



GRM Development Solutions Ltd
Laurus House
First Avenue
Centrum 100
Burton upon Trent
Staffordshire
DE14 2WH

Tel: 01283 551 249
Fax: 01283 211 968
Web: www.grm-uk.com

Our Ref: P10056\GAL
Date: 9th December 2022

Alan Johnston Partnership Ltd
4th Floor
1 Dale Street
Liverpool
L2 2ET

Attention of Danny Sinclair (Director)

Dear Danny,

Re: Gas Addendum Letter Report for New Victoria Office Block, Manchester

The gas monitoring programme at the above site is now complete. The assessment below supersedes the information in the Phase II Site Appraisal Report (GRM/P10056/PIISAR.1) dated August 2022, and should be submitted to the regulatory bodies for approval.

A 'Phase 1 Preliminary Environmental Assessment Report' was previously undertaken by VertaseFLI Ltd (Ref: 1946AJP-001), dated May 2022. The Phase I desk study identified the following potential sources of ground gas:

- Made ground.

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

The ground investigation identified the following potential sources of ground gas:

- Made ground (deep in places).

As the proposed land use is classed as low sensitivity (commercial), five 35mm diameter gas/water monitoring standpipes were installed across the site. The standpipes were installed in the rotary openhole boreholes (ROH1, ROH2, ROH3, ROH5 & ROH7), with response zones in the made ground or natural strata.

To confirm potential liabilities, eight gas monitoring visits were carried out between the 1st August and the 1st December 2022, to assess if there is any risk posed to the end user from potentially harmful ground gases.

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

The post fieldwork monitoring has been designed to identify and assess the groundwater and gas regimes below the site. The recently completed gas monitoring results are summarised below:

Land Appraisal | Environmental | Geotechnical | Design | Mining | Inspections

GRM Development Solutions Limited, Laurus House, First Avenue, Centrum 100, Burton upon Trent, Staffs DE14 2WH
www.grm-uk.com | info@grm-uk.com | 01283 551249 Company No. 3099018 (England), VAT Reg. No. 658 1005 48

Borehole	Response Zone (m begl) / Strata	Contamination	No. of Monitoring Visits	Methane (%v/v)	Carbon Dioxide (%v/v)	Oxygen (%v/v)	Flow (l/hr)	Atmospheric Pressure Range
ROH1	2.0-5.0 / NS	None	8	0.0	0.2-1.2	19.2-20.8	0.0	972-1022
ROH2	3.0-5.0 / NS	None	4	0.0	0.0-0.2	19.9-21.1	0.0	972-1022
ROH3	2.0-5.0 / NS	None	8	0.0	0.0-1.6	18.8-20.6	0.0	972-1022
ROH5	2.0-5.0 / MG	None	4	0.0	0.2-2.7	15.5-18.5	0.0	972-1022
ROH7	2.5-5.0 / MG	None	7	0.0	0.0-1.4	19.2-20.9	0.0	972-1022

MG = Made Ground; NS = Natural Strata

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 limiting factors including gas concentrations and flow rates.

In summary no methane has been detected, whilst carbon dioxide of up to 2.7%v/v and oxygen as low as 15.5%v/v has been recorded.

Made Ground

As both flow rate and methane concentrations have been consistently below the monitor's lower limit of detection for the installation within the made ground, a default flow rate of 0.1l/hr and a default methane concentration of 0.1%v/v have been used in the following assessment.

Using the default 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 default flow rate, the maximum steady state carbon dioxide concentration of 2.7%v/v equates to a Q_{hg} of 0.0027l/hr. On this basis, the GSV for the made ground is determined as 0.0027l/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, 'Characteristic Situation 1' or CS1 as outlined in BS8485:2015+A1:2019 is required for the made ground, for which gas protection measures are not required.

Natural Strata

As both flow rate and methane concentrations have been consistently below the monitor's lower limit of detection for the installations within the natural ground, a default flow rate of 0.1l/hr and a default methane concentration of 0.1%v/v have been used in the following assessment.

Using the default 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 default flow rate, the maximum steady state carbon dioxide concentration of 1.6%v/v equates to a Q_{hg} of 0.0016l/hr. On this basis, the GSV for the natural strata is determined as 0.0016l/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, 'Characteristic Situation 1' or CS1 as outlined in BS8485:2015+A1:2019 is required for the natural strata, for which gas protection measures are not required.

