Ground and Water Limited
Unit 2, The Long Barn
Norton Farm
Selborne Road
Alton
Hampshire
GU34 3NB

Tel: 0333 600 1221
E-mail: enquiries@groundandwater.co.uk/
alex.stratford@groundandwater.co.uk

Remediation Verification Certificate

CLIENT	Drew Smith Limited
SITE ADDRESS	Former Colt International, New Lane, Havant PO9 2LZ
PROJECT NUMBER	GWPR4409 The terms and conditions of this report can be seen within Appendix A.
ENGINEER	Alex Stratford, Ground and Water Limited
DATE	Friday 31st March 2023
RELEVANT DOCUMENTATION	Previous reports and relevant documentation for the site located at the Former Colt International, New Lane, Havant PO9 2LZ are listed below and should be read in conjunction with this report. Ground and Water Limited Ground Investigation Report (Ref: GWPR3724/RM/CAR/August 2020). Ground and Water Limited Ground Investigation Report (Ref: GWPR4409/GIR/September 2021). Ground and Water Limited Validation letter report plots 1-12, 26-53 (Ref: GWPR4409/VLR/April/2022). Ground and Water Limited Validation letter report plots 54-75 (Ref: GWPR4409/VLR/August/2022). Ground and Water Limited Validation letter report Block A (Ref: GWPR4409/VLR/March 2023). Please note, this validation report should be read in conjunction with the previous Ground Investigation Reports.
PROPOSED REMEDIATION STRATEGY	Based on the contamination testing undertaken as part of the Ground and Water Limited Consolidated Ground Investigation Report (Ref: GWPR3724/RM/August 2020), the following remedial works were recommended: The following remedial methodology should be undertaken within all proposed private and communal garden areas: Based on the above the remedial strategy for the site was to produce a 600mm clean capping of material within all private and communal garden areas. Including a >50 – 100mm break layer. To produce a 300mm clean capping of material within all public open spaces. Including a >50 – 100mm break layer. Full liaison must be made with the statutory authority, prior to the implementation of this method statement and/or the removal of any material from site. All works must be undertaken to meet their full approval. However, the Subsoil and Topsoil placed in proposed private and communal garden areas must

be fit for purpose and must either be supplied with traceable chemical laboratory test certificates or be tested, either prior to placing (ideally) or after placing, to ensure that the human receptor cannot come into contact with compounds that could be detrimental to human health.

Soil samples for validation testing should be taken at 1 per 50m^3 or 1 per 4 plots.

TOPSOIL VALIDATION

Soil samples from Block B were taken on the 6th February 2023 in order to validate the soft landscaping areas on-site within residential properties. Topsoil was imported onto site and comprised of a light to dark brown sandy gravelly Clay. The sand was fine to coarse grained and the gravel was sub-angular to sub-rounded, fine to coarse, flint. The client has informed Ground and Water that the topsoil imported for use in Block B is from the football stadium close to site.

A total of 2No. trial pits were hand excavated within residential garden plots at a sampling density of 1 per 4 plots, with the pits undertaken to depths of approximately 0.60m bgl.

A sampling location plan can be seen in Figure 1 for plots Block B.

The Topsoil depth can be seen tabulated below.

Topsoil Depth				
Validation Pit	Depth of Topsoil	Required Thickness	Required Thickness reached?	Concrete Capping Present
Block B1	600mm	600mm	Yes	Yes
Block B2	600mm	600mm	Yes	Yes

A total of 2No. samples of the imported Topsoil were sent to ALS Limited (ALS Report: 679137) and were tested for a wide range of determinands as detailed below:

The testing schedule can be seen below and comprised:

Semi-metals and heavy metals incl. Arsenic, Cadmium, Chromium (incl. Hexavalent Chromium), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc;

Polycyclic Aromatic Hydrocarbons (PAHs) incl. Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(ghi)perylene;

Fuel Oils – Speciated TPH including full aliphatic/aromatic split;

BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE – used as marker compounds for Volatile Organic Compounds (VOCs);

Asbestos screen.

The results of the chemical testing can be seen in Appendix B (ALS Report: 679137). The derivation of Soil Assessment Criteria used within this report can be seen within Appendix F.

The results of the chemical laboratory testing were compared to the LQM/CIEH Suitable 4 Use Levels (S4UL) and General Assessment Criteria (GAC) for a 'Residential With Homegrown Produce' land-use scenario, as this was considered the most appropriate land-use scenario and likely worst case. The C4SL LLTC for Lead was compared to a 'Residential With Homegrown Produce' land-use scenario.

Where no LQM/CIEH S4UL/GAC/C4SL LLTC was available for a particular determinand then preliminary reference was made to the laboratory detection limit of the determinand. If a positive concentration was

noted then further risk assessment would be required.

For Cyanide, where no S4UL/C4SL was available for chronic exposure, the Society of Brownfield Risk Assessment's (SoBRA) free cyanide acute Generic Assessment Criteria for a child receptor of 24mg/kg was adopted. As acute GACs are typically of higher concentration when compared to chronic GACs, the adopted GAC of 24mg/kg is considered conservative.

Where a contaminant of concern's LQM/CIEH S4UL/C4SL LLTC varies according to the Soil's Organic Matter (SOM), the SOM recorded for each uncontaminated soil sample was used to derive the appropriate SGV/GAC. The soil organic matter (SOM) of the 7No. samples analysed from the Topsoil ranged between 1.01-3.71%.

The 1.00% scenario was utilised as this would provide the most conservative values for the soils tested.

Sample B2 was found to have **no elevated levels of determinands over the** '**Residential with Homegrown Produce**'. However sample B1 was noted to have a positive asbestos test result. This positive asbestos result comprised a bundle of Amosite fibres within the soil. No other elevated levels of determinands were recorded in sample B1.

Therefore further testing was required on site to determine the extent of any asbestos within block B. Five additional trial pits were excavated within the area of trial pit B1 and 5 Asbestos screen tests were undertaken (1 in each pit). The results from these 5 Asbestos tests had a result of No Asbestos Detected. These results can be seen within Appendix C report reference. Figure 2 shows the additional the location of the additional 5 trial pits dug on site.

Therefore, the area of Trial pit B1 was limited to be the area containing the positive asbestos result. This area of topsoil was excavated out. Further testing of the trial pit in the form of sample at the base of the pit and 2 samples from side where also tested for Asbestos screens. The results showed No Asbestos detected. The results from these tests can be seen in Appendix D report reference 684166.

Chemical testing of the stockpile of topsoil which was to be placed in the excavation was undertaken. The results showed that the new topsoil had No Asbestos detected. The results from this test can be seen in Appendix E report reference 683964. Photographs showing the newly placed topsoil can be seen in Appendix G.

CONCLUSION	**Following the validation exercise undertaken on Block B, the thickness and chemical composition of the imported topsoil is considered to be suitable for use and the concrete crush capping layer was observed in all plots.**

Date: 31st March 2023

Signed:

[redacted]

Mr Alex Stratford
Geotechnical & Geo-Environmental Engineer
For and on behalf of Ground and Water Limited

The following Figures and Appendices completed this report.

Figure 1: Validation Sampling Plan –Block B February 2023
Figure 2: Validation Sampling Plan –Secondary Testing March 2023

Appendix A: Conditions and Limitations
Appendix B: Chemical Laboratory Results February 2023
Appendix C: Chemical Laboratory results additional testing March 2023
Appendix D: Chemical Laboratory results Hole B1
Appendix E: Chemical Laboratory results New Topsoil Stockpile
Appendix F: Soil Assessment Criteria
Appendix G: Site Photographs

