Technical Note

Project:	Low Moor Road, Sutton In Ashfield
Subject:	Technical Note – Ground Gas Risk Assessment
Date:	18th May 2018
Prepared by:	Rob Woodhouse BSc/BEng (Hons) – Geo-Environmental Engineer
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Revision	A – Monitoring data received for Sutton Quarry 07/06/2018

1 Introduction

In January 2018, Rodgers Leask Environmental Ltd (RLE) was commissioned by Hallam Land Management Ltd to undertake site investigation works at land off Low Moor Road, Sutton in Ashfield. The site investigation focussed on the northeast portion of land referred to as the Rolls Royce (RR) parcel. This area will henceforth be referred to as 'the Site'.

It is understood the site is to be redeveloped for a residential end use.

This investigation follows a preliminary investigation documented in the RLE Technical Note dated 13th September 2017:

- *Low Moor Road, Sutton In Ashfield, Technical Note - Permeability Testing and Ground Gas Monitoring.*

A Phase 1 Desk Study was also completed by RLE dated 26th January 2017 which incorporated the 3 No parcels that make up the proposed development area. This includes the RR parcel/the Site:

- *Low Moor Road, Sutton In Ashfield, Phase 1 Desk Study for Hallam Land Management, Rev A.*

Both of the above documents should be read in conjunction with this Technical Note.

2 Objectives

The objectives of this investigation are to:

- To assess the risk of gas migration from the adjacent former household, commercial and industrial waste landfill site to the northeast of the Site, currently managed by Suez (Sutton Quarry), through undertaking window sample (WS) and rotary (RO) boreholes along the boundary of the Site which borders Coxmoor Road.
- To undertake a more robust gas risk assessment by monitoring these boreholes and existing boreholes over an extended period.

- Classify the site with regards to ground gas in accordance with the NHBC Traffic Light System and CIRIA C665.

3 Site Setting

The Site is located to the southwest of Sutton-in-Ashfield, Nottinghamshire. The Site centre co-ordinates are at approximately 451556E, 357656N.

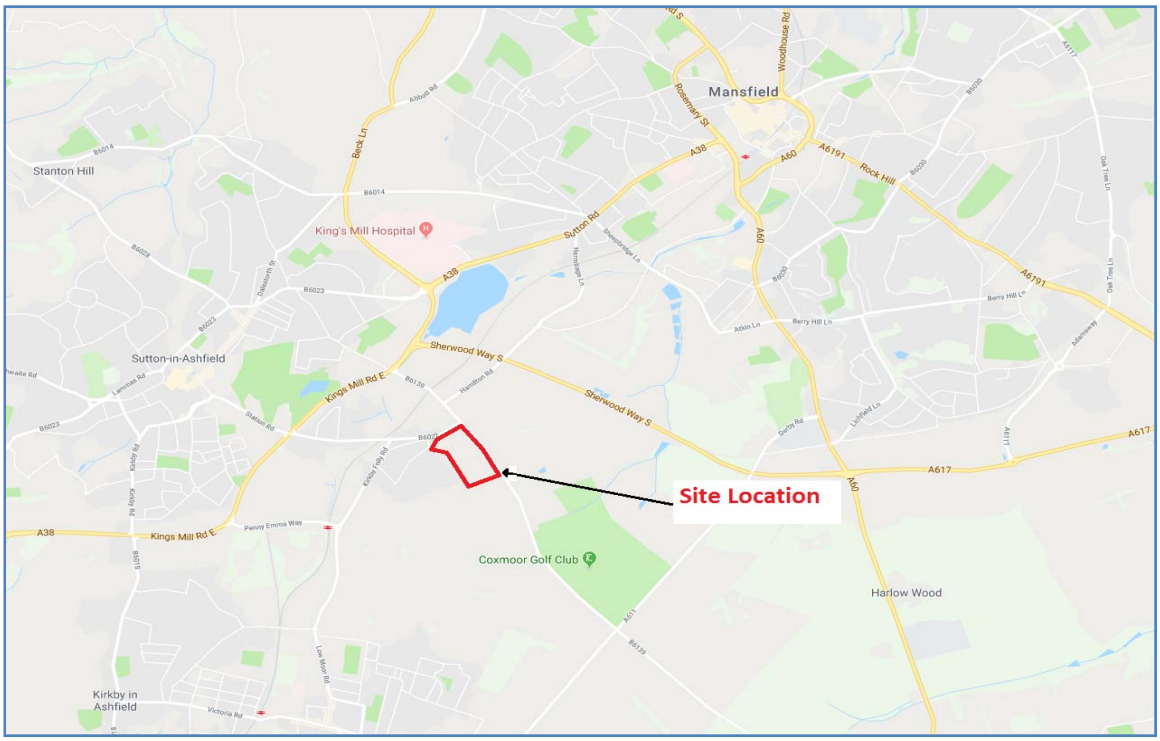


Figure 1 Approximate boundary and location of site.

The Site is currently used as arable farm land.

4 Previous Investigation

4.1 Preliminary Gas Monitoring

An intrusive investigation was undertaken by RLE in April 2017 to determine the depth of made ground in the former onsite landfill area, infiltration testing and assessment of the ground gas regime across the Site.

RLE's Desk Study considered that in areas where landfilling had taken place on or adjacent to the Site the risk of ground gassing impacting the Site would be considered moderate/high and the sensitivity of the Site was considered high.

A minimum of 12 gas monitoring visits over a 6 month period was recommended by RLE to establish the gassing regime of the Site.

During the initial works, a total of 8 No WS boreholes and 2 No Cable Percussion (CP) boreholes were drilled in and around the area of the former landfill, all of which were installed with gas monitoring ancillaries. Six monitoring visits were carried out over a 3 month period.

An initial assessment after the six monitoring visits concluded that any proposed development would require Amber 1 gas protection measures.

Key conclusions from the investigation were that:

- Generally, methane was detected in low concentrations (<5%) in some boreholes at times of low and falling atmospheric pressure.
- The majority of the occurrences of methane were in the deeper CP boreholes, indicating that methane may be generated in the deeper areas of fill onsite.
- Several readings of carbon dioxide were recorded above trigger levels but there was no direct correlation between carbon dioxide and atmospheric pressure.
- The Sutton Quarry landfill was not generating significant concentrations of gas or gas is not migrating onto the Site from the adjacent site.
- It was recommended that further gas monitoring was undertaken.

After the issue of the preliminary gas assessment by RLE; Suez, the owner of the Sutton Quarry landfill expressed concerns that the initial monitoring had not targeted the boundary between the proposed development and their site.

In response, the EHO at Sutton in Ashfield confirmed that “The Council will not accept Amber 1 classification for the dwellings... without first a targeted ground gas investigation....”

RLE liaised with Leigh Warhurst, EHO at Sutton in Ashfield to design a satisfactory targeted ground gas investigation. It was agreed that boreholes at 50m centres and targeting both the bedrock and subsoils at the boundary of the two sites would be satisfactory to the council for a robust risk assessment to be carried out.

5 Site Investigation Works

5.1 Site Works

The further intrusive works were carried out at the Site on the 12th and 13th of February 2018. A combination of Rotary (RO) and WS boreholes were drilled at the north-eastern boundary where the Site is adjacent to the Sutton Quarry site. A borehole location plan is included in **Appendix A**.

5.2 Rationale of Borehole Location and Depth

A total of 4 No RO boreholes and 5 No WS boreholes were drilled along the boundary of the site adjacent with Coxmoor Rd in addition to the 8 No existing WS and 2 No CP boreholes on the Site.

Borehole RO 03 was stopped early and not installed due to dense concrete obstructions. Borehole RO 03A was drilled in close proximity and installed to 10m depth with monitoring ancillaries.

These boreholes allowed both the onsite deep and shallow areas of fill to be targeted along with the bedrock and the subsoils at the boundary of the Site adjacent with Coxmoor Rd as shown in Table 1 below. A copy of the borehole logs is included in **Appendix B**.

Table 1 All boreholes drilled to date

Borehole Reference	Depth (mm)	Borehole Type	Target
WS101 – WS105	0.9 – 4.0m	WS	Soft Strata at Site boundary with Coxmoor Rd
RO 01 – RO 03A	4.0 - 10m	RO	Sandstone Bedrock at Site Boundary with Coxmoor Rd
WS01 – WS08*	1.0 – 4.45m	WS	Area of onsite inert fill
CP01 – CP02*	4.45 – 9.45m	CP	Base of onsite inert fill

**Boreholes from previous investigation*

5.3 Ground Conditions

Ground conditions encountered in this investigation were largely typical of the previous investigation. Deeper RO boreholes uncovered several concrete obstructions at the northern boundary of the site between depths of 1.0 to 7.0m. Detailed findings are as overleaf:

Table 2 Ground Conditions

Strata Encountered	Depth encountered to top of strata (range, m)	Depth encountered to base of strata (m)	Thickness (range, m)
MADE GROUND TOPSOIL Encountered across the investigation area. Comprising dark brown sandy topsoil with gravels of quartzite, brick, concrete and sandstone.	0	0.2 - 0.3	0.2 – 0.3
MADE GROUND FILL MATERIAL Encountered in the northern end of the investigation area. Comprising variable strata of sandy gravelly clay and clayey gravelly sand. Deeper RO boreholes encountered several concrete obstructions.	0.3 – 1.0	2.0 – 7.0	1.7 – 6.0
LENTON SANDSTONE FORMATION Encountered below the made ground across the investigation area. Recovered as orange red brown sand with quartzite gravels. Occasional bands of firm clay were encountered in some boreholes.	0.2 – 0.9	Unproven	Unproven

No groundwater or evidence of contamination was encountered within the exploratory holes.

6 Ground Gas Monitoring and Assessment

6.1 Completed Ground Gas Monitoring

The risk to end users from ground gas has been assessed in accordance with the following documents:

- British Standards BS8485:2015 – Code of practise for the design of protective measures for methane and carbon dioxide ground gases for new buildings;
- CIRIA C665: Assessing risks posed by hazardous ground gas to buildings, 2007.

