



GROUNDTECH
CONSULTING

Job title: Tetrosyl Bevis Green Works,
Bury

Report type: Permanent Ground Gas & VOC
Vapour Risk Assessment (Plots
139 to 142)

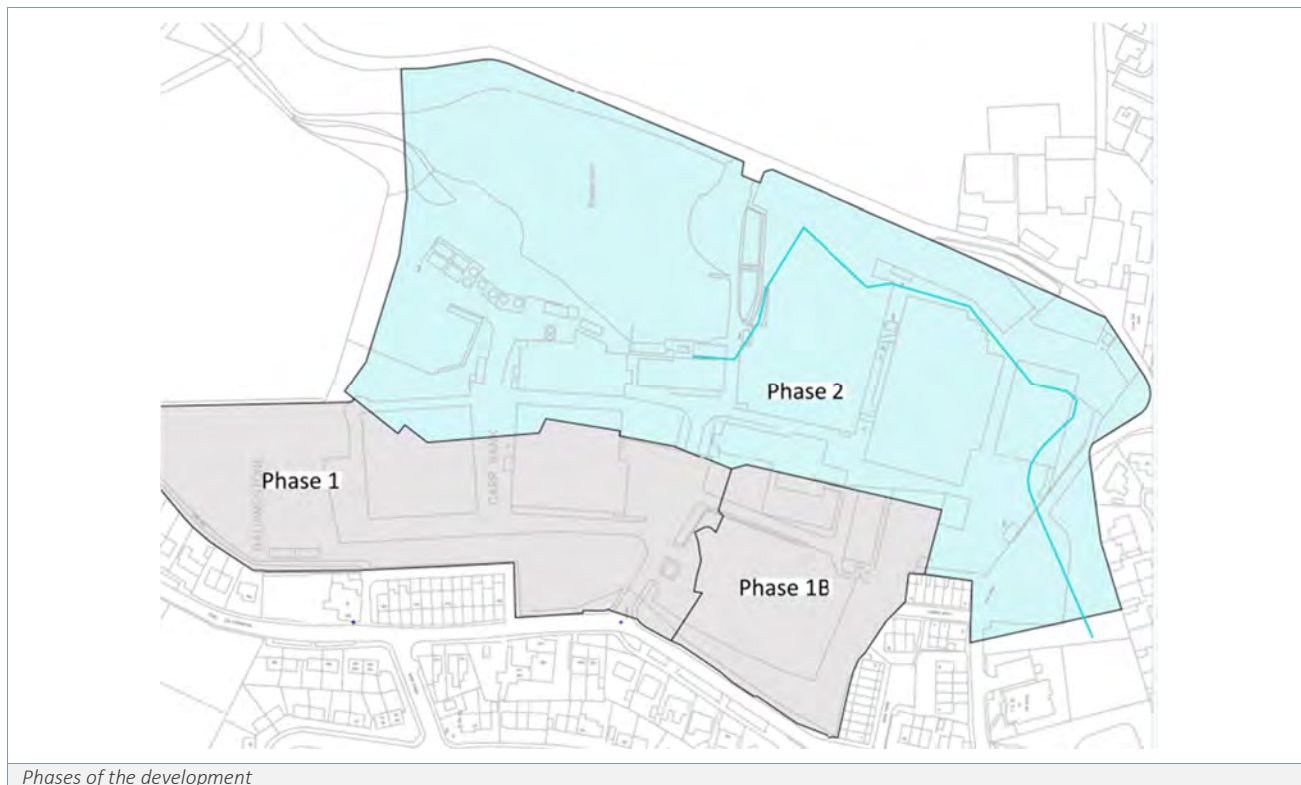
Prepared for: Urban Regen

Date: 16 December 2022

Document Control Form	
PROJECT	TETROSYL BEVIS GREEN WORKS, BURY
REPORT NAME	PERMANENT GROUND GAS & VOC VAPOUR RISK ASSESSMENT (Plots 139 to 142)
REPORT REFERENCE	GRO-21459-4060
STATUS	FINAL
ISSUE DATE	15 DECEMBER 2022
REVISION	
CLIENT	URBAN REGEN
CLIENT CONTACT	BEN THOMAS
For and Behalf of Groundtech Consulting	
SIGNATURE	
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REVIEWED	James Doyle BSc (Hons) CGeol FGS

1. Introduction

Groundtech Consulting have completed a supplementary gas and VOC monitoring/sampling programme for Plots 319 to 142 in the northern end of Phase 2 at Tetrosyl, for the proposed residential development.



2. Previous Gas Monitoring Information

Previous investigation has been undertaken on the site with respect to permanent ground gases in the northern section of Phase 2 prior to the supplementary gas monitoring programme carried out by Groundtech Consulting and are summarised below:

- ENSR International Limited Ref: 10468-1(01) "Phase I and Phase II Environmental Site Assessment Tetrosyl, Bevis Green Works." (Dated: January 2003).
- RSK STATS Geoconsult Limited Ref: 16565-R1(00) "Revised Environmental Site Assessment Tetrosyl, Bevis Green Works." (Dated: February 2011).
- E3P Limited Ref: 10-110-R1 "Phase I and Phase II Geo-Environmental Site Investigation Bevis Green Works (Tetrosyl)." (Dated: May 2014).
- Smith Grant LLP Ref: R2714c-R02-v2 "Phase 1: Supplementary Site Investigation." (Dated: June 2020).
- Smith Grant LLP Ref: R2714c-R06-v1 "Phase 2: Supplementary Site Investigation." (Dated: April 2021).
- Smith Grant LLP Ref: R2174-R01-v2 "Outline Remedial Strategy." (Dated: May 2019).
- Groundtech Consulting Ltd Ref: GRO-21459-3784_1.1 "Permanent Ground Gas & VOC Vapour Risk Assessment." (Dated: August 2022).

Smith Grant have previously undertaken VOC monitoring in Phase 1. The report recorded high vapour concentrations of vapour phase Chlorofluorocarbons (Dichlorodifluoromethane (F-12)) in the eastern section of Phase 1, perceived to be sourced from Hotspot 9 in Phase 2.

The Phase 2 Smith Grant supplementary site investigation targeted Hotspot 9 as part of the investigation. Hotspot 9 is positioned in the central/northern area of Phase 2, as indicated on plan *GRO-21459-P02*. The investigation did not record any elevated CoCs within the Made Ground soil, however detectable levels of SVOCS and VOCs were present in some of the samples and high PID levels were recorded. It was therefore recommended that HS9 is remediated.

Works have been undertaken in the area to remove primary and secondary contamination sources and a groundwater treatment trial is underway. Further investigation and assessment of gas and VOC vapour risks to built development and future residents was recommended by Smith Grant to classify the permanent ground gas risk and vapour risk and satisfy the requirements of Bury Council that the appropriate construction-stage mitigation (gas protection measures) could adequately manage residual risks.

3. Ground Model

Five boreholes were drilled to depths of between 0.9m and 2.6m bgl and monitoring standpipes were installed in four of the five wells. A description of the ground conditions in line with the scope of works is illustrated below.

Made Ground

Reworked Made Ground was encountered in all WS514, WS515 and WS516A to depths of between 0.85m and 2.4m bgl and comprised a single main Made Ground population:

- *Firm to stiff occasionally soft to firm brown grey slightly gravelly sandy silty clay with minor constituents of brick, coal, concrete and sandstone.*

Natural Ground

The natural ground generally confirmed the geological records and previous investigations. Superficial deposits were encountered beneath the site and comprised a single main stratification:

- *Stiff brown mottled grey sandy gravelly CLAY with minor constituents of mudstone, chert and sandstone was encountered within WS516 and WS517 from ground level to depths of between 0.4m and 0.7m bgl.*

Bedrock

Extremely weak brown Sandstone bedrock, residually weathered, recovered as slightly sandy cobbly gravel was typically below the Made Ground and superficial deposits from depths of between 0.4m and 2.4m bgl to a maximum depth of 2.6m bgl.

Groundwater was not encountered in the boreholes during the investigation.

The exploratory hole positions are presented on the Exploratory Hole Location Plan *GRO-21459-P12* and the logs are in *Appendix 2*.

4. Gas Monitoring

Scope

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

Location	Depth (m bgl)	Response Zone (m bgl)	Targeted Strata	Reason
WS514	2.5	1.0 – 2.5	Made Ground & Natural Sandstone	Ground Gas/VOC
WS515	2.5	1.0 – 2.5	Made Ground & Natural Sandstone	Ground Gas/VOC
WS516	1.1	0.5 – 1.1	Natural Clay & Natural Sandstone	Ground Gas/VOC
WS517	1.5	0.5 – 1.5	Natural Clay & Natural Sandstone	Ground Gas/VOC

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.

Five ground gas monitoring visits have been completed between 6th October 2022 and 24th November 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 peak 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 3*.

Gas Monitoring Results

During the monitoring period, methane (CH₄) concentrations up to a maximum of 13.0%v/v have been recorded within the standpipes and levels of carbon dioxide (CO₂) were recorded within the standpipes up to a maximum level of 5.1%v/v, associated depleted oxygen (O₂) concentrations (minimum 1.2% v/v) were recorded.

No flow rates have been recorded in any of the installations during the monitoring period.

Groundwater levels were recorded within three of the standpipes (WS514, WS516 and WS517) ranging from 0.99m to 2.59m bgl during the monitoring period and were consistently recorded within the response zone of the standpipes.

No groundwater was recorded in WS515 during any of the visits.