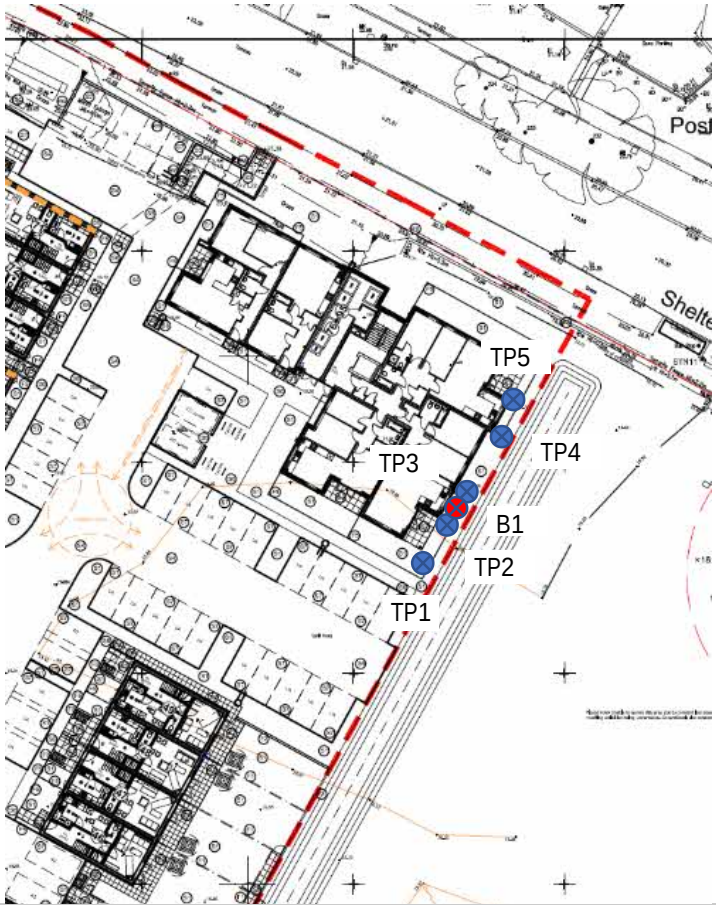
Plot Boundary

Hand Excavated Trial Pit

NOT TO SCALE

Former Colt International, New Lane, Havant PO9 2LZ	
Drew Smith Limited	March 2023
Figure 1 – Trial Hole Location Plan Block B	GWPR4409

ground&water



Plot Boundary

Additional Hand Excavated Trial Pit

Positive Asbestos Result within Trail Pit

NOT TO SCALE

Former Colt International, New Lane, Havant PO9 2LZ	
Drew Smith Limited	March 2023
Figure 2 – Trial Hole Location Plan Block B	GWPR4409

ground&water

APPENDIX A
Conditions and Limitations

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly, any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations relate to the Former Colt International, New Lane, Havant PO9 2LZ.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B
Chemical Laboratory Results February 2023

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

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

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	17 February 2023
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	230209-77
Your Reference:	Colt International
Location:	Havant
Report No:	679137
Order Number:	GWPR4409

We received 3 samples on Thursday February 09, 2023 and 3 of these samples were scheduled for analysis which was completed on Thursday February 16, 2023. 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:

[redacted]

Sonia McWhan

Operations Manager

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27533381	Block A		0.30 - 0.30	06/02/2023
27533386	Block B1		0.30 - 0.30	06/02/2023
27533392	Block B2		0.30 - 0.30	06/02/2023

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

Validated

CERTIFICATE OF ANALYSIS

SDG: 230209-77 **Report Number:** 679137 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

Results Legend

X Test

N 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)					27533381			27533386			27533392
Customer Sample Reference					Block A			Block B1			Block B2
AGS Reference											
Depth (m)					0.30 - 0.30			0.30 - 0.30			0.30 - 0.30
Container			1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
Sample Type			S	S	S	S	S	S	S	S	S
Anions by Kone (soil)	All	NDPs: 0 Tests: 3		X			X			X	
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 3	X			X			X		
Boron Water Soluble	All	NDPs: 0 Tests: 3		X			X			X	
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 3		X			X			X	
EPH CWG GC (S)	All	NDPs: 0 Tests: 3		X			X			X	
GRO by GC-FID (S)	All	NDPs: 0 Tests: 3			X			X			X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 3		X			X			X	
Metals in solid samples by OES	All	NDPs: 0 Tests: 3		X			X			X	
PAH by GCMS	All	NDPs: 0 Tests: 3		X			X			X	
pH	All	NDPs: 0 Tests: 3		X			X			X	
Phenols by HPLC (S)	All	NDPs: 0 Tests: 3		X			X			X	
Sample description	All	NDPs: 0 Tests: 3		X			X			X	
Total Organic Carbon	All	NDPs: 0 Tests: 3		X			X			X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 3		X			X			X	
VOC MS (S)	All	NDPs: 0 Tests: 3			X			X			X

Sample Descriptions

Grain Sizes

very fine	< 0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	> 10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
27533381	Block A	0.30 - 0.30	Dark Brown	Clay Loam	Vegetation	None
27533386	Block B1	0.30 - 0.30	Dark Brown	Clay Loam	Vegetation	None
27533392	Block B2	0.30 - 0.30	Dark Brown	Loamy Sand	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG: 230209-77 **Report Number:** 679137 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+5@ Sample deviation (see appendix)

Customer Sample Ref.			Block A	Block B1	Block B2			
Depth (m)			0.30 - 0.30	0.30 - 0.30	0.30 - 0.30			
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
Date Sampled			06/02/2023	06/02/2023	06/02/2023			
Sample Time			15:00	15:00	15:00			
Date Received			09/02/2023	09/02/2023	09/02/2023			
SDG Ref			230209-77	230209-77	230209-77			
Lab Sample No.(s)			27533381	27533386	27533392			
AGS Reference								
Component	**LOD/Units**	**Method**						
Moisture Content Ratio (% of as received sample)	%	PM024	23	22	15			
Phenol	<0.01 mg/kg	TM062 (S)	0.013 M	<0.01 M	<0.01 M			
Cresols	<0.01 mg/kg	TM062 (S)	0.013 M	0.0128 M	0.0117 M			
Xylenols	<0.015 mg/kg	TM062 (S)	<0.015 M	<0.015 M	<0.015 M			
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)	<0.035 M	<0.035 M	<0.035 M			
Organic Carbon, Total	<0.2 %	TM132	2.51 M	3.53 M	1.25 M			
Soil Organic Matter (SOM)	<0.35 %	TM132	4.33 #	6.09 #	2.16 #			
pH	1 pH Units	TM133	7.68 M	8.06 M	8.34 M			
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6 M	<0.6 M	<0.6 M			
Cyanide, Total	<1 mg/kg	TM153	<1 M	<1 M	<1 M			
Arsenic	<0.6 mg/kg	TM181	8.37 M	7.66 M	10.9 M			
Cadmium	<0.02 mg/kg	TM181	0.213 M	0.206 M	0.146 M			
Chromium	<0.9 mg/kg	TM181	14.7 M	13.1 M	9.79 M			
Copper	<1.4 mg/kg	TM181	17 M	15.4 M	7.55 M			
Lead	<0.7 mg/kg	TM181	38.3 M	31.2 M	22.9 M			
Mercury	<0.1 mg/kg	TM181	<0.1 M	<0.1 M	<0.1 M			
Nickel	<0.2 mg/kg	TM181	11.7 M	10.4 M	7.8 M			
Selenium	<1 mg/kg	TM181	<1 #	<1 #	<1 #			
Vanadium	<0.2 mg/kg	TM181	29.1 #	27.2 #	29.7 #			
Zinc	<1.9 mg/kg	TM181	57.5 M	53.4 M	29.9 M			
Boron, water soluble	<1 mg/kg	TM222	1.31 M	1.3 M	<1 M			
Water Soluble Sulphate as SO4 2:1 Extract	<0.004 g/l	TM243	0.0061 M	<0.004 M	0.0337 M			

10:26:20 17/02/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 230209-77 **Report Number:** 679137 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

PAH by GCMS

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+5@ Sample deviation (see appendix)

Customer Sample Ref.			Block A	Block B1	Block B2			
Depth (m)			0.30 - 0.30	0.30 - 0.30	0.30 - 0.30			
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
Date Sampled			06/02/2023	06/02/2023	06/02/2023			
Sample Time			15:00	15:00	15:00			
Date Received			09/02/2023	09/02/2023	09/02/2023			
SDG Ref			230209-77	230209-77	230209-77			
Lab Sample No.(s)			27533381	27533386	27533392			
AGS Reference								
Component	**LOD/Units**	**Method**						
Naphthalene-d8 % recovery**	%	TM218	80.1	86	89			
Acenaphthene-d10 % recovery**	%	TM218	78.9	83.8	86.4			
Phenanthrene-d10 % recovery**	%	TM218	79.3	84.1	86.1			
Chrysene-d12 % recovery**	%	TM218	70.4	72.8	75.8			
Perylene-d12 % recovery**	%	TM218	70.5	75.3	78.5			
Naphthalene	<0.009 mg/kg	TM218	<0.009 M	<0.009 M	<0.009 M			
Acenaphthylene	<0.012 mg/kg	TM218	<0.012 M	<0.012 M	<0.012 M			
Acenaphthene	<0.008 mg/kg	TM218	<0.008 M	<0.008 M	<0.008 M			
Fluorene	<0.01 mg/kg	TM218	<0.01 M	<0.01 M	<0.01 M			
Phenanthrene	<0.015 mg/kg	TM218	0.0263 M	0.0303 M	0.0313 M			
Anthracene	<0.016 mg/kg	TM218	<0.016 M	<0.016 M	<0.016 M			
Fluoranthene	<0.017 mg/kg	TM218	0.0547 M	0.0822 M	0.0704 M			
Pyrene	<0.015 mg/kg	TM218	0.0449 M	0.07 M	0.0611 M			
Benz(a)anthracene	<0.014 mg/kg	TM218	0.0211 M	0.04 M	0.0373 M			
Chrysene	<0.01 mg/kg	TM218	0.0271 M	0.0495 M	0.0324 M			
Benzo(b)fluoranthene	<0.015 mg/kg	TM218	0.0372 M	0.0759 M	0.0544 M			
Benzo(k)fluoranthene	<0.014 mg/kg	TM218	<0.014 M	0.0269 M	0.0185 M			
Benzo(a)pyrene	<0.015 mg/kg	TM218	0.0225 M	0.051 M	0.039 M			
Indeno(1,2,3-cd)pyrene	<0.018 mg/kg	TM218	<0.018 M	0.0367 M	0.0278 M			
Dibenzo(a,h)anthracene	<0.023 mg/kg	TM218	<0.023 M	<0.023 M	<0.023 M			
Benzo(g,h,i)perylene	<0.024 mg/kg	TM218	<0.024 M	0.0366 M	0.0304 M			
PAH, Total Detected USEPA 16	<0.118 mg/kg	TM218	0.234	0.499	0.403			

