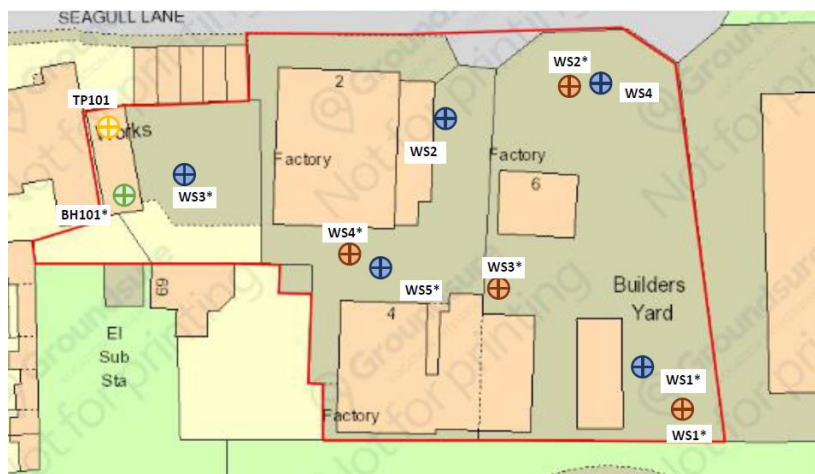


Technical Note

SITE ADDRESS	2 - 6 Seagull Lane, Emsworth, Hampshire PO10 7QH
PLANNING REFERENCE	APP/22/00155
REPORT REFERENCE	GWPR6868
ENGINEER	Natasha Kearl, Ground and Water Limited
AIM	This Technical Note addresses the Havant Pollution Team's concern around comparing the new gas canister results with a residential vGAC rather than a commercial one, to address concerns relating to the neighbouring property at Seagull Court which comprises a terraced house. This Cover Letter is to be read alongside the report referenced: GWPR6838/CAR&GDQRA/January 2026 V1.2.

COMMENT 1	The Trial Hole Location Plan can be viewed within the draft version of the report but has been reproduced below for ease of review.
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- * = well installation
- 1st Phase:
 Windowless Sampler Boreholes (June 2023 SI)
- 2nd Phase:
 Windowless Sampler Boreholes (Feb 2025)
- 4th Phase:
 Cut Down Cable Percussion Borehole with install (Nov 2025)
-  Hand dug trial pit (Nov 2025)
- The blue well installation locations were destroyed/lost during the demolition process on-site.

On 26th November 2025, VOC sampling through vacuum canister was undertaken on 1No. sample obtained from BH101. Worst case falling conditions were not captured during the canister testing.

Samples were obtained in line with the laboratory sampling guidance and submitted within a coolbox to the laboratory. There are limited assessment criteria available for the direct comparison of volatile organic compounds in the air and ultimately posing a vapour risk. As a result, numerous sources of criteria are considered in order to provide a reflective assessment value that can be used within the vapour risk assessment. In-house assessment criteria have been generated, for various VOCs when directly measured in their vapour phases within the soil gas, from here in referred to as vGAC. This is based upon the framework for assessing the risk posed to a site's receptors outlined within CIRIA C682. The methodology for the derivation of this criteria is presented within Appendix A. A site specific residential criteria has been created based on the neighbouring terraced property at Seagull Court based on a 200m² building footprint, 4.8m building living space height.

Technical Note

The results of the canister sampling are within Appendix B and tabulated below. Only determinands above the limit of detection and with data to derive a vGAC have been included.

Canister Risk Assessment			
Determinand	Laboratory Analysis Range (mg/m ³)	Residential vGAC (mg/m ³)	Was the vGAC Exceeded?
Aliphatic (C4-C6)	0.1390	40,441	No
Aliphatic (C6-C8)	0.0577	40,441	No
Aliphatic (C8-C10)	0.1070	2,346	No

vGAC calculated in line with methodology in Appendix J, using Health Criteria Values outline within UK guidance documents CL:AIRE GAC, CLEA 1.07 and LQM S4UL. Where UK Health Criteria Values are not available for the determinand, US EPA values have been adopted. The values are considered to be the most relevant to the proposed development.

Based on the risk assessment, the VOCs identified were not at a level that posed a risk to the off-site neighbours. Therefore, no further risk assessment is required.

Appendix A: vGAC Assessment Criteria and calculation explanation.

