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Our Ref: P8723\Addnl.GAL

Date: 10th January 2020

Partner Construction Limited
19 Mallard Way
Derby
DE24 8GX

Waterloo Housing Group Limited
1700 Solihull Parkway
Birmingham Business Park
Solihull B37 7YD

Attention of Mr D. Wigley

Dear Dean,

Re: Additional Gas Addendum Letter for Crease Drove, Crowland

Following recent correspondence with the Local Authority Environmental Protection Officer, additional gas monitoring was carried out and is now complete. The assessment below supersedes the information in the GRM Gas Addendum Letter dated 25th March 2019 (Ref: P8723/PEL/GAL) and GRM Remedial Strategy dated September 2019 (Ref: GRM/P8723/RS.1 Rev.A) and should be submitted to the regulatory bodies for approval.

Background Information

The Phase I desk study dated December 2018 (Ref: GRM/P8723/DS.1) identified the following potential sources of ground gas:

- Σ Potentially contaminated made ground.
- Σ Potentially contaminated infilled ground.
- Σ Organic rich natural strata (peat).

Two separate phases of ground investigation were carried out by GRM in December 2018 and June 2019, full details are reported in;

- Σ GRM, Phase II Site Appraisal, dated January 2019 (Ref: GRM/P8723/F.1).
- Σ GRM, Phase II Site Appraisal, dated July 2019 (Ref: GRM/P8723/F.2).

The ground investigations confirmed the presence of Peat in the south of the site, to depths of between 0.55m and 2.8m below existing ground level (begl) and typically increased in thickness towards the south east and south west corners of the site. The stratum was typically encountered as grey / brown, occasionally slightly sandy occasionally slightly gravelly, silty organic clay with occasional decomposed fibrous plant materials and organic odour.

Evidence of contamination was observed in the Peat in the southwest corner of the site where black staining and hydrocarbon odours were recorded from 1.1 and 1.8m begl.

Black staining was observed in the peat located to the east of the site, however no hydrocarbon odour was noted within these materials that it is considered likely to be associated with the natural organic staining.

No further significant potential sources of ground gas or volatile vapours were identified during both ground investigations.

Since the Phase II reports were issued, remedial work with respect to the hydrocarbon impacted peat materials was carried out in November 2019 which involved the removal of the grossly impacted peat materials within the south west corner of the site for off-site disposal. As a result of this work monitoring wells WS06 and WS09 were removed, however, two replacement wells; WS06A and WS109A were installed, within the peat materials, outside and downgradient of the remediated area. In addition, WS01 and BH101 had been damaged and were no longer serviceable. A plan showing the monitoring locations is enclosed for reference.

Gas Readings

As the proposed end use has been classified as high sensitivity residential with gardens, a total of eight 35mm diameter gas/groundwater monitoring standpipes have been installed across the site in the window sample boreholes WS01 to WS04, WS06, WS109, WS06A and WS109A and targeted at the natural strata (low generation potential). Locations WS01, WS03, WS06, WS06A and WS109A target the areas containing Peat, with WS02 positioned close to the anticipated boundary of the made ground and Peat.

Two 50mm diameter standpipes were installed in the boreholes BH101 and BH102. The response zone of BH101 targeted the Oxford Clay Formation and BH102 targeted the Peat materials.

On the basis of the confirmed sources of ground gas and proposed end use gas monitoring has been carried out over a 3 month period from the 19th December 2018 to 25th February 2019, with two additional rounds on 18th June and 16th August 2019 to assess the risk posed to the end users from potentially harmful ground gases, with volatile vapours recorded on three of these occasions.

The recent post-remediation gas monitoring was carried out between 6th and 20th December 2019 on three weekly visits and included monitoring of all available wells.