Validated

CERTIFICATE OF ANALYSIS

SDG: 230209-77 **Report Number:** 679137 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

TPH CWG (S)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+5@	Sample deviation (see appendix)

Customer Sample Ref.			Block A	Block B1	Block B2			
Depth (m)			0.30 - 0.30	0.30 - 0.30	0.30 - 0.30			
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
Date Sampled			06/02/2023	06/02/2023	06/02/2023			
Sample Time			15:00	15:00	15:00			
Date Received			09/02/2023	09/02/2023	09/02/2023			
SDG Ref			230209-77	230209-77	230209-77			
Lab Sample No.(s)			27533381	27533386	27533392			
AGS Reference								
Component	**LOD/Units**	**Method**						
GRO Surrogate % recovery**	%	TM089	75.3	77.8	91.1			
Aliphatics >C5-C6 (HS_1D_AL)	<0.01 mg/kg	TM089	<0.01	<0.01	<0.01			
Aliphatics >C6-C8 (HS_1D_AL)	<0.01 mg/kg	TM089	<0.01	<0.01	<0.01			
Aliphatics >C8-C10 (HS_1D_AL)	<0.01 mg/kg	TM089	<0.01	<0.01	<0.01			
Aliphatics >C10-C12 (EH_2D_AL_#1)	<1 mg/kg	TM414	<1 #	<1 #	<1 #			
Aliphatics >C12-C16 (EH_2D_AL_#1)	<1 mg/kg	TM414	<1 #	<1 #	<1 #			
Aliphatics >C16-C21 (EH_2D_AL_#1)	<1 mg/kg	TM414	2.17 #	1.87 #	<1 #			
Aliphatics >C21-C35 (EH_2D_AL_#1)	<1 mg/kg	TM414	16.1 #	14.6 #	4.54 #			
Aliphatics >C35-C44 (EH_2D_AL_#1)	<1 mg/kg	TM414	<1	<1	<1			
Total Aliphatics >C10-C44 (EH_2D_AR_#1)	<5 mg/kg	TM414	18.8	17	<5			
Total Aliphatics & Aromatics >C10-C44 (EH_2D_Total_#1)	<10 mg/kg	TM414	69.3	58.4	15.7			
Aromatics >EC5-EC7 (HS_1D_AR)	<0.01 mg/kg	TM089	<0.01	<0.01	<0.01			
Aromatics >EC7-EC8 (HS_1D_AR)	<0.01 mg/kg	TM089	<0.01	<0.01	<0.01			
Aromatics >EC8-EC10 (HS_1D_AR)	<0.01 mg/kg	TM089	<0.01	<0.01	<0.01			
Aromatics > EC10-EC12 (EH_2D_AR_#1)	<1 mg/kg	TM414	<1 #	<1 #	<1 #			
Aromatics > EC12-EC16 (EH_2D_AR_#1)	<1 mg/kg	TM414	<1 #	<1 #	<1 #			
Aromatics > EC16-EC21 (EH_2D_AR_#1)	<1 mg/kg	TM414	7.22 #	5.08 #	<1 #			
Aromatics > EC21-EC35 (EH_2D_AR_#1)	<1 mg/kg	TM414	38.7 #	31.7 #	9.03 #			
Aromatics >EC35-EC44 (EH_2D_AR_#1)	<1 mg/kg	TM414	4.1	4.67	1.2			
Aromatics > EC40-EC44 (EH_2D_AR_#1)	<1 mg/kg	TM414	<1	1.03	<1			
Total Aromatics > EC10-EC44 (EH_2D_AR_#1)	<5 mg/kg	TM414	50.5	41.5	10.9			
Total Aliphatics & Aromatics >C5-C44 (EH_2D_Total_#1+HS_1D_Total)	<10 mg/kg	TM414	69.3	58.4	10.9			
Total Aliphatics >C5-C10 (HS_1D_AL_TOTAL)	<0.05 mg/kg	TM089	<0.05	<0.05	<0.05			
Total Aromatics >EC5-EC10 (HS_1D_AR_TOTAL)	<0.05 mg/kg	TM089	<0.05	<0.05	<0.05			
GRO >C5-C10 (HS_1D_TOTAL)	<0.02 mg/kg	TM089	<0.02	<0.02	<0.02			

Validated

CERTIFICATE OF ANALYSIS

SDG: 230209-77 **Report Number:** 679137 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

VOC MS (S)

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+5@ Sample deviation (see appendix)

Customer Sample Ref.			Block A	Block B1	Block B2			
Depth (m)			0.30 - 0.30	0.30 - 0.30	0.30 - 0.30			
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)			
Date Sampled			06/02/2023	06/02/2023	06/02/2023			
Sample Time			15:00	15:00	15:00			
Date Received			09/02/2023	09/02/2023	09/02/2023			
SDG Ref			230209-77	230209-77	230209-77			
Lab Sample No.(s)			27533381	27533386	27533392			
AGS Reference								
Component	**LOD/Units**	**Method**						
Dibromofluoromethane**	%	TM116	120	107	110			
Toluene-d8**	%	TM116	97.7	97.6	92.8			
4-Bromofluorobenzene**	%	TM116	90.1	90.2	70.8			
Methyl Tertiary Butyl Ether	<0.01 mg/kg	TM116	<0.1 M	<0.1 M	<0.01 M			
Benzene	<0.009 mg/kg	TM116	<0.09 M	<0.09 M	<0.009 M			
Toluene	<0.007 mg/kg	TM116	<0.07 M	<0.07 M	<0.007 M			
Ethylbenzene	<0.004 mg/kg	TM116	<0.04 M	<0.04 M	<0.004 M			
p/m-Xylene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #	<0.01 #			
o-Xylene	<0.01 mg/kg	TM116	<0.1 M	<0.1 M	<0.01 M			
Sum of Detected Xylenes	<0.02 mg/kg	TM116	<0.2	<0.2	<0.02			
Sum of BTEX	<0.04 mg/kg	TM116	<0.4	<0.4	<0.04			

10:26:20 17/02/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 230209-77 **Report Number:** 679137 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

Asbestos Identification - Solid Samples

Results Legend

#	ISO17025 accredited.
M	MCERTS accredited.
*	Subcontracted test.
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Asbestos Actinolite	Asbestos Anthophyllite	Asbestos Tremolite	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	Block A 0.30 - 0.30 SOLID 06/02/2023 00:00:00 09/02/2023 05:00:00 230209-77 27533381 TM048	16/02/23	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	Block B1 0.30 - 0.30 SOLID 06/02/2023 00:00:00 09/02/2023 05:00:00 230209-77 27533386 TM048	16/02/23	Eva Guerra	bundle of fibres in soil	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	Block B2 0.30 - 0.30 SOLID 06/02/2023 00:00:00 09/02/2023 05:00:00 230209-77 27533392 TM048	16/02/23	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

Table of Results - Appendix

Method No	Description
PM024	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM048	Identification of Asbestos in Bulk Material
TM062 (S)	Determination of Phenols in Soils by HPLC
TM089	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	ELTRA CS800 Operators Guide
TM133	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Determination of Hexavalent Chromium using Kone analyser
TM153	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM181	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	The determination of PAH in soil samples by GC-MS
TM222	Determination of Hot Water Soluble Boron in Soils (10:1 Water:Soil) by ICP OES.
TM243	Mixed Anions In Soils By Kone
TM414	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