It should be noted that falling pressure was also recorded during four of the eight monitoring visits. The made ground will be mostly removed as part of the basement construction of the commercial development, and that waterproofing will offer a degree of defacto protection. It is recommended that geosynthetic clay liners are not used.

On this basis, gas protection measures for methane or carbon dioxide are not required for the proposed commercial development. In addition, no radon gas protection measures are required either.

This assessment confirms that contained in the Phase II Site Appraisal Report dated August 2022.

Groundwater

No groundwater ingresses were encountered in any of the trial pits or rotary openhole boreholes. However, in the rotary cored boreholes, groundwater strikes were recorded at three locations at depths of between 16.0m and 16.5m begl.

Four groundwater monitoring visits were initially undertaken between the 1st August and 24th August 2022, which confirmed that standing water was not detected in any installation, on any of the monitoring visits. Four further groundwater monitoring visits have since been undertaken, between 20th October and 1st December 2022. Due to site activities, two (and then three) of the five monitoring installations were lost. A standing water level of between 4.8m and 4.9m begl was recorded in one of the remaining installations (ROH1) on three monitoring visits only, with the other two installations not recording any standing water.

From the ground investigation undertaken, it is likely that excavations will be generally unstable in the short term. Some materials such as made ground or granular soils are liable to collapse without warning. This situation is likely to be exacerbated by water ingress. However, no significant groundwater ingresses were recorded during the ground investigation undertaken.

The observed groundwater conditions suggest that water ingress will not be a significant issue for any excavations and the use of conventional sump pumping should be adequate to control any groundwater ingress into shallow open 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 Location Plan
Appendix B – Gas Monitoring Results



A P P E N D I X A

Land Appraisal | Environmental | Geotechnical | Design | Mining | Inspections

GRM Development Solutions Limited, Laurus House, First Avenue, Centrum 100, Burton upon Trent, Staffs DE14 2WH
www.grm-uk.com | info@grm-uk.com | 01283 551249 Company No. 3099018 (England), VAT Reg. No. 658 1005 48



In-Situ Gas Monitoring Results

Project Name	New Victoria Office Block, Manchester
Project Number	10056
Client	Alan Johnston Partnership Ltd
Date	01/08/2022
Weather	Mostly Sunny
Atmospheric Pressure (mb)	1019
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
R0H1	2.0	5.0	NS	0.0	0.0	0.3	0.3	19.7	19.7	0.0	0.0	Not Recorded	
R0H2	3.0	5.0	NS	0.0	0.0	0.0	0.0	20.7	20.7	0.0	0.0	Not Recorded	
R0H3	2.0	5.0	NS	0.0	0.0	0.0	0.0	20.6	20.6	0.0	0.0	Not Recorded	
R0H5	2.0	5.0	MG	0.0	0.0	0.2	0.2	18.5	18.5	0.0	0.0	Not Recorded	
R0H7	2.5	5.0	NS	0.0	0.0	0.0	0.0	20.9	20.9	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
Not Detected	5.1
Not Detected	5.0
Not Detected	5.2
Not Detected	4.7
Not Detected	3.8

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

MG	Made Ground
----	-------------

a	Methane => 1% v/v
b	Carbon Dioxide =>5% v/v
MG	Made Ground
NS	Natural Strata



In-Situ Gas Monitoring Results

Project Name	New Victoria Office Block, Manchester
Project Number	10056
Client	Alan Johnston Partnership Ltd
Date	11/08/2022
Weather	Sunny
Atmospheric Pressure (mb)	1020
Pressure Trend	Falling
Equipment	Gas Data GFM430
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
R0H1	2.0	5.0	NS	0.0	0.0	0.8	0.8	20.8	20.8	0.0	0.0	Not Recorded	
R0H2	3.0	5.0	NS	0.0	0.0	0.0	0.0	21.1	21.1	0.0	0.0	Not Recorded	
R0H3	2.0	5.0	NS	0.0	0.0	0.0	0.0	20.6	20.6	0.0	0.0	Not Recorded	
R0H5	2.0	5.0	MG	0.0	0.0	1.3	1.3	17.9	17.9	0.0	0.0	Not Recorded	
R0H7	2.5	5.0	NS	0.0	0.0	0.0	0.0	20.9	20.9	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
Not Detected	5.1
Not Detected	5.0
Not Detected	5.2
Not Detected	4.7
Not Detected	3.8