A minimum of 12 No gas monitoring visits over a period of 6 months is recommended in accordance with CIRIA C665. This assessment is based on a moderate generation potential and high sensitivity development.

Gas monitoring has been carried out using both GA2000 and GA5000 landfill gas analysers with integral flow measuring capability.

A total of 12 No gas monitoring rounds have been completed on the original installations (WS01 – WS08 and CP 1 and 2) across two periods of three months. Monitoring was carried out between 27th April and 19th June 2017 and 14th February to 11th May 2018.

A total of 6 No gas monitoring rounds have been completed on the additional installations at the northern site boundary (WS101-105 and RO1 -3) between 14th February to 11th May 2018.

Several monitoring visits have been carried out during low and falling atmospheric conditions with the lowest recorded pressure during falling conditions being 976mb on the 8th March 2018.

Ground gas monitoring records are presented in **Appendix C**.

6.2 Ground Gas Analysis

Ground gas monitoring has been carried out in order to target two potential sources of ground gas generation:

- **Target A**: The former onsite inert landfill targeted in the first intrusive investigation.
- **Target B**: The adjacent Sutton Quarry landfill and the potential pathways onto the proposed development site.

6.3 Target A - Former onsite inert landfill

RLE's Technical Note dated September 2017 set out an initial recommendation of Amber 1 gas protection measures for development in and around the former inert landfill.

The further monitoring carried out since the issue of the Technical Note has not recorded any elevated concentrations of CO_2 or CH_4 higher than those recorded in the previous period

of monitoring. Higher readings of borehole flow were recorded this time around and therefore the Gas Screening Values (GSV) based on worst case scenario have changed slightly since the original Technical Note.

A summary of the maximum borehole hazardous gas flow rates (Q_{hg}) for carbon dioxide and methane recorded during each monitoring visit undertaken is presented below in Table 3 overleaf.

Table 3 Summary of the maximum borehole hazardous gas flow rates (Qhg) for carbon dioxide and methane - Former onsite inert landfill

Monitoring Visit	Max. CH_4 Concentration (% v/v)	Max. CO_2 Concentration (% v/v)	Max. Initial Gas Flow Rate (l/hr)	Max. Steady Gas Flow Rate (l/hr)	BH CH_4 Hazardous Flow Rate Q_{hg} (l/hr)	BH CO_2 Hazardous Flow Rate (l/hr) Q_{hg}
27/04/2017	<0.1	7.7	0.1	0.1	0.0001	0.0077
02/05/2017	<0.1	5.8	0.1	<0.1	0.0001	0.0058
17/05/2017	2.1	7.6	0.1	<0.1	0.0021	0.0076
26/05/2017	2.2	9.1	0.2	<0.1	0.0044	0.0091
29/06/2017	3.4	6.3	<0.1	<0.1	0.0034	0.0063
19/07/2017	3.1	13.9	<0.1	<0.1	0.0031	0.0139
14/02/2018	2.2	5.5	0.2	2.0	0.0044	0.1100
21/02/2018	0.6	8.1	0.1	0.1	0.0006	0.0081
08/03/2018	2.1	4.2	0.4	0.1	0.0084	0.0042
16/04/2018	1.9	6.6	1.3	0.1	0.0057	0.0066
30/04/2018	2.2	8.4	0.2	0.1	0.0044	0.0084
11/05/2018	1.2	6.8	0.1	0.1	0.0012	0.0068

Q_{hg} based on worst case concentrations and flow rates

GSVs have been calculated using the following figures, and based on worst case hazardous gas concentrations and flow rates from all boreholes within the area of Target A.

Table 4 Calculation of GSVs on site

C_{hg} Methane (% v/v)	C_{hg} Carbon Dioxide (% v/v)	Initial Gas Flow Rate (l/hr)	Steady Gas Flow Rate (l/hr)	Hazardous Gas Flow Rate Q_{hg} CH_4 (l/hr)	Hazardous Gas Flow Rate Q_{hg} CO_2 (l/hr)	Implied Characteristic Situation (CS)	NHBC Traffic Light System
3.4	13.9	1.3	2.0	0.0680	0.278	CS-2 Low Risk	Green / Amber 1

GSV calculated using worst case values

In accordance with the NHBC Traffic Light System, based on the calculated gas screening value alone, the area of the former landfill would be classed as 'Green'. However, in

accordance with guidance presented within CIRIA C665, it is recommended that an Amber 1 classification is adopted at the site for the following reasons:

- Made ground is consistently encountered across the monitoring area presenting a continued source of gas, even if this appears to be of a very low volume.
- Carbon Dioxide has been recorded above the Typical Maximum Concentration (5%) on numerous occasions.
- Methane has also regularly exceeded the Typical Maximum Concentration (1%) on numerous occasions, albeit with less frequency than CO_2.

In accordance with BS 8485:2015, a solution score of 3.5 Points are considered necessary for a Type A Building (based on residential). These points could be obtained in a variety of ways, and shall depend upon the type of foundation adopted, and reference should be made to the above document. The following indicates how these points could be obtained:

- Passive sub floor ventilation (venting layer can be a clear void or formed using gravel, geocomposites, polystyrene void formers, etc.) 1.5- 2.5 points
- Gas membrane meeting requirements of BS8485 2 points.

The data is consistent with the underlying inert waste deposited in the former landfill and is not considered to represent a significant source of ground gas.

6.4 Target B - adjacent Sutton Quarry landfill

The second period of monitoring undertaken also incorporated the new WS and RO boreholes installed along the boundary with Coxmoor Rd. These were installed to target any ground gas that may be entering the site from the Sutton Quarry site.

Both the subsoils and the bedrock at the boundary were individually targeted. RO boreholes were drilled into the underlying sandstone bedrock, while WS boreholes targeted shallower strata mainly consisting of gravelly sands.

Monitoring of the boreholes in the Target B area recorded no occurrences of methane over limits of detection (0.1%). Carbon dioxide was recorded over typical maximum concentrations on 4 No visits from the total of 6 No monitoring visits undertaken.

A summary of the maximum borehole hazardous gas flow rates for carbon dioxide and methane recorded during each monitoring visit undertaken is presented below in Table 3 below.

Table 5 Summary of the maximum borehole hazardous gas flow rates (Qhg) for carbon dioxide and methane.

Monitoring Visit	Max. CH_4 Concentration (% v/v)	Max. CO_2 Concentration (% v/v)	Max. Initial Gas Flow Rate (l/hr)	Max. Steady Gas Flow Rate (l/hr)	BH CH_4 Hazardous Flow Rate Q_{hg} (l/hr)	BH CO_2 Hazardous Flow Rate Q_{hg} (l/hr)
14/02/2018	<0.1	4.8	<0.1	<0.1	0.0001	0.0048
21/02/2018	<0.1	8.1	0.1	0.1	0.0001	0.0081
08/03/2018	<0.1	4.2	0.4	0.1	0.0004	0.0042
16/04/2018	<0.1	4.9	0.1	0.1	0.0001	0.0049
30/04/2018	<0.1	8.4	0.1	0.1	0.0001	0.0084
11/05/2018	<0.1	6.8	0.1	0.1	0.0001	0.0068

GSVs have been calculated using the following figures, and based on worst case hazardous gas concentrations and flow rates from all boreholes within the area of Target A.

Table 6 Calculation of GSVs at site boundary

C_{hg} Methane (% v/v)	C_{hg} Carbon Dioxide (% v/v)	Initial Gas Flow Rate (l/hr)	Steady Gas Flow Rate (l/hr)	Hazardous Gas Flow Rate Q_{hg} CH_4 (l/hr)	Hazardous Gas Flow Rate Q_{hg} CO_2 (l/hr)	Implied Characteristic Situation (CS)	NHBC Traffic Light System
<0.1	8.4	0.4	0.1	0.0004	0.0084	CS-1	Green / Amber 1

In accordance with the NHBC Traffic Light System, based on the calculated gas screening value alone, the area of the former landfill would be classed as 'Green'. However, in accordance with guidance presented within CIRIA C665, it is recommended that an Amber 1 classification is adopted at the site for the following reasons:

- Made ground is consistently encountered across the monitoring area presenting a continued source of gas, even if this appears to be of a very low volume.
- Carbon Dioxide has been recorded above the Typical Maximum Concentration (5%) on numerous occasions.
- The proximity to the adjacent former landfill site and possible source of future ground gas ingress onto the site.

In accordance with BS 8485:2015, a solution score of 0 Points are considered necessary for a Type A Building (based on residential), no gas protection required.

The GSV for the Target B area indicates a negligible gas regime in this part of the Site. The ground encountered in the investigation revealed some made ground which appears to be inert in nature.

6.5 General Observations

The data obtained from the two periods of gas monitoring across the Site can be summarised into the following salient points:

- The presence of methane has coincided with low and falling atmospheric pressure, suggesting there may be a correlation between the two.
- Methane has been found within the former landfill site area but not at the boundary of the site adjacent to Sutton Quarry.
- Methane has been most prevalent in the deeper boreholes that target the fill at depth (but not found in the underlying bedrock)
- The data suggests that there is less of a correlation between atmospheric pressure and carbon dioxide. Higher concentrations were generally found in times of the lowest atmospheric pressures.
- Gas flow rates have been generally low irrespective of atmospheric pressure suggesting that there is only a negligible source of gas.

  Concentrations of carbon monoxide and hydrogen sulphide have been at very low levels throughout the monitoring period.

6.6 Monitoring data obtained for Sutton Quarry

Further to RLE's gas monitoring, the Environment Agency has supplied gas monitoring data from the adjacent Sutton Quarry site. The data consists of quarterly monitoring results from the past two years and is presented in **Appendix D**. Four boreholes have been monitored, however the locations of which are not supplied. The data is referenced 'Perimeter Gas Monitoring' suggesting the boreholes are situated on the perimeter of the site.

The results of the monitoring indicate that very low levels of landfill gas are detected at the perimeter of the site. The maximum methane detected during the two year monitoring period was 0.1% and the maximum carbon dioxide was recorded at 2.3%. Monitoring was carried out during periods of low pressure with 984mb being the lowest during the period.