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

Test Completion Dates

Lab Sample No(s)	27533381	27533386	27533392
Customer Sample Ref.	Block A	Block B1	Block B2
AGS Ref.			
Depth	0.30 - 0.30	0.30 - 0.30	0.30 - 0.30
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)	14-Feb-2023	14-Feb-2023	14-Feb-2023
Asbestos ID in Solid Samples	16-Feb-2023	16-Feb-2023	16-Feb-2023
Boron Water Soluble	14-Feb-2023	14-Feb-2023	14-Feb-2023
Cyanide Comp/Free/Total/Thiocyanate	13-Feb-2023	13-Feb-2023	13-Feb-2023
EPH CWG GC (S)	13-Feb-2023	13-Feb-2023	13-Feb-2023
GRO by GC-FID (S)	14-Feb-2023	14-Feb-2023	13-Feb-2023
Hexavalent Chromium (s)	14-Feb-2023	14-Feb-2023	14-Feb-2023
Metals in solid samples by OES	14-Feb-2023	14-Feb-2023	14-Feb-2023
PAH by GCMS	13-Feb-2023	13-Feb-2023	13-Feb-2023
pH	10-Feb-2023	10-Feb-2023	10-Feb-2023
Phenols by HPLC (S)	13-Feb-2023	13-Feb-2023	13-Feb-2023
Sample description	09-Feb-2023	09-Feb-2023	09-Feb-2023
Total Organic Carbon	15-Feb-2023	15-Feb-2023	15-Feb-2023
TPH CWG GC (S)	14-Feb-2023	14-Feb-2023	13-Feb-2023
VOC MS (S)	15-Feb-2023	15-Feb-2023	14-Feb-2023

Appendix

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

2. If sufficient sample is received a sub sample will be retained free of charge f days after analysis is completed (e-mailed) for all sample types unless the sample is on testing. The prepared soil sub sample that is analysed for asbestos will be retai period of 6 months after the analysis date. All bulk samples will be retained for a p months after the analysis date. All samples received and not scheduled will be dis one month after the date of receipt unless we are instructed to the contrary. Once t period has expired, a storage charge will be applied for each month or part thereof client cancels the request for sample storage. ALS reserve the right to charge fo 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 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 determinan are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with track record will be utilised.

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

Identification of Asbestos in Bulk Materials & Soils

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

The results for identification of asbestos in soils are obtained from a homog sample which has been examined to determine the presence of asbestos 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 accredit 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.

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.

APPENDIX C
Chemical Laboratory results additional testing March 2023

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

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

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	21 March 2023
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	230311-32
Your Reference:	Colt International
Location:	Havant
Report No:	682882
Order Number:	GWPR4409

We received 5 samples on Friday February 24, 2023 and 5 of these samples were scheduled for analysis which was completed on Tuesday March 21, 2023. 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:

[redacted]

Sonia McWhan

Operations Manager

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27668805	TP1 Block B		0.50 - 0.50	20/02/2023
27668807	TP2 Block B		0.20 - 0.20	20/02/2023
27668811	TP3 Block B		0.40 - 0.40	20/02/2023
27668813	TP4 Block B		0.30 - 0.30	20/02/2023
27668815	TP5 Block B		0.20 - 0.20	20/02/2023

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

Validated

CERTIFICATE OF ANALYSIS

SDG: 230311-32 **Report Number:** 682882 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

Results Legend

X Test

N 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)	27668805	27668807	27668811	27668813	27668815
		Customer Sample Reference	TP1 Block B	TP2 Block B	TP3 Block B	TP4 Block B	TP5 Block B
		AGS Reference					
		Depth (m)	0.50 - 0.50	0.20 - 0.20	0.40 - 0.40	0.30 - 0.30	0.20 - 0.20
		Container	BAG	BAG	BAG	BAG	BAG
		Sample Type	S	S	S	S	S
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 5	X	X	X	X	X

Validated

CERTIFICATE OF ANALYSIS

SDG: 230311-32 **Report Number:** 682882 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

Asbestos Identification - Solid Samples

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
*	Subcontracted test.
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Asbestos Actinolite	Asbestos Anthophyllite	Asbestos Tremolite	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	TP1 Block B 0.50 - 0.50 SOLID 20/02/2023 00:00:00 24/02/2023 05:00:00 230311-32 27668805 TM048	21/03/23	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	TP2 Block B 0.20 - 0.20 SOLID 20/02/2023 00:00:00 24/02/2023 05:00:00 230311-32 27668807 TM048	21/03/2023	Odhran McLernon	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	TP3 Block B 0.40 - 0.40 SOLID 20/02/2023 00:00:00 24/02/2023 05:00:00 230311-32 27668811 TM048	21/03/23	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	TP4 Block B 0.30 - 0.30 SOLID 20/02/2023 00:00:00 24/02/2023 05:00:00 230311-32 27668813 TM048	21/03/23	Eva Guerra	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	TP5 Block B 0.20 - 0.20 SOLID 20/02/2023 00:00:00 24/02/2023 05:00:00 230311-32 27668815 TM048	21/03/2023	Odhran McLernon	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

Table of Results - Appendix

Method No	Description
TM048	Identification of Asbestos in Bulk Material

NA = not applicable.

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

Test Completion Dates

Lab Sample No(s)	27668805	27668807	27668811	27668813	27668815
Customer Sample Ref.	TP1 Block B	TP2 Block B	TP3 Block B	TP4 Block B	TP5 Block B
AGS Ref.					
Depth	0.50 - 0.50	0.20 - 0.20	0.40 - 0.40	0.30 - 0.30	0.20 - 0.20
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	21-Mar-2023	21-Mar-2023	21-Mar-2023	21-Mar-2023	21-Mar-2023

Appendix

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

2. If sufficient sample is received a sub sample will be retained free of charge f days after analysis is completed (e-mailed) for all sample types unless the sample is on testing. The prepared soil sub sample that is analysed for asbestos will be retai period of 6 months after the analysis date. All bulk samples will be retained for a p months after the analysis date. All samples received and not scheduled will be dis one month after the date of receipt unless we are instructed to the contrary. Once t period has expired, a storage charge will be applied for each month or part thereof client cancels the request for sample storage. ALS reserve the right to charge fo 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 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 determinan are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with track record will be utilised.

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

Identification of Asbestos in Bulk Materials & Soils

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

The results for identification of asbestos in soils are obtained from a homog sample which has been examined to determine the presence of asbestos 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 accredit 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.

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.

APPENDIX D
Chemical Laboratory results Hole B1

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

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

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	30 March 2023
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	230329-36
Your Reference:	Colt International
Location:	Havant
Report No:	684166
Order Number:	GWPR4409

We received 3 samples on Wednesday March 29, 2023 and 3 of these samples were scheduled for analysis which was completed on Thursday March 30, 2023. 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:

[redacted]

Sonia McWhan

Operations Manager

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27757712	B101		0.60 - 0.60	27/03/2023
27757716	B102		0.30 - 0.30	27/03/2023
27757721	B103		0.30 - 0.30	27/03/2023

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

Validated

CERTIFICATE OF ANALYSIS

SDG: 230329-36 **Report Number:** 684166 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

Results Legend

X Test

N 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)	27757712	27757716	27757721
		Customer Sample Reference	B101	B102	B103
		AGS Reference			
		Depth (m)	0.60 - 0.60	0.30 - 0.30	0.30 - 0.30
		Container	1kg Cardboard Container	1kg Cardboard Container	1kg Cardboard Container
		Sample Type	S	S	S
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 3	X	X	X

Validated

CERTIFICATE OF ANALYSIS

SDG: 230329-36 **Report Number:** 684166 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

Asbestos Identification - Solid Samples

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
*	Subcontracted test.
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Asbestos Actinolite	Asbestos Anthophyllite	Asbestos Tremolite	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	B101 0.60 - 0.60 SOLID 27/03/2023 00:00:00 29/03/2023 05:00:00 230329-36 27757712 TM048	30/03/2023	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	B102 0.30 - 0.30 SOLID 27/03/2023 00:00:00 29/03/2023 05:00:00 230329-36 27757716 TM048	30/03/2023	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	B103 0.30 - 0.30 SOLID 27/03/2023 00:00:00 29/03/2023 05:00:00 230329-36 27757721 TM048	30/03/2023	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

Table of Results - Appendix

Method No	Description
TM048	Identification of Asbestos in Bulk Material

NA = not applicable.

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

Test Completion Dates

Lab Sample No(s)	27757712	27757716	27757721
Customer Sample Ref.	B101	B102	B103
AGS Ref.			
Depth	0.60 - 0.60	0.30 - 0.30	0.30 - 0.30
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	30-Mar-2023	30-Mar-2023	30-Mar-2023

Appendix

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

2. If sufficient sample is received a sub sample will be retained free of charge f days after analysis is completed (e-mailed) for all sample types unless the sample is on testing. The prepared soil sub sample that is analysed for asbestos will be retai period of 6 months after the analysis date. All bulk samples will be retained for a p months after the analysis date. All samples received and not scheduled will be dis one month after the date of receipt unless we are instructed to the contrary. Once t period has expired, a storage charge will be applied for each month or part thereof client cancels the request for sample storage. ALS reserve the right to charge fo 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 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 determinan are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with track record will be utilised.