Notes		Ground Material Key	
L.E.L.	Lower Explosive Limit (100% L.E.L.= 5% Flammable Gas)	MG	Made Ground
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

Comments

WS07 rebung



In-Situ Gas Monitoring Results

Project Name	New Victoria Office Block, Manchester
Project Number	P10056
Client	Alan Johnston Partnership Ltd
Date	18/08/2022
Weather	Cloudy
Atmospheric Pressure (mb)	1015
Pressure Trend	Falling
Equipment	Gas Data LMSXi
Operator	James Wardle

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
R0H1	2.0	5.0	NS	0.0	0.0	0.2	0.2	20.0	20.0	0.0	0.0	Not Recorded	
R0H2	3.0	5.0	NS	0.0	0.0	0.2	0.2	19.9	19.9	0.0	0.0	Not Recorded	
R0H3	2.0	5.0	NS	0.0	0.0	0.6	0.6	20.0	20.0	0.0	0.0	Not Recorded	
R0H5	2.0	5.0	MG	0.0	0.0	2.1	2.1	15.5	15.5	0.0	0.0	Not Recorded	
R0H7	2.5	5.0	NS	0.0	0.0	0.2	0.2	20.2	20.2	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
Not Detected	5.1
Not Detected	5.1
Not Detected	5.2
Not Detected	4.7
Not Detected	3.8

Notes

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

Ground Material Key

MG	Made Ground
----	-------------



In-Situ Gas Monitoring Results

Project Name	New Victoria Office Block, Manchester
Project Number	P10056
Client	Alan Johnston Partnership Ltd
Date	24/08/2022
Weather	Cloudy
Atmospheric Pressure (mb)	1012
Pressure Trend	Steady
Equipment	Gas Data LMSXi
Operator	James Wardle

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
R0H1	2.0	5.0	NS	0.0	0.0	0.6	0.6	19.6	19.6	0.0	0.0	Not Recorded	
R0H2	3.0	5.0	NS	0.0	0.0	0.2	0.2	20.0	20.0	0.0	0.0	Not Recorded	
R0H3	2.0	5.0	NS	0.0	0.0	1.1	1.1	19.7	19.7	0.0	0.0	Not Recorded	
R0H5	2.0	5.0	MG	0.0	0.0	2.7	2.7	17.5	17.5	0.0	0.0	Not Recorded	
R0H7	2.5	5.0	NS	0.0	0.0	0.2	0.2	20.2	20.2	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
Not Detected	5.1
Not Detected	5.0
Not Detected	5.1
Not Detected	4.7
Not Detected	3.8

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

MG	Made Ground
----	-------------

a	Methane => 1% v/v
b	Carbon Dioxide =>5% v/v
MG	Made Ground
NS	Natural Strata



In-Situ Gas Monitoring Results

Project Name	New Victoria Office Block, Manchester
Project Number	P10056
Client	Alan Johnston Partnership Ltd
Date	20/10/2022
Weather	Rain
Atmospheric Pressure (mb)	1007
Pressure Trend	Falling
Equipment	Gas Data GFM436
Operator	James Wardle

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
R0H1	2.0	5.0	NS	0.0	0.0	0.2	0.2	20.4	20.4	0.0	0.0	Not Recorded	
R0H2	3.0	5.0	NS										
R0H3	2.0	5.0	NS	0.0	0.0	0.6	0.6	20.0	20.0	0.0	0.0	Not Recorded	
R0H5	2.0	5.0	MG										
R0H7	2.5	5.0	NS	0.0	0.0	1.0	1.0	19.4	19.4	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
4.9	5.1
Not Detected	5.1
Not Detected	3.7

Notes		Ground Material Key	
L.E.L.	Lower Explosive Limit (100% L.E.L.= 5% Flammable Gas)	MG	Made Ground
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

Comments

could not locate 2 and 5 - assumed destroyed or obstructed.