The atmospheric pressure ranged between 989mb and 1001mb during the monitoring period and was carried out during periods of steady 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 **moderate to high**, (assessment based on the environmental setting) as well as observations noted during the fieldworks.
- Negligible flow rates have been recorded (Table 8.5 – Modified Wilson & Card classification). For this site, three of the monitoring visits were targeted to correlate with a falling atmospheric pressure trend. As a comparison, three monitoring visits have also been undertaken during steady 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” (Qhg) have been derived for each monitoring point. As levels of methane and carbon dioxide have been recorded, a GSV has been calculated for both. No flow rates have been recorded, and the limit of the analyser (0.1l/hr) has been selected.

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

For this assessment, the maximum recorded concentration of methane of 13.0%v/v has been used together with the analyser limit of 0.1l/hr to calculate the GSV.

$$\text{Methane GSV} = 0.130 (13.0\%) \times 0.1 = 0.013 \text{ l/hr}$$

For this assessment, the maximum recorded concentration of carbon dioxide of 5.1%v/v has been used together with the analyser limit of 0.1l/hr to calculate the GSV.

$$\text{Carbon Dioxide GSV} = 0.051 (5.1\%) \times 0.1 = 0.0051 \text{ l/hr}$$

5. Assessment

Supplementary ground gas monitoring was carried out based on the findings of the previous Ground Investigation works carried out by E3P Ltd and Smith Grant LLP.

Detectable methane concentrations of up to 13.0%v/v have been recorded and a maximum concentration of carbon dioxide of 5.1%v/v has been recorded over the monitoring period.

The concentrations of methane and carbon dioxide are considered to be associated with the lower range hydrocarbon fractions and volatile organic compounds still present within the natural bedrock (Rough Rock Sandstone). The source of the methane is anticipated to be Hotspot 9, at the position of the former concrete infilled USTs near the boiler house.

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 characterises the site as within the Green Traffic Light Zone. The typical maximum CO₂ concentration is less than 5%v/v across the monitoring visits and therefore considering an increase to Amber 1 is not necessary.

The GSV for methane is below the GSV of <0.16l/hr and also falls within the Green Traffic Light Zone. No concentrations of methane have been recorded within three of the four monitoring wells. The maximum concentration of methane is greater than 10%v/v at a single monitoring well (WS514) however the typical maximum concentrations of methane are approximately 10%, and a source has been identified (Historic USTs). It is therefore considered that Amber 1 conditions should prevail based on the typical methane concentrations recorded. The GSV is also lower than the CS1 limit of 0.07l/hr placing the site in CS1, however due to the methane concentrations it should be increased to CS2.

*NHBC – Amber 1 Traffic Light
Wilson Card – CS2*

It should be noted that the contents of the USTs at HS9 are not known and have been infilled with concrete prior to 2003. However, the methane concentrations are likely due to the breakdown of light fraction hydrocarbons in mixed oxic-anoxic conditions associated from the previous usage of white spirit and interference with the infrared gas monitor - not a gassing source. This is discussed further in Section 6 including increasing the specification of the membrane.

An extract of the Wilson & Card (2006) and NHBC Traffic Light table is presented below.

Characteristic Situation (Wilson and Card)	Methane				Carbon Dioxide				Traffic Light Classification (NHBC)
	NHBC		Wilson and Card		NHBC		Wilson and Card		
	Gas Screening Value (l/hr)	Typical Maximum Concentration (%v/v)	Gas Screening Value (l/hr)	Typical Maximum Concentration (%v/v)	Gas Screening Value (l/hr)	Typical Maximum Concentration (%v/v)	Gas Screening Value (l/hr)	Typical Maximum Concentration (%v/v)	
1	0.16	1	<0.07	<1	0.78	5	<0.07	<5	Green
2			<0.7	Borehole flow rate not greater than 70l/hr			<0.7	Borehole flow rate not greater than 70l/hr	Amber 1
3	0.63	5	<3.5		1.56	10	<3.5		Amber 2
4			<15	Quantitative Risk Assessment Required			<15	Quantitative Risk Assessment Required	
5	1.56	20	<70		3.10	30	<70		Red
6			>70				>70		

The proposed residential development is classified as a Building Type A in accordance with BS 8485. The site falls in CS2/Amber 1 in accordance with Table 2 of the above guidance and therefore, 3.5 points of protection are required for the proposed development and gas protection measures are deemed necessary.

The 3.5 points can be achieved using a combination of the following methods as detailed in BS 8485:

- *Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations - 1 or 1.5 points.*
- *Clear sub-floor void (Very good performance) – 2.5 points*
- *Gas Resistant Membrane – 2.0 points.*

CIRIA C665 details the following typical protection measures for residential buildings, except those that fall into Situation B, that are classified as CS2:

- Reinforced concrete cast in situ floor slab (suspended, non suspended or raft) with propriety gas resistant membrane and passively vented underfloor sub-space.*
- Beam and block or pre-cast concrete and propriety gas resistant membrane and passively vented underfloor sub-space.*
- All joints and penetrations sealed.*

The above gas precautions are required only for Plots 140 to 142 in Phase 2B, as presented on Groundtech Plan GRO-21459-P13.

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

6. VOC Analysis

In addition to the Gas Monitoring Programme carried out focusing Plots 139 to 142 on northern end of Phase 2, Volatile Organic Compound (VOC) vapour analysis has been undertaken following the recommendations outlined by Smith Grant LLP in Outline Remedial Strategy referenced *R2174-R01-v2 (Dated: May 2019)*.

Vapour Survey – Photo Ionisation Detector

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on Ground Investigation. Onsite monitoring was carried out in line CIRIA C665 to aid targeting samples for VOC laboratory analysis.

Soil was collected for onsite testing, a plastic bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested for Total Volatile Organic Compounds (TVOCs) using a Photo Ionisation Detector (PID).

Results of the PID readings are presented on the exploratory hole logs, a summary can be found below:

Location	Minimum concentration (ppm)	Maximum concentration (ppm)
WS514	4	422
WS515	0	0
WS516	0	0
WS516A	0	0
WS5017	0	0

Additional PID testing was carried out after the installation of the gas monitoring wells, the results are presented below:

Location	Maximum concentration (ppm)
WS514	28.7
WS515	1.2
WS516	9.1
WS516A	N/A
WS5017	0.1

VOC Vapour – Bulk Gas Sampling

Four samples of bulk gas have been tested for a VOCs and speciated TPH. A Generic Quantitative Risk Assessment (GQRA) has been undertaken to determine the significance of the concentrations as derived through Geo-Environmental analysis.

The methodology for deriving assessment screening criteria for health impacts from VOCs at the receptor is set out in *Appendix 9* of the VOC handbook. Tolerable Daily Soil Intake values or Index Doses (for non-carcinogens and carcinogens respectively) are multiplied by the body weight (13.3 kg) and divided by the inhalation rate (8.8 m³/day) of a child receptor as defined in the most recent published UK guidance (DEFRA C4SL).

A summary of the VOC and speciated TPH results is presented below and a full set is in *Appendix 5*:

Contaminant	Range (ug/m ³)	Inhalation HCV (ug/kg.bw.day ⁻¹)	Assessment Criteria (ug/m ³)	Exceedances	Locations
<i>Benzene</i>	5.1 – 46.3	1.4 (S4UL)	5	4	WS514 – WS517
<i>Toluene</i>	1385.1 – 9271.8	1,400 (S4UL)	2,116	3	WS514, WS515 & WS517
<i>Ethylbenzene</i>	56.9 – 475.9	74.3 (S4UL)	112	1	WS514
<i>m/p-Xylene</i>	208.4 – 1042.6	60 (S4UL)	91	4	WS514 – WS517
<i>o-Xylene</i>	32.6 – 92.1	60 (S4UL)	91	1	WS514
<i>Aliphatic (C4-C6)</i>	<33 – 258	5,000 (S4UL)	7,557	0	-
<i>Aliphatic (C6-C8)</i>	<41 – 3354	5,000 (S4UL)	7,557	0	-
<i>Aliphatic (C8-C10)</i>	<53 – 4455	290 (S4UL)	438	1	WS514
<i>Aliphatic (C10-C12)</i>	79 – 151	290 (S4UL)	438	0	-
<i>Aromatic (EC8-EC10)</i>	481 – 2312	60 (S4UL)	91	4	WS514, WS515, WS516, WS517
<i>Aromatic (EC10 – EC12)</i>	<53 – 218	60 (S4UL)	91	2	WS515, WS517
<i>Chloromethane</i>	<3.1	5.14 (CL:AIRE GAC)	7.77	0	-
<i>1, 1-Dichloroethane</i>	<6.1 – 8.5	200 (CL:AIRE GAC)	132.33	0	-
<i>1,2 - Dichloroethane</i>	<6.1	0.12 (S4UL)	0.181	0	-
<i>Chloroform</i>	<7.3	40 (S4UL)	26.47	0	-
<i>Trichloroethene (TCE)</i>	<8.1 – 30.1	0.57 (S4UL)	0.86	0	-
<i>Tetrachloroethene (PCE)</i>	<10.2	71	107.3 (S4UL)	0	-
<i>1, 1, 1 - Trichloroethane</i>	<8.2 – 27.8	600	906.8 (S4UL)	0	-
<i>Naphthalene</i>	<1.7	0.86	1.3 (S4UL)	0	-
<i>Chlorobenzene</i>	<6.9	8.1	12.2 (S4UL)	0	-
<i>1, 2 - Dichlorobenzene</i>	<9.0	0.043	0.065 (S4UL)	0	-
<i>1, 4 - Dichlorobenzene</i>	<9.0	0.12	0.181 (S4UL)	0	-
<i>1, 2, 3 - Trichlorobenzene</i>	<11.1	0.001	0.002 (S4UL)	0	-
<i>1, 2, 4 - Trichlorobenzene</i>	<11.1	0.0023	0.003 (S4UL)	0	-

For TCE, Dichloroethane, Dichlorobenzene and Trichlorobenzene, the laboratory detection value is greater than the gas assessment criteria and it is possible that all of the samples fall above the screening value criteria.

