.3m begl (WS03). During the last monitoring visit, three installations (WS04, WS05 & WS06) were recorded as being dry.

There is no clear pattern to the recorded depth of the standing water across the site. The monitoring results indicate low permeability and perched water collecting in excavations.

From the trial pit stability observations, it is likely that excavations will mostly remain stable. Some side trench collapse is inevitable particularly in the medium term and in inclement periods. Granular soils (where encountered) are liable to collapse without warning; this situation is likely to be exacerbated by any water ingress. If required, trench stability should be maintained by providing full support to the side walls, in line with the necessary Temporary Works procedures and Code of Practices.

The observed groundwater conditions suggest that the use of conventional sump pumping would be adequate to control any water ingress in shallow excavations.

We trust this is suitable for your current requirements, should you require any further information or would like any clarification of the points raised please do not hesitate to contact us.

Yours sincerely,
For GRM Development Solutions Ltd



Robert Crossland MSc FGS CGeol
Senior Engineering Geologist

Appendices

Appendix A – Gas Monitoring Plan

Appendix B – Gas Monitoring Results



A P P E N D I X A

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A P P E N D I X B

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In-Situ Gas Monitoring Results

Project Name	Bones Lane, Cheddleton, Leek
Project Number	P10913
Client	Sammons Architectural Ltd
Date	16/06/2025
Weather	Mostly Sunny
Atmospheric Pressure (mb)	1001
Pressure Trend	Falling
Equipment	Gas Data GFM436
Operator	James McGuigan

Ground Gas													
Well ID	Response Zone			Methane		CO2		Oxygen		Gas Flow		PID Reading	
	mbegl			%v/v		%v/v		%v/v		l/h		ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS02	1.0	2.0	NS	0.0	0.0	1.1	1.1	18.6	18.6	0.0	0.0	Not Recorded	
WS03	1.0	2.0	NS	0.0	0.0	1.8	1.8	18.3	18.3	0.0	0.0	Not Recorded	
WS04	1.0	3.0	NS	0.0	0.0	1.9	1.9	18.4	18.4	0.0	0.0	Not Recorded	
WS05	1.0	3.0	NS	0.0	0.0	0.2	0.2	19.2	19.2	0.0	0.0	Not Recorded	
WS06	1.0	2.0	NS	0.0	0.0	1.5	1.5	18.3	18.3	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
1.4	2.1
1.9	2.4
2.9	3.4
Not Detected	3.0
Not Detected	2.1

Notes		Ground Material Key	
L.E.L.	Lower Explosive Limit (100% L.E.L.= 5% Flammable Gas)	NS	Natural Strata
N.D.	Not Detected	a	Methane => 1% v/v
N.R.	Not Recorded	b	Carbon Dioxide =>5% v/v
PID	Photo-Ionising Detector	MG	Made Ground
%	By volume	NS	Natural Strata



In-Situ Gas Monitoring Results

Project Name	Bones Lane, Cheddleton, Leek
Project Number	P10913
Client	Sammons Architectural Ltd
Date	26/06/2025
Weather	Partly Sunny
Atmospheric Pressure (mb)	981
Pressure Trend	Steady
Equipment	Gas Data GFM436
Operator	Liam Press

Ground Gas													
Well ID	Response Zone			Methane		CO2		Oxygen		Gas Flow		PID Reading	
	mbegl			%v/v		%v/v		%v/v		l/h		ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS02	1.0	2.0	NS	0.0	0.0	0.7	0.7	20.6	20.6	0.0	0.0	Not Recorded	
WS03	1.0	2.0	NS	0.0	0.0	1.2	1.2	20.1	20.1	0.0	0.0	Not Recorded	
WS04	1.0	3.0	NS	0.0	0.0	1.1	1.1	20.2	20.2	0.0	0.0	Not Recorded	
WS05	1.0	3.0	NS	0.0	0.0	0.1	0.1	20.7	20.7	0.0	0.0	Not Recorded	
WS06	1.0	2.0	NS	0.0	0.0	0.9	0.9	201.0	20.1	0.1	0.1	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
2.0	2.1
2.0	2.4
Not Detected	3.4
Not Detected	3.1
Not Detected	2.1

Notes

L.E.L.	Lower Explosive Limit (100% L.E.L.= 5% Flammable Gas)
N.D.	Not Detected
N.R.	Not Recorded
PID	Photo-Ionising Detector
%	By volume

Ground Material Key

NS	Natural Strata
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In-Situ Gas Monitoring Results

Project Name	Bones Lane, Cheddleton, Leek
Project Number	P10913
Client	Sammons Architectural Ltd
Date	04/07/2025
Weather	Mostly Cloudy
Atmospheric Pressure (mb)	998
Pressure Trend	Steady
Equipment	Gas Data GFM430
Operator	Alfie Woolley

Ground Gas													
Well ID	Response Zone			Methane		CO2		Oxygen		Gas Flow		PID Reading	
	mbegl			%v/v		%v/v		%v/v		l/h		ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS02	1.0	2.0	NS	0.0	0.0	0.7	0.7	20.3	20.3	0.0	0.0	Not Recorded	
WS03	1.0	2.0	NS	0.0	0.0	0.9	0.9	20.0	20.0	0.0	0.0	Not Recorded	
WS04	1.0	3.0	NS	0.0	0.0	0.9	0.9	20.0	20.0	0.0	0.0	Not Recorded	
WS05	1.0	3.0	NS	0.0	0.0	0.0	0.0	20.5	20.5	0.0	0.0	Not Recorded	
WS06	1.0	2.0	NS	0.0	0.0	0.8	0.8	20.0	20.0	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
1.9	2.0
2.3	2.4
2.1	3.4
Not Detected	3.0
Not Detected	2.0

Notes

L.E.L.	Lower Explosive Limit (100% L.E.L.= 5% Flammable Gas)
N.D.	Not Detected
N.R.	Not Recorded
PID	Photo-Ionising Detector
%	By volume

Ground Material Key

NS	Natural Strata
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In-Situ Gas Monitoring Results

Project Name	Bones Lane, Cheddleton, Leek
Project Number	P10913
Client	Sammons Architectural Ltd
Date	11/07/2025
Weather	Sunny
Atmospheric Pressure (mb)	996
Pressure Trend	Steady
Equipment	Gas Data GFM430
Operator	Lewis Haller

Ground Gas													
Well ID	Response Zone			Methane		CO2		Oxygen		Gas Flow		PID Reading	
	mbegl			%v/v		%v/v		%v/v		l/h		ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS02	1.0	2.0	NS	0.0	0.0	0.8	0.8	20.1	20.1	0.0	0.0	Not Recorded	
WS03	1.0	2.0	NS	0.0	0.0	0.9	0.9	20.2	20.2	0.0	0.0	Not Recorded	
WS04	1.0	3.0	NS	0.0	0.0	0.9	0.9	20.1	20.1	0.0	0.0	Not Recorded	
WS05	1.0	3.0	NS	0.0	0.0	0.0	0.0	20.8	20.8	0.0	0.0	Not Recorded	
WS06	1.0	2.0	NS	0.0	0.0	0.9	0.9	20.0	20.0	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
1.8	2.0
2.1	2.3
Not Detected	3.4
Not Detected	3.0
Not Detected	2.0

Notes

L.E.L.	Lower Explosive Limit (100% L.E.L.= 5% Flammable Gas)	
N.D.	Not Detected	a Methane => 1% v/v
N.R.	Not Recorded	b Carbon Dioxide =>5% v/v
PID	Photo-Ionising Detector	MG Made Ground
%	By volume	NS Natural Strata

Ground Material Key

NS	Natural Strata
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