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

Well ID (No. of Readings)	Response Zone / Strata (m)	Methane (%v/v)	CO2 (%v/v)	Oxygen (%v/v)	Peak Gas Flow (l/h)	Groundwater Level (m begl)	PID (ppm)
WS01 (8)	0.5-3.0 / Peat	0.0	0.7 – 4.6	17.5 – 20.2	0.0	0.87 – 1.10	0.0 - 0.6
WS02 (8)	0.6-1.7 / MG & Peat	0.0	1.2 – 6.9	14.7 – 20.9	0.0	0.32 – 0.93	0.0 - 0.3
WS03 (10)	1.0-3.0 / AB	0.0	0.3 – 1.6	18.5 – 20.9	0.0	0.12 – 0.68	0.0 - 0.3
WS04 (10)	0.5-1.5 / AB	0.0	0.0 – 1.7	16.6 – 20.6	0.0	0.00 – 0.40	0.0 - 0.0
WS06 (8)	1.0-2.0 / Peat	0.0	0.0 – 0.7	19.6 – 19.8	0.0	0.75 – 1.10	0.0 - 0.3
WS06A (2)	0.6-1.1 / Peat	0.0 – 1.1	0.7 – 2.3	16.7 – 19.2	0.0	0.00 – 0.85	NR
WS109 (2)	1.3-2.5 / Peat	0.0	2.2 – 4.7	6.9 – 20.2	0.0 – -1.31	0.62 – 1.31	NR
WS109A (2)	0.7-1.4 / Peat	0.0	0.7 – 2.9	16.7 – 20.7	0.0	0.00 – 0.83	NR
BH101 (2)	4.0-15.0 / OX	0.0	0.4 – 1.8	19.7 – 20.6	0.0	0.74 – 1.27	NR
BH102 (5)	1.0-1.7 / Peat	0.0	3.5 – 30.0	6.5 – 14.4	0.0	1.00 – 1.42	NR

MG = Made Ground, AB = Abbey Sand Formation, OX = Oxford Clay Formation, NR = Not recorded.
Atmospheric Pressure 967mb to 1044mb.

Groundwater

Throughout the whole monitoring program the general presence of shallow groundwater has been confirmed beneath the site. Groundwater was encountered at depths of between ground level and 1.42m begl. It was noted that during the summer visits no notable difference was recorded in water levels, therefore it is considered that the groundwater table is relatively consistent and shallow and not significantly influenced by seasonal variation.

Ground Gas Risk Assessment

It should be noted that during the most recent monitoring rounds significant concentrations of carbon dioxide were not recorded in comparison to the previous maximum concentration of 30% by volume (v/v) with a concentration of 6.3% v/v recorded in BH102 on the final round where the response zone was saturated. Therefore, it is considered that the peak carbon dioxide concentration recorded in BH102 is not representative of the gas regime beneath the site and has not been considered as part of the assessment below.

Methane was recorded above the monitor's lower limit of detection on a single occasion throughout the whole monitoring period in WS06A at 1.1%v/v, when the monitoring well was completely saturated. Taking into account that methane has not been recorded elsewhere across the site over the whole monitoring programme, it is not considered representative of the gas regime beneath the site and therefore has not been considered as part of the assessment below.

Depleted oxygen concentrations have been recorded broadly corresponding with a peak of carbon dioxide.

Positive gas flow has not been recorded throughout the monitoring period.

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.

Based upon the above, the monitor's lower limit of detection for methane (0.1% v/v) and flow rate (0.1l/hr) have been used.

Using the default methane concentration of 0.1%v/v and the default flow rate of 0.1l/hr a Q_{hg} of 0.0001l/hr has been calculated for methane.

Using the maximum recorded steady state carbon dioxide concentration of 6.9%v/v, excluding 30% v/v, and the default flow rate of 0.1l/hr a Q_{hg} of 0.0069l/hr has been calculated for carbon dioxide.

On this basis the GSV for the site is determined as 0.0069l/hr.

Taking into account that a significant source of ground gas has not been identified, given the Peat strata has a low (<5%) organic content, the recent monitoring confirms that the ground gas concentrations are typically below 5% v/v for carbon dioxide and 1% v/v for methane and no positive gas flow has been recorded, it is considered that the site is characterised as 'Characteristic Situation 1' (CS1) for which no gas protection measures are required.

Vapours

Very low levels of volatile organic compounds (VOCs) between the limit of detection for the apparatus and 0.6ppm have been recorded associated with the hydrocarbon-impacted Peat. However, the soil chemical results do not record shorter (<C10) aliphatic or aromatic carbon bands above the laboratory limit of detection which are considered to be volatile. In addition the hydrocarbon-impacted Peat soils have now been removed from site. Therefore, VOC vapour protection is not considered necessary for this site.