There is no HCV value for F-11 (Trichlorofluoromethane) or F-12 (Dichlorodifluoromethane) and these have not been included in the table. USGS described the historical use of Chlorofluorocarbons:

“Chlorofluorocarbons (CFCs) are stable, synthetic, halogenated alkanes, developed in the early 1930s as safe alternatives to ammonia and sulphur dioxide in refrigeration. Production of CFC12 (dichlorodifluoromethane, CF₂Cl₂) began in 1931 followed by CFC-11 (trichlorofluoromethane) in 1936. Many other CFC compounds have since been produced, most notably CFC-113

(trichlorotrifluoroethane, C2F3Cl3). CFCs are non-flammable, noncorrosive, nonexplosive, very low in toxicity, and have physical properties conducive to a wide range of industrial and refrigerant applications. Primary uses of CFC-11 and CFC-12 include refrigerants in air-conditioning and other coolers, blowing agents in foams, insulation, and packing materials, propellants in aerosol cans, and as solvents."

CFCs are generally considered inert and nontoxic at low concentrations and F-12 concentrations of between 177ug/m³ and 33278ug/mg³ have been recorded. The highest concentrations were recorded within WS516 and are considered to be associated with the contaminated soils and bedrock from HS9, due to the likely past use of the former USTs as aerosol production. The maximum F-12 concentration of 33.78mg/kg is not present at a high enough concentration to be considered toxic. A plan illustrating the distribution of F-12 is presented in *GRO-21459-P08A*.

Elevated concentrations of BTEX have been recorded in all four of the samples screened, with the highest levels being recorded within WS514 at the nearest location to HS9 where the highest PID readings were recorded. Toluene was recorded at the highest concentrations of up to 9271.8ug/mg³ within WS514 however only minor exceedances were present within the other samples. Exceedances of benzene and m/p-xylene were detected in all four of the bulk gas samples screened as these have more stringent screening values.

No detectable concentrations of chloromethane, trichlorobenzene, chlorobenzene, PCE and TCE have been recorded within any of the samples screened.

The VOC Assessment has been undertaken during the groundwater treatment in Phase 2 which, on completion will also provide betterment and reduce the vapour risk.

Recommendations

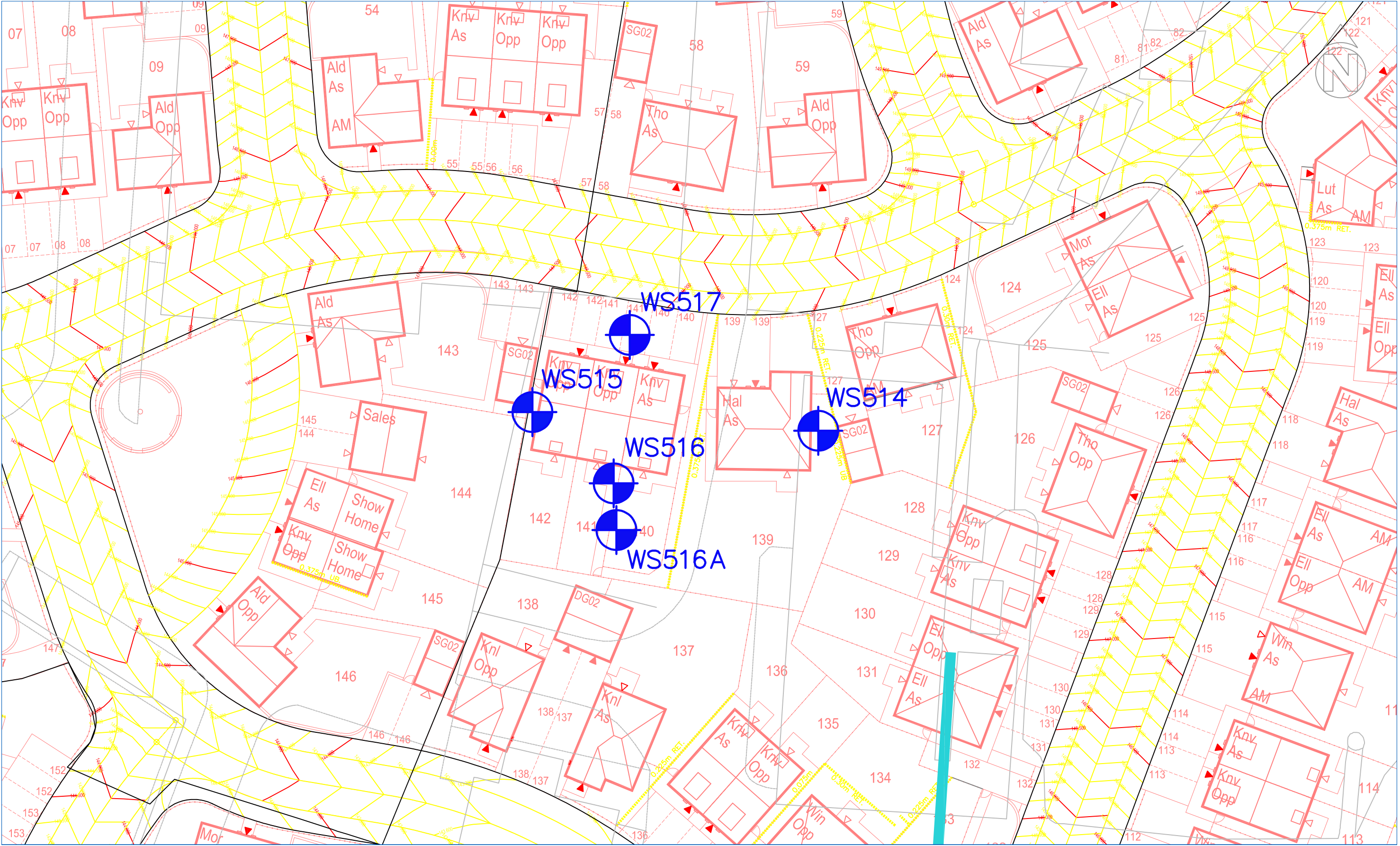
When considering the laboratory testing results alongside the PID values, a VOC vapour risk has been identified and vapour precautions are required as part of the proposed residential development. The recommended vapour precautions include the installation of a regulatory approved vapour resistant membrane.

A vapour membrane is a higher specification than a carbon dioxide/methane resistant membrane and will be sufficient to mitigate the identified risk from permanent ground gases. The specification of the membrane should be agreed with the Local Authority.

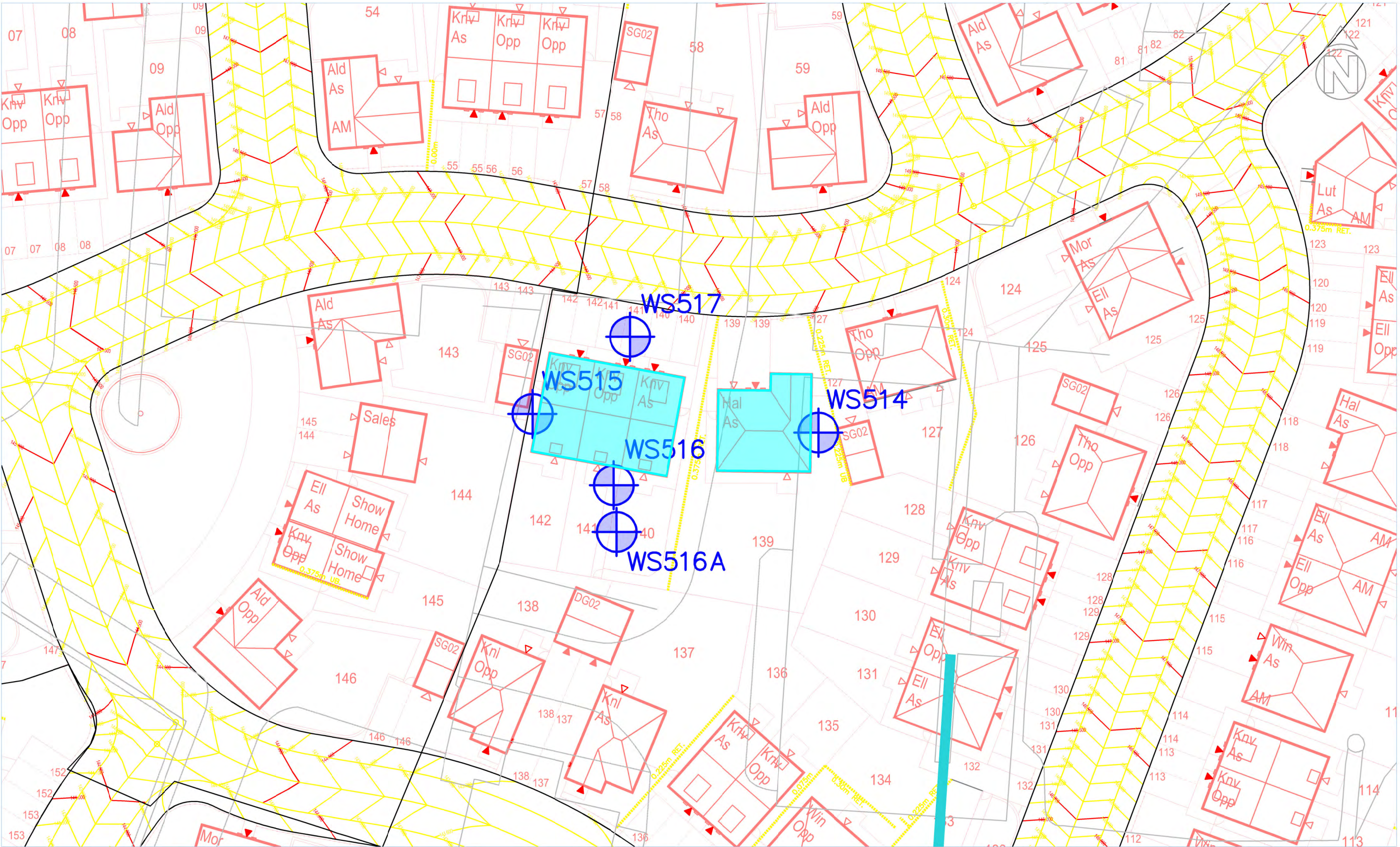
The vapour resistant membrane in addition to a sub floor void with very good performance to allow for passive ventilation is required in all plots (Plot 139 to 142), as specified on *GRO-21459-P13*.