Appendix B: Chemical Test Results

Table 3 - Vapour Generic Assessment Criteria (Residential)

Determinand	Residential vGACs (mg/m3)					
	Bungalow	Small Terrace House	Medium/Large Terrace House	Semi-Detached House	Detached House	Site Specific (Residential)
TPH_Aliph EC5-EC6	7886	5662	8897	8695	13750	40441
TPH_Aliph >EC6-EC8	7886	5662	8897	8695	13750	40441
TPH_Aliph >EC8-EC10	457	328	516	504	797	2346
TPH_Aliph >EC10-EC12	457	328	516	504	797	2346
TPH_Aliph >EC12-EC16	457	328	516	504	797	2346
TPH_Arom >EC5-EC7	2208	1585	2491	2435	3850	11323
TPH_Arom >EC7-EC8	2208	1585	2491	2435	3850	11323
TPH_Arom >EC8-EC10	94.6	67.9	107	104	165	485
TPH_Arom >EC10-EC12	94.6	67.9	107	104	165	485
TPH_Arom >EC12-EC16	94.6	67.9	107	104	165	485
Acenaphthene	94.6	67.9	107	104	165	485
Acenaphthylene	94.6	67.9	107	104	165	485
Acetonitrile	62.4	44.8	70.4	68.8	109	320
Difluorochloromethane	52000	37333	58667	57333	90667	266667
Chloroethane	4506	3235	5084	4968	7857	23108
Chloromethane	8.11	5.82	9.15	8.94	14.1	41.6
1,2-Dichlorotetrafluoroethane	7000*	7000*	7000*	7000*	7000*	7000*
Dichlorodifluoromethane	104	74.7	117	115	181	533
Vinyl Chloride	45.1	32.4	50.9	49.7	78.6	231
Bromomethane	4.16	2.99	4.69	4.59	7.25	21.3
Acetone + Propanal	8.32	5.97	9.39	9.17	14.5	42.7
1,3-Butadiene	2.08	1.49	2.35	2.29	3.63	10.7
1,1-Dichloroethene	89.9	64.5	101	99.1	157	461
Iodomethane	10*	10*	10*	10*	10*	10*
Trichlorofluoromethane	5600*	5600*	5600*	5600*	5600*	5600*
Acrolein	0.0208	0.0149	0.0235	0.0229	0.0363	0.107
Methylene Chloride (Dichloromethane)	212	152	239	234	369	1086
Pentane	1040	747	1173	1147	1813	5333
trans-1,2-Dichloroethene	26.8	19.2	30.2	29.6	46.7	137
Trichlorotrifluoroethane	5200	3733	5867	5733	9067	26667
Carbon Disulfide	45.1	32.4	50.9	49.7	78.6	231
Vinyl Acetate	208	149	235	229	363	1067
1-Propanol	500*	500*	500*	500*	500*	500*
Benzene	2.21	1.59	2.49	2.43	3.85	11.3
cis-1,2-Dichloroethene	9.46	6.79	10.7	10.4	16.5	48.5
1,1-Dichloroethane	315	226	356	348	550	1618
MTBE	1139	818	1285	1256	1985	5840
Butanal	5306	3809	5986	5850	9251	27209
Trichloromethane (chloroform)	63.1	45.3	71.2	69.6	110	324
2-Butanone (MEK)	5200	3733	5867	5733	9067	26667
Cyclohexane	6240	4480	7040	6880	10880	32000
Hexane	728	523	821	803	1269	3733
1,2-Dichloroethane	0.189	0.136	0.214	0.209	0.330	0.971
Carbon Tetrachloride	5.14	3.69	5.80	5.67	8.96	26.4
1,1,1-Trichloroethane	946	679	1068	1043	1650	4853
4-Methyl-2-pentanone	3120	2240	3520	3440	5440	16000
Trichloroethene	0.899	0.645	1.01	0.991	1.57	4.61
Bromoform	31.5	22.6	35.6	34.8	55.0	162
cis-1,3-Dichloropropene	20.8	14.9	23.5	22.9	36.3	107
1,2-Dichloropropane	1.80	1.29	2.03	1.98	3.13	9.22
trans-1,3-Dichloropropene	20.8	14.9	23.5	22.9	36.3	107
Bromodichloromethane	0.473	0.340	0.534	0.522	0.825	2.43
Toluene	2208	1585	2491	2435	3850	11323
m/p-Xylene	94.6	67.9	107	104	165	485
1,1,2-Trichloroethane	7.65	5.49	8.63	8.43	13.3	39.2
Ethylbenzene	117	84.1	132	129	204	601
1,2-Dibromoethane	9.36	6.72	10.6	10.3	16.3	48.0
Tetrachloroethene	89.9	64.5	101	99.1	157	461
Chlorobenzene	12.8	9.17	14.4	14.1	22.3	65.5
1,2,4-Trimethylbenzene	3.15	2.26	3.56	3.48	5.50	16.2
1,3,5-Trimethylbenzene	62.4	44.8	70.4	68.8	109	320
Styrene	379	272	427	417	660	1941
o-Xylene	94.6	67.9	107	104	165	485
1,1,2,2-Tetrachloroethane	9.15	6.57	10.3	10.1	15.9	46.9
1,2-Dichlorobenzene	67.8	48.7	76.5	74.8	118	348
1,2,3-Trimethylbenzene	62.4	44.8	70.4	68.8	109	320
Benzyl Chloride	1.04	0.747	1.17	1.15	1.81	5.33
1,2,4-Trichlorobenzene	3.63	2.60	4.09	4.00	6.32	18.6
1,4-Dichlorobenzene	189	136	214	209	330	971
1,4-Dioxane	31.2	22.4	35.2	34.4	54.4	160
Naphthalene	1.36	0.974	1.53	1.50	2.36	6.96
Hexachlorobutadiene	0.24*	0.24*	0.24*	0.24*	0.24*	0.24*
2-Pentanone	530*	530*	530*	530*	530*	530*
3-Pentanone	705*	705*	705*	705*	705*	705*
2-Hexanone	31.2	22.4	35.2	34.4	54.4	160
Notes						
* The National Institute for Occupational Safety and Health (NIOSH) limits, given the absence of available toxicological data.						