Observations of the data:

- Very low levels of both carbon dioxide and methane were detected over the past two years of monitoring which indicates that either there is very little gas being generated within the landfill or that any gas present in the landfill is very well controlled / vented.
- The monitoring interval at Sutton Quarry is carried out on a quarterly basis, indicating that the site is not considered to be high risk to local environs.

7 Conclusions and Recommendations

7.1 Conclusions

Ground gas monitoring at the Site has identified negligible to low gas regime.

Both the area around the former onsite inert landfill and the portion investigated along the northern boundary of the Site can be classified as very low to low risk to potential end users.

It is considered that Amber 1 gas protection measures would be required for developments within the Site. Gas protection measures commensurate with Amber 1 conditions would typically comprise a membrane and ventilated sub-floor void to create a permeability contrast to limit the ingress of gas into the buildings.

Gas protection measures should be as prescribed in BRE Report 414 (Johnson, 2001).

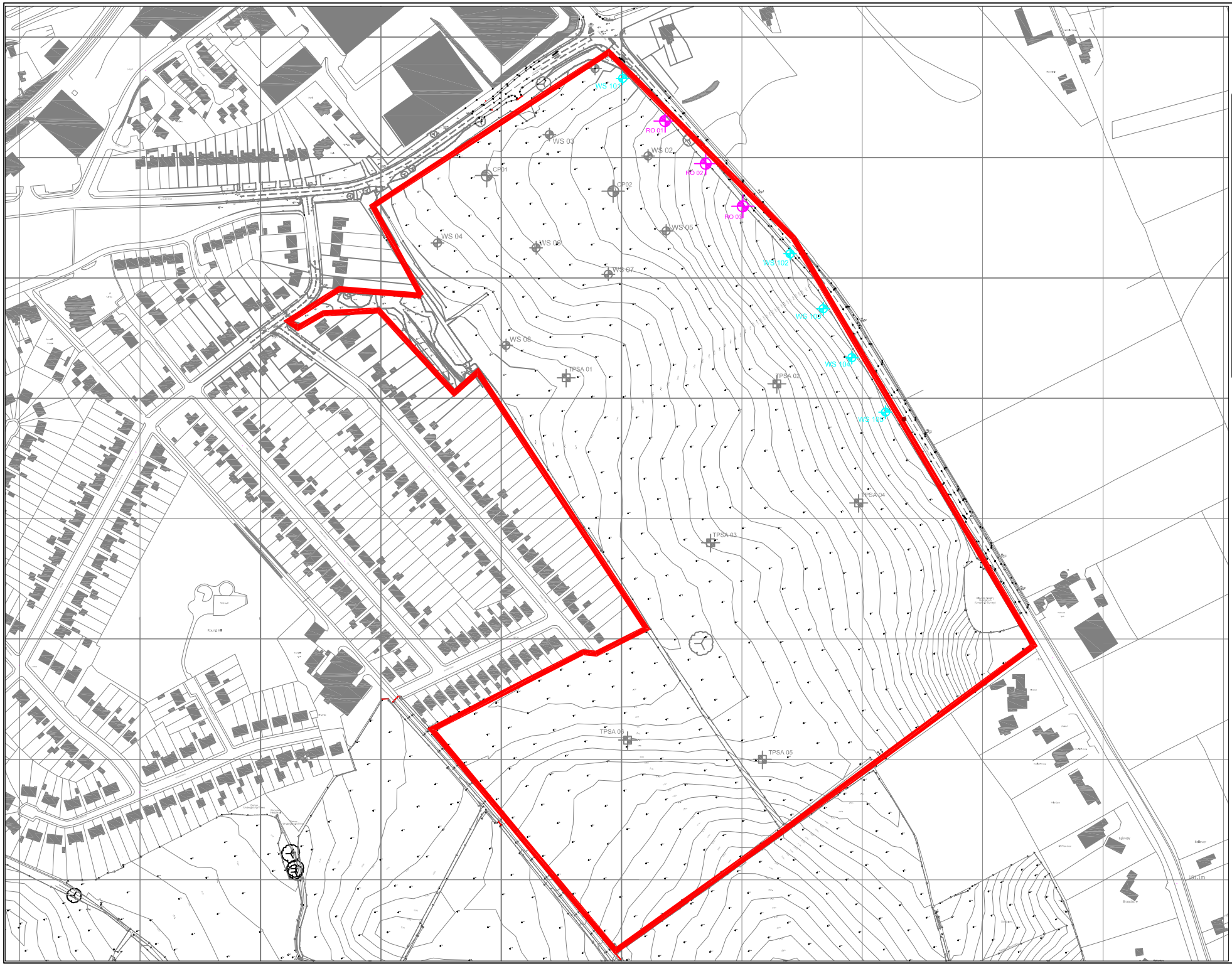
Certification is not a requirement of Amber 1 sites, however BS 8485:2015 recommends that all membranes are verified in accordance with CIRIA C735. In addition, the Local Authority may require all membrane installations to be independently verified. This should be confirmed with the Local Authority prior to development.

In general, the available data is considered consistent with the recorded and verified inert nature of the waste deposited in the onsite landfill and the made ground encountered at the Site boundary. This is not considered to be a significant source of ground gas.

Monitoring data received from the EA indicates that the former landfill at Sutton Quarry poses a low risk to the development site. The data suggests that any gas generated within the landfill is well controlled and does not migrate to the perimeter. Generation levels within the former landfill are likely to be low indicated by the quarterly frequency of monitoring.

The data indicates that there is very low risk to the proposed development end users from ground gas.

Appendix A Borehole Location Plan



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY

- Denotes approximate location of site boundary
- TPSA 01 — Approximate location and reference of Machine Excavated Trial Pit Soakaway Test undertaken by RLE
- CP 01 — Approximate location and reference of historic Cable Percussive Borehole excavated by RLE
- WS 01 — Approximate location and reference of historic Window Sample Borehole excavated by RLE
- WS 01 — Approximate location and reference of Window Sample Borehole
- RO 01 — Approximate location and reference of Rotary Borehole

Rev.	Date	Amendments	By	Chk. by

RODGERS LEASK ENVIRONMENTAL
Consulting Geotechnical & Environmental Engineers

Client
Hallam Land Management

Project
Land Off Low Moor Road
Sutton in Ashfield

Drawing Title
Borehole Location Plan

Status
INFORMATION

Scale	Drawn	Checked	Date
NTS	VH	RW	19/01/18

Project No.	Drawing No.	Rev.
P16-549	101	O

File Path:

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Appendix B Borehole Logs

Borehole Log

Borehole No. **WS101**

Sheet 1 of 1

Project Name:	Low Moor Road, Sutton-in-Ashfield	Project No. P16-549	Co-ords:	451601E - 358566N	Hole Type WLS
Location:	Sutton In Ashfield		Level:		Scale 1:50
Client:	Hallam Land Management		Dates:	13/02/2018	Logged By RW

Sample and In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strikes	Well
Depth (m)	Ref.	Type	Results						
					0.20	MADE GROUND comprising reddish brown slightly clayey sandy slightly gravelly reworked agricultural TOPSOIL. Gravel is sub-angular to sub-rounded, fine to coarse quartzite, brick, concrete and sandstone.			
					0.40	Firm dark brown mottled yellow sandy CLAY.			
						Reddish orange gravelly SAND. Gravel is sub-rounded, fine to coarse quartzite.			
					1.00	End of Borehole at 1.000m			

Remarks

1. Rig refusal at 1.0m 2. No water encountered 3. Ground gas ancillaries installed to 1.0m

Borehole Log

Borehole No. **WS102**

Sheet 1 of 1

Project Name:	Low Moor Road, Sutton-in-Ashfield	Project No. P16-549	Co-ords:	451735E - 358417N	Hole Type WLS
Location:	Sutton In Ashfield		Level:		Scale 1:50
Client:	Hallam Land Management		Dates:	13/02/2018	Logged By RW

Sample and In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strikes	Well
Depth (m)	Ref.	Type	Results						
					0.30	MADE GROUND comprising dark brown slightly clayey slightly sandy gravelly reworked agricultural TOPSOIL. Gravel is sub-angular to sub-rounded, fine to coarse coal, quartzite, sandstone and brick.			
					0.70	MADE GROUND comprising reddish orange clayey gravelly SAND. Gravel is sub-rounded, fine to coarse quartzite.			
						MADE GROUND comprising black brown sandy gravelly CLAY. Gravel is sub-angular to sub-rounded brick, coal, concrete, quartzite and tarmacadam.			
					2.00	End of Borehole at 2.000m			

Remarks

1. Rig refusal at 2.0m 2. No water encountered 3. Ground gas ancillaries installed to 2.0m

Borehole Log

Borehole No. **WS103**

Sheet 1 of 1

Project Name:	Low Moor Road, Sutton-in-Ashfield	Project No. P16-549	Co-ords:	451767E - 358374N	Hole Type WLS
Location:	Sutton In Ashfield		Level:		Scale 1:50
Client:	Hallam Land Management		Dates:	13/02/2018	Logged By RW

Sample and In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strikes	Well
Depth (m)	Ref.	Type	Results						
					0.25	MADE GROUND comprising reddish brown clayey slightly gravelly reworked agriculutural TOPSOIL. Gravel sub-angular to sub-rounded, fine to coarse sandstone, brick and coal.			
						Reddish orange slightly clayey gravelly SAND. Gravel is sub-rounded, fine to coarse quartzite.			
					4.00	End of Borehole at 4.000m			

Remarks

1. Borehole terminated at 4.0m 2. No water encountered 3. Ground gas ancillaries installed to 4.0m

Borehole Log

Borehole No. **WS104**

Sheet 1 of 1

Project Name:	Low Moor Road, Sutton-in-Ashfield	Project No. P16-549	Co-ords:	451791E - 358334N	Hole Type WLS
Location:	Sutton In Ashfield		Level:		Scale 1:50
Client:	Hallam Land Management		Dates:	13/02/2018	Logged By RW

Sample and In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strikes	Well
Depth (m)	Ref.	Type	Results						
					0.20	MADE GROUND comprising reddish brown clayey slightly gravelly reworked agricultural TOPSOIL. Gravel sub-angular to sub-rounded, fine to coarse sandstone, brick and coal.			
						Yellow orange slightly clayey gravelly SAND. Gravel is sub-rounded, fine to coarse quartzite.			
					1.50	End of Borehole at 1.500m			