It is recommended that the installation of the vapour membrane is verified by an independent third party in accordance with CIRIA C735.

APPENDIX 1 - Plans



GROUNDTECH CONSULTING 	CLIENT	DATE				Status		Notes  Approximate position of Gas Well 
	URBAN REGEN	DECEMBER 2022				Preliminary		
	PROJECT TITLE	SCALE				Draft		
	TETROSYL BEVIS GREEN WORKS, BURY	NTS				Issued		
	PLAN TITLE	PLAN NUMBER				For Comment		
	GAS WELL LOCATION PLAN	GRO-21459-P12	Rev.	Details	Date	Approved		



GROUNDTECH CONSULTING	CLIENT	DATE			Status	Notes Plots requiring vapour resistant membrane as detailed in Gas Assessment (GRO-21459-4060)
	URBAN REGEN	DECEMBER 2022			Preliminary	
	PROJECT TITLE	SCALE			Draft	
	TETROSYL BEVIS GREEN WORKS, BURY	NTS			Issued	
PLAN TITLE VAPOUR PROTECTION PLAN	PLAN NUMBER	PLAN NUMBER			For Comment	
	GRO-21459-P13	GRO-21459-P13			Approved	
			Rev.	Details	Date	

APPENDIX 2 - Exploratory Hole Logs



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Borehole Log

Borehole No.

WS514

Sheet 1 of 1

Project Name: TETROSYL

Project No.
GRO-21459

Co-ords: -

Hole Type
WS

Location: BURY

Level:

Scale
1:25

Client: URBAN REGEN

Dates: 27/09/2022 -

Logged By
JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES	PID=4				MADE GROUND: Stiff brown sandy gravelly clay. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, coal and sandstone. Sand is fine to coarse.	
		1.00	ES	PID=7	1.00			MADE GROUND: Soft to firm dark grey gravelly silty clay. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete and sandstone.	1
		1.90	ES	PID=422				<u>Strong hydrocarbon odour present from 1.9m to 2.0m bgl.</u>	2
		2.30	ES	PID=23	2.20 2.50			Extremely weak grey brown medium grain SANDSTONE residually weathered recovered as slightly clayey sandy angular to subangular fine to coarse gravel. Sand is fine to coarse. <u>Moderate hydrocarbon odour present from 2.2m to 2.3m bgl.</u> End of borehole at 2.50 m	3
									4
									5

Remarks

1. Location cleared of services with hand held scanner. 2. Hand dug inspection pit to 1.2m bgl. 3. No groundwater encountered. 4. Monitoring standpipe installed to 2.5m bgl (1.0m plain, 1.5m slotted).





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Borehole Log

Borehole No.

WS515

Sheet 1 of 1

Project Name: TETROSYL

Project No.
GRO-21459

Co-ords: -

Hole Type
WS

Location: BURY

Level:

Scale
1:25

Client: URBAN REGEN

Dates: 27/09/2022 -

Logged By
JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES	PID=0				MADE GROUND: Brown grey gravelly fine to coarse sand. Locally clayey. Gravel is angular to subangular fine to coarse of mixed lithologies including brick and coal.	1
		1.50	ES	PID=0					2
		2.50	ES	PID=0	2.40 2.60			Extremely weak brown SANDSTONE residually weathered recovered as gravelly clayey fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including quartzite. End of borehole at 2.60 m	3
									4
									5

Remarks

1. Location cleared of services with hand held scanner. 2. Hand dug inspection pit to 1.2m bgl. 3. No groundwater encountered. 4. Monitoring standpipe installed to 2.6m bgl (1.0m plain, 1.6m slotted).





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Borehole Log

Borehole No.

WS516

Sheet 1 of 1

Project Name: TETROSYL

Project No.
GRO-21459

Co-ords: -

Hole Type
WS

Location: BURY

Level:

Scale
1:25

Client: URBAN REGEN

Dates: 27/09/2022 -

Logged By
JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES	PID=0	0.40			Stiff brown mottled grey sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of mixed lithologies including mudstone, chert and sandstone. Sand is fine to coarse.	1
		0.70	ES	PID=0				Extremely weak brown SANDSTONE residually weathered recovered as gravelly clayey fine to coarse sand. Gravel is angular to subangular fine to coarse of sandstone.	
		1.10	ES	PID=0	1.20			End of borehole at 1.20 m	
									2
									3
									4
									5

Remarks

1. Location cleared of services with hand held scanner. 2. Hand dug inspection pit to 0.4m bgl. 3. No groundwater encountered. 4. Monitoring standpipe installed to 1.2m bgl (0.5m plain, 0.7m slotted).





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Borehole Log

Borehole No.

WS516A

Sheet 1 of 1

Project Name: TETROSYL

Project No.
GRO-21459

Co-ords: -

Hole Type
WS

Location: BURY

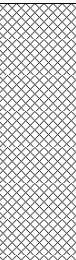
Level:

Scale
1:25

Client: URBAN REGEN

Dates: 27/09/2022 -

Logged By
JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES	PID=0	0.85 0.90			MADE GROUND: Brown grey gravelly clayey fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete, metal, ceramics and glass.	1
		0.75	ES	PID=0					
		0.85	ES	PID=0			Extremely weak light grey fine to medium grained SANDSTONE residually weathered recovered as slightly sandy, gravelly angular to subangular fine to coarse cobbles. Gravel is fine to coarse. Sand is fine to medium. End of borehole at 0.90 m		
									2
									3
									4
									5

Remarks

1. Location cleared of services with hand held scanner. 2. Hand dug inspection pit to 0.85m bgl. 3. No groundwater encountered. 4. Backfilled with arisings.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

WS517

Sheet 1 of 1

Project Name: TETROSYL

Project No.
GRO-21459

Co-ords: -

Hole Type
WS

Location: BURY

Level:

Scale
1:25

Client: URBAN REGEN

Dates: 27/09/2022 -

Logged By
JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES	PID=0	0.70 1.00 1.30 1.50			Stiff grey gravelly slightly sandy CLAY. Gravel is angular to subangular fine to coarse of mixed lithologies including sandstone and coal. Sand is fine to coarse.	1
		1.00	ES	PID=0				Extremely weak brown fine to medium grained SANDSTONE residually weathered recovered as sandy gravelly cobbles. Gravel is angular to subangular fine to coarse. Sand is fine to medium.	
		1.30	ES	PID=0				<u>Band of soft to firm clay between 1.25m and 1.35m bgl.</u>	
								End of borehole at 1.50 m	
									2
									3
									4
									5

Remarks

1. Location cleared of services with hand held scanner. 2. Hand dug inspection pit to 0.7m bgl. 3. No groundwater encountered. 4. Monitoring standpipe installed to 1.5m bgl (0.5m plain, 1.0m slotted).



APPENDIX 3 – Gas Monitoring Results

GROUNDTECH
CONSULTING

SITE NAME:		TETROSYL BEVIS GREEN WORKS, BURY				ENGINEER:		Jack Perkins				
CLIENT:		URBAN REGEN LIMITED				DATE:		06/10/2022				
JOB NO:		GRO-21459										
Pressure Trend:		Falling	Weather:	Raining			Equipment:		GFM 436			
Ambient:		O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)					
Start		20.6	0.0	0.0	0.0	0.0	0.0					
Finish		20.6	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)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
WS514	0.0	0.0	0.00	4.6	3.7	92.0	0.0	0.0	1.8	6.1	0.0	0.0	0.0	0.0	0.0000	0.0046	1000	-	N	N/A	N/A	1.79
WS515	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.7	20.7	0.0	0.0	0.0	0.0	0.0000	0.0000	1000	-	N	N/A	N/A	NGW
WS516	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.3	17.1	18.6	0.0	0.0	0.0	0.0	0.0005	0.0000	1000	-	N	N/A	N/A	1.00
WS516	0.0	0.0	0.00	0.0	0.0	0.0	3.2	2.6	8.8	10.8	0.0	0.0	0.0	0.0	0.0032	0.0000	1000	-	N	N/A	N/A	1.30
Notes:																						