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

Identification of Asbestos in Bulk Materials & Soils

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

The results for identification of asbestos in soils are obtained from a homog sample which has been examined to determine the presence of asbestos 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 accredit 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.

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.

APPENDIX E
Chemical Laboratory results New Topsoil Stockpile

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

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

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	29 March 2023
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	230329-20
Your Reference:	Colt International
Location:	Havant
Report No:	683964
Order Number:	GWPR4409

We received 1 sample on Sunday March 26, 2023 and 1 of these samples were scheduled for analysis which was completed on Wednesday March 29, 2023. 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:

[redacted]

Sonia McWhan

Operations Manager

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27756065	STP1 Topsoil		0.30 - 0.30	24/03/2023

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

Validated

CERTIFICATE OF ANALYSIS

SDG: 230329-20 **Report Number:** 683964 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

Results Legend

X Test

N 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)			27756065
Customer Sample Reference			STP1 Topsoil
AGS Reference			
Depth (m)			0.30 - 0.30
Container			1kg Cardboard Container
Sample Type			S
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 1	X

Validated

CERTIFICATE OF ANALYSIS

SDG: 230329-20 **Report Number:** 683964 **Superseded Report:**
Client Ref.: Colt International **Location:** Havant

Asbestos Identification - Solid Samples

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
*	Subcontracted test.
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Asbestos Actinolite	Asbestos Anthophyllite	Asbestos Tremolite	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Non-Asbestos Fibre
Cust. Sample Ref.	STP1 Topsoil	29/03/2023	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Depth (m)	0.30 - 0.30										
Sample Type	SOLID										
Date Sampled	24/03/2023 00:00:00										
Date Received	26/03/2023 05:00:00										
SDG	230329-20										
Original Sample	27756065										
Method Number	TM048										

Table of Results - Appendix

Method No	Description
TM048	Identification of Asbestos in Bulk Material

NA = not applicable.

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

Test Completion Dates

Lab Sample No(s)	27756065
Customer Sample Ref.	STP1 Topsoil
AGS Ref.	
Depth	0.30 - 0.30
Type	Soil/Solid (S)
Asbestos ID in Solid Samples	29-Mar-2023

Appendix

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

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

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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.

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General

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Identification of Asbestos in Bulk Materials & Soils

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

Asbestos Type	Common Name
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Amosite	Brown Asbestos
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Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredit 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.

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.

APPENDIX F
Soil Assessment Criteria

The Contaminated Land Regime reflects the UK Government's stated objectives of achieving sustainable development through the 'suitable for use approach'. At preliminary risk assessment stage, risks are evaluated qualitatively. As the site investigation progresses to a generic or detailed quantitative risk assessment, data is collected and assessment criteria are utilised to evaluate whether the contaminants represent an unacceptable risk to the identified receptors.

1. Contaminated Land Exposure Assessment Model (CLEA)

Current United Kingdom risk assessment practice is based on the Contaminated Land Exposure Assessment Model (CLEA).

The CLEA Guidance comprises the following documents:

1) EA Science Report SC050021/SR2: Human health toxicological assessment of contaminants in soil.
2) EA Science Report SC050021/SR3: Updated technical background to the CLEA model.
3) EA CLEA Bulletin (2009).
4) CLEA software version 1.06 (2009)
5) Toxicological reports and SGV technical notes.

The CLEA guidance and tools:

Do not cover other types of risk to humans, such as fire, suffocation or explosion, or short-term and acute exposures;
Do not cover risks to the environment, such as groundwater, ecosystems or buildings;
Do not provide a definitive test for telling when human health risks are significant; and
Are not a legal requirement in assessing land contamination risks. They are not part of the legal regime for Part 2A of the Environmental Protection Act 1990.

The CLEA guidance derives soil concentrations of contaminants above which (in the opinion of the EA) there may be a concern that warrants further investigation. It does not provide a definitive test for establishing that the risk is significant.

1.1. Land-use Scenarios

The CLEA model uses a range of standard land-use scenarios to develop conceptual exposure models outlined in the following sections.

1.1.1. Residential (with home grown produce) (RwHP)

Generic scenario assumes a typical two-storey house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

Critical receptor is a young female child (zero to six years old) Exposure duration is six years. Exposure pathways include direct soil and indoor dust ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours. Building type is a two-storey small-terraced house.

A sub-set of this land-use is residential apartments with communal landscaped gardens where the consumption of home grown vegetables will not occur. (Residential without homegrown produce (RwoHP)).

1.1.2. Allotments

Provision of open space (about 250sq.m) commonly made available to tenants by the local authority to grow fruit and vegetable for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make occasional accompanied visits.

Although some allotment holders may choose to keep animals including rabbits, hens, and ducks, potential exposure to contaminated meat and eggs is not considered.

Critical receptor is a young female child (zero to six years old) Exposure duration is six years. Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours. There is no building.

1.1.3. Commercial/Industrial

The generic scenario assumes a typical commercial or light industrial property comprising a three-storey building at which employees spend most time indoors and are involved in office-based or relatively light physical work.

Critical receptor is a working female adult (aged 16 to 65 years old). Exposure duration is a working lifetime of 49 years. Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours. Building type is a three-storey office (pre 1970).

2. LQM/CIEH Suitable 4 Use Levels (S4UL)

For derivation of these S4UL reference must be made to:

Nathanial, P., McCaffrey, C., Gillet, A., Ogden, R., Nathanial, J., The LQM/CIEH S4UL's for Human Health Risk Assessment. Land Quality Press. 2015

2.1. S4UL Background

The Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) S4UL for a given land use is the concentration of the contaminant in soil at which the predicted daily exposure,

as calculated by the CLEA software, equals the Health Criteria Value. The S4ULs have been derived for substances based on various generic land use and soil organic matter contents.

The final output for each contaminant represents a synthesis of new toxicological (and fate and transport) reviews published since the preparation of the 2nd edition LQM/CIEH GAC's (Nathanial et al., 2009).

In the derivation of LQM/CIEH S4UL's the principles of 'minimal' or 'tolerable' risk enshrined in SR2, which has not been withdrawn, has been maintained.

2.2. S4UL Land-use

S4UL's have been derived for the basic CLEA land-uses, as described in section 1.2, and for two new land uses:

Public Open Spaces near Residential Housing (POSresi).
Public Park (POSpark).

2.2.1. Public Open Spaces near Residential Housing (POSresi)

Includes the predominantly grassed areas adjacent to high density housing, the central green area on many 1930's – 1970's housing estates, and smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soils with planting. It is assumed that the close proximity to the place of residence will allow tracking back of soil to occur.

2.2.2. Public Park (POSpark)

An area of open space, usually owned and maintained by the local authority, provided for recreational uses including family visists and picnics, children's play area, informal sporting activities (not a dedicated sports pitch), and dog walking. It is assumed that tracking back of soils into places of residence will be negligible.

The following LQM/CIEH S4Uls (Copyright Land Quality Management Limited) have been reproduced with permission, to the publication number S4UL3072.

3. Category 4 Screening Levels (C4SLs)

In the case of Lead, no SGV or GAC has been published to date. This is likely to be due to the toxicity review that is currently being undertaken by the Environment Agency. In the absence of updated toxicity information the SGV derived using CLEA 1.06 methodology and related toxicity will be used.

The overall objective of the C4SLs research project was to assist the provision of technical guidance in support of Defra's revised Statutory Guidance (SG) for Part 2A of the Environmental Protection Act 1990 (Part 2A) (Defra, 2012a). Specifically, the project aimed to deliver:

A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and
A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised SG presented a new four category

system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a significant possibility of significant harm (SPOSH) is unacceptably high. More specific guidance on what type of land should be considered as Category 4 (Human Health) is provided in Paragraphs 4.21 and 4.22 of the revised SG, as follows:

> "4.21 The local authority should consider that the following types of land should be placed into Category 4: Human Health:
> (a) Land where no relevant contaminant linkage has been established.
> (b) Land where there are only normal levels of contaminants in soil, as explained in Section 3 of this Guidance.
> (c) Land that has been excluded from the need for further inspection and assessment because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of this Guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of this Guidance.
> (d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed in the normal course of their lives).
>
> 4.22 The local authority may consider that land other than the types described in paragraph 4.21 should be placed into Category 4: Human Health if following a detailed quantitative risk assessment it is satisfied that the level of risk posed is sufficiently low."

The C4SLs are intended as "relevant technical tools" (in relation to Paragraph 4.21(c)) to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

> "The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land."

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> "SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health."

The implication of Paragraph 47(h) of the IA is that minimal risk is well within Category 4 and that the C4SLs should describe a higher level of risk which, whilst not minimal, can still be considered low enough to allow a judgement to be made that land containing substances at, or below, the C4SLs would typically fall within Category 4. This reflects Paragraph 4.20 of the revised SG, which states:

> "4.20 The local authority should not assume that land poses a significant possibility of significant harm if it considers that there is no risk or that the level of risk posed is low. For the purposes of this Guidance, such land is referred to as a "Category 4: Human Health" case. The authority may decide that the land is a Category 4: Human Health case as soon as it considers it has evidence to this effect, and this may happen at any stage during risk assessment including the early stages."