Remarks

1. Rig refusal at 1.5m 2. No water encountered 3. Ground gas ancillaries installed to 1.5m

Borehole Log

Borehole No. **WS105**

Sheet 1 of 1

Project Name:	Low Moor Road, Sutton-in-Ashfield	Project No. P16-549	Co-ords:	451320E - 358292N	Hole Type WLS
Location:	Sutton In Ashfield		Level:		Scale 1:50
Client:	Hallam Land Management		Dates:	13/02/2018	Logged By RW

Sample and In Situ Testing				Level (m)	Depth (m)	Stratum Description	Legend	Water Strikes	Well
Depth (m)	Ref.	Type	Results						
					0.25	MADE GROUND comprising reddish brown clayey slightly gravelly reworked agricultural TOPSOIL. Gravel sub-angular to sub-rounded, fine to coarse sandstone, brick and coal.			
						Reddish brown slightly clayey SAND.			
					0.90	End of Borehole at 0.900m			

Remarks

1. Rig refusal at 0.9m 2. No water encountered 3. Ground gas ancillaries installed to 0.9m

Borehole Log

Borehole No. **RO 01**

Sheet 1 of 1

Project Name:	Low Moor Road, Sutton-in-Ashfield	Project No. P16-549	Co-ords:	451636E - 358530N	Hole Type RO
Location:	Sutton In Ashfield		Level:		Scale 1:50
Client:	Hallam Land Management		Dates:	13/02/2018	Logged By DS

Sample and In Situ Testing				Level (m)		Depth (m)	Stratum Description	Legend	Water Strikes	Well
Depth (m)	Ref.	Type	Results							
							MADE GROUND comprising dark brown clayey TOPSOIL			
					1	0.90	Dense brown SAND & GRAVEL			
					2					
					3	3.00	Weak reddish brown SANDSTONE			
					4					
					5					
					6					
					7					
					8					
					9					
					10	10.00	End of Borehole at 10.000m			

Remarks

1. No water encountered 2. Gas monitoring ancillaries installed to 10.0m

Borehole Log

Borehole No. **RO 02**

Sheet 1 of 1

Project Name:	Low Moor Road, Sutton-in-Ashfield	Project No. P16-549	Co-ords:	451668E - 358491N	Hole Type RO
Location:	Sutton In Ashfield		Level:		Scale 1:50
Client:	Hallam Land Management		Dates:	13/02/2018	Logged By DS

Sample and In Situ Testing				Level (m)		Depth (m)	Stratum Description	Legend	Water Strikes	Well
Depth (m)	Ref.	Type	Results							
							MADE GROUND comprising dense brown SAND & GRAVEL			
					1	0.90	MADE GROUND comprising concrete obstructions			
					2					
					3					
					4					
					5					
					6					
					7	7.00	Weak reddish brown SANDSTONE			
					8					
					9					
					10	10.00	End of Borehole at 10.000m			

Remarks

1. No water encountered 2. Gas monitoring ancillaries installed to 10.0m

Borehole Log

Borehole No. **RO 03**

Sheet 1 of 1

Project Name:	Low Moor Road, Sutton-in-Ashfield	Project No. P16-549	Co-ords:	451701E - 358454N	Hole Type RO
Location:	Sutton In Ashfield		Level:		Scale 1:50
Client:	Hallam Land Management		Dates:	13/02/2018	Logged By DS

Sample and In Situ Testing				Level (m)		Depth (m)	Stratum Description	Legend	Water Strikes	Well
Depth (m)	Ref.	Type	Results							
							MADE GROUND comprising dark brown clayey TOPSOIL			
					1	1.00	MADE GROUND comprising solid concrete obstruction			
					2					
					3					
					4	4.00	End of Borehole at 4.000m			
					5					
					6					
					7					
					8					
					9					
					10					

Remarks

1. Borehole terminated in concrete, moved 1m to east (RO 03A)

Borehole Log

Borehole No. **RO 03A**

Sheet 1 of 1

Project Name:	Low Moor Road, Sutton-in-Ashfield	Project No. P16-549	Co-ords:	451702E - 358453N	Hole Type RO
Location:	Sutton In Ashfield		Level:		Scale 1:50
Client:	Hallam Land Management		Dates:	13/02/2018	Logged By DS

Sample and In Situ Testing				Level (m)		Depth (m)	Stratum Description	Legend	Water Strikes	Well
Depth (m)	Ref.	Type	Results							
							MADE GROUND comprising dark brown clayey TOPSOIL			
					1	1.00	MADE GROUND comprising concrete obstructions			
					2					
					3					
					4					
					5	5.00	Weak reddish brown SANDSTONE			
					6					
					7					
					8					
					9					
					10	10.00	End of Borehole at 10.000m			

Remarks

1. No water encountered 2. Gas monitoring ancillaries installed to 8.0m due to partial collapse between 8-10m

Appendix C Further Gas Monitoring Records

Ground Gas Monitoring Form

Site Name:	Low Moor Road, Sutton in Ashfield	**RLE Engineer:**	RW
Job No.	P16-549	**Date:**	14/02/2018

Atmospheric Pressure:	999-998 mb	**Weather Conditions:**	Overcast
State:	Falling	**Temperature:**	5℃

Time	BH Ref.	Gas Flow Rate (l/hr)		B/H Pressure (Pa)	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		CO (% ppm)		H2S (% ppm)		Depth of Borehole installation (m bgl)	Depth to Water (m bgl)	Barom mb
		Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
14:05	**WS01**	<0.1	<0.1	0	<0.1	<0.1	3.8	3.8	14.8	14.8	0	0	0	0	2.00	Dry	999
14:09	**WS02**	<0.1	0.1	-2	<0.1	<0.1	3.9	3.9	14.4	14.4	0	0	0	0	3.20	-	999
14:25	**WS03**	<0.1	-0.1	-1	<0.1	<0.1	0.4	0.5	21.1	21.1	0	0	0	0	2.50	2.42	999
14:29	**WS04**	-0.2	-0.1	-5	<0.1	<0.1	1.6	2.0	10.6	7.1	0	0	0	0	1.00	Dry	999
14:33	**WS05**	<0.1	0.1	-11	<0.1	<0.1	5.5	5.5	9.1	9.1	0	0	0	0	4.00	Dry	999
	WS06																
14:40	**WS07**	<0.1	-2.0	+1	<0.1	<0.1	1.0	1.0	16.5	15.9	0	0	0	0	1.80	Dry	999
	WS08																
14:45	**CPBH01**	<0.1	<0.1	+1	0.1	0.1	0.9	0.9	15.9	15.9	0	0	0	0	8.5	Dry	999
15:06	**CPBH02**	<0.1	<0.1	-1	2.2	2.1	3.2	3.2	0.5	0.5	0	0	0	0	3.45	Dry	999
15:55	**WS101**	-0.1	-0.1	-1	<0.1	<0.1	0.5	0.5	19.1	19.0	0	0	0	0	0.9	Dry	998
15:48	**WS102**	-0.1	-0.1	-2	<0.1	<0.1	2.6	2.6	11.2	10.9	0	0	0	0	1.75	Dry	998
15:40	**WS103**	<0.1	<0.1	0	<0.1	<0.1	2.6	2.6	15.8	15.9	0	0	0	0	3.9	Dry	998
15:36	**WS104**	<0.1	<0.1	0	<0.1	<0.1	1.1	1.1	18.7	18.7	0	0	0	0	1.5	Dry	998
15:25	**WS105**	<0.1	<0.1	0	<0.1	<0.1	0.6	0.6	11.0	11.9	0	0	0	0	1.0	Dry	998
15:10	**RO01**	+0.1	<0.1	0	<0.1	<0.1	4.5	4.5	13.0	12.0	0	0	0	0	10.0	Dry	998
14:58	**RO02**	<0.1	<0.1	0	<0.1	<0.1	3.5	3.5	10.8	9.5	0	0	0	0	10.0	Dry	998
14:50	**RO03**	-0.1	-0.1	-1	<0.1	<0.1	4.8	4.8	13.2	13.2	0	0	0	0	10.0	Dry	998

NOTES
Monitoring order is from **Left to Right** across this table (expect when using a PID, which should be used first).
Monitoring should be for **NO less than 3 minutes**, unless there have been fluctuations between initial and steady state recorded during the 3 minutes, or high concentrations of gases are initially recorded. Monitoring should then be up to 10 minutes or steady state.

Equipment used:	Infra Red Gas Analyser	Geotechnical Instruments GA2000 Gas Analyser	**Last calibrated:**	04/05/2018
	MiniRAE PID	-	**Last calibrated:**	-
Visible signs of vegetation Stress:		No		
Other Comments/ Observations/Tests:		Bung Stuck Tight in WS02. WS06 and WS07 lost.		