GROUNDTECH
CONSULTING

SITE NAME:		TETROSYL BEVIS GREEN WORKS, BURY				ENGINEER:		William Sandiford Mitchell				
CLIENT:		URBAN REGEN LIMITED				DATE:		18/10/2022				
JOB NO:		GRO-21459										
Pressure Trend:		Steady	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		20.9	0.0	0.0	0.0	0.0	0.0					
Finish		20.9	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)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
WS514	0.0	0.0	0.00	10.8	9.7	216.0	0.0	0.0	3.0	2.0	0.0	0.0	0.0	0.0	0.0000	0.0108	1011	-	N	N/A	N/A	2.07
WS515	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.0	19.6	20.3	0.0	0.0	0.0	0.0	0.0001	0.0000	1009	-	N	N/A	N/A	NGW
WS516	0.0	0.0	0.00	0.0	0.0	0.0	1.2	1.2	15.8	15.9	0.0	0.0	0.0	0.0	0.0012	0.0000	1010	-	N	N/A	N/A	1.28
WS516	0.0	0.0	0.00	0.0	0.0	0.0	4.5	4.4	2.2	2.9	0.0	0.0	0.0	0.0	0.0045	0.0000	1009	-	N	N/A	N/A	1.62

Notes:

GROUNDTECH
CONSULTING

SITE NAME:		TETROSYL BEVIS GREEN WORKS, BURY				ENGINEER:		Jack Perkins				
CLIENT:		URBAN REGEN LIMITED				DATE:		02/11/2022				
JOB NO:		GRO-21459										
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		20.3	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)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
WS514	0.0	0.0	0.00	13.0	8.6	260.0	0.0	0.0	3.1	8.9	0.0	0.0	0.0	0.0	0.0000	0.0130	990	28.7	N	N/A	N/A	1.32
WS515	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.1	20.1	0.0	0.0	0.0	0.0	0.0000	0.0000	989	1.2	N	N/A	N/A	NGW
WS516	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.1	19.1	19.1	0.0	0.0	0.0	0.0	0.0001	0.0000	988	9.1	N	N/A	N/A	0.99
WS517	0.0	0.0	0.00	0.0	0.0	0.0	4.3	3.6	5.7	7.9	0.0	0.0	0.0	0.0	0.0043	0.0000	989	0.1	N	N/A	N/A	1.54
Notes:																						

SITE NAME:		TETROSYL BEVIS GREEN WORKS, BURY				ENGINEER:		William Sandiford Mitchell				
CLIENT:		URBAN REGEN LIMITED				DATE:		14/11/2022				
JOB NO:		GRO-21459										
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		20.6	0.0	0.0	0.0	0.0	0.0					
Finish		20.6	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)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
WS514	0.0	0.0	0.00	7.8	6.7	156.0	0.0	0.0	2.0	3.0	0.0	0.0	0.0	0.0	0.0000	0.0078	1003	-	N	N/A	N/A	2.04
WS515	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	19.6	20.3	0.0	0.0	0.0	0.0	0.0000	0.0000	1002	-	N	N/A	N/A	NGW
WS516	0.0	0.0	0.00	0.0	0.0	0.0	0.7	0.6	17.3	18.7	0.0	0.0	0.0	0.0	0.0007	0.0000	1002	-	N	N/A	N/A	1.03
WS516	0.0	0.0	0.00	0.0	0.0	0.0	3.5	3.3	5.8	6.9	0.0	0.0	0.0	0.0	0.0035	0.0000	1002	-	N	N/A	N/A	1.61
Notes:																						

GROUNDTECH
CONSULTING

SITE NAME:		TETROSYL BEVIS GREEN WORKS, BURY				ENGINEER:		William Sandiford Mitchell				
CLIENT:		URBAN REGEN LIMITED				DATE:		24/11/2022				
JOB NO:		GRO-21459										
Pressure Trend:		Steady	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		20.9	0.0	0.0	0.0	0.0	0.0					
Finish		20.9	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)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady								
WS514	0.0	0.0	0.00	8.4	7.9	168.0	0.0	0.0	1.2	2.5	0.0	0.0	0.0	0.0	0.0000	0.0084	999	-	N	N/A	N/A	2.59
WS515	0.0	0.0	0.00	0.0	0.0	0.0	0.3	0.0	19.2	20.1	0.0	0.0	0.0	0.0	0.0003	0.0000	999	-	N	N/A	N/A	NGW
WS516	0.0	0.0	0.00	0.0	0.0	0.0	0.8	0.6	19.3	19.8	0.0	0.0	0.0	0.0	0.0008	0.0000	999	-	N	N/A	N/A	1.01
WS516	0.0	0.0	0.00	0.0	0.0	0.0	5.1	4.2	5.8	6.4	0.0	0.0	0.0	0.0	0.0051	0.0000	998	-	N	N/A	N/A	1.59
Notes:																						

APPENDIX 4 - VOC Bulk Testing Results

Groundtech Consulting Limited
PO Box 499
Manchester
M28 8EE



Attention : Luke Harrison
Date : 27th October, 2022
Your reference : GRO-21459
Our reference : Test Report 22/16941 Batch 1
Location : Tetrosyl
Date samples received : 15th October, 2022
Status : Final Report
Issue : 1

Eight samples were received for analysis on 15th October, 2022 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Simon Gomery BSc
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21459
Location: Tetrosyl
Contact: Luke Harrison

Sample Date: 13 Oct 2022
Date of Receipt: 15 Oct 2022
Date Analysed: 25 Oct 2022

Sample ID: WS514
Depth:
EMT Job No: 22/16941
EMT Sample No: 1
Matrix: Air
Method: TM68 VOCs in gases (GC-MS)

Canister Serial number: V 1156 0.55

Sample Train Serial number: -

Q* - Qualifiers

B Indicates analyte found in associated method blank
>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
RL Reporting Limit
ISO 17025 (UKAS) accredited

Cas No	Molecular Weight	Compound	Q*	RESULT ppbv	RESULT ug/m ³	RL ppbv	MDL ppbv	RL ug/m ³	MDL ug/m ³
75-01-4	62.5	# Vinyl Chloride		<1.5	<3.8	<1.5	<1.5	<3.8	<3.8
75-71-8	120.91	Dichlorodifluoromethane (F-12)		35.8	177	<2.5	<2.5	<12.4	<12.4
74-87-3	50.49	Chloromethane		<1.5	<3.1	<1.5	<1.5	<3.1	<3.1
74-83-9	94.95	# Bromomethane		<1.5	<5.8	<1.5	<1.5	<5.8	<5.8
75-00-3	64.52	# Chloroethane		<1.5	<4.0	<1.5	<1.5	<4.0	<4.0
75-69-4	137.36	# Trichlorofluoromethane (F-11)		<1.5	<8.4	<1.5	<1.5	<8.4	<8.4
75-35-4	96.95	1,1-Dichloroethene (1,1 DCE)		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-09-2	84.93	# Dichloromethane (DCM)		<14.4	<50	<14.4	<14.4	<50	<50
156-60-5	96.94	Trans-1,2-Dichloroethene		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-34-3	98.97	# 1,1-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
156-59-2	96.94	# cis-1,2-Dichloroethene		<1	<4	<1	<1	<4	<4
594-20-7	112.99	2,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-97-5	129.38	Bromochloromethane (Int Std)		NA	NA	<1.5	<1.5	<7.9	<7.9
67-66-3	119.39	# Chloroform		<1.5	<7.3	<1.5	<1.5	<7.3	<7.3
71-55-6	133.42	# 1,1,1-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
563-58-6	110.97	1,1-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
56-23-5	153.84	# Carbon Tetrachloride		<1.5	<9.4	<1.5	<1.5	<9.4	<9.4
107-06-2	98.96	# 1,2-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
71-43-2	78.11	# Benzene		14.5	46.3	<1.5	<1.5	<4.8	<4.8
79-01-6	131.4	# Trichloroethene (TCE)		<1.5	<8.1	<1.5	<1.5	<8.1	<8.1
78-87-5	112.99	# 1,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-95-3	173.83	Dibromomethane		<1.5	<10.7	<1.5	<1.5	<10.7	<10.7
75-27-4	163.83	Bromodichloromethane		<1.5	<10.1	<1.5	<1.5	<10.1	<10.1
10061-01-5	110.97	cis-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
108-88-3	92.13	# Toluene	>>	2460.7 _{AA}	9271.8 _{AA}	<3.0	<1.5	<11.4	<5.7
10061-02-6	110.97	trans-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
79-00-5	133.4	# 1,1,2-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
127-18-4	165.85	# Tetrachloroethene (PCE)		<1.5	<10.2	<1.5	<1.5	<10.2	<10.2
142-28-9	112.99	1,3-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
124-48-1	208.28	Dibromochloromethane		<1.5	<12.8	<1.5	<1.5	<12.8	<12.8
106-93-4	187.86	# 1,2-Dibromoethane		<1.5	<11.5	<1.5	<1.5	<11.5	<11.5
108-90-7	112.56	# Chlorobenzene		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
630-20-6	167.85	1,1,1,2-Tetrachloroethane		<1.5	<10.3	<1.5	<1.5	<10.3	<10.3
100-41-4	106.16	# Ethylbenzene		109.6	475.9	<1.5	<1.5	<6.5	<6.5
179601-23-1	106.17	# m/p-Xylene		240.1	1042.6	<1.5	<1.5	<6.5	<6.5
95-47-6	106.17	# o-Xylene		21.2	92.1	<1.5	<1.5	<6.5	<6.5
100-42-5	104.14	# Styrene		<1.5	<6.4	<1.5	<1.5	<6.4	<6.4
75-25-2	252.77	Bromoform		<1.5	<15.5	<1.5	<1.5	<15.5	<15.5
98-82-8	120.19	Isopropylbenzene		2.4	11.8	<1.5	<1.5	<7.4	<7.4

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21459
Location: Tetrosyl
Contact: Luke Harrison

Sample Date: 13 Oct 2022
Date of Receipt: 15 Oct 2022
Date Analysed: 25 Oct 2022

Sample ID: WS514
Depth:
EMT Job No: 22/16941
EMT Sample No: 1
Matrix: Air
Method: TM68 VOCs in gases (GC-MS)