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

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



Charlotte Mortimer BSc (Hons) MEnvSc
Senior Environmental Scientist



Siobhan Jackson BSc (Hons) MEnvSc
Principal Geo-environmental Scientist

Enc:
P8723 Gas Monitoring Location Plan
P8723 Gas Monitoring Results



In-Situ Gas Monitoring Results

Project Name:	Crease Drove Crowland Peterborough
Project Number:	P8723
Client:	Partner Construction
Date:	20/12/2018
Weather:	Raining
Atmospheric Pressure (mb):	1001
Pressure Trend:	Rising
Equipment:	Gas Data GFM430
Operator:	Tom Robson

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS01	0.50	3.00	NS	0.00	0.00	2.10	2.10	18.20	18.20	0.00	0.00	Not Recorded	
WS02	0.60	1.60	NS	0.00	0.00	3.90	3.90	15.60	15.60	0.00	0.00	Not Recorded	
WS03	1.00	3.00	NS	0.00	0.00	0.90	0.90	19.40	19.40	0.00	0.00	Not Recorded	
WS04	0.50	1.50	NS	0.00	0.00	0.30	0.30	19.80	19.80	0.00	0.00	Not Recorded	
WS06	1.00	2.00	NS	0.00	0.00	0.30	0.30	19.70	19.70	0.00	0.00	Not Recorded	

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
1.09	2.94
0.75	1.65
0.50	3.20
0.39	1.43
0.93	2.09

Comments: All holes bailed

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

Highlighted cell for following conditions:
 a Methane >= 1% v/v
 b Carbon Dioxide >= 5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name:	Crease Drove Crowland Peterborough
Project Number:	P8723
Client:	Partner Construction
Date:	02/01/2019
Weather:	Cloudy
Atmospheric Pressure (mb):	1044
Pressure Trend:	Falling
Equipment:	Gas Data GFM430
Operator:	Tom Robson

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS01	0.50	3.00	NS	0.00	0.00	2.30	2.30	17.50	17.50	0.00	0.00	Not Recorded	
WS02	0.60	1.60	NS	0.00	0.00	5.80	5.80	15.00	15.00	0.00	0.00	Not Recorded	
WS03	1.00	3.00	NS	0.00	0.00	1.40	1.40	18.90	18.90	0.00	0.00	Not Recorded	
WS04	0.50	1.50	NS	0.00	0.00	0.30	0.30	19.40	19.40	0.00	0.00	Not Recorded	
WS06	1.00	2.00	NS	0.00	0.00	0.60	0.60	19.60	19.60	0.00	0.00	Not Recorded	

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
1.03	2.91
0.85	1.63
0.58	3.15
0.00	1.41
0.95	1.92

Comments: All holes bailed

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

Highlighted cell for following conditions:
 a Methane >= 1% v/v
 b Carbon Dioxide >= 5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name: Crease Drove Crowland Peterborough
 Project Number: P8723
 Client: Partner Construction
 Date: 08/01/2019
 Weather: Ice
 Atmospheric Pressure (mb): 900
 Pressure Trend: Steady
 Equipment: Gas Data GFM430, Ion Science Tiger Pro Photo-ionising detector (PID)
 Operator: Tom Robson

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS01	0.50	3.00	NS										
WS02	0.60	1.60	NS										
WS03	1.00	3.00	NS										
WS04	0.50	1.50	NS										
WS06	1.00	2.00	NS										

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl

Comments: no gas visit. only water samples

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

Highlighted cell for following conditions:
 a Methane $\geq 1\%$ v/v
 b Carbon Dioxide $\geq 5\%$ v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name:	Crease Drove Crowland Peterborough
Project Number:	P8723
Client:	Partner Construction
Date:	17/01/2019
Weather:	Ice
Atmospheric Pressure (mb):	1003
Pressure Trend:	Rising
Equipment:	Gas Data LMSXi, Ion Science Tiger Pro Photo-Ionising detector (PID)
Operator:	Tom Robson