In-Situ Gas Monitoring Results

Project Name	New Victoria Office Block, Manchester
Project Number	P10056
Client	Alan Johnston Partnership Ltd
Date	07/11/2022
Weather	Clear
Atmospheric Pressure (mb)	972
Pressure Trend	Falling
Equipment	Gas Data GFM430
Operator	James Wardle

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
R0H1	2.0	5.0	NS	0.0	0.0	0.5	0.5	20.1	20.1	0.0	0.0	Not Recorded	
R0H2	3.0	5.0	NS										
R0H3	2.0	5.0	NS	0.0	0.0	0.6	0.6	19.7	19.7	0.0	0.0	Not Recorded	
R0H5	2.0	5.0	MG										
R0H7	2.5	5.0	NS	0.0	0.0	1.2	1.2	19.2	19.2	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
4.8	5.1
Not Detected	5.1
Not Detected	3.7

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

MG	Made Ground
----	-------------

could not locate 2 and 5 - assumed destroyed or obstructed.



In-Situ Gas Monitoring Results

Project Name	New Victoria Office Block, Manchester
Project Number	P10056
Client	Alan Johnston Partnership Ltd
Date	22/11/2022
Weather	Mostly Cloudy
Atmospheric Pressure (mb)	986
Pressure Trend	Steady
Equipment	Gas Data GFM436
Operator	James Wardle

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
R0H1	2.0	5.0	NS	0.0	0.0	1.2	1.2	19.3	19.3	0.0	0.0	Not Recorded	
R0H2	3.0	5.0	NS										
R0H3	2.0	5.0	NS	0.0	0.0	0.8	0.8	19.6	19.6	0.0	0.0	Not Recorded	
R0H5	2.0	5.0	MG										
R0H7	2.5	5.0	NS	0.0	0.0	1.4	1.4	19.4	19.4	0.0	0.0	Not Recorded	

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
4.8	5.1
Not Detected	5.1
Not Detected	3.7

Notes

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

Ground Material Key

MG	Made Ground
----	-------------

could not locate 2 and 5 - assumed destroyed or obstructed.



In-Situ Gas Monitoring Results

Project Name	New Victoria Office Block, Manchester
Project Number	P10056
Client	Alan Johnston Partnership Ltd
Date	01/12/2022
Weather	Cloudy
Atmospheric Pressure (mb)	1022
Pressure Trend	Steady
Equipment	Gas Data GFM436
Operator	James Wardle

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
R0H1	2.0	5.0	NS	0.0	0.0	1.1	1.1	19.2	19.2	0.0	0.0	Not Recorded	
R0H2	3.0	5.0	NS										
R0H3	2.0	5.0	NS	0.0	0.0	1.6	1.6	18.8	18.8	0.0	0.0	Not Recorded	
R0H5	2.0	5.0	MG										
R0H7	2.5	5.0	NS										

Groundwater	
Depth to Groundwater	Total Well Depth
mbegl	mbegl
Not Detected	5.1
Not Detected	5.1

Notes		Ground Material Key	
L.E.L.	Lower Explosive Limit (100% L.E.L.= 5% Flammable Gas)	MG	Made Ground
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

could not locate 2, 5 and 7 - assumed destroyed or obstructed.



A P P E N D I X B

Land Appraisal | Environmental | Geotechnical | Design | Mining | Inspections

GRM Development Solutions Limited, Laurus House, First Avenue, Centrum 100, Burton upon Trent, Staffs DE14 2WH
www.grm-uk.com | info@grm-uk.com | 01283 551249 Company No. 3099018 (England), VAT Reg. No. 658 1005 48



NOTES:

NOTES

CLIENT: Alan Johnson Partnership Ltd / Vinci Construction (on behalf of Morgan Capital)	TITLE: Gas Monitoring Location Plan	PROJECT No: P10056	DATE: July 2022	 GRM Development Solutions Ltd Tel: 01283 551 249 Fax: 01283 211 968 mail@grm-uk.com www.grm-uk.com
PROJECT: New Victoria Office Block, Manchester		DESIGN/DRAWN: RP	ISSUE: Figure 5	
© GRM Development Solutions Ltd © Crown Copyright. AL 100014100				