Canister Serial number: V 1156 0.55

Sample Train Serial number: -

Q* - Qualifiers

B Indicates analyte found in associated method blank
>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
RL Reporting Limit
ISO 17025 (UKAS) accredited

Cas No	Molecular Weight	Compound	Q*	RESULT	RESULT	RL	MDL	RL	MDL
				ppbv	ug/m ³	ppbv	ppbv	ug/m ³	ug/m ³
79-34-5	167.85	# 1,1,2,2-Tetrachloroethane		<1.5	<10.3	<1.5	<1.5	<10.3	<10.3
108-86-1	157.01	Bromobenzene		<1.5	<9.6	<1.5	<1.5	<9.6	<9.6
96-18-4	147.43	1,2,3-Trichloropropane		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
103-65-1	120.19	Propylbenzene		<1.5	<7.4	<1.5	<1.5	<7.4	<7.4
95-49-8	126.58	2-Chlorotoluene		<1.5	<7.8	<1.5	<1.5	<7.8	<7.8
108-67-8	120.2	# 1,3,5-Trimethylbenzene		<1.5	<7.4	<1.5	<1.5	<7.4	<7.4
106-43-4	126.58	4-Chlorotoluene		<1.5	<7.8	<1.5	<1.5	<7.8	<7.8
98-06-6	134.22	Tert-Butylbenzene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
95-63-6	120.19	# 1,2,4-Trimethylbenzene		<1.5	<7.4	<1.5	<1.5	<7.4	<7.4
135-98-8	134.22	Sec-Butylbenzene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
99-87-6	134.22	4-Isopropyltoluene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
106-46-7	147.01	# 1,4-Dichlorobenzene		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
541-73-1	147.01	# 1,3-Dichlorobenzene		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
104-51-8	134.22	n-Butylbenzene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
95-50-1	147	# 1,2-Dichlorobenzene		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
96-12-8	236.33	1,2-Dibromo-3-chloropropane		<1.5	<14.5	<1.5	<1.5	<14.5	<14.5
120-82-1	181.46	1,2,4-Trichlorobenzene		<1.5	<11.1	<1.5	<1.5	<11.1	<11.1
87-68-3	260.76	Hexachlorobutadiene		<1.5	<16.0	<1.5	<1.5	<16.0	<16.0
91-20-3	128.17	Naphthalene		<0.32	<1.7	<0.32	<0.32	<1.7	<1.7
87-61-6	181.45	1,2,3-Trichlorobenzene		<1.5	<11.1	<1.5	<1.5	<11.1	<11.1
1634-04-4	88.15	Methyl tertiary butyl ether		<1.5	<5.4	<1.5	<1.5	<5.4	<5.4
		Sum of VOC USEPA compounds		2884.3	11117.5				
460-00-4		4-Bromofluorobenzene Surrogate Recovery		92%		0%	0%		
	81	Aliphatic >C4-C6		78	258	<10	<10	<33	<33
	100	Aliphatic >C6-C8		820	3354	<10	<10	<41	<41
	130	Aliphatic >C8-C10		838	4455	<10	<10	<53	<53
	160	Aliphatic >C10-C12		12	79	<10	<10	<65	<65
	78.11	Aromatic >C5-EC7 (Benzene)		14.5	46.3	<1.5	<1.5	<4.8	<4.8
	92.13	Aromatic >EC7-EC8 (Toluene)	>>	2460.7 _{AA}	9271.8 _{AA}	<3.0	<1.5	<11.4	<5.7
	120	Aromatic >EC8-EC10		471	2312	<10	<10	<49	<49
	130	Aromatic >EC10-EC12		<10	<53	<10	<10	<53	<53

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21459
Location: Tetrosyl
Contact: Luke Harrison

Sample Date: 13 Oct 2022
Date of Receipt: 15 Oct 2022
Date Analysed: 25 Oct 2022

Sample ID: WS515
Depth:
EMT Job No: 22/16941
EMT Sample No: 2
Matrix: Air
Method: TM68 VOCs in gases (GC-MS)

Canister Serial number: V 1014 0.55

Sample Train Serial number: -

Q* - Qualifiers

B Indicates analyte found in associated method blank
>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
RL Reporting Limit
ISO 17025 (UKAS) accredited

Cas No	Molecular Weight	Compound	Q*	RESULT ppbv	RESULT ug/m ³	RL ppbv	MDL ppbv	RL ug/m ³	MDL ug/m ³
75-01-4	62.5	# Vinyl Chloride		<1.5	<3.8	<1.5	<1.5	<3.8	<3.8
75-71-8	120.91	Dichlorodifluoromethane (F-12)		353	1745.6	<2.5	<2.5	<12.4	<12.4
74-87-3	50.49	Chloromethane		<1.5	<3.1	<1.5	<1.5	<3.1	<3.1
74-83-9	94.95	# Bromomethane		<1.5	<5.8	<1.5	<1.5	<5.8	<5.8
75-00-3	64.52	# Chloroethane		<1.5	<4.0	<1.5	<1.5	<4.0	<4.0
75-69-4	137.36	# Trichlorofluoromethane (F-11)		<1.5	<8.4	<1.5	<1.5	<8.4	<8.4
75-35-4	96.95	1,1-Dichloroethene (1,1 DCE)		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-09-2	84.93	# Dichloromethane (DCM)		<14.4	<50	<14.4	<14.4	<50	<50
156-60-5	96.94	Trans-1,2-Dichloroethene		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-34-3	98.97	# 1,1-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
156-59-2	96.94	# cis-1,2-Dichloroethene		<1	<4	<1	<1	<4	<4
594-20-7	112.99	2,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-97-5	129.38	Bromochloromethane (Int Std)		NA	NA	<1.5	<1.5	<7.9	<7.9
67-66-3	119.39	# Chloroform		<1.5	<7.3	<1.5	<1.5	<7.3	<7.3
71-55-6	133.42	# 1,1,1-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
563-58-6	110.97	1,1-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
56-23-5	153.84	# Carbon Tetrachloride		<1.5	<9.4	<1.5	<1.5	<9.4	<9.4
107-06-2	98.96	# 1,2-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
71-43-2	78.11	# Benzene		3.6	11.5	<1.5	<1.5	<4.8	<4.8
79-01-6	131.4	# Trichloroethene (TCE)		<1.5	<8.1	<1.5	<1.5	<8.1	<8.1
78-87-5	112.99	# 1,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-95-3	173.83	Dibromomethane		<1.5	<10.7	<1.5	<1.5	<10.7	<10.7
75-27-4	163.83	Bromodichloromethane		<1.5	<10.1	<1.5	<1.5	<10.1	<10.1
10061-01-5	110.97	cis-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
108-88-3	92.13	# Toluene		777	2927.7	<1.5	<1.5	<5.7	<5.7
10061-02-6	110.97	trans-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
79-00-5	133.4	# 1,1,2-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
127-18-4	165.85	# Tetrachloroethene (PCE)		<1.5	<10.2	<1.5	<1.5	<10.2	<10.2
142-28-9	112.99	1,3-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
124-48-1	208.28	Dibromochloromethane		<1.5	<12.8	<1.5	<1.5	<12.8	<12.8
106-93-4	187.86	# 1,2-Dibromoethane		<1.5	<11.5	<1.5	<1.5	<11.5	<11.5
108-90-7	112.56	# Chlorobenzene		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
630-20-6	167.85	1,1,1,2-Tetrachloroethane		<1.5	<10.3	<1.5	<1.5	<10.3	<10.3
100-41-4	106.16	# Ethylbenzene		14.7	63.8	<1.5	<1.5	<6.5	<6.5
179601-23-1	106.17	# m/p-Xylene		53.6	232.7	<1.5	<1.5	<6.5	<6.5
95-47-6	106.17	# o-Xylene		8.9	38.6	<1.5	<1.5	<6.5	<6.5
100-42-5	104.14	# Styrene		<1.5	<6.4	<1.5	<1.5	<6.4	<6.4
75-25-2	252.77	Bromoform		<1.5	<15.5	<1.5	<1.5	<15.5	<15.5
98-82-8	120.19	Isopropylbenzene		1.9	9.3	<1.5	<1.5	<7.4	<7.4

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21459
Location: Tetrosyl
Contact: Luke Harrison

Sample Date: 13 Oct 2022
Date of Receipt: 15 Oct 2022
Date Analysed: 25 Oct 2022

Sample ID: WS515
Depth:
EMT Job No: 22/16941
EMT Sample No: 2
Matrix: Air
Method: TM68 VOCs in gases (GC-MS)

Canister Serial number: V 1014 0.55

Sample Train Serial number: -

Q* - Qualifiers

B Indicates analyte found in associated method blank
>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
RL Reporting Limit
ISO 17025 (UKAS) accredited

