



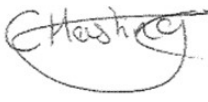
GROUNDTECH
CONSULTING

Job title: Saxon Street, Manchester

Report type: Permanent Ground Gas Risk Assessment

Prepared for: Sandton London EC1Y Limited

Date: June 2022

Document Control Form	
PROJECT	SAXON STREET, MANCHESTER
REPORT NAME	PERMANENT GROUND GAS RISK ASSESSMENT
REPORT REFERENCE	GRO-22035-3629
STATUS	FINAL
ISSUE DATE	JUNE 2022
REVISION	
CLIENT	SANDTON LONDON EC1Y LIMITED
CLIENT CONTACT	KEN NAKAE
For and Behalf of Groundtech Consulting	
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SIGNATURE	
REVIEWED	James Doyle BSc (Hons) CGeol FGS

Introduction

We are pleased to present our findings following the completion of the gas monitoring programme undertaken at Saxon Street in Manchester for the proposed residential development.

Ground Investigation Information

A Geo-Environmental Appraisal was carried out by Groundtech Consulting referenced GRO-22035-3556, dated 24 May 2022.

No significant onsite sources of ground gas have been identified, Made Ground was encountered during the Ground Investigation to a maximum depth of 1.5m bgl.

Ground Model

Made Ground has been encountered to depths of between 0.8m and 1.5m bgl. The surfacing comprised reworked topsoil to a maximum depth of 0.4m bgl and block paving over sand to 0.2m bgl. The remainder of the Made Ground consisted of brown variably clayey gravelly sand.

Very loose to loose brown black clayey Gravel of mixed lithologies and very gravelly clayey Sand was in WS01 and WS02 to depths of between 3.8m and 4.5m bgl. Medium dense to dense clayey gravelly Sand was observed in WS03 from 0.8m to 2.3m bgl. Soft to firm to very stiff slightly gravelly Clay was in all of the boreholes from depths of between 2.3m and 4.5m bgl.

Bedrock was not observed in the boreholes.

Groundwater strikes were observed at 3.0m bgl in WS01 and WS02 in the superficial sand deposits and in WS03 in the clay deposits.

The exploratory hole positions are shown on the Exploratory Hole Location Plan *GRO-22035-P02* and the logs are presented within *Appendix 1*.

Gas Monitoring

During the Ground Investigation works, monitoring standpipes were installed in the following holes and a summary of the installations is provided in the table below.

Location	Depth (m bgl)	Response Zone (m bgl)	Targeted Strata	Reason
WS01	5.00	2.00 – 5.00	Natural Strata	Ground Gas
WS02	2.00	1.00 – 5.00	Natural Strata	Ground Gas
WS03	3.00	2.00 – 5.00	Natural Strata	Ground Gas

The standpipes consisted of polyvinyl chloride (pvc) pipe - a bentonite seal was placed around the plain pipe and a clean gravel pack was placed around the slotted pipe.

Four ground gas monitoring visits have been completed between 19th April and 17th June 2022. Monitoring of the weather conditions and predicted atmospheric pressures (Met Office Surface Pressure Charts) was carried out up to 72 hours in advance of proposed monitoring visits in order that a reasonable period of data was obtained to determine atmospheric trends, and also to target the 'worst case' scenario.

Permanent gas and flow rate monitoring was carried out using a GFM436 infrared gas monitor with integral electronic flow analyser. The measurements taken are listed below:

- Oxygen (O₂), carbon dioxide (CO₂) and methane (CH₄) as the percentage volume in air (%v/v).
- Hydrogen sulphide (H₂S) and carbon monoxide (CO) as the percentage volume in air (%v/v).
- Lower Explosive Limit (% LEL) of methane.
- Atmospheric and borehole pressure, including pressure trend.
- Flow measurements (l/hr).
- Weather and ground surface conditions.

Both falling, rising and steady state conditions were monitored to understand the behaviour of the permanent ground gas, the steady state conditions were recorded by allowing the gas monitor to run for a minimum of 3 minutes.

Permanent gas and groundwater monitoring results are presented in *Appendix 2*.

Gas Monitoring Results

During the monitoring period, no concentrations of methane (CH₄) have been recorded within the standpipes. However, detectable levels of carbon dioxide (CO₂) were recorded within the standpipes, up to a maximum level of 2.9% v/v together with slightly depleted oxygen (O₂) concentrations (minimum 14.6% v/v).

No positive flow rates were recorded during the monitoring period.