Derivation of Vapour Phase Generic Assessment Criteria for Volatile Organic Compounds

Background

This document provides background and methodology for the calculation of Generic Assessment Criteria (GAC) for various Volatile Organic Compounds (VOCs) when directly measured in their vapour phases within the soil gas, from here in referred to as vGAC. This is based upon the framework for assessing the risk posed to a site's receptors outlined within CIRIA C682^[1].

The development of these vGAC has been driven by the limitations in using the results of soil or groundwater testing, compared to published Soil Guideline Values (SGV) or calculated GAC, for assessing the risk posed to a development and its end-users by VOCs within the soils underlying the site. The most notable of these limitations arises from the volatile nature of the contaminants of concern, resulting in the loss of VOC to the atmosphere during sampling. To counter this, there is a need for assessment criteria that can be applied to direct measurements of the level of VOCs within the soil gas, for example via sampling of the soil gas from ground-gas monitoring standpipes installed onsite. Further guidance on investigating VOCs in soil gas can be found in CIRIA C682, Section 6.4^[1], which should be followed during any sampling of soil gas.

It should be noted that it is not considered necessary to undertake VOC testing of soil gas on every site. Development of the Conceptual Site Model (CSM) should evaluate the potential risk to the site's receptors posed by VOCs and determine on a site-by-site basis whether soil gas VOC testing is an appropriate assessment tool. Factors that should be considered within this assessment include the presence and scale of potential VOC sources, presence or lack of visual/olfactory evidence of VOC contamination during intrusive investigations and the presence of VOCs above laboratory detection limits within other forms of chemical testing undertaken on the site (within soil or groundwater).

Method

Ground and Water Limited have chosen to calculate vGAC using the J&E method^[2] as per discussion within CIRIA C682 Section 7.4.3^[1] and recommendation by Evans *et al* (2002)^[3]. The basis of this methodology can be seen outlined within the *Updated technical background to the CLEA model (SR3), 2009, (section 10.3, equation 10.4)*^[4]. The J&E method describes the attenuation factor (α), which is a quantitative representation of the reduction of VOC concentration as it migrates from soil gas, present directly below the site, to the air indoors within a building onsite. The attenuation factor can be calculated as outlined overleaf:

$$\alpha = \frac{\left[\frac{D_{eff} A_B}{Q_b L_T} \exp \left(\frac{Q_s L_{crack}}{D_{crack} A_{crack}} \right) \right]}{\left[\exp \left(\frac{Q_s L_{crack}}{D_{crack} A_{crack}} \right) + \frac{D_{eff} A_B}{Q_b L_T} + \left(\frac{D_{eff} A_B}{Q_s L_T} \right) \left[\exp \left(\frac{Q_s L_{crack}}{D_{crack} A_{crack}} \right) - 1 \right] \right]}$$