Ground Gas Monitoring Form

Site Name:	Low Moor Road, Sutton in Ashfield	**RLE Engineer:**	RW
Job No.	P16-549	**Date:**	21/02/2018

Atmospheric Pressure:	1000-1001 mb	**Weather Conditions:**	Overcast
State:	Rising	**Temperature:**	6℃

Time	BH Ref.	Gas Flow Rate (l/hr)		B/H Pressure (Pa)	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		CO (% ppm)		H2S (% ppm)		Depth of Borehole installation (m bgl)	Depth to Water (m bgl)	Barom mb
		Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
10:15	**WS01**	<0.1	<0.1	0	<0.1	<0.1	3.6	3.5	15.0	15.0	0	0	0	0	2.00	Dry	1000
10:21	**WS02**	<0.1	<0.1	0	<0.1	<0.1	3.1	3.1	15.1	15.1	0	0	0	0	3.20	-	1000
10:26	**WS03**	<0.1	<0.1	0	<0.1	<0.1	0.6	0.7	20.9	20.9	0	0	0	0	2.50	2.42	1000
10:33	**WS04**	<0.1	<0.1	0	<0.1	<0.1	1.6	2.0	11.0	11.0	0	0	0	0	1.00	Dry	1000
10:45	**WS05**	<0.1	<0.1	1	<0.1	<0.1	5.0	5.0	9.6	9.6	0	0	0	0	4.00	Dry	1001
	WS06																
10:49	**WS07**	<0.1	<0.1	2	<0.1	<0.1	1.7	1.9	17.2	17.2	0	0	0	0	1.80	Dry	1001
	WS08																
10:55	**CPBH01**	<0.1	<0.1	2	0.1	0.1	1.8	1.8	15.2	15.2	0	0	0	0	8.5	Dry	1001
11:06	**CPBH02**	<0.1	<0.1	1	0.6	0.5	2.3	2.3	0.5	0.5	0	0	0	0	3.45	Dry	1001
8:45	**WS101**	<0.1	<0.1	-1	<0.1	<0.1	1.1	1.1	19.0	19.0	0	0	0	0	0.9	Dry	1000
8:51	**WS102**	<0.1	<0.1	-2	<0.1	<0.1	7.3	7.2	11.0	11.0	0	0	0	0	1.75	Dry	1000
8:59	**WS103**	<0.1	<0.1	-1	<0.1	<0.1	4.3	4.4	15.0	15.0	0	0	0	0	3.9	Dry	1000
9:05	**WS104**	<0.1	<0.1	-2	<0.1	<0.1	1.7	1.7	18.1	18.1	0	0	0	0	1.5	Dry	1000
9:15	**WS105**	<0.1	<0.1	0	<0.1	<0.1	4.1	4.2	11.3	11.3	0	0	0	0	1.0	Dry	1000
9:21	**RO01**	<0.1	<0.1	-2	<0.1	<0.1	8.1	8.1	13.3	13.3	0	0	0	0	10.0	Dry	1000
9:30	**RO02**	<0.1	<0.1	-2	<0.1	<0.1	8.0	8.0	10.3	10.3	0	0	0	0	10.0	Dry	1000
9:39	**RO03**	-0.1	-0.1	-1	<0.1	<0.1	4.5	4.5	14.0	14.0	0	0	0	0	10.0	Dry	1000

NOTES
Monitoring order is from **Left to Right** across this table (expect when using a PID, which should be used first).
Monitoring should be for **NO less than 3 minutes**, unless there have been fluctuations between initial and steady state recorded during the 3 minutes, or high concentrations of gases are initially recorded. Monitoring should then be up to 10 minutes or steady state.

Equipment used:	Infra Red Gas Analyser	Geotechnical Instruments GA5000 Gas Analyser	**Last calibrated:**	
	MiniRAE PID	-	**Last calibrated:**	-
Visible signs of vegetation Stress:		-		
Other Comments/ Observations/Tests:		Bung Stuck Tight in WS02 and WS06 lost.		

Ground Gas Monitoring Form

Site Name:	Low Moor Road, Sutton in Ashfield	**RLE Engineer:**	RW
Job No.	P16-549	**Date:**	08/03/2018

Atmospheric Pressure:	979-976 mb	**Weather Conditions:**	Fine
State:	Falling	**Temperature:**	4 ℃

Time	BH Ref.	Gas Flow Rate (l/hr)		B/H Pressure (Pa)	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		CO (% ppm)		H2S (% ppm)		Depth of Borehole installation (m bgl)	Depth to Water (m bgl)	Barom mb
		Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
14:04	**WS01**	<0.1	<0.1	-1	<0.1	<0.1	2.9	3.0	16.3	16.2	0	0	0	0	2.00	Dry	978
14:25	**WS02**	<0.1	<0.1	-2	<0.1	<0.1	2.2	2.3	19.5	19.4	0	0	0	0	3.20	-	977
14:00	**WS03**	<0.1	<0.1	-5	<0.1	<0.1	0.3	0.3	20.5	20.5	0	0	0	0	2.50	2.45	978
13:50	**WS04**	+0.1	+0.1	+7	<0.1	<0.1	0.8	0.9	5.9	4.9	0	0	0	0	1.00	Dry	979
15:40	**WS05**	<0.1	<0.1	+1	<0.1	<0.1	0.3	0.3	20.1	20.1	0	0	0	0	4.00	Dry	976
	WS06														2.60		
16.00	**WS07**	<0.1	<0.1	0	<0.1	<0.1	0.5	0.6	19.1	19.3	0	0	0	0	1.80	Dry	976
	WS08														2.50		
13:45	**CPBH01**	-0.3	<0.1	0	<0.1	<0.1	1.2	1.2	10.2	10.4	0	0	0	0	8.5	3.35	979
15:20	**CPBH02**	<0.1	<0.1	+5	2.1	2.1	4.0	3.9	0.4	<0.1	0	0	0	0	3.45	Dry	976
14:10	**WS101**	<0.1	<0.1	+1	<0.1	<0.1	0.5	0.5	19.5	19.6	0	0	0	0	0.9	Dry	978
14:45	**WS102**	+0.2	+0.1	+9	<0.1	<0.1	1.8	1.7	18.4	18.5	0	0	0	0	1.75	Dry	976
14:50	**WS103**	+0.1	<0.1	+40	<0.1	<0.1	2.7	2.8	17.3	17.4	0	0	0	0	3.9	Dry	976
15:00	**WS104**	<0.1	<0.1	+1	<0.1	<0.1	0.5	0.5	19.2	19.2	0	0	0	0	1.5	Dry	976
15:15	**WS105**	<0.1	<0.1	+3	<0.1	<0.1	1.6	1.6	15.4	15.4	0	0	0	0	1.0	Dry	976
14:15	**RO01**	<0.1	<0.1	-5	<0.1	<0.1	<0.1	<0.1	20.7	20.7	0	0	0	0	10.0	9.25	977
14:30	**RO02**	+0.4	+0.1	-1	<0.1	<0.1	0.9	1.0	20.1	20.1	0	0	0	0	10.0	Dry	977
14:40	**RO03**	<0.1	<0.1	+2	<0.1	<0.1	4.3	4.2	13.8	14.0	0	0	0	0	10.0	Dry	977

NOTES
Monitoring order is from **Left to Right** across this table (expect when using a PID, which should be used first).
Monitoring should be for **NO less than 3 minutes**, unless there have been fluctuations between initial and steady state recorded during the 3 minutes, or high concentrations of gases are initially recorded. Monitoring should then be up to 10 minutes or steady state.

Equipment used:	Infra Red Gas Analyser	Geotechnical Instruments GA2000 Gas Analyser	**Last calibrated:**	05/04/2017
	MiniRAE PID	-	**Last calibrated:**	-
Visible signs of vegetation Stress:		No		
Other Comments/ Observations/Tests:		WS06 and WS08 lost – Bung stuck in WS02		

Ground Gas Monitoring Form

Site Name:	Low Moor Road, Sutton in Ashfield	**RLE Engineer:**	AG
Job No.	P16-549	**Date:**	16/04/2018

Atmospheric Pressure:	993-996 mb	**Weather Conditions:**	Overcast
State:	Rising	**Temperature:**	11 ℃

Time	BH Ref.	Gas Flow Rate (l/hr)		B/H Pressure (Pa)	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		CO (% ppm)		H2S (% ppm)		Depth of Borehole installation (m bgl)	Depth to Water (m bgl)	Barom mb
		Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
11:30	**WS01**	<0.1	<0.1	-50	<0.1	<0.1	3.3	3.3	14.2	14.2	0	0	0	0	2.00	Dry	993
12:00	**WS02**	<0.1	0.1	-2	<0.1	<0.1	3.7	3.7	14.6	14.6	0	0	0	0	3.20	-	993
13:15	**WS03**	<0.1	-0.1	-50	<0.1	<0.1	0.4	0.5	21.1	21.1	0	0	0	0	2.50	2.42	994
13:50	**WS04**	-1.3	-0.1	-30	<0.1	<0.1	1.6	2.2	10.6	7.1	0	0	0	0	1.00	Dry	996
13:15	**WS05**	<0.1	0.1	-220	<0.1	<0.1	5.5	5.4	9.2	9.1	1	1	1	1	4.00	Dry	994
	WS06														2.60		
14:10	**WS07**	<0.1	-5.1	-4	<0.1	<0.1	1.7	1.9	16.0	15.8	1	1	2	2	1.80	Dry	996
	WS08														2.50		
13:40	**CPBH01**	<0.1	<0.1	+5	0.1	0.1	1.8	1.7	14.6	15.4	1	1	1	1	8.5	Dry	996
13:30	**CPBH02**	<0.1	<0.1	-35	1.9	1.9	4.1	4.0	0.3	0.2	0	0	2	2	3.45	Dry	994
11:40	**WS101**	-0.1	<0.1	0	<0.1	<0.1	0.8	0.8	19.2	19.1	0	0	0	0	0.9	Dry	993
12:25	**WS102**	<0.1	-0.1	-5	<0.1	<0.1	1.7	4.9	19.6	14.1	1	1	0	0	1.75	Dry	994
12:40	**WS103**	<0.1	-0.1	0	<0.1	<0.1	4.9	3.6	15.9	17.7	0	0	1	1	3.9	Dry	994
12:45	**WS104**	<0.1	-0.1	0	<0.1	<0.1	0.6	0.7	20.5	20.3	1	1	0	0	1.5	Dry	994
12:50	**WS105**	-0.1	-0.1	+4	<0.1	<0.1	2.9	3.0	13.0	12.7	1	1	1	1	1.0	Dry	994
11:50	**RO01**	<0.1	<0.1	-8	<0.1	<0.1	6.2	6.6	14.3	13.8	1	1	0	0	10.0	Dry	993
12:10	**RO02**	<0.1	<0.1	-5	<0.1	<0.1	1.9	1.7	18.2	18.7	0	0	0	0	10.0	Dry	993
12:20	**RO03**	<0.1	<0.1	-7	<0.1	<0.1	3.6	3.3	15.5	16.1	1	1	1	1	10.0	Dry	993

NOTES
Monitoring order is from **Left to Right** across this table (expect when using a PID, which should be used first).
Monitoring should be for **NO less than 3 minutes**, unless there have been fluctuations between initial and steady state recorded during the 3 minutes, or high concentrations of gases are initially recorded. Monitoring should then be up to 10 minutes or steady state.