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS01	0.50	3.00	NS	0.00	0.00	0.70	0.70	19.40	19.40	0.00	0.00	0.60	0.60
WS02	0.60	1.60	NS	0.00	0.00	6.90	6.90	15.50	15.50	0.00	0.00	0.20	0.20
WS03	1.00	3.00	NS	0.00	0.00	1.30	1.30	19.20	19.20	0.00	0.00	0.00	0.00
WS04	0.50	1.50	NS	0.00	0.00	0.00	0.00	20.00	20.00	0.00	0.00	0.00	0.00
WS06	1.00	2.00	NS	0.00	0.00	0.00	0.00	19.80	19.80	0.00	0.00	0.30	0.30

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
1.10	2.90
0.89	1.63
0.68	3.20
0.30	1.43
1.10	1.90

Comments: None

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

Highlighted cell for following conditions:
 a Methane >= 1% v/v
 b Carbon Dioxide >= 5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name:	Crease Drove Crowland Peterborough
Project Number:	P8723
Client:	Partner Construction
Date:	28/01/2019
Weather:	Ice
Atmospheric Pressure (mb):	1006
Pressure Trend:	Steady
Equipment:	Gas Data GFM430, Ion Science Tiger Pro Photo-ionising detector (PID)
Operator:	Tom Robson

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS01	0.50	3.00	NS	0.00	0.00	2.90	2.90	18.30	18.30	0.00	0.00	0.30	0.30
WS02	0.60	1.60	NS	0.00	0.00	0.90	0.90	15.10	15.10	0.00	0.00	0.30	0.30
WS03	1.00	3.00	NS	0.00	0.00	0.70	0.70	19.60	19.60	0.00	0.00	0.30	0.30
WS04	0.50	1.50	NS	0.00	0.00	0.00	0.00	19.90	19.90	0.00	0.00	0.00	0.00
WS06	1.00	2.00	NS	0.00	0.00	0.00	0.00	19.80	19.80	0.00	0.00	0.30	0.30

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
1.10	2.91
0.93	1.65
0.67	3.12
0.33	1.39
1.10	1.91

Comments: None

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

Highlighted cell for following conditions:
 a Methane >= 1% v/v
 b Carbon Dioxide >= 5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name:	Crease Drove Crowland Peterborough
Project Number:	P8723
Client:	Partner Construction
Date:	12/02/2019
Weather:	Sunny
Atmospheric Pressure (mb):	1031
Pressure Trend:	Steady
Equipment:	Gas Data GFM430, Ion Science Tiger Pro Photo-ionising detector (PID)
Operator:	Tom Robson

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS01	0.50	3.00	NS	0.00	0.00	2.60	2.60	18.30	18.30	0.00	0.00	0.00	0.00
WS02	0.60	1.60	NS	0.00	0.00	4.50	4.50	16.90	16.90	0.00	0.00	0.00	0.00
WS03	1.00	3.00	NS	0.00	0.00	0.30	0.30	20.00	20.00	0.00	0.00	0.00	0.00
WS04	0.50	1.50	NS	0.00	0.00	0.00	0.00	20.10	20.10	0.00	0.00	0.00	0.00
WS06	1.00	2.00	NS	0.00	0.00	0.70	0.70	19.60	19.60	0.00	0.00	0.00	0.00

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
0.87	2.89
0.75	1.63
0.49	3.17
0.00	1.40
0.75	1.91

Comments: All holes bailed

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

Highlighted cell for following conditions:
 a Methane >= 1% v/v
 b Carbon Dioxide >= 5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name: Crease Drove Crowland Peterborough
 Project Number: P8723
 Client: Partner Construction
 Date: 25/02/2019
 Weather: Sunny
 Atmospheric Pressure (mb): 1039
 Pressure Trend: Steady
 Equipment: Gas Data GFM430
 Operator: Tom Robson

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
WS01	0.50	3.00	NS	0.00	0.00	2.50	2.50	17.70	17.70	0.00	0.00	Not Recorded	
WS02	0.60	1.60	NS	0.00	0.00	5.40	5.40	14.70	14.70	0.00	0.00	Not Recorded	
WS03	1.00	3.00	NS	0.00	0.00	0.60	0.60	19.80	19.80	0.00	0.00	Not Recorded	
WS04	0.50	1.50	NS	0.00	0.00	0.00	0.00	20.00	20.00	0.00	0.00	Not Recorded	
WS06	1.00	2.00	NS	0.00	0.00	0.40	0.40	19.80	19.80	0.00	0.00	Not Recorded	