Where: α is the steady-state attenuation coefficient between soil and indoor air, dimensionless
 D_{eff} is the effective diffusion coefficient for unsaturated soils, $\text{cm}^2 \text{s}^{-1}$
 A_B is the area of enclosed floor and walls below ground, cm^2
 Q_b is the building ventilation rate, $\text{cm}^3 \text{s}^{-1}$
 L_T is the source-building separation, cm
 Q_s is the volumetric flow rate of soil gas into the enclosed space, $\text{cm}^3 \text{s}^{-1}$ [25 to 150]
 L_{crack} is the foundation slab thickness, cm
 A_{crack} is the floor crack area, cm^2
 D_{crack} is the effective diffusion coefficient through the cracks, $\text{cm}^2 \text{s}^{-1}$ [= D_{eff}]
 Note: Appendix 1, Equation A10 where the Peclet number approaches infinity

However, it is considered that the full method of calculating the attenuation factor as outlined above is not practical from a site investigation standpoint as there are too many variables that would be impractical or too costly to measure, and if assumed would not necessarily provide an adequate level of conservatism.

A more simple and suitably conservative determination of attenuation factor can be provided by Johnson (2002)^[5], in which the output of the model was found to be dependent on only three parameters. The relationship between these three parameters within the output of the model varies depending on the relative dominance of advection vs diffusion as the rate limiting process for VOC migrating from soil gas to indoor air. In the most conservative of the identified scenarios, where advection is both the dominant mechanism across foundations and is the overall rate-limiting factor, the attenuation factor was shown to be roughly equivalent to the parameter C. This scenario is considered the most conservative as VOC migration via advection occurs at a quicker rate than via diffusion, parameter C can be calculated as below:

$$C = \left[\frac{Q_{soil}}{Q_B} \right]$$

Where: Q_B is the building ventilation rate ($\text{cm}^3 \text{s}^{-1}$)
 Q_{soil} is the soil gas flow into building ($\text{cm}^3 \text{s}^{-1}$)

For this calculation, worst-case Q_{soil} values can be obtained from *Updated technical background to the CLEA model (SR3), 2009, (section 10.3)^[4]*, these are provided as $25 \text{ cm}^3 \text{s}^{-1}$ and $150 \text{ cm}^3 \text{s}^{-1}$ respectively for residential and commercial land-use scenarios. Further to this, SR3 section 10.3, equation 10.5 ref provides a calculation for Q_B which is outlined overleaf:

$$Q_b = (H \times A_{foot} \times Ex) \times 1000000 \text{ cm}^3 \text{ m}^{-3} \times \frac{1}{3600} \text{ s hr}^{-1}$$

Where: Q_b is the building ventilation rate, $\text{cm}^3 \text{ s}^{-1}$
 H is height of living space, m
 A_{foot} is the building footprint, m^2
 Ex is the building air exchange rate, hour^{-1}

The height and area used in this calculation can either be directly taken from existing or proposed development plans for the relevant site, or from a number of example scenarios provided within SR3, Tables 3.3, 3.10 and 4.21^[4]. The values for the Air Exchange Rate can be taken from SR3, Tables 3.3 and 3.10^[4].

Once the attenuation factor (α) is known, the equation below is used to calculate vGAC from any applicable inhalation Health Criteria Value (HCV), the HCV is required to be presented in units of mg/m^3 .

$$vGAC = HCV / \alpha$$

The standard set of HCVs used by Ground and Water Limited have been calculated based on the data provided in the following sources: *LQM S4UL (2015)*^[5], *CLEA1.071 Software*^[6] and *CLAIRE GAC (2010)*^[7]. Within these sources the inhalation HCVs are listed in units of $\mu\text{g}/\text{kg}/\text{day}$, this represents the amount of contaminant that is inhaled per kg of body weight per day by the critical receptor. To be used in the calculation for vGAC these values need to be converted into mg/m^3 , the process for this conversion is outlined below.

$$HCV = \frac{HCV_{source} \times Bw}{V_{inh}} \div 1000$$

Where: HCV is the calculated Health Criteria Value for the critical receptor (mg/m^3)
 HCV_{source} is the Health Criteria Value taken from the source material ($\mu\text{g}/\text{kg}/\text{day}$)
 Bw is the critical receptors body weight (kg)
 V_{inh} is the daily inhalation rate for the critical receptor (m^3/day)

For calculation of the HCVs two critical receptor scenarios have been considered; residential and commercial, the inputs used for these two scenarios are outlined below, inhalation rates and weight for the critical receptors have been taken from Table 3.2 of SP1010^[9] and Table 4.6 of SR3^[4] respectively:

Residential

- The critical receptor for this scenario is a female child, age classes 1 – 6 (0 – 6 years old).
- The average weight of the critical receptor is 13.3kg.
- The average inhalation rate of the critical receptor is $8.77\text{m}^3/\text{day}$.