Equipment used:	Infra Red Gas Analyser	Geotechnical Instruments GA5000 Gas Analyser	**Last calibrated:**	03/01/2018
	MiniRAE PID	-	**Last calibrated:**	-
Visible signs of vegetation Stress:		No		
Other Comments/ Observations/Tests:		Bung Stuck Tight in WS02. WS06 and WS07 lost.		

Ground Gas Monitoring Form

Site Name:	Low Moor Road, Sutton in Ashfield	**RLE Engineer:**	RW
Job No.	P16-549	**Date:**	30/04/2018

Atmospheric Pressure:	989-988 mb	**Weather Conditions:**	Overcast
State:	Falling	**Temperature:**	10℃

Time	BH Ref.	Gas Flow Rate (l/hr)		B/H Pressure (Pa)	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		CO (% ppm)		H2S (% ppm)		Depth of Borehole installation (m bgl)	Depth to Water (m bgl)	Barom mb
		Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
10:10	**WS01**	<0.1	<0.1	-5	<0.1	<0.1	3.8	3.8	14.8	14.8	0	0	0	0	2.00	Dry	988
10:16	**WS02**	<0.1	0.1	-21	<0.1	<0.1	3.9	3.9	14.4	14.4	0	0	0	0	3.20	-	988
10:25	**WS03**	<0.1	-0.1	-5	<0.1	<0.1	0.4	0.5	21.1	21.1	0	0	0	0	2.50	2.42	988
10:33	**WS04**	-0.2	-0.1	-11	<0.1	<0.1	1.6	2.0	10.6	7.1	0	0	0	0	1.00	Dry	988
10:40	**WS05**	<0.1	0.1	-25	<0.1	<0.1	5.5	5.5	9.1	9.1	0	0	0	0	4.00	Dry	988
	WS06																
10:45	**WS07**	<0.1	-0.1	-4	<0.1	<0.1	1.7	1.9	16.0	15.8	1	1	2	2	1.80	Dry	988
	WS08																
10:55	**CPBH01**	<0.1	<0.1	+5	0.1	0.1	1.8	1.7	14.6	15.4	1	1	1	1	8.5	Dry	988
11:06	**CPBH02**	<0.1	<0.1	-3	2.2	2.1	4.1	3.5	0.3	0.2	0	0	2	2	3.45	Dry	988
8:55	**WS101**	-0.1	-0.1	-5	<0.1	<0.1	1.5	1.5	19.4	19.1	0	0	0	0	0.9	Dry	989
9:26	**WS102**	-0.1	-0.1	-2	<0.1	<0.1	7.7	7.7	11.0	10.9	0	0	0	0	1.75	Dry	989
9:35	**WS103**	<0.1	<0.1	0	<0.1	<0.1	4.3	4.4	15.3	15.3	0	0	0	0	3.9	Dry	989
9:45	**WS104**	<0.1	<0.1	-2	<0.1	<0.1	1.7	1.7	18.7	18.7	0	0	0	0	1.5	Dry	988
9:50	**WS105**	<0.1	<0.1	0	<0.1	<0.1	4.5	4.5	11.7	11.7	0	0	0	0	1.0	Dry	988
9:10	**RO01**	+0.1	<0.1	-2	<0.1	<0.1	8.4	8.4	13.4	12.4	0	0	0	0	10.0	Dry	989
9:15	**RO02**	<0.1	<0.1	-2	<0.1	<0.1	7.7	8.1	10.3	9.9	0	0	0	0	10.0	Dry	989
9:20	**RO03**	-0.1	-0.1	-1	<0.1	<0.1	4.8	4.7	14.1	13.8	0	0	0	0	10.0	Dry	989

NOTES
Monitoring order is from **Left to Right** across this table (expect when using a PID, which should be used first).
Monitoring should be for **NO less than 3 minutes**, unless there have been fluctuations between initial and steady state recorded during the 3 minutes, or high concentrations of gases are initially recorded. Monitoring should then be up to 10 minutes or steady state.

Equipment used:	Infra Red Gas Analyser	Geotechnical Instruments GA5000 Gas Analyser	**Last calibrated:**	03/01/2018
	MiniRAE PID	-	**Last calibrated:**	-
Visible signs of vegetation Stress:		No		
Other Comments/ Observations/Tests:		Bung Stuck Tight in WS02. WS06 and WS07 lost.		

Ground Gas Monitoring Form

Site Name:	Low Moor Road, Sutton in Ashfield	**RLE Engineer:**	AG
Job No.	P16-549	**Date:**	11/05/2018

Atmospheric Pressure:	994-993 mb	**Weather Conditions:**	Fine
State:	Falling	**Temperature:**	20℃

Time	BH Ref.	Gas Flow Rate (l/hr)		B/H Pressure (Pa)	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		CO (% ppm)		H2S (% ppm)		Depth of Borehole installation (m bgl)	Depth to Water (m bgl)	Barom mb
		Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady			
15:11	**WS01**	<0.1	<0.1	0	<0.1	<0.1	3.9	3.1	14.0	14.0	0	0	0	0	2.00	Dry	993
15:20	**WS02**	<0.1	0.1	6	<0.1	<0.1	3.4	3.5	14.6	14.5	0	0	0	0	3.20	-	993
15:26	**WS03**	<0.1	<0.1	5	<0.1	<0.1	0.4	0.5	21.1	21.0	0	0	0	0	2.50	2.42	993
15:35	**WS04**	<0.1	<0.1	0	<0.1	<0.1	1.6	1.7	10.6	7.9	0	0	0	0	1.00	Dry	993
15:45	**WS05**	-0.1	<0.1	1	<0.1	<0.1	5.9	5.7	9.2	9.2	0	0	0	0	4.00	Dry	993
	WS06														2.60		
15:51	**WS07**	<0.1	<0.1	1	<0.1	<0.1	1.7	1.9	16.0	15.9	0	0	0	0	1.80	Dry	993
	WS08														2.50		
15:55	**CPBH01**	<0.1	<0.1	-5	<0.1	0.1	1.8	1.7	14.6	15.1	1	0	0	0	8.5	Dry	993
16:03	**CPBH02**	<0.1	<0.1	-3	1.2	1.1	4.0	4.0	0.5	0.2	0	0	1	1	3.45	Dry	993
13.55	**WS101**	-0.1	<0.1	0	<0.1	<0.1	0.8	0.8	19.0	19.0	0	0	0	0	0.9	Dry	994
14:05	**WS102**	<0.1	<0.1	1	<0.1	<0.1	1.7	4.9	15.1	14.5	1	1	0	0	1.75	Dry	994
14:11	**WS103**	<0.1	<0.1	0	<0.1	<0.1	4.5	4.2	15.9	17.7	0	0	1	1	3.9	Dry	994
14:17	**WS104**	<0.1	<0.1	0	<0.1	<0.1	0.6	0.7	20.1	20.3	1	1	0	0	1.5	Dry	994
14:25	**WS105**	-0.1	-0.1	3	<0.1	<0.1	2.9	2.9	13.2	12.9	1	1	1	1	1.0	Dry	994
14:33	**RO01**	<0.1	<0.1	1	<0.1	<0.1	6.7	6.8	14.9	13.9	1	1	0	0	10.0	Dry	994
14:41	**RO02**	<0.1	<0.1	2	<0.1	<0.1	1.9	1.7	18.0	18.9	0	0	0	0	10.0	Dry	994
14:45	**RO03**	<0.1	<0.1	8	<0.1	<0.1	3.9	4.1	16.5	16.9	0	0	0	0	10.0	Dry	994

NOTES
Monitoring order is from **Left to Right** across this table (expect when using a PID, which should be used first).
Monitoring should be for **NO less than 3 minutes**, unless there have been fluctuations between initial and steady state recorded during the 3 minutes, or high concentrations of gases are initially recorded. Monitoring should then be up to 10 minutes or steady state.

Equipment used:	Infra Red Gas Analyser	Geotechnical Instruments GA2000 Gas Analyser	**Last calibrated:**	03/05/2018
	MiniRAE PID	-	**Last calibrated:**	-
Visible signs of vegetation Stress:		No		
Other Comments/ Observations/Tests:		Bung Stuck Tight in WS02. WS06 and WS07 lost.		

Appendix D Sutton Quarry Data

Site	Sutton	Sutton	Sutton	Sutton	Sutton
Sample Point	SU/01	SU/01	SU/02	SU/03	SU/04
Date	18/07/2016	26/07/2016	18/07/2016	18/07/2016	18/07/2016
Comment					
Atmospheric Pressure (mb)		999	1004	1003	1004
Carbon Dioxide (% v/v)		0	0	0.1	0
Flow (Internal) (l/h)		0	0	0	-0.3
Gas Screen Value					
Carbon Dioxide (l/h)		0	0	0	0
Gas Screen Value					
Methane (l/h)		0	0	0	0
Methane (% v/v)		0	0	0	0
Monitoring Point Status	UTM				
GAS	OVERGROWN	Satisfactory	Satisfactory	Satisfactory	Satisfactory
Oxygen (% v/v)		20.7	19.8	19.8	19.5
Relative Pressure (mb)		0.16	0	0.05	0.12

	SU/01 05/01/2017	SU/02 05/01/2017	SU/03 05/01/2017	SU/04 05/01/2017
Atmospheric Pressure (mb)	1017	1017	1020	1019
Carbon Dioxide (% v/v)	0.1	0.1	0.1	0.1
Flow (Internal) (l/h)	0	0.1	0.2	0
Gas Screen Value Carbon Dioxide (l/h)	0	0	0	0
Gas Screen Value Methane (l/h)	0	0	0	0
Ground Condition Around Gas Well	Ground Damp/Wet	Ground Damp/Wet	Ground Damp/Wet	Ground Damp/Wet
Methane (% v/v)	0	0	0	0
Monitoring Point Status GAS	Satisfactory	Satisfactory	Satisfactory	Satisfactory
Oxygen (% v/v)	21.7	22.1	21.5	21.5
Relative Pressure (mb)	-0.7	-0.46	-0.31	-0.19