C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

The generic screening values referred to before usually take the form of risk-based Soil Guideline Values (SGVs) or other Generic Assessment Criteria (GACs) that are most typically derived using the Environment Agency's Contaminated Land Exposure Assessment (CLEA) model, as described in the Environment Agency's SR2, SR3 and SR7 reports (EA, 2009b & c; EA, 2008). It is anticipated that C4SLs will be used in a similar manner; as generic screening criteria that can be used within a GQRA, albeit describing a higher level of risk than the SGVs.

The suggested approach to the development of C4SLs consists of the retention and use of the CLEA framework, modified according to considerations of the underlying science within the context of Defra's policy objectives relating to the revised SG. Within this context, it is suggested that the development of C4SLs may be achieved in one of three ways, namely:

- By modifying the toxicological parameters used within CLEA (while maintaining current exposure parameters);
- By modifying the exposure parameters embedded within CLEA (while maintaining current toxicological "minimal risk" interpretations); and
- By modifying both toxicological and exposure parameters.

There is also a suggested check on "other considerations" (e.g., background levels, epidemiological data, sources of uncertainty) within the approach, applicable to all three options.

It is suggested that a new term is defined for the toxicological guidance values associated with the derivation of C4SLs – a Low Level of Toxicological Concern (LLTC). A LLTC should represent an intake of low concern that remains suitably protective of health, and definitely does not approach an intake level that could be defined as SPOSH.

4. CL:AIRE Generic Assessment Criteria (GAC)

For derivation of the CL:AIRE Generic Assessment Criteria (GAC) reference should be made to the following report:

> CL:AIRE, The Soil Generic Assessment Criteria for Human Health Risk Assessment. Contaminated Land: Applications in the Real Environment. 2009.

Within this report, Contaminated Land: Applications in Real Environments (CL:AIRE) provided Generic Assessment Criteria (GAC) in accordance with the CLEA software and the principles outlined previously for a further 35 contaminants sometimes encountered on land affected by contamination.

5. SoBRA Acute GAC

The Society of Brownfield Risk Assessment (SoBRA) identified that most human health risk assessments focus on the chronic risks arising from long-term exposure to specific substances. As chronic risks often occur at lower doses than acute risks, they are often the key drivers, however, in some instances the acute dose may also be an important consideration within risk assessments.

The methodology for deriving the acute GAC were related to two distinct receptor groups:

> Members of the public, where the 'critical' receptor for this group will typically be a female child, which is consistent with CLEA residential and Public Open Space/allotments land-uses;
> Workers involved with excavations. The critical receptor for this group is assumed to be a female working adult, without the use of PPE.

The acute GACs relate to short term exposure of high concentrations of a substance that lead to acute effects. They are not considered to be average exposures across a specific / defined area. As a result, the GACs should be normally be compared with the maximum likely concentration that the individual may be exposed to, and not the average concentration within a specific area.

The SoBRA acute GAC will primarily be used for contaminants that do not currently have any GAC, most notably Cyanide.

6. Detailed Quantitative Risk Assessments (DQRA)

Where the adoption of a GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses, then a DQRA may be undertaken to develop site specific values for relevant soil contaminants.

Establishing the plausibility that generic exposure pathways exist in practice by measurement and observation. Developing more accurate parameters using site data.

7. Phytotoxicity

CLEA guidance only addresses human health toxicity; assessment of plant toxicity (phytotoxicity) is based on threshold trigger values obtained from the following source:

> BS3882:2015 – Specification for Topsoil

The trigger values are relevant only to those contaminants, where present in excess, have the potential to inhibit plant growth, or kill plants (Cu, Ni and Zn). The criteria have been based on a wide range of planting that are common within a multi-purpose topsoil.

8. Statistical Tests

DEFRA R&D Publication CLR 7 (DOE 1994) addressed the statistical treatment of test results and their comparison to Soil Guideline Values.

Consideration must be given to the appropriate area of land to be considered termed the critical averaging area.

For a communal open space or commercial land-use, the critical averaging area will depend on the proposed layout. For a residential use with private gardens the averaging area is the individual plot.

It may be appropriate to compare the upper 95th percentile concentration with the Soil Guideline Value, subject to applying a statistical test to establish that the range of concentrations are reasonably consistent and belonging to the same underlying distribution of data.

CL:AIRE published guidance in 2020, Guidance in comparing soil contamination data with a critical concentration, superseding the CL:AIRE/CIEH 2008 report of the same name. The guidance provides ways to assist land contamination stakeholders to apply statistical methods to their data to enable decisions under the legislative framework; either planning system or Part 2A of the Environmental Protection Act 1990.

The use of the statistical tests should only be applied if the following statements are valid for the datasets:

Averaging areas, as well as the smallest area of concern have been identified on the basis of the CSM, including the desk study and/or the site walkover;
The sample locations were chosen using a simple random, stratified random or stratified systematic (square, herringbone or triangular grid) sampling pattern, rather than being targeted to locations suspected of being contaminated;
The sample locations are relatively evenly spread across the area and are not clustered, to avoid giving undue weight to some parts of the site over others in the calculated statistics;
The analyses do not suggest a hotspot or outlier of contamination that should be treated as a separate zone. This has been established by a histogram and/or a names statistical test;
The sample locations are all taken from one population (i.e. the same material);
Where an averaging zone encompasses several averaging areas, analyses do not show a spatial trend or other spatial pattern across that zone; and
The number of samples has been shown to be sufficient for a statistical analysis.

Any included statistical spreadsheet is based on an in-house method of statistical analysis, in line with those outlined within the CL:AIRE guidance (2020).

Treatment of Hot-Spots

A statistical test is applied to establish whether the data is a part of a single set, or whether data outliers are present.
Provided that the data is based on random sampling and no distinct contamination source was present at the sampling location, the hot-spot(s) may be excluded and the mean of the remaining data assessed.

9. Ground and Water Limited Soil Assessment Criteria

The Soil Assessment Criteria used in the preparation of the Generic Quantitative Risk Assessment are tabulated in the following pages, where the source of each has been outlined in the previous sections.

9.1. Inorganics

SoBRA – Acute Generic Assessment Criteria						
Determinand	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Cyanide	24	24	24	1400	24	24

9.2. Metals

C4SL Low Level of Toxicological Concern						
Determinand	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Lead	< 200	< 310	< 80	< 2300	< 630	< 1300

LQM/CIEH Suitable 4 Use Levels – Metals and Semi-metals						
Determinand	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Arsenic	37	40	43	640	79	170
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11000	45	240000	21000	46000
Cadmium	11	85	1.9	190	120	532
Chromium (III)	910	910	18000	8600	1500	33000
Chromium (VI)	6	6	1.8	33	7.7	220
Copper	2400	7100	520	68000	12000	44000
Elemental Mercury	1.2	1.2	21	58	16	30
Inorganic Mercury	40	56	19	1100	120	240
Methylmercury	11	15	6	320	40	68
Nickel	130	180	53	980	230	800
Selenium	250	430	88	12000	1100	1800
Vanadium	410	1200	91	9000	2000	5000
Zinc	3700	40000	620	730000	81000	170000

Phytotoxicity (Harmful to Plants) Threshold Trigger Values			
Determinand	Soil pH < 6.0 (mg/kg)	Soil pH 6.0 – 7.0 (mg/kg)	Soil pH > 7.0 (mg/kg)
Copper	100	135	200
Nickel	60	75	110
Zinc	200	200	300
Notes: BS3882:2015 – Specification for Topsoil. Based on a wide range of common plants that will be exposed to multi-purpose topsoil. Toxicity of contaminant may also be impacted by pH of soils. Site observation of plant vitality may give additional guidance.			