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
1.05	2.93
0.88	1.63
0.63	3.14
0.29	1.39
1.06	1.91

Comments

PID BROKE

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

Highlighted cell for following conditions:
 a Methane >= 1% v/v
 b Carbon Dioxide >= 5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name: Crease Drove Crowland Peterborough
 Project Number: P8723
 Client: Partner Construction
 Date: 18/06/2019
 Weather: Partly Sunny
 Atmospheric Pressure (mb): 1014
 Pressure Trend: Falling
 Equipment: Gas Data LMSXi
 Operator: Bryan Burgh

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
BH101	4.00	15.00	NS	0.00	0.00	0.40	0.40	20.60	20.36	0.00	0.00	Not Recorded	
BH102	1.00	1.70	NS	0.00	0.00	6.30	6.30	14.10	14.10	0.00	0.00	Not Recorded	
WS01	0.50	3.00	NS	0.00	0.00	1.60	1.60	20.20	20.20	0.00	0.00	Not Recorded	
WS02	0.60	1.60	NS										
WS03	1.00	3.00	NS	0.00	0.00	1.20	1.20	20.40	20.40	0.00	0.00	Not Recorded	
WS04	0.50	1.50	NS	0.00	0.00	1.80	1.80	19.60	19.60	0.00	0.00	Not Recorded	
WS06	1.00	2.00	NS	0.00	0.00	1.10	1.10	20.50	20.50	0.00	0.00	Not Recorded	
WS109	1.30	2.50	NS	0.00	0.00	4.70	4.70	6.90	6.90	0.00	0.00	Not Recorded	

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
0.74	15.05
1.12	1.82
0.68	2.92
0.00	3.10
0.00	1.35
0.60	1.87
0.62	2.25

Comments: WS02 overgrown, no access

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

Highlighted cell for following conditions:
 a Methane >>1% v/v
 b Carbon Dioxide >>5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name:	Crease Drove Crowland Peterborough
Project Number:	P8723
Client:	Partner Construction
Date:	15/08/2019
Weather:	Raining
Atmospheric Pressure (mb):	1012
Pressure Trend:	TBA
Equipment:	Gas Data LMSXi
Operator:	James Wardle

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
BH101	4.00	15.00	NS	0.00	0.00	1.80	1.80	19.70	19.70	0.00	0.00	Not Recorded	
BH102	1.00	1.70	NS	0.00	0.00	30.00	30.00	6.50	6.50	0.00	0.00	Not Recorded	
WS01	0.50	3.00	NS	0.00	0.00	4.60	4.60	18.40	18.40	0.00	0.00	Not Recorded	
WS02	0.60	1.60	NS										
WS03	1.00	3.00	NS	0.00	0.00	0.30	0.30	20.90	20.90	0.00	0.00	Not Recorded	
WS04	0.50	1.50	NS	0.00	0.00	1.20	1.20	20.90	20.90	0.00	0.00	Not Recorded	
WS06	1.00	2.00	NS	0.00	0.00	0.40	0.40	20.90	20.90	0.00	0.00	Not Recorded	
WS109	1.30	2.50	NS	0.00	0.00	2.20	2.20	20.20	20.20	-1.31	-0.51	Not Recorded	

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
1.27	15.06
1.42	1.84
1.28	2.92
0.77	3.06
0.42	1.70
1.10	1.87
1.31	2.05

Comments WS02 overgrown, no access

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

Highlighted cell for following conditions:
 a Methane >>1% v/v
 b Carbon Dioxide >>5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name: Crease Drove Crowland Peterborough
 Project Number: P8723
 Client: Partner Construction
 Date: 06/12/2019
 Weather: Dreary (Overcast)
 Atmospheric Pressure (mb): 987
 Pressure Trend: Rising
 Equipment: Gas Data LMSXi
 Operator: Bryan Burgh

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
BH101	4.00	15.00	NS	DESTROYED									
BH102	1.00	1.70	NS	0.00	0.00	4.20	4.20	14.00	14.00	0.00	0.00	Not Recorded	
WS01	0.50	3.00	NS	DESTROYED									
WS02	0.60	1.60	NS	0.00	0.00	1.20	1.20	20.90	20.90	0.00	0.00	Not Recorded	
WS03	1.00	3.00	NS	0.00	0.00	1.30	1.30	19.70	19.70	0.00	0.00	Not Recorded	
WS04	0.50	1.50	NS	0.00	0.00	0.30	0.30	20.60	20.60	0.00	0.00	Not Recorded	
WS06	1.00	2.00	NS	DESTROYED									
WS06A	0.60	1.10	NS										
WS109	1.30	2.50	NS	DESTROYED									
WS109A	0.70	1.40	NS										