Commercial

- The critical receptor for this scenario is a female adult of age class 17 (16 – 65 years old).
- The average weight of the critical receptor is 70kg.
- The average inhalation rate of the critical receptor is $15.7\text{m}^3/\text{day}$.

An exception to the above method of calculating the HCV had to be made for two determinands, these were 1,1-dichloroethane and cis-1,2-dichloroethene. This exception was made due to there being no available inhalation pathway HCV for these determinands within the available source material. Instead, the HCVs for the oral pathway from the *CL:AIRE GACs (2010)*^[8] was used, this is considered to be suitable conservative, and the most appropriate approach based on the data/resources available at the time of writing.

Limitations and Assumptions

The following assumptions have been made in development of the vGACs:

- The source of the VOCs is directly beneath the building foundations.
- The movement of VOCs from soil gas to indoor air is controlled by advection and diffusion has a negligible effect on the change in VOC concentration.

The following limitations in this methodology were considered worth highlighting:

- The vGAC are only relevant for contaminants where the indoor inhalation pathway is the dominant exposure pathway.
- The vGAC are only to be used for comparison against onsite measurements of VOC concentration within soil gas.
- The vGAC may not be suitably conservative in a situation where there are high rates of flow measured from ground-gas monitoring.
- The methodology for calculating vGAC does not factor in vapour intrusion/migration along drainage pipes.
- Biodegradation of the VOCs is not factored into the methodology.

Despite these limitations/assumptions it is considered by Ground and Water Limited that the methodology presented herein provides an adequately conservative and appropriate approach for assessing the risk of VOCs onsite.

References

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2. Johnson P.C. & Ettinger R.A. (1991). *Heuristic model for the intrusion rate of contaminant vapors into buildings*. Environmental Science & Technology, 25(8); 1445–1452.
3. Evans, D, Hers, I, Wolters, R. M, Boddington, R. T. B. & Hall, D. H. (2002) *Vapour transfer of soil contaminants*. R&D Technical Report P5-018/TR, Environment Agency (Bristol).
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8. CL:AIRE (2010). *Soil Generic Assessment Criteria for Human Health Risk Assessment*. CL:AIRE (London).
9. CL:AIRE (2014). *SP1010 - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Revision 2*. DEFRA research project.



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Website: www.alsenvironmental.co.uk

Ground and Water Ltd
Head Office
2 The Long Barn
Norton Farm, Selborne Road
Alton
Hampshire
GU34 3NB

Attention: Natasha Kearn

CERTIFICATE OF ANALYSIS

Date of report Generation:	08 January 2026
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	251127-52
Your Reference:	GWPR6838
Location:	2 - 6 Seagull Lane Emsworth Hampshire PO10 7QH
Report No:	787983
Order Number:	GWPR6838

This report has been revised and directly supersedes 786516 in its entirety.

We received 1 sample on Thursday November 27, 2025 and 1 of these samples were scheduled for analysis which was completed on Thursday January 08, 2026. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Justin Keeton
Business Unit Leader - Land





CERTIFICATE OF ANALYSIS

Validated

SDG: 251127-52
Client Ref.: GWPR6838

Report Number: 787983

Superseded Report: 786516

Location: 2 - 6 Seagull Lane Emsworth Hampshire PO10 7QH

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
32523193	BH101		0.00 - 0.00	26/11/2025

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 251127-52
Client Ref.: GWPR6838

Report Number: 787983
Location: 2 - 6 Seagull Lane Emsworth Hampshire PO10 7QH

Superseded Report: 786516

Results Legend



Test



No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

32523193

Customer
Sample Reference

BH101

AGS Reference

Depth (m)

0.00 - 0.00

Container

Gas Canister

Sample Type

G

Bulk Gas

All

NDPs: 0
Tests: 1

X

TPH in Gas samples

All

NDPs: 0
Tests: 1

X

VOC's

All

NDPs: 0
Tests: 1

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 251127-52
Client Ref.: GWPR6838

Report Number: 787983
Location: 2 - 6 Seagull Lane

Superseded Report: 786516
Emsworth Hampshire PO10 7QH

Sample Number 32523193

Sample ID BH101

Depth 0.00 - 0.00

Sampled Date 26/11/2025 00:00:00

- ISO17025 accredited. M - mCERTS accredited. 1-4*§@ - Sample deviation (see appendix)