CL:AIRE Soil Generic Assessment Criteria				
Determinand	Residential (mg/kg)	Residential without plant uptake (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)
Antimony	ND	550	ND	7500
Barium	ND	1300	ND	22000
Molybdenum	ND	670	ND	17000
ND – Not derived				

9.3. Total Petroleum Hydrocarbons (TPHs)

9.3.1. BTEX Compounds

LQM/CIEH Suitable 4 Use Levels – BTEX Compounds							
Determinand	Soil Organic Matter	RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Benzene	1.0% SOM	0.087	0.38	0.017	27	72	90
	2.5% SOM	0.170	0.70	0.034	47	72	100
	6.0% SOM	0.370	1.40	0.075	90	73	110
Toluene	1.0% SOM	130	880	22	56000	56000	87000
	2.5% SOM	290	1900	51	110000	56000	95000
	6.0% SOM	660	3900	120	180000	56000	100000
Ethylbenzene	1.0% SOM	47	83	16	5700	24000	17000
	2.5% SOM	110	190	39	13000	24000	22000
	6.0% SOM	260	440	91	27000	25000	27000
o-Xylene	1.0% SOM	60	88	28	6600	41000	17000
	2.5% SOM	140	210	67	15000	42000	24000
	6.0% SOM	330	480	160	33000	43000	33000
m-Xylene	1.0% SOM	59	82	31	6200	41000	17000
	2.5% SOM	140	190	74	14000	42000	24000
	6.0% SOM	320	450	170	31000	43000	33000
p-Xylene	1.0% SOM	56	79	29	5900	41000	17000
	2.5% SOM	130	180	69	14000	42000	23000
	6.0% SOM	310	430	160	30000	43000	31000
SOM = Soil Organic Matter Content (%)							

9.3.2. Total Petroleum Hydrocarbons – Aliphatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aliphatic		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
EC 5-6	1.0% SOM	42	42	730	3,200 (304) [sol]	570,000 (304) [sol]	95,000 (304) [sol]
	2.5% SOM	78	78	1,700	5,900 (558) [sol]	590,000	130,000 (558) [sol]
	6.0% SOM	160	160	3,900	12,000 (1150) [sol]	600,000 (1150)[sol]	180,000 (1150) [sol]
EC >6-8	1.0% SOM	100	100	2,300	7,800 (144) [sol]	600,000	150,000 (144) [sol]
	2.5% SOM	230	230	5,600	17,000 (322) [sol]	610,000	220,000 (322) [sol]
	6.0% SOM	530	530	13,000	40,000 (736) [sol]	620,000	320,000 (736) [sol]
EC >8-10	1.0% SOM	27	27	320	2,000 (78) [sol]	13,000	14,000 (78) [sol]
	2.5% SOM	65	65	770	4,800 (118) [vap]	13,000	18,000 (118) [vap]
	6.0% SOM	150	150	1,700	11,000 (451) [vap]	13,000	21,000 (451) [vap]
EC >10-12	1.0% SOM	130 (48) [vap]	130 (48) [vap]	2,200	9,700 (48) [sol]	13,000	21,000 (48) [sol]
	2.5% SOM	330 (118) [vap]	330 (118) [vap]	4,400	23,000 (118) [vap]	13,000	23,000 (118) [vap]
	6.0% SOM	760 (283) [vap]	760 (283) [vap]	7,300	47,000 (283) [vap]	13,000	24,000 (283) [vap]
EC >12-16	1.0% SOM	1,100 (24) [sol]	1,100 (24) [sol]	11,000	59,000 (24) [sol]	13,000	25,000 (24) [sol]
	2.5% SOM	2,400 (59) [sol]	2,400 (59) [sol]	13,000	82,000 (59) [sol]	13,000	25,000 (59) [sol]
	6.0% SOM	4,300 (142) [sol]	4,400 (142) [sol]	13,000	90,000 (142) [sol]	13,000	26,000 (142) [sol]
EC >16-35	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000
EC >35-44	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000
SOM = Soil Organic Matter Content (%) [vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets. [sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.							

9.3.3. Total Petroleum Hydrocarbons – Aromatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aromatic		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
EC 5-7 (Benzene)	1.0% SOM	70	370	13	26,000 (1220) [sol]	56,000	76,000 (1220 [sol]
	2.5% SOM	140	690	27	46,000 (2260) [sol]	56,000	84,000 (2260) [sol]
	6.0% SOM	300	1,400	57	86,000 (4710) [sol]	56,000	92,000 (4710) [sol]
EC >7-8 (Toluene)	1.0% SOM	130	860	22	56,000 (869) [vap]	56,000	87,000 (869) [sol]
	2.5% SOM	290	1,800	51	110,000 (1920) [sol]	56,000	95,000 (1920) [sol]
	6.0% SOM	660	3,900	120	180,000 (4360) [vap]	56,000	100,000 (4360) [vap]
EC >8-10	1.0% SOM	34	47	8.6	3,500 (613) [vap]	5,000	7,200 (613) [vap]
	2.5% SOM	83	110	21	8,100 (1500) [vap]	5,000	8,500 (1500) [vap]
	6.0% SOM	190	270	51	17,000 (3850) [vap]	5,000	9,300 (3580) [vap]
EC >10-12	1.0% SOM	74	250	13	16,000 (364) [sol]	5,000	9,200 (364) [sol]
	2.5% SOM	180	590	31	28,000 (899) [sol]	5,000	9,700 (889) [sol]
	6.0% SOM	380	1,200	74	34,000 (2150) [sol]	5,000	10,000
EC >12-16	1.0% SOM	140	1,800	23	36,000 (169) [sol]	5,100	10,000
	2.5% SOM	330	2,300 (419) [sol]	57	37,000	5,100	10,000
	6.0% SOM	660	2,500	130	38,000	5,000	10,000
EC >16-21	1.0% SOM	260	1,900	46	28,000	3,800	7,600
	2.5% SOM	540	1,900	110	28,000	3,800	7,700
	6.0% SOM	930	1,900	260	28,000	3,800	7,800
EC >21-35	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >35-44	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >44-70	1.0% SOM	1,600	1,900	1,200	28,000	3,800	7,800
	2.5% SOM	1,800	1,900	2,100	28,000	3,800	7,800
	6.0% SOM	1,900	1,900	3,000	28,000	3,800	7,900

SOM = Soil Organic Matter Content (%)
[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.4. Polycyclic Aromatic Hydrocarbons (PAHs)

LQM/CIEH Suitable 4 Use Levels For Polycyclic Aromatic Hydrocarbons (PAHs)							
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Acenapthene	1.0% SOM	210	3,000 (57.0) sol	34	84,000(57.0) sol	15,000	29,000
	2.5% SOM	510	4,700(141) sol	85	97,000(141) sol	15,000	30,000
	6.0% SOM	1100	6,000(336) sol	200	100,000	15,000	30,000
Acenapthylene	1.0% SOM	170	2,900(86.1) sol	28	83,000(86.1) sol	15,000	29,000
	2.5% SOM	420	4,600(212) sol	69	97,000(212) sol	15,000	30,000
	6.0% SOM	920	6,000(506) sol	160	100,000	15,000	30,000
Anthracene	1.0% SOM	2,400	31,000(1.17) vap	380	520,000	74,000	150,000
	2.5% SOM	5,400	35,000	950	540,000	74,000	150,000
	6.0% SOM	11,000	37,000	2,200	540,000	74,000	150,000
Benzo(a)anthracene	1.0% SOM	7.20	11	2.90	170	29	49
	2.5% SOM	11	14	6.50	170	29	56
	6.0% SOM	13	15	13	180	29	62
Benzo(a)pyrene	1.0% SOM	2.20	3.20	0.97	35	5.70	11
	2.5% SOM	2.70	3.20	2.00	35	5.70	12
	6.0% SOM	3.00	3.20	3.50	36	5.70	13
Benzo(b)flouranthene	1.0% SOM	2.60	3.90	0.99	44	7.10	13
	2.5% SOM	3.30	4.00	2.10	44	7.20	15
	6.0% SOM	3.70	4.00	3.90	45	7.20	16
Benzo(ghi)perylene	1.0% SOM	320	360	290	3,900	640	1,400
	2.5% SOM	340	360	470	4,000	640	1,500
	6.0% SOM	350	360	640	4,000	640	1,600
Benzo(k)flouranthene	1.0% SOM	77	110	37	1,200	190	370
	2.5% SOM	93	110	75	1,200	190	410
	6.0% SOM	100	110	130	1,200	190	440
Chrysene	1.0% SOM	15	30	4.10	350	57	93
	2.5% SOM	22	31	9.40	350	57	110
	6.0% SOM	27	32	19	350	57	120
Dibenzo(ah)anthracene	1.0% SOM	0.24	0.31	0.14	3.50	0.57	1.10
	2.5% SOM	0.28	0.32	0.27	3.50	0.57	1.30
	6.0% SOM	0.30	0.32	0.43	3.60	0.58	1.40
Flouranthene	1.0% SOM	280	1,500	52	23,000	3,100	6,300
	2.5% SOM	560	1,600	130	23,000	3,100	6,300
	6.0% SOM	890	1,600	290	23,000	3,100	6,300
Flourene	1.0% SOM	170	2,800 (30.9) sol	27	63,000(30.9) sol	9,900	20,000
	2.5% SOM	400	3,800(76.5) sol	67	68,000	9,900	20,000
	6.0% SOM	860	4,500(183) sol	160	71,000	9,900	20,000
Indeno(123-cd)pyrene	1.0% SOM	27	45	9.50	500	82	150
	2.5% SOM	36	46	21	510	82	170
	6.0% SOM	41	46	39	510	82	180
Napthalene	1.0% SOM	2.30	2.6	4.10	190 (76.4) sol	4,900	1,200(76.4) sol
	2.5% SOM	5.60	5.6	10	460 (183) sol	4,900	1,900(183) sol
	6.0% SOM	13	13	24	1,100 (432) sol	4,900	3,000
Phenanthrene	1.0% SOM	95	1,300(183) sol	15	22,000	3,100	6,200
	2.5% SOM	220	1,500	38	22,000	3,100	6,200
	6.0% SOM	440	1,500	90	23,000	3,100	6,300
Pyrene	1.0% SOM	620	3,700	110	54,000	7,400	15,000
	2.5% SOM	1200	3,800	270	54,000	7,400	15,000
	6.0% SOM	2000	3,800	620	54,000	7,400	15,000
Coal Tar (Benzo(a)pyrene used as marker compound)	1.0% SOM	0.79	1.2	0.32	15	2.20	4.40
	2.5% SOM	0.98	1.2	0.67	15	2.20	4.70
	6.0% SOM	1.10	1.2	1.20	15	2.20	4.80