	SU/01 19/04/2017	SU/02 19/04/2017	SU/03 19/04/2017	SU/04 19/04/2017
Atmospheric Pressure (mb)	1012	1015	1012	1012
Carbon Dioxide (% v/v)	0.1	0.1	0.1	0.1
Flow (Internal) (l/h)	-0.3	0.3	0.7	0.6
Gas Screen Value Carbon Dioxide (l/h)	0	0	0	0
Gas Screen Value Methane (l/h)	0	0	0	0
Ground Condition Around Gas Well	Ground Dry	Ground Dry	Ground Dry	Ground Dry
Methane (% v/v)	0	0	0	0
Monitoring Point Status GAS	Satisfactory	Satisfactory	Satisfactory	Satisfactory
Oxygen (% v/v)	20.6	20.8	20	20.3
Relative Pressure (mb)	-0.43	-0.21	-0.21	-0.17

		Atmospheric Pressure (mb)	Carbon Dioxide (% v/v)	Flow (Internal) (l/h)	Gas Screen Value Carbon Dioxide (l/h)	Gas Screen Value Methane (l/h)
SU/01	05/07/2017	998	0.1	0.1	0	0
SU/02	05/07/2017	999	0.1	0	0	0
SU/03	31/07/2017	987	0.1	0.1	0	0
SU/04	31/07/2017	986	0.1	0	0	0

		Ground Condition Around Gas Well	Methane (% v/v)	Monitoring Point Status GAS	Oxygen (% v/v)	Relative Pressure (mb)
SU/01	05/07/2017	Ground Dry	0.1	Satisfactory	19.9	0.1
SU/02	05/07/2017	Ground Dry	0.1	Satisfactory	20.7	-0.08
SU/03	31/07/2017	Ground Dry	0	Satisfactory	20.9	-0.14
SU/04	31/07/2017	Ground Dry	0	Satisfactory	20.6	0.15

Monitoring Point	Date Sampled	Atmospheric Pressure (mb)	Carbon Dioxide (% v/v)	Flow (Internal) (l/h)	Gas Screen Value Carbon Dioxide (l/h)	Gas Screen Value Methane (l/h)
SU/01	18/10/2017	994	1.5	0.1	0	0
SU/02	18/10/2017	996	1.7	0	0	0
SU/03	18/10/2017	995	1.1	0.1	0	0
SU/04	18/10/2017	996	2.3	0.1	0	0

		Ground Condition Around Gas Well	Methane (% v/v)	Monitoring Point Status GAS	Oxygen (% v/v)	Relative Pressure (mb)
SU/01	18/10/2017	Ground Damp/ Wet	0	Satisfactory	20.1	0.27
SU/02	18/10/2017	Ground Damp/ Wet	0	Satisfactory	20.9	0.03
SU/03	18/10/2017	Ground Damp/ Wet	0	Satisfactory	20.4	-0.31
SU/04	18/10/2017	Ground Damp/ Wet	0	Satisfactory	19.7	-0.26

Monitoring Point	Date Sampled	Atmospheric Pressure (mb)	Carbon Dioxide (% v/v)	Flow (Internal) (l/h)	Gas Screen Value Carbon Dioxide (l/h)	Gas Screen Value Methane (l/h)	Ground Condition Around Gas Well
SU/01	31/01/2018	984	2	0.3	0	0	Ground Dry
SU/02	31/01/2018	984	4.3	0.6	0	0	Ground Dry
SU/03	31/01/2018	985	1.5	0.1	0	0	Ground Dry
SU/04	31/01/2018	984	2.1	0.2	0	0	Ground Dry

SU/01	31/01/2018	0.1	Satisfactory	17.6	1.87	
SU/02	31/01/2018	0.1	Satisfactory	16.7	1.75	
SU/03	31/01/2018	0.1	Satisfactory	18.8	0.09	
SU/04	31/01/2018	0.1	Satisfactory	18.5	0.09	

Appendix F: Coal Authority consultants report.

The Coal Authority

Summary of findings

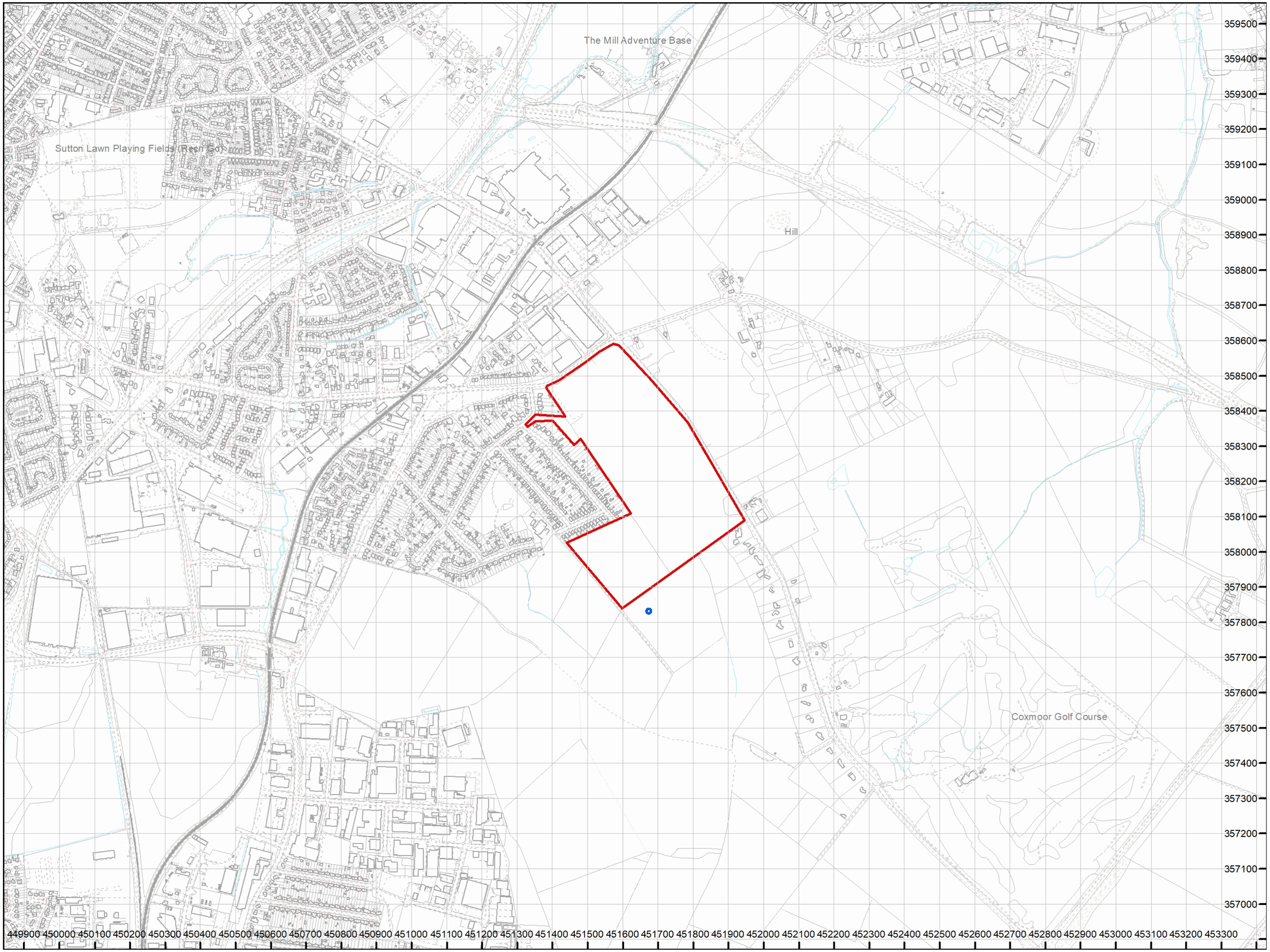
Map data

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown

Coal claim



How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

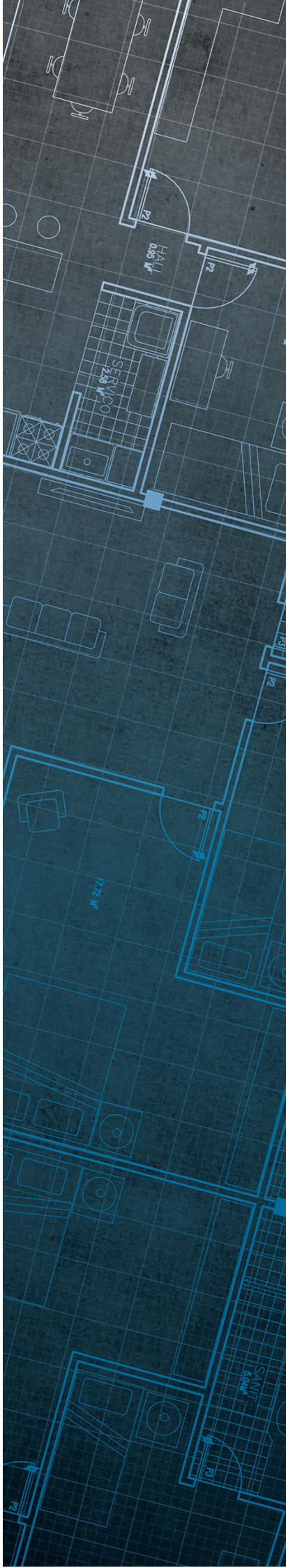
The Coal Authority

Consultants

Coal Mining Report

4 Newark Road
Sutton In Ashfield
Nottinghamshire
NG17 5JP

Date of enquiry:	**8 February 2022**
Date enquiry received:	**8 February 2022**
Issue date:	**8 February 2022**
Our reference:	**51002945671001**
Your reference:	**RLL-22-02-21**