Method TM335 Determination of TPH in atmospheric, sub-slab and soil gas samples

Canister No. 33 Sample Volume (ml) 100 Initial pressure (psia) 15.72 Final pressure (psia) 18.86 Dilution 1.1997455471

CAS Number	Compound	LOD	Result	Units	LOD	Result	Units
1634-04-4	MTBE	<1.80	<1.80	ppbv	<6.48	<6.48	ug/m ³
71-43-2	Benzene	<1.56	<1.56	ppbv	<4.98	<4.98	ug/m ³
108-88-3	Toluene	<1.80	<1.80	ppbv	<6.77	<6.77	ug/m ³
100-41-4	Ethyl Benzene	<1.80	<1.80	ppbv	<7.80	<7.80	ug/m ³
108-38-3 & 106-42-3	m/p-Xylene	<1.80	<1.80	ppbv	<7.80	<7.80	ug/m ³
95-47-6	o-Xylene	<1.80	<1.80	ppbv	<7.80	<7.80	ug/m ³
91-20-3	Naphthalene	<2.76	<2.76	ppbv	<14.4	<14.4	ug/m ³
-	TPH (C4-C6)	<12.0	47.6	ppbv	<35.0	139	ug/m ³
-	TPH (C6-C8)	<12.0	15.6	ppbv	<44.3	57.7	ug/m ³
-	TPH (C8-C10)	<16.4	22.7	ppbv	<77.5	107	ug/m ³
-	TPH (C10-C12)	<25.4	<25.4	ppbv	<147	<147	ug/m ³
-	TPH (C4-C12)	<65.8	85.9	ppbv	<304	<304	ug/m ³
-	Aliphatic (C4-C6)	<12.0	47.6	ppbv	<35.0	139	ug/m ³
-	Aliphatic (C6-C8)	<8.64	15.6	ppbv	<32.6	57.7	ug/m ³
-	Aliphatic (C8-C10)	<4.40	22.7	ppbv	<22.5	107	ug/m ³
-	Aliphatic (C10-C12)	<13.4	<13.4	ppbv	<53.0	<53.0	ug/m ³
-	Aromatic (EC5-EC7)	<1.56	<1.56	ppbv	<4.98	<4.98	ug/m ³
-	Aromatic (EC7-EC8)	<1.80	<1.80	ppbv	<6.77	<6.77	ug/m ³
-	Aromatic (EC8-EC10)	<12.0	<12.0	ppbv	<55.0	<55.0	ug/m ³
-	Aromatic (EC10-EC12)	<12.0	<12.0	ppbv	<94.0	<94.0	ug/m ³



CERTIFICATE OF ANALYSIS

Validated

SDG: 251127-52
Client Ref.: GWPR6838

Report Number: 787983

Superseded Report: 786516

Location: 2 - 6 Seagull Lane Emsworth Hampshire PO10 7QH

Sample Number 32523193

Sample ID BH101

Depth

0.00 - 0.00

Sampled Date 26/11/2025 00:00:00

- ISO17025 accredited.

M - mCERTS accredited.

1-4*§@ - Sample deviation (see appendix)