Cas No	Molecular Weight	Compound	Q*	RESULT	RESULT	RL	MDL	RL	MDL
				ppbv	ug/m ³	ppbv	ppbv	ug/m ³	ug/m ³
79-34-5	167.85	# 1,1,2,2-Tetrachloroethane		<1.5	<10.3	<1.5	<1.5	<10.3	<10.3
108-86-1	157.01	Bromobenzene		<1.5	<9.6	<1.5	<1.5	<9.6	<9.6
96-18-4	147.43	1,2,3-Trichloropropane		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
103-65-1	120.19	Propylbenzene		1.7	8.4	<1.5	<1.5	<7.4	<7.4
95-49-8	126.58	2-Chlorotoluene		<1.5	<7.8	<1.5	<1.5	<7.8	<7.8
108-67-8	120.2	# 1,3,5-Trimethylbenzene		2.3	11.3	<1.5	<1.5	<7.4	<7.4
106-43-4	126.58	4-Chlorotoluene		<1.5	<7.8	<1.5	<1.5	<7.8	<7.8
98-06-6	134.22	Tert-Butylbenzene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
95-63-6	120.19	# 1,2,4-Trimethylbenzene		1.7	8.4	<1.5	<1.5	<7.4	<7.4
135-98-8	134.22	Sec-Butylbenzene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
99-87-6	134.22	4-Isopropyltoluene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
106-46-7	147.01	# 1,4-Dichlorobenzene		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
541-73-1	147.01	# 1,3-Dichlorobenzene		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
104-51-8	134.22	n-Butylbenzene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
95-50-1	147	# 1,2-Dichlorobenzene		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
96-12-8	236.33	1,2-Dibromo-3-chloropropane		<1.5	<14.5	<1.5	<1.5	<14.5	<14.5
120-82-1	181.46	1,2,4-Trichlorobenzene		<1.5	<11.1	<1.5	<1.5	<11.1	<11.1
87-68-3	260.76	Hexachlorobutadiene		<1.5	<16.0	<1.5	<1.5	<16.0	<16.0
91-20-3	128.17	Naphthalene		<0.32	<1.7	<0.32	<0.32	<1.7	<1.7
87-61-6	181.45	1,2,3-Trichlorobenzene		<1.5	<11.1	<1.5	<1.5	<11.1	<11.1
1634-04-4	88.15	Methyl tertiary butyl ether		<1.5	<5.4	<1.5	<1.5	<5.4	<5.4
		Sum of VOC USEPA compounds		1218.4	5057.3				
460-00-4		4-Bromofluorobenzene Surrogate Recovery		91%		0%	0%		
	81	Aliphatic >C4-C6		<10	<33	<10	<10	<33	<33
	100	Aliphatic >C6-C8		10	<41	<10	<10	<41	<41
	130	Aliphatic >C8-C10		<10	<53	<10	<10	<53	<53
	160	Aliphatic >C10-C12		20	131	<10	<10	<65	<65
	78.11	Aromatic >C5-EC7 (Benzene)		3.6	11.5	<1.5	<1.5	<4.8	<4.8
	92.13	Aromatic >EC7-EC8 (Toluene)		777	2927.7	<1.5	<1.5	<5.7	<5.7
	120	Aromatic >EC8-EC10		110	540	<10	<10	<49	<49
	130	Aromatic >EC10-EC12		31	165	<10	<10	<53	<53

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21459
Location: Tetrosyl
Contact: Luke Harrison

Sample Date: 13 Oct 2022
Date of Receipt: 15 Oct 2022
Date Analysed: 25 Oct 2022

Sample ID: WS516
Depth:
EMT Job No: 22/16941
EMT Sample No: 3
Matrix: Air
Method: TM68 VOCs in gases (GC-MS)

Canister Serial number: V 1227 0.55

Sample Train Serial number: -

Q* - Qualifiers

B Indicates analyte found in associated method blank
>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
RL Reporting Limit
ISO 17025 (UKAS) accredited

Cas No	Molecular Weight	Compound	Q*	RESULT ppbv	RESULT ug/m ³	RL ppbv	MDL ppbv	RL ug/m ³	MDL ug/m ³
75-01-4	62.5	# Vinyl Chloride		<1.5	<3.8	<1.5	<1.5	<3.8	<3.8
75-71-8	120.91	Dichlorodifluoromethane (F-12)		6729.6 _{AB}	33278.0 _{AB}	<250.0	<2.5	<1240.0	<12.4
74-87-3	50.49	Chloromethane		<1.5	<3.1	<1.5	<1.5	<3.1	<3.1
74-83-9	94.95	# Bromomethane		<1.5	<5.8	<1.5	<1.5	<5.8	<5.8
75-00-3	64.52	# Chloroethane		<1.5	<4.0	<1.5	<1.5	<4.0	<4.0
75-69-4	137.36	# Trichlorofluoromethane (F-11)		<1.5	<8.4	<1.5	<1.5	<8.4	<8.4
75-35-4	96.95	1,1-Dichloroethene (1,1 DCE)		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-09-2	84.93	# Dichloromethane (DCM)		<14.4	<50	<14.4	<14.4	<50	<50
156-60-5	96.94	Trans-1,2-Dichloroethene		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-34-3	98.97	# 1,1-Dichloroethane		2.1	8.5	<1.5	<1.5	<6.1	<6.1
156-59-2	96.94	# cis-1,2-Dichloroethene		<1	<4	<1	<1	<4	<4
594-20-7	112.99	2,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-97-5	129.38	Bromochloromethane (Int Std)		NA	NA	<1.5	<1.5	<7.9	<7.9
67-66-3	119.39	# Chloroform		<1.5	<7.3	<1.5	<1.5	<7.3	<7.3
71-55-6	133.42	# 1,1,1-Trichloroethane		5.1	27.8	<1.5	<1.5	<8.2	<8.2
563-58-6	110.97	1,1-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
56-23-5	153.84	# Carbon Tetrachloride		<1.5	<9.4	<1.5	<1.5	<9.4	<9.4
107-06-2	98.96	# 1,2-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
71-43-2	78.11	# Benzene		8.6	27.5	<1.5	<1.5	<4.8	<4.8
79-01-6	131.4	# Trichloroethene (TCE)		1.8	9.7	<1.5	<1.5	<8.1	<8.1
78-87-5	112.99	# 1,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-95-3	173.83	Dibromomethane		<1.5	<10.7	<1.5	<1.5	<10.7	<10.7
75-27-4	163.83	Bromodichloromethane		<1.5	<10.1	<1.5	<1.5	<10.1	<10.1
10061-01-5	110.97	cis-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
108-88-3	92.13	# Toluene		367.6	1385.1	<1.5	<1.5	<5.7	<5.7
10061-02-6	110.97	trans-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
79-00-5	133.4	# 1,1,2-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
127-18-4	165.85	# Tetrachloroethene (PCE)		<1.5	<10.2	<1.5	<1.5	<10.2	<10.2
142-28-9	112.99	1,3-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
124-48-1	208.28	Dibromochloromethane		<1.5	<12.8	<1.5	<1.5	<12.8	<12.8
106-93-4	187.86	# 1,2-Dibromoethane		<1.5	<11.5	<1.5	<1.5	<11.5	<11.5
108-90-7	112.56	# Chlorobenzene		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
630-20-6	167.85	1,1,1,2-Tetrachloroethane		<1.5	<10.3	<1.5	<1.5	<10.3	<10.3
100-41-4	106.16	# Ethylbenzene		25.6	111.1	<1.5	<1.5	<6.5	<6.5
179601-23-1	106.17	# m/p-Xylene		89	386.5	<1.5	<1.5	<6.5	<6.5
95-47-6	106.17	# o-Xylene		10.2	44.3	<1.5	<1.5	<6.5	<6.5
100-42-5	104.14	# Styrene		2.1	8.9	<1.5	<1.5	<6.4	<6.4
75-25-2	252.77	Bromoform		<1.5	<15.5	<1.5	<1.5	<15.5	<15.5
98-82-8	120.19	Isopropylbenzene		5.1	25.1	<1.5	<1.5	<7.4	<7.4

Sample Date: 13 Oct 2022
Date of Receipt: 15 Oct 2022
Date Analysed: 25 Oct 2022

Canister Serial number: V 1227 0.55
Sample Train Serial number: -

MDL	Method Detection Limit
RL	Reporting Limit
#	ISO 17025 (UKAS) accredited

QF-PM 3.1.13 v6 Please include all sections of this report if it is reproduced 7 of 15

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21459
Location: Tetrosyl
Contact: Luke Harrison

Sample Date: 13 Oct 2022
Date of Receipt: 15 Oct 2022
Date Analysed: 25 Oct 2022

Sample ID: WS517
Depth:
EMT Job No: 22/16941
EMT Sample No: 4
Matrix: Air
Method: TM68 VOCs in gases (GC-MS)

Canister Serial number: V 259 0.55

Sample Train Serial number: -

Q* - Qualifiers

B Indicates analyte found in associated method blank
>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
RL Reporting Limit
ISO 17025 (UKAS) accredited