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
1.13	1.90
0.32	1.56
0.28	3.07
0.17	1.42

Comments: Gas readings taken, WS04 bailed and recharged to 0.17 in 7 minutes

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

Highlighted cell for following conditions:
 a Methane >=1% v/v
 b Carbon Dioxide >=5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name: Crease Drove Crowland Peterborough
 Project Number: P8723
 Client: Partner Construction
 Date: 13/12/2019
 Weather: Dreary
 Atmospheric Pressure (mb): 987
 Pressure Trend: Rising
 Equipment: Gas Data GFM430
 Operator: James Wardle

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
BH101	4.00	15.00	NS	DESTROYED									
BH102	1.00	1.70	NS	0.00	0.00	3.50	3.50	14.40	14.40	0.00	0.00	Not Recorded	
WS01	0.50	3.00	NS	DESTROYED									
WS02	0.60	1.60	NS	0.00	0.00	1.40	1.40	17.40	17.40	0.00	0.00	Not Recorded	
WS03	1.00	3.00	NS	0.00	0.00	1.60	1.60	18.50	18.50	0.00	0.00	Not Recorded	
WS04	0.50	1.50	NS	0.00	0.00	1.70	1.70	16.60	16.60	0.00	0.00	Not Recorded	
WS06	1.00	2.00	NS	DESTROYED									
WS06A	0.60	1.10	NS	0.00	0.00	2.30	2.30	16.70	16.70	0.00	0.00	Not Recorded	
WS109	1.30	2.50	NS	DESTROYED									
WS109A	0.70	1.40	NS	0.00	0.00	2.90	2.90	16.70	16.70	0.00	0.00	Not Recorded	

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
1.36	1.82
0.68	1.66
0.12	3.07
0.40	2.66
0.85	1.08
0.83	1.50

Comments: None

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

Highlighted cell for following conditions:
 a Methane >= 1% v/v
 b Carbon Dioxide >= 5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata



In-Situ Gas Monitoring Results

Project Name: Crease Drove Crowland Peterborough
 Project Number: P8723
 Client: Partner Construction
 Date: 20/12/2019
 Weather: Raining
 Atmospheric Pressure (mb): 967
 Pressure Trend: Rising
 Equipment: Gas Data LMSXi
 Operator: Liam Press

Ground Gases													
				Methane %v/v		CO2 %v/v		Oxygen %v/v		Gas Flow l/h		PID Reading ppm	
ID	Top	Base	Strata	Peak	Steady	Peak	Steady	Low	Steady	Peak	Steady	Peak	Steady
BH101	4.00	15.00	NS	DESTROYED									
BH102	1.00	1.70	NS	0.00	0.00	6.30	6.30	12.40	12.40	0.00	0.00	Not Recorded	
WS01	0.50	3.00	NS	DESTROYED									
WS02	0.60	1.60	NS										
WS03	1.00	3.00	NS										
WS04	0.50	1.50	NS	0.00	0.00	0.80	0.80	20.60	20.60	0.00	0.00	Not Recorded	
WS06	1.00	2.00	NS	DESTROYED									
WS06A	0.60	1.10	NS	1.10	1.10	0.70	0.70	19.20	19.20	0.00	0.00	Not Recorded	
WS109	1.30	2.50	NS	DESTROYED									
WS109A	0.70	1.40	NS	0.00	0.00	0.70	0.70	20.70	20.70	0.00	0.00	Not Recorded	

Ground Waters	
Depth to Groundwater mbegl	Total Well Depth mbegl
1.00	1.90
0.00	1.40
0.00	1.15
0.00	1.40

Comments: WS02, WS03 were submerged by standing water, with no safe access.

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

Highlighted cell for following conditions:
 a Methane >=1% v/v
 b Carbon Dioxide >=5% v/v
 MG Made Ground
 NS Natural Strata

Ground Material Key

NS Natural Strata