Method TM330

Determination of VOC's in atmospheric, sub-slab and soil gas samples

Canister No. 33

Sample Volume (ml) 100

Dispatch pressure (psia) -0.18

Initial pressure (psia) 15.72

Final pressure (psia) 18.86

Dilution 1.1997455471

CAS Number	Compound	LOD	Result	Units	LOD	Result	Units
71-55-6	1,1,1-Trichloroethane	<1.80	<1.80	# ppbv	<9.79	<9.79	#
79-34-5	1,1,2,2-Tetrachloroethane	<1.80	<1.80	# ppbv	<12.4	<12.4	#
79-00-5	1,1,2-Trichloroethane	<1.80	<1.80	# ppbv	<9.79	<9.79	#
75-34-3	1,1-Dichloroethane	<1.80	<1.80	# ppbv	<7.29	<7.29	#
75-35-4	1,1-Dichloroethene	<1.80	<1.80	# ppbv	<7.14	<7.14	#
120-82-1	1,2,4-Trichlorobenzene	<1.80	<1.80	# ppbv	<13.3	<13.3	#
95-63-6	1,2,4-Trimethylbenzene	<1.80	<1.80	# ppbv	<8.83	<8.83	#
106-93-4	1,2-Dibromoethane	<1.80	<1.80	# ppbv	<13.8	<13.8	#
95-50-1	1,2-Dichlorobenzene	<1.80	<1.80	# ppbv	<10.8	<10.8	#
107-06-2	1,2-Dichloroethane	<1.80	<1.80	# ppbv	<7.29	<7.29	#
78-87-5	1,2-Dichloropropane	<1.80	<1.80	# ppbv	<8.32	<8.32	#
76-14-2	1,2-Dichlorotetrafluoroethane	<1.80	<1.80	# ppbv	<12.6	<12.6	#
108-67-8	1,3,5-Trimethylbenzene	<1.80	<1.80	# ppbv	<8.83	<8.83	#
106-99-0	1,3-Butadiene	<1.80	<1.80	# ppbv	<3.98	<3.97	#
541-73-1	1,3-Dichlorobenzene	<1.80	<1.80	ppbv	<10.8	<10.8	
106-46-7	1,4-Dichlorobenzene	<1.80	<1.80	# ppbv	<10.8	<10.8	#
123-91-1	1,4-Dioxane	<1.80	<1.80	ppbv	<6.48	<6.48	
78-93-3	2-Butanone (MEK)	<1.80	<1.80	# ppbv	<5.30	<5.30	#
591-78-6	2-Hexanone	<1.80	<1.80	# ppbv	<7.36	<7.36	#
67-63-0	2-Propanol	<1.80	<1.80	ppbv	<4.42	<4.42	
622-96-8	4-Ethyltoluene	<1.80	<1.800	ppbv	<8.83	<8.83	
108-10-1	4-Methyl-2-pentanone	<1.80	<1.80	# ppbv	<7.36	<7.36	#
67-64-1	Acetone	<1.80	<1.80	ppbv	<4.27	<4.27	
107-02-8	Acrolein	<1.80	<1.80	# ppbv	<4.12	<4.12	#
71-43-2	Benzene	<1.56	<1.56	# ppbv	<4.98	<4.98	#
100-44-7	Benzyl Chloride	<1.80	<1.80	# ppbv	<9.35	<9.35	#
75-27-4	Bromodichloromethane	<1.80	<1.80	# ppbv	<12.1	<12.1	#
75-25-2	Bromoform	<1.80	<1.80	# ppbv	<18.6	<18.6	#
74-83-9	Bromomethane	<1.80	<1.80	# ppbv	<6.99	<6.99	#
75-15-0	Carbon Disulfide	<1.80	<1.80	# ppbv	<5.60	<5.59	#
56-23-5	Carbon Tetrachloride	<1.80	<1.80	# ppbv	<11.3	<11.3	#
108-90-7	Chlorobenzene	<1.80	<1.80	# ppbv	<8.32	<8.32	#
75-00-3	Chloroethane	<1.80	<1.80	# ppbv	<4.79	<4.78	#
67-66-3	Chloroform	<1.80	<1.80	# ppbv	<8.76	<8.76	#
74-87-3	Chloromethane	<1.80	<1.80	# ppbv	<3.68	<3.68	#
156-59-2	cis-1,2-Dichloroethene	<1.80	<1.80	# ppbv	<7.14	<7.14	#
10061-01-5	cis-1,3-Dichloropropene	<1.80	<1.80	# ppbv	<8.17	<8.17	#
110-82-7	Cyclohexane	<1.80	<1.80	# ppbv	<6.18	<6.18	#
124-48-1	Dibromochloromethane	<1.80	<1.80	ppbv	<15.3	<15.3	
75-71-8	Dichlorodifluoromethane	<1.80	<1.80	# ppbv	<8.91	<8.91	#
141-78-6	Ethyl Acetate	<1.80	<1.80	ppbv	<6.48	<6.48	
100-41-4	Ethylbenzene	<1.80	<1.80	# ppbv	<7.80	<7.80	#
142-82-5	Heptane	<1.80	<1.80	ppbv	<7.36	<7.36	
87-68-3	Hexachlorobutadiene	<1.80	<1.80	ppbv	<19.1	<19.1	
110-54-3	Hexane	<1.80	<1.80	# ppbv	<6.33	<6.33	#
108-38-3 & 106-42-3	m/p-Xylene	<3.60	<3.60	# ppbv	<15.6	<15.6	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 251127-52
Client Ref.: GWPR6838

Report Number: 787983
Location: 2 - 6 Seagull Lane Emsworth Hampshire PO10 7QH

Superseded Report: 786516

Sample Number 32523193

Sample ID BH101

Depth 0.00 - 0.00

Sampled Date 26/11/2025 00:00:00

- ISO17025 accredited.