Groundwater was encountered within the standpipes during the monitoring period between depths of 1.89m and 2.43m bgl.

The atmospheric pressure ranged between 1009mb and 1021mb during the monitoring period and was carried out during periods of steady rising and falling barometric pressure.

Characterisation of the Gas Screening Value (GSV)

In accordance with CIRIA Report C665, November 2007 it is felt that an adequate risk assessment can be undertaken based on the following limiting factors:

- *The proposed development has been considered as **high sensitivity** based on the site being developed with residential dwellings (Table 5.5 – Typical/Idealised frequency and period of monitoring, after Wilson et al, 2005).*
- *The risk associated with the generation potential of a source is considered as **very low**, assessment based on observations noted during the fieldworks.*
- *Negligible flow rates have been recorded (Table 8.5 – Modified Wilson & Card classification). For this site, two of the monitoring visits were targeted to correlate with a falling atmospheric pressure trend. As a comparison, monitoring has also been undertaken during steady and rising atmospheric pressure trends.*

Based upon the results recorded, in accordance with CIRIA Report C665, the risk to the site from ground gases has been assessed by converting the results to gas screening values (GSVs), calculated by multiplying the typical maximum gas concentrations with the recorded maximum positive flow rates. In addition, individual “hazardous gas flow rates” (Q_{hg}) have been derived for each monitoring point. As no levels of methane have been recorded a GSV for carbon dioxide only has been calculated.

$$GSV \text{ (l/hr)} = \text{max borehole flow rate (l/hr)} \times \text{max gas concentration (\%)}$$

For this assessment, the maximum recorded concentration of carbon dioxide of 2.9%v/v has been used together with a flow rate of 0.1l/hr to calculate the GSV.

Carbon Dioxide GSV = 0.029 (2.9%) x 0.12 = 0.0029 l/hr

Methane GSV = 0.0 l/hr

Assessment

Ground gas monitoring was carried out as potential ground gas sources were identified within influencing distance of the site.

No methane has been detected and a maximum concentration of carbon dioxide of 2.9% v/v has been recorded over the monitoring period.

Groundwater has been encountered during the monitoring period between depths of 1.89m and 2.43m bgl. The Groundwater was not recorded above the response zone in any of standpipes during the monitoring visits. The low concentrations of carbon dioxide encountered during the monitoring are likely a combination of dissolved carbon dioxide within the groundwater and a small amount of lateral migration from offsite sources. A positive borehole pressure was not recorded during the monitoring period.

Based on the site being developed with low-rise housing, the Boyle and Witherington, 2006 method has been used to carry out the assessment. This is a risk-based approach that is designed to allow an identification of gas protection for a low-rise housing development by comparing the measured gas emission rates to generic 'traffic lights' scenarios. The traffic lights include 'typical maximum concentrations' and are provided for initial screening purposes and risk-based gas screening values for consideration in situations where the typical maximum concentrations are exceeded.

When considering the results, in accordance with CIRIA C665 (Situation B – Low-rise housing with a ventilated underfloor void (min 150mm) and Table 8.7 – NHBC Traffic light system for 150mm void) it can be seen that the GSV value for carbon dioxide is below the assessment GSV of <0.78l/hr and falls within the Green traffic light zone.

NHBC - Green Traffic Light

An extract of the table is presented below.

Traffic Light Classification	Methane ¹		Carbon Dioxide ¹	
	Typical Maximum Concentration ³ (%v/v)	Gas Screening Value ^{2,4} (l/hr)	Typical Maximum Concentration ³ (%v/v)	Gas Screening Value ^{2,4} (l/hr)
Green	1	0.16	5	0.78
Amber 1	5	0.63	10	1.56
Amber 2	20	1.56	30	3.10
Red				

Notes:

1. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter will be the decider as to what Traffic Light is allocated;
2. Gas Screening Value is the Borehole Gas Volume Flow Rate, in litres per hour, as defined in Wilson and Card (1999), which is the borehole flow rate multiplied by the concentration in the air stream of the particular gas being considered;
3. The Typical Maximum Concentrations can be exceeded in certain circumstances should the Conceptual Site Model indicate it is safe to do so;
4. The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.

Table 8.7 – NHBC Traffic Light System

The proposed dwelling is classified as Building Type A in accordance with BS8485:2015 and the site falls in CS1 in accordance with Table 2 of the above guidance and as such, 0 points of protection are required for the proposed development and no gas protection measures are deemed necessary.

Radon Gas

In accordance with BRE 211 'Radon Guidance on Protective Measures for New Buildings' 2015 and UKRadon, the site falls in an area where less than 1% of homes are affected by radon gas, therefore no radon precautions are required within the proposed dwellings.