Consultants

Coal Mining Report

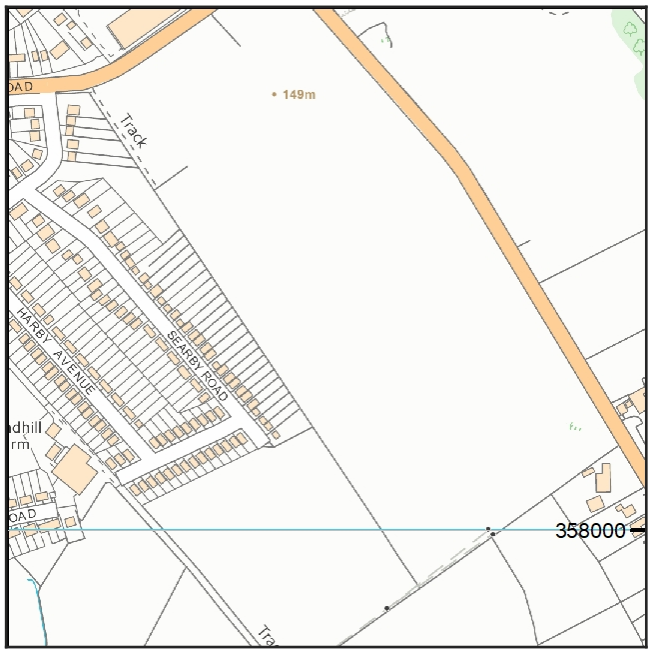
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

RODGERS LEASK ENVIRONMENTAL LTD

Enquiry address

4 Newark Road
Sutton In Ashfield
Nottinghamshire
NG17 5JP



Approximate position of property

How to contact us

0345 762 6848 (UK)
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Mansfield
Nottinghamshire
NG18 4RG

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/company/the-coal-authority
/thecoalauthority
/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
KIRKBY	HIGH MAIN	Coal	5NDY	193	South-East	4.9	East	90	1956
KIRKBY	HIGH MAIN	Coal	5NEN	201	Beneath Property	3.5	East	110	1958
KIRKBY	HIGH MAIN	Coal	5Q56	210	East	4.3	South-East	110	1963
KIRKBY	HIGH MAIN	Coal	5Q51	217	South-East	2.9	East	90	1957
KIRKBY	TOP HARD	Coal	5NEQ	410	Beneath Property	4.5	East	110	1937
KIRKBY	TOP HARD	Coal	5NEO	417	Beneath Property	2.4	North	110	1936
KIRKBY	TOP HARD	Coal	5NDZ	418	Beneath Property	3.9	East	110	1924
KIRKBY	TOP HARD	Coal	5Q57	438	East	3.8	South-East	110	1942
KIRKBY	TOP HARD	Coal	5Q55	452	South-East	3.2	East	110	1936
KIRKBY	DEEP SOFT	Coal	5NEU	521	West	1.5	East	111	1933
SHERWOOD	TOP HARD	Coal	5PPI	523	North	13.4	South	180	1953
SHERWOOD	TOP HARD	Coal	5NEP	539	North	5.9	South-East	110	1950
SHERWOOD	TOP HARD	Coal	5Q58	567	North-East	20.2	South	180	1942
KIRKBY	DEEP SOFT	Coal	5NET	569	Beneath Property	4.2	South-East	111	1934
KIRKBY	DEEP SOFT	Coal	5Q53	580	South-East	1.8	South-East	111	1961
KIRKBY	DEEP SOFT	Coal	5NE2	584	Beneath Property	3.0	East	120	1950
KIRKBY	DEEP SOFT	Coal	5NES	596	South-East	3.0	North-East	111	1950
KIRKBY	DEEP SOFT	Coal	5NER	600	South-East	3.0	North-East	111	1950
KIRKBY	DEEP SOFT	Coal	5Q5A	608	South-East	2.6	East	110	1949
SUTTON	DEEP HARD	Coal	5PPJ	704	North-West	12.5	South	120	1977

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth
No spine roadway recorded at shallow depth.

Mine entries
None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers
The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

EM607	EM944	EM945
EM468		

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops
No outcrops recorded.

Geological faults, fissures and breaklines
No faults, fissures or breaklines recorded.

Opencast mines
None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips
None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations
None recorded within 50 metres of the enquiry boundary.

Remediated sites
None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence
There are 1 claim(s) within 50 metres of the property boundary that do not match the property address. These are shown on the enquiry boundary plot.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

If further subsidence damage claims information is required, please visit www.groundstability.com.

See Section 4 for further information.

Mine gas
None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes
None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders

Name	Order date	Amendments
Sutton Area	1964	None

Section 46 notices
No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices
The property is in an area where a notice to withdraw support was given in 1946.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Coal mining subsidence

The site is within an area of previous interest. It is close to where the Coal Authority or licensed mine operator has investigated and where necessary remediated issues relating to coal mining subsidence.

The site requires further investigation and may influence your risk assessment. We recommend that you order the appropriate **Coal Authority Subsidence Claims Report**, which will include more information about the hazard.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes
Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining
Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing
Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders
Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

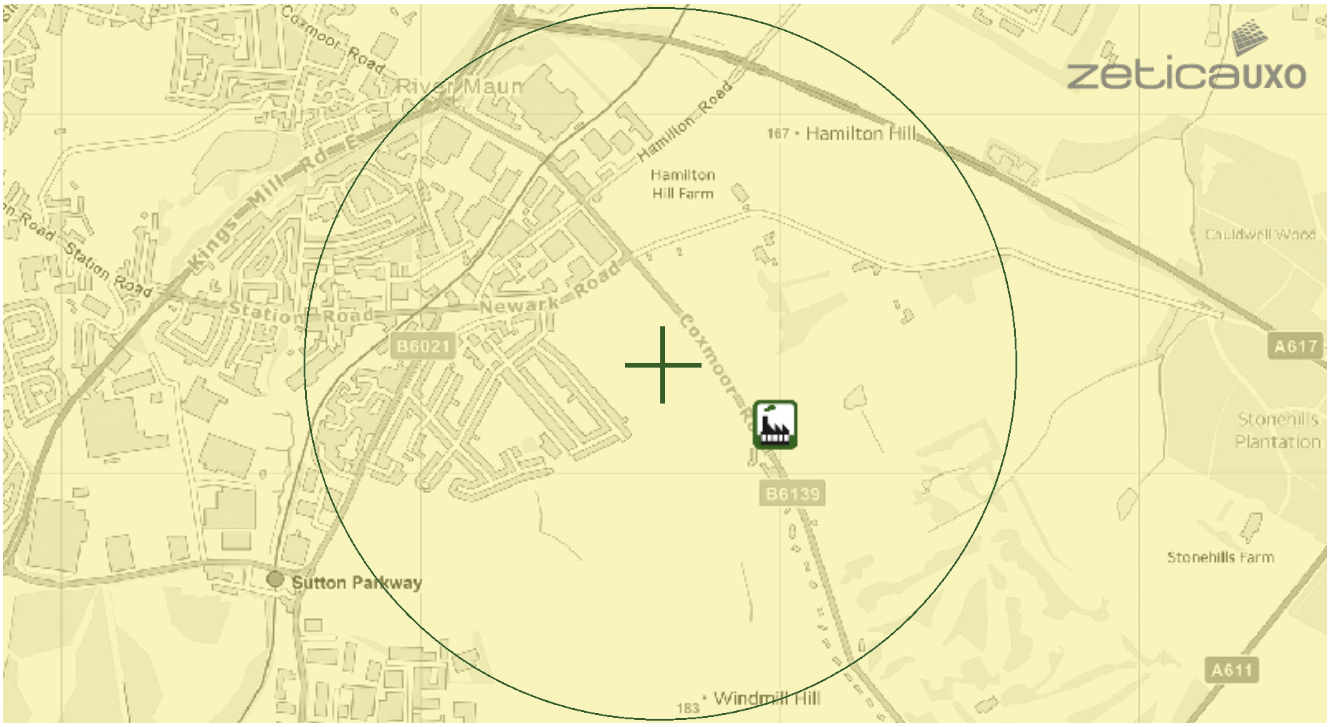
Appendix G: UXO risk map

UNEXPLODED BOMB RISK MAP

zeticaUXO

SITE LOCATION

Map Centre: 451680,358306



LEGEND

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

miltary	**industry**	**UXO find**
transport	**dock**	**Luftwaffe targets**
utilities	**Bombing decoy**	**other**

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: **(https://zeticauxo.com/downloads-and-resources/risk-maps/)**

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

Appendix H: CIRIA C552 Terminology

The likelihood of an event can be classified on a four-point system using the following terms and definitions based on CIRIA C552:

- Highly likely: the event appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution;
- Likely: it is probable that an event will occur or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;
- Low likelihood; circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely that in the short term; and
- Unlikely: circumstances are such that it is improbable the event would occur even in the long term

The severity can be classified using a similar system also based on CIRIA C552. The terms and definitions relating to severity are:

- Severe: short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part 11A. Short term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. Short-term risk to an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land' DETR 2000);
- Medium; chronic damage to human health ('significant harm' as defined in Draft Circular on Contaminated Land', DETR 2000), pollution of sensitive water resources, significant change in an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in Draft Circular on Contaminated Land', DETR 2000);
- Mild: pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures or the environment; and
- Minor: harm, not necessarily significant, but that could result in financial loss or expenditure to resolve. Non-permanent human health effects easily prevented by use of personal protective clothing. Easily repairable damage to buildings, structures and services.

Once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned from the table below:

		Consequences			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**Highly likely**	Very high	high	Moderate	Moderate / low
	Likely	High	Moderate	Moderate / low	Low
	Low likelihood	Moderate	Moderate / low	Low	Very low
	Unlikely	Moderate / low	Low	Very low	Very low

Definitions of these risk categories are as shown below with an assessment of the further work that might be required:

- Very high: there is a high probability that severe harm could occur or there is evidence harm is currently happening. This risk, if realised, could result in substantial liability and urgent investigation and remediation are likely to be required;
- High: harm is likely to occur. Realisation of the risk is likely to present a substantial liability and urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term;
- Moderate: it is possible that harm could arise, but it is unlikely that the harm would be severe and it is more likely that harm would be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term;
- Low: it is possible that harm could occur, but it is likely that if realised this harm would at worst normally be mild; and
- Very Low: there is a low possibility that harm could occur and if realised the harm is likely to be sever.

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