Cas No	Molecular Weight	Compound	Q*	RESULT ppbv	RESULT ug/m ³	RL ppbv	MDL ppbv	RL ug/m ³	MDL ug/m ³
75-01-4	62.5	# Vinyl Chloride		<1.5	<3.8	<1.5	<1.5	<3.8	<3.8
75-71-8	120.91	Dichlorodifluoromethane (F-12)		79	390.7	<2.5	<2.5	<12.4	<12.4
74-87-3	50.49	Chloromethane		<1.5	<3.1	<1.5	<1.5	<3.1	<3.1
74-83-9	94.95	# Bromomethane		<1.5	<5.8	<1.5	<1.5	<5.8	<5.8
75-00-3	64.52	# Chloroethane		<1.5	<4.0	<1.5	<1.5	<4.0	<4.0
75-69-4	137.36	# Trichlorofluoromethane (F-11)		<1.5	<8.4	<1.5	<1.5	<8.4	<8.4
75-35-4	96.95	1,1-Dichloroethene (1,1 DCE)		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-09-2	84.93	# Dichloromethane (DCM)		<14.4	<50	<14.4	<14.4	<50	<50
156-60-5	96.94	Trans-1,2-Dichloroethene		<1.5	<5.9	<1.5	<1.5	<5.9	<5.9
75-34-3	98.97	# 1,1-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
156-59-2	96.94	# cis-1,2-Dichloroethene		<1	<4	<1	<1	<4	<4
594-20-7	112.99	2,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-97-5	129.38	Bromochloromethane (Int Std)		NA	NA	<1.5	<1.5	<7.9	<7.9
67-66-3	119.39	# Chloroform		<1.5	<7.3	<1.5	<1.5	<7.3	<7.3
71-55-6	133.42	# 1,1,1-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
563-58-6	110.97	1,1-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
56-23-5	153.84	# Carbon Tetrachloride		<1.5	<9.4	<1.5	<1.5	<9.4	<9.4
107-06-2	98.96	# 1,2-Dichloroethane		<1.5	<6.1	<1.5	<1.5	<6.1	<6.1
71-43-2	78.11	# Benzene		1.6	5.1	<1.5	<1.5	<4.8	<4.8
79-01-6	131.4	# Trichloroethene (TCE)		5.6	30.1	<1.5	<1.5	<8.1	<8.1
78-87-5	112.99	# 1,2-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
74-95-3	173.83	Dibromomethane		<1.5	<10.7	<1.5	<1.5	<10.7	<10.7
75-27-4	163.83	Bromodichloromethane		<1.5	<10.1	<1.5	<1.5	<10.1	<10.1
10061-01-5	110.97	cis-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
108-88-3	92.13	# Toluene		632.9	2384.7	<1.5	<1.5	<5.7	<5.7
10061-02-6	110.97	trans-1,3-Dichloropropene		<1.5	<6.8	<1.5	<1.5	<6.8	<6.8
79-00-5	133.4	# 1,1,2-Trichloroethane		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
127-18-4	165.85	# Tetrachloroethene (PCE)		<1.5	<10.2	<1.5	<1.5	<10.2	<10.2
142-28-9	112.99	1,3-Dichloropropane		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
124-48-1	208.28	Dibromochloromethane		<1.5	<12.8	<1.5	<1.5	<12.8	<12.8
106-93-4	187.86	# 1,2-Dibromoethane		<1.5	<11.5	<1.5	<1.5	<11.5	<11.5
108-90-7	112.56	# Chlorobenzene		<1.5	<6.9	<1.5	<1.5	<6.9	<6.9
630-20-6	167.85	1,1,1,2-Tetrachloroethane		<1.5	<10.3	<1.5	<1.5	<10.3	<10.3
100-41-4	106.16	# Ethylbenzene		13.1	56.9	<1.5	<1.5	<6.5	<6.5
179601-23-1	106.17	# m/p-Xylene		48	208.4	<1.5	<1.5	<6.5	<6.5
95-47-6	106.17	# o-Xylene		7.5	32.6	<1.5	<1.5	<6.5	<6.5
100-42-5	104.14	# Styrene		<1.5	<6.4	<1.5	<1.5	<6.4	<6.4
75-25-2	252.77	Bromoform		<1.5	<15.5	<1.5	<1.5	<15.5	<15.5
98-82-8	120.19	Isopropylbenzene		<1.5	<7.4	<1.5	<1.5	<7.4	<7.4

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21459
Location: Tetrosyl
Contact: Luke Harrison

Sample Date: 13 Oct 2022
Date of Receipt: 15 Oct 2022
Date Analysed: 25 Oct 2022

Sample ID: WS517
Depth:
EMT Job No: 22/16941
EMT Sample No: 4
Matrix: Air
Method: TM68 VOCs in gases (GC-MS)

Canister Serial number: V 259 0.55

Sample Train Serial number: -

Q* - Qualifiers

B Indicates analyte found in associated method blank
>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
RL Reporting Limit
ISO 17025 (UKAS) accredited

Cas No	Molecular Weight	Compound	Q*	RESULT	RESULT	RL	MDL	RL	MDL
				ppbv	ug/m ³	ppbv	ppbv	ug/m ³	ug/m ³
79-34-5	167.85	# 1,1,2,2-Tetrachloroethane		<1.5	<10.3	<1.5	<1.5	<10.3	<10.3
108-86-1	157.01	Bromobenzene		<1.5	<9.6	<1.5	<1.5	<9.6	<9.6
96-18-4	147.43	1,2,3-Trichloropropane		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
103-65-1	120.19	Propylbenzene		<1.5	<7.4	<1.5	<1.5	<7.4	<7.4
95-49-8	126.58	2-Chlorotoluene		<1.5	<7.8	<1.5	<1.5	<7.8	<7.8
108-67-8	120.2	# 1,3,5-Trimethylbenzene		2	9.8	<1.5	<1.5	<7.4	<7.4
106-43-4	126.58	4-Chlorotoluene		<1.5	<7.8	<1.5	<1.5	<7.8	<7.8
98-06-6	134.22	Tert-Butylbenzene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
95-63-6	120.19	# 1,2,4-Trimethylbenzene		<1.5	<7.4	<1.5	<1.5	<7.4	<7.4
135-98-8	134.22	Sec-Butylbenzene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
99-87-6	134.22	4-Isopropyltoluene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
106-46-7	147.01	# 1,4-Dichlorobenzene		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
541-73-1	147.01	# 1,3-Dichlorobenzene		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
104-51-8	134.22	n-Butylbenzene		<1.5	<8.2	<1.5	<1.5	<8.2	<8.2
95-50-1	147	# 1,2-Dichlorobenzene		<1.5	<9.0	<1.5	<1.5	<9.0	<9.0
96-12-8	236.33	1,2-Dibromo-3-chloropropane		<1.5	<14.5	<1.5	<1.5	<14.5	<14.5
120-82-1	181.46	1,2,4-Trichlorobenzene		<1.5	<11.1	<1.5	<1.5	<11.1	<11.1
87-68-3	260.76	Hexachlorobutadiene		<1.5	<16.0	<1.5	<1.5	<16.0	<16.0
91-20-3	128.17	Naphthalene		<0.32	<1.7	<0.32	<0.32	<1.7	<1.7
87-61-6	181.45	1,2,3-Trichlorobenzene		<1.5	<11.1	<1.5	<1.5	<11.1	<11.1
1634-04-4	88.15	Methyl tertiary butyl ether		<1.5	<5.4	<1.5	<1.5	<5.4	<5.4
		Sum of VOC USEPA compounds		789.7	3118.3				
460-00-4		4-Bromofluorobenzene Surrogate Recovery		91%		0%	0%		
	81	Aliphatic >C4-C6		<10	<33	<10	<10	<33	<33
	100	Aliphatic >C6-C8		<10	<41	<10	<10	<41	<41
	130	Aliphatic >C8-C10		<10	<53	<10	<10	<53	<53
	160	Aliphatic >C10-C12		23	151	<10	<10	<65	<65
	78.11	Aromatic >C5-EC7 (Benzene)		1.6	5.1	<1.5	<1.5	<4.8	<4.8
	92.13	Aromatic >EC7-EC8 (Toluene)		632.9	2384.7	<1.5	<1.5	<5.7	<5.7
	120	Aromatic >EC8-EC10		98	481	<10	<10	<49	<49
	130	Aromatic >EC10-EC12		41	218	<10	<10	<53	<53

Client Name: Groundtech Consulting Limited

Reference: GRO-21459

Location: Tetrosyl

Contact: Luke Harrison

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/16941

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x2 Dilution
AB	x100 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/16941

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM68	Modified TO-15 method. Volatile Organic Compounds (VOCs) sampled using Gas Canisters, BottleVacs or Tedlar bags and analysed using Entech GC-MS.	PM0	No preparation is required.				
TM68	Modified TO-15 method. Volatile Organic Compounds (VOCs) sampled using Gas Canisters, BottleVacs or Tedlar bags and analysed using Entech GC-MS.	PM0	No preparation is required.	Yes			

Appendix 5 - Limitations

Limitations

This report (Report) forms part of the Services and if applicable Additional Services undertaken by Groundtech Consulting Ltd pursuant to a written contract (Agreement) which contains detailed provisions including express limitations of the liability of Groundtech Consulting Ltd.

This Report was prepared using reasonable skill and care as stated in the Agreement for the purpose including intended end use stated by the Client (Purpose) and the liability of Groundtech Consulting Ltd in respect of the form and content of this Report is no greater than its liability under the Agreement. All records, measurements notes, or any other data (Data) obtained by or for the benefit of the Consultant were obtained at a specific point in time and it may not be assumed by the Client or any person relying on this Report that the Data will remain unaffected by the passage of time, the seasons, weather conditions, changes in the water table or the carrying out and completion of works at the Site.

Unless otherwise agreed this Report has been prepared exclusively for the use and reliance of the Client and may not be relied upon, by any other party except as provided for in the Agreement. A third party who relies on this Report, does so at their own and sole risk and Groundtech Consulting Ltd has no liability to such parties.

Groundtech Consulting Ltd that this Report is to be used for the Purpose. The Purpose was instrumental in determining the scope and of the Services provided. If the Purpose should change, the Client may not be able to rely on the Report without the separate agreement of Groundtech Consulting Ltd.

Since the Report was written, 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 (see below) 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 written confirmation from Groundtech Consulting Ltd 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 Ltd.

Groundtech Consulting Ltd is 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 Report is based upon Groundtech Consulting Ltd's 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 Ltd have relied upon such information assuming it to be correct.

Groundtech Consulting Ltd accepts no responsibility for errors or inaccuracies in third party information presented in this Report. Groundtech Consulting Ltd was 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 or Additional Services. Groundtech Consulting Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting Ltd 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 may also vary due to the ground's heterogeneous properties and because 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. If so stipulated in the Agreement, geo-environmental testing was carried out for a limited number of parameters based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

Any 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 groundwater levels may occur at other times of the year which are higher than were recorded during this investigation.

Any site drawings provided in this Report are preliminary and used to present the general relative locations of features on, and surrounding, the Site.