Conclusions

No gas protection measures are required within the proposed houses at the site.

No radon precautions are necessary.

It is recommended that confirmation of these findings is made with the Local Authority prior to any irrevocable action being taken.



PLANS



GROUNDTECH CONSULTING 	CLIENT	DATE			Status		Notes SITE LOCATION
	SANDTON LONDON EC1Y LIMITED	MAY 2022			Preliminary		
	PROJECT TITLE	SCALE			Draft		
	SAXON STREET, MANCHESTER	NTS			Issued		
	PLAN TITLE	PLAN NUMBER			For Comment		
	PROJECT LOCATION PLAN	GRO-22035-P01			Approved		
	Rev.	Details		Date			



GROUNDTECH CONSULTING	CLIENT SANDTON LONDON EC1Y LIMITED	DATE APRIL 2022				Status		Notes  Approximate Windowless Sample Borehole Position: 
	PROJECT TITLE SAXON STREET, MANCHESTER	SCALE NTS				Preliminary		
	PLAN TITLE EXPLORATORY HOLE LOCATION PLAN	PLAN NUMBER GRO-22035-P02				Draft		
						Issued 		
						For Comment		
Rev. Details Date						Approved		



EXPLORATORY HOLE LOGS



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Borehole Log

Borehole No.

WS01

Sheet 1 of 2

Project Name: SAXON STREET

Project No.
GRO-22035

Co-ords: -

Hole Type
WS

Location: MANCHESTER

Level:

Scale
1:25

Client: SANDTON LONDON EC1Y LIMITED

Dates: 05/04/2022 -

Logged By
CJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.40			MADE GROUND: Dark brown gravelly sandy topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete, ceramic, ash and fabrics. Sand is fine to coarse.	1
		0.70	ES		0.90			MADE GROUND: Brown very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick and rare ash.	
		1.00	D		1.50			MADE GROUND: Brown very clayey gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	
		1.20		N=6 (1,2/2,2,1,1)					
		2.00	D		2.50			Loose brown black clayey angular fine to coarse GRAVEL of mixed lithologies including coal and mudstone.	2
		2.00		N=3 (0,0/0,1,1,1)					
		3.00	D		4.50			Loose light brown very gravelly clayey fine to medium SAND. Gravel is angular to subangular fine to coarse of mixed lithologies.	3
		3.00		N=4 (1,1/1,1,1,1)					
		4.00		N=6 (1,1/2,2,1,1)					4
		4.50	D		4.50			Very stiff brown slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of mixed lithologies.	
					5.00				5

Continued on next sheet

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 3.0m bgl. 4. Monitoring standpipe installed to 5.0m bgl (2.0m plain, 3.0m slotted).





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Borehole Log

Borehole No.

WS01

Sheet 2 of 2

Project Name: SAXON STREET

Project No.
GRO-22035

Co-ords: -

Hole Type
WS

Location: MANCHESTER

Level:

Scale
1:25

Client: SANDTON LONDON EC1Y LIMITED

Dates: 05/04/2022 -

Logged By
CJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		5.00		N=50 (5,5/50 for 245mm)				End of borehole at 5.00 m	
									6
									7
									8
									9
									10

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 3.0m bgl. 4. Monitoring standpipe installed to 5.0m bgl (2.0m plain, 3.0m slotted).





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Borehole Log

Borehole No.

WS02

Sheet 1 of 2

Project Name: SAXON STREET

Project No.
GRO-22035

Co-ords: -

Hole Type
WS

Location: MANCHESTER

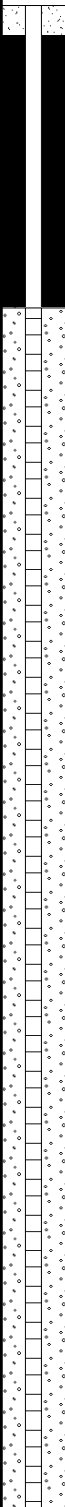
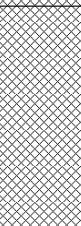
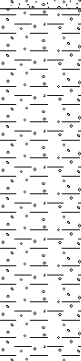
Level:

Scale
1:25

Client: SANDTON LONDON EC1Y LIMITED

Dates: 05/04/2022 -

Logged By
CJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.30			MADE GROUND: Dark brown gravelly sandy topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete, ceramic and fabrics. Sand is fine to coarse.	1
		0.70	ES					MADE GROUND: Brown very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick and rare ash.	
		1.20		N=1 (1,0/0,0,1,0)	1.10			Very loose black angular medium GRAVEL of mixed lithologies including coal.	2
		1.50	D						
		2.00 2.00	D	N=9 (1,2/2,2,2,3)	1.90			Loose light brown very gravelly clayey fine to medium SAND. Gravel is angular to subangular fine to coarse of mixed lithologies including coal and mudstone.	
		3.00 3.00	D	N=3 (0,0/0,1,1,1)					3
		4.00 4.00	D	N=4 (0,0/0,0,2,2)	3.80			Soft to firm brown slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of mixed lithologies.	4
								Continued on next sheet	5

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 3.0m bgl. 4. Monitoring standpipe installed to 5.0m bgl (1.0m plain, 4.0m slotted).





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Borehole Log

Borehole No.

WS02

Sheet 2 of 2

Project Name: SAXON STREET

Project No.
GRO-22035

Co-ords: -

Hole Type
WS

Location: MANCHESTER

Level:

Scale
1:25

Client: SANDTON LONDON EC1Y LIMITED

Dates: 05/04/2022 -

Logged By
CJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		5.00		N=50 (5,7/50 for 240mm)				Becoming very stiff from 5.0m bgl	
		5.50	D						
		5.70		N=50 (6,9/50 for 231mm)					
					6.45			End of borehole at 6.45 m	

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 3.0m bgl. 4. Monitoring standpipe installed to 5.0m bgl (1.0m plain, 4.0m slotted).





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Borehole Log

Borehole No.

WS03

Sheet 1 of 2

Project Name: SAXON STREET

Project No.
GRO-22035

Co-ords: -

Hole Type
WS

Location: MANCHESTER

Level:

Scale
1:25

Client: SANDTON LONDON EC1Y LIMITED

Dates: 05/04/2022 -

Logged By
CJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.08			MADE GROUND: Block paving.	
					0.20			MADE GROUND: Orange grey fine to medium sand.	
		0.60	ES					MADE GROUND: Brown very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick and rare ash.	
					0.80				
		1.20		N=46 (4,13/12,12,9,13)				Dense black brown very gravelly fine to medium SAND. Gravel is angular to subangular fine to coarse of mixed lithologies including coal and mudstone.	1
		1.50	ES						
		2.00			1.80			Medium dense light brown very gravelly clayey fine to medium SAND. Gravel is angular to subangular fine to coarse of mixed lithologies including coal and mudstone.	2
		2.00	D	N=29 (2,2/7,6,7,9)					
					2.30			Firm to stiff brown slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of mixed lithologies.	
		3.00							3
		3.00	D	N=2 (1,0/0,0,1,1)					
								Becoming soft from 3.0m bgl.	
		4.00							4
		4.00	D	N=16 (2,2/3,3,4,6)				Becoming stiff from 4.0m bgl.	
									5

Continued on next sheet

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 3.0m bgl. 4. Monitoring standpipe installed to 5.0m bgl (2.0m plain, 3.0m slotted).





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Borehole Log

Borehole No.

WS03

Sheet 2 of 2

Project Name: SAXON STREET

Project No.
GRO-22035

Co-ords: -

Hole Type
WS

Location: MANCHESTER

Level:

Scale
1:25

Client: SANDTON LONDON EC1Y LIMITED

Dates: 05/04/2022 -

Logged By
CJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		5.00		N=50 (5,6/50 for 233mm)				Becoming very stiff from 5.0m bgl	
		5.50	D						
		5.70		N=50 (5,8/50 for 240mm)					
					6.45			End of borehole at 6.45 m	

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.20m bgl. 3. Groundwater encountered at 3.0m bgl. 4. Monitoring standpipe installed to 5.0m bgl (2.0m plain, 3.0m slotted).





GROUND GAS MONITORING RESULTS

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Pressure Trend:	Steady	Weather:	Sunny			Equipment:	GFM 436
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)	
Start	20.4	0.0	0.0	0.0	0.0	0.0	
Finish	20.4	0.0	0.0	0.0	0.0	0.0	

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS01	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.5	18.2	18.3	0.0	0.0	0.0	0.0	0.0005	0.0000	1009	-	N	2.21
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.1	19.5	20.1	0.0	0.0	0.0	0.0	0.0005	0.0000	1009	-	N	2.04
WS03	0.0	0.0	0.00	0.0	0.0	0.0	2.9	2.1	14.6	16.3	0.0	0.0	0.0	0.0	0.0029	0.0000	1009	-	N	2.43
Notes:																				