M - mCERTS accredited.

1-4*§@ - Sample deviation (see appendix)

Method TM330

Determination of VOC's in atmospheric, sub-slab and soil gas samples

Canister No. 33

Sample Volume (ml) 100 Dispatch pressure (psia) -0.18 Initial pressure (psia) 15.72 Final pressure (psia) 18.86 Dilution 1.1997455471

CAS Number	Compound	LOD	Result	Units	LOD	Result	Units
80-62-6	Methyl Methacrylate	<1.80	<1.80	ppbv	<7.36	<7.36	
75-09-2	Methylene Chloride	<1.80	<1.80	# ppbv	<6.26	<6.26	#
1634-04-4	MTBE	<1.80	<1.80	# ppbv	<6.48	<6.48	#
91-20-3	Naphthalene	<1.80	<1.80	ppbv	<9.42	<9.42	
95-47-6	o-Xylene	<1.80	<1.80	# ppbv	<7.80	<7.80	#
115-07-01	Propylene	<1.80	<1.80	ppbv	<3.09	<3.09	
100-42-5	Styrene	<1.80	<1.80	# ppbv	<7.66	<7.65	#
127-18-4	Tetrachloroethene	<1.80	<1.80	# ppbv	<12.2	<12.2	#
109-99-9	Tetrahydrofuran	<1.80	<1.80	ppbv	<5.30	<5.30	
	TIC's				See Attached		
108-88-3	Toluene	<1.80	<1.80	# ppbv	<6.77	<6.77	#
156-60-5	trans-1,2-Dichloroethene	<1.80	<1.80	# ppbv	<7.14	<7.14	#
1006-02-6	trans-1,3-Dichloropropene	<1.80	<1.80	# ppbv	<8.17	<8.17	#
79-01-6	Trichloroethene	<1.80	<1.80	# ppbv	<9.64	<9.64	#
75-69-4	Trichlorofluoromethane	<1.80	<1.80	# ppbv	<10.1	<10.1	#
26523-64-8	Trichlorotrifluoroethane	<1.80	<1.80	# ppbv	<13.8	<13.8	#
108-05-4	Vinyl Acetate	<1.80	<1.80	# ppbv	<6.33	<6.33	#
75-01-4	Vinyl Chloride	<1.80	<1.80	# ppbv	<4.56	<4.56	#



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Table of Results - Appendix

Method No	Description
TM053	Determination of Bulk Gas Composition
TM335	TPH in atmospheric, sub-slab and soil gas samples
TM330	Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



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Superseded Report: 786516

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Test Completion Dates

Lab Sample No(s)	32523193
Customer Sample Ref.	BH101
AGS Ref.	
Depth	0.00 - 0.00
Type	Gas (G)

Bulk Gas	08-Jan-2026
TPH in Gas samples	08-Dec-2025
VOC's	05-Dec-2025



VOC TENTATIVELY IDENTIFIED COMPOUNDS REPORT

JOB NUMBER:	251127-52
SAMPLE IDENTITY:	BH101
DATE REPORTED:	05/12/2025
ANALYST:	dj

TENTATIVE COMPOUND IDENTIFICATION		RESULT (ppbv)	RESULT (µg/m3)
1	propane	12	21
2	Mixed Hydrocarbons	18	
3	butane	17	41
4	Mixed Hydrocarbons	10	
5			
6			
7			
8			
9			
10			

Tentatively Identified Compounds (TICs) are non-target peaks in the VOC air analysis. All non-target peaks detected with a concentration above the LoD of 10ppbv are subjected to a mass spectral library search. Non-target peaks with a **Library Search Confidence of >75%** are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as **“Mixed Hydrocarbons”**. Non-target compounds identified from the scan data are semi-quantified relative to one of the internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as a Tentatively Identified Compound (TIC). TICs are outside the scope of our UKAS accreditation.



CERTIFICATE OF ANALYSIS

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Client Ref: GWPR6838

Report Number: 787983
Location: 2 - 6 Seagull Lane

Superseded Report: 786516
Emsworth Hampshire PO10 7QH

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur - e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

If during the search of the two 'pinch' samples by PLM only 1 or 2 fibres or fibre bundles are seen and identified as asbestos, the term 'trace asbestos identified' is reported.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Potentially respirable fibres are identified by using a Phase Contrast Microscope.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

21. 6:2 FTAB

Recovery of 6:2 FTAB in the quality control samples has been observed to be <50% of the target value. Please note the 6:2 FTAB result is supplied as indicative only.