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Pressure Trend:	Falling	Weather:	Overcast			Equipment:	GFM 436
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)	
Start	20.2	0.0	0.0	0.0	0.0	0.0	
Finish	20.2	0.0	0.0	0.0	0.0	0.0	

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS01	0.0	0.0	0.00	0.0	0.0	0.0	0.7	0.3	19.3	19.2	0.0	0.0	0.0	0.0	0.0007	0.0000	1019	-	N	2.06
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.7	0.4	18.5	19.1	0.0	0.0	0.0	0.0	0.0007	0.0000	1019	-	N	1.89
WS03	0.0	0.0	0.00	0.0	0.0	0.0	2.1	1.6	15.6	17.3	0.0	0.0	0.0	0.0	0.0021	0.0000	1019	-	N	2.24
Notes:																				

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SITE NAME:	SAXON STREET, MANCHESTER	ENGINEER:	Jack Perkins
CLIENT:	SANDTON LONDON EC1Y LIMITED	DATE:	08/06/2022
JOB NO:	GRO-22035		

Pressure Trend:	Falling	Weather:	Sunny			Equipment:	GFM 436	
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)		
Start	20.5	0.0	0.0	0.0	0.0	0.0		
Finish	20.5	0.0	0.0	0.0	0.0	0.0		

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS01	0.0	0.0	0.00	0.0	0.0	0.0	0.6	0.5	20.1	20.0	0.0	0.0	0.0	0.0	0.0006	0.0000	1021	-	N	2.14
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.2	19.7	19.5	0.0	0.0	0.0	0.0	0.0005	0.0000	1021	-	N	1.93
WS03	0.0	0.0	0.00	0.0	0.0	0.0	1.8	1.7	17.2	16.4	0.0	0.0	0.0	0.0	0.0018	0.0000	1021	-	N	2.21
Notes:																				

SITE NAME:	SAXON STREET, MANCHESTER	ENGINEER:	Jack Perkins
CLIENT:	SANDTON LONDON EC1Y LIMITED	DATE:	17/06/2022
JOB NO:	GRO-22035		

Pressure Trend:	Rising	Weather:	Sunny			Equipment:	GFM 436
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)	
Start	20.3	0.0	0.0	0.0	0.0	0.0	
Finish	20.3	0.0	0.0	0.0	0.0	0.0	

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS01	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.5	20.0	19.8	0.0	0.0	0.0	0.0	0.0005	0.0000	1017	-	N	2.16
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.6	0.7	19.6	19.3	0.0	0.0	0.0	0.0	0.0006	0.0000	1017	-	N	1.98
WS03	0.0	0.0	0.00	0.0	0.0	0.0	1.4	1.3	18.5	17.6	0.0	0.0	0.0	0.0	0.0014	0.0000	1017	-	N	2.32
Notes:																				

LIMITATIONS

Limitations

This contract was completed by Groundtech Consulting on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with due skill and care, taking into consideration the project brief provided, project objectives, agreed scope of works, prevailing site conditions and budget allocation.

Other than that defined in the paragraph above, Groundtech Consulting provides no other accountability or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted industry practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Groundtech Consulting. A third party who relies on this report, does so at their own and sole risk and no liability to such parties is provided by Groundtech Consulting.

It is the understanding of Groundtech Consulting that this report is to be used for the intended purpose as set out in the introduction. The purpose was instrumental in determining the scope and level of the services provided. Should the purpose of the report or the proposed end use of the site change, this report will no longer be directly applicable, and its validity readdressed. No reliance upon the report in the revised situation should be assumed by the client without the permission of Groundtech Consulting.

The report was written in 2020, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change and should be investigated if there is any significant delay in acting on the findings of this report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions in this report should not be relied upon in the future without the written confirmation from Groundtech Consulting that it is safe to do so.

The observations and conclusions outlined in this report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting.

Groundtech Consulting are not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The services provided are based upon Groundtech Consulting observations of existing physical conditions at the site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and Groundtech Consulting assume the information to be correct.

No responsibility can be accepted for errors for third party information presented in this report. Groundtech Consulting were not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Groundtech Consulting are not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting and forms the contract with the client.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable due to its heterogeneous properties and as investigation exploratory locations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. Geo-Environmental testing was carried out for a limited number of parameters [as stipulated in the contract] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.



Any site drawings provided in this report are not meant to be an accurate base plan, but are preliminary and used to present the general relative locations of features on, and surrounding, the site.