SOM = Soil Organic Matter Content (%)
vap – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
sol – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.5. Volatile and Semi-volatile Organic Compounds

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Chloroalkanes & alkenes							
1,2 Dichloroethane	1.0% SOM	0.11	0.16	0.054	12	300	300
	2.5% SOM	0.18	0.24	0.100	17	310	330
	6.0% SOM	0.31	0.41	0.190	29	310	380
1,1,2,2 Tetrachloroethane	1.0% SOM	1.60	3.90	0.41	270	1,400	1,800
	2.5% SOM	3.40	8.00	0.89	550	1,400	2,100
	6.0% SOM	7.50	17	2.00	1,100	1,400	2,300
1,1,1,2 Tetrachloroethane	1.0% SOM	1.20	1.50	0.79	110	1,400	1,500
	2.5% SOM	2.80	3.50	1.90	250	1,400	1,800
	6.0% SOM	6.40	8.20	4.40	560	1,400	2,100
Tetrachloroethene	1.0% SOM	0.31	0.32	2.0	24	3,200	1,400
	2.5% SOM	0.70	0.71	4.8	55	3,300	1,900
	6.0% SOM	1.60	1.60	11.0	130	3,400	2,500
1,1,1 Trichloroethane	1.0% SOM	8.80	9.00	48	660	140,000	57,000 [vap](1425)
	2.5% SOM	18	18	110	1,300	140,000	76,000 [vap](2915)
	6.0% SOM	39	40	240	3,000	140,000	100,000 [vap] (6392)
Tetrachloromethene	1.0% SOM	0.026	0.026	0.45	2.90	890	190
	2.5% SOM	0.056	0.056	1.00	6.30	920	270
	6.0% SOM	0.130	0.130	2.40	14	950	400
Trichloroethene	1.0% SOM	0.0093	0.0097	0.0320	0.73	76	41
	2.5% SOM	0.0200	0.0200	0.0720	1.50	78	54
	6.0% SOM	0.0430	0.0450	0.1600	3.40	79	69
Trichloromethane	1.0% SOM	0.91	1.20	0.42	99	2,500	2,600
	2.5% SOM	1.70	2.10	0.83	170	2,500	2,800
	6.0% SOM	3.40	4.20	1.70	350	2,500	3,100
Vinyl Chloride	1.0% SOM	0.0064	0.0150	0.0017	1.1	7.8	18
	2.5% SOM	0.0100	0.0190	0.0031	1.4	7.8	19
	6.0% SOM	0.0170	0.0290	0.0058	2.2	7.8	19
Explosives							
2,4,6 Trinitrotoluene	1.0% SOM	1.60	65	0.24	1,000	130	260
	2.5% SOM	3.70	66	0.58	1,000	130	270
	6.0% SOM	8.10	66	1.40	1,000	130	270
RDX (Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)	1.0% SOM	120	13,000	17	210,000	26,000	49,000(18.7)[sol]
	2.5% SOM	250	13,000	38	210,000	26,000	51,000
	6.0% SOM	540	13,000	85	210,000	27,000	53,000
HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)	1.0% SOM	5.70	67,00	0.86	110,000	13,000	23,000(0.35)[vap]
	2.5% SOM	13	67,00	1.90	110,000	13,000	23,000(0.39)[vap]
	6.0% SOM	26	67,00	3.90	110,000	13,000	24,000(0.48)[vap]
Atrazine	1.0% SOM	3.30	610	0.50	9,300	1,200	2,300
	2.5% SOM	7.60	620	1.20	9,400	1,200	2,400
	6.0% SOM	17.40	620	2.70	9,400	1,200	2,400

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Pesticides							
Aldrin	1.0% SOM	5.70	7.30	3.20	170	18	30
	2.5% SOM	6.60	7.40	6.10	170	18	31
	6.0% SOM	7.10	7.50	9.60	170	18	31
Dieldrin	1.0% SOM	0.97	7.00	0.17	170	18	30
	2.5% SOM	2.00	7.30	0.41	170	18	30
	6.0% SOM	3.50	7.40	0.96	170	18	31
Dichlorvos	1.0% SOM	0.032	6.40	0.0049	140	16	26
	2.5% SOM	0.066	6.50	0.0100	140	16	26
	6.0% SOM	0.140	6.60	0.0220	140	16	27
Alpha - Endosulfan	1.0% SOM	7.40	160(0.003)[vap]	1.20	5,600(0.003)[vap]	1,200	2,400
	2.5% SOM	18	280(0.007)[vap]	2.90	7,400(0.007)[vap]	1,200	2,400
	6.0% SOM	41	410(0.016)[vap]	6.80	8,400(0.016)[vap]	1,200	2,400
Beta - Endosulfan	1.0% SOM	7.00	190(0.00007)[vap]	1.10	6,300(0.00007)[vap]	1,200	2,400
	2.5% SOM	17	320(0.0002)[vap]	2.70	7,800(0.0002)[vap]	1,200	2,400
	6.0% SOM	39	440(0.0004)[vap]	6.40	8700	1,200	2,500
Alpha - Hexachlorocyclohexanes	1.0% SOM	0.23	6.90	0.035	170	24	47
	2.5% SOM	0.55	9.20	0.087	180	24	48
	6.0% SOM	1.20	11	0.210	180	24	48
Beta - Hexachlorocyclohexanes	1.0% SOM	0.085	3.70	0.013	65	8.10	15
	2.5% SOM	0.200	3.80	0.032	65	8.10	15
	6.0% SOM	0.460	3.80	0.077	65	8.10	16
Gamma - Hexachlorocyclohexanes	1.0% SOM	0.06	2.90	0.0092	67	8.2	14
	2.5% SOM	0.14	3.30	0.0230	69	8.2	15
	6.0% SOM	0.33	3.50	0.0540	70	8.2	15
Chlorobenzenes							
Chlorobenzene	1.0% SOM	0.46	0.46	5.90	56	11,000	1,300(675)[sol]
	2.5% SOM	1.00	1.00	14	130	13,000	2,000(1520)[sol]
	6.0% SOM	2.40	2.40	32	290	14,000	2,900
1,2-Dichlorobenzene	1.0% SOM	23	24	94	2,000 (571) [sol]	90,000	24,000(571)[sol]
	2.5% SOM	55	57	230	4,800 (1370) [sol]	95,000	36,000(1370)[sol]
	6.0% SOM	130	130	540	11,000 (3240) [sol]	98,000	51,000(3240)[sol]
1,3-Dichlorobenzene	1.0% SOM	0.40	0.44	0.25	30	300	390
	2.5% SOM	1.00	1.10	0.60	73	300	440
	6.0% SOM	2.30	2.50	1.50	170	300	470
1,4-Dichlorobenzene	1.0% SOM	61	61	15	4,400 (224)[vap]	17,000[g]	36,000 (224)[vap]
	2.5% SOM	150	150	37	10,000 (540)[vap]	17,000[g]	36,000 (540)[vap]
	6.0% SOM	350	350	88[g]	25,000 (1280)[vap]	17,000[g]	36,000 (1280)[vap]
1,2,3,-Trichlorobenzene	1.0% SOM	1.50	1.50	4.70	102	1,800	770(134)[vap]
	2.5% SOM	3.60	3.70	12	250	1,800	1,100(330)[vap]
	6.0% SOM	8.60	8.80	28	590	1,800	1,600(789)[vap]
1,2,4,-Trichlorobenzene	1.0% SOM	2.60	2.60	55	220	15,000	1,700(318)[vap]
	2.5% SOM	6.40	6.40	140	530	17,000	2,600(786)[vap]
	6.0% SOM	15	15	320	1,300	19,000	4,000(1880)[vap]
1,3,5,-Trichlorobenzene	1.0% SOM	0.33	0.33	4.70	23	1,700	380(36.7)[vap]
	2.5% SOM	0.81	0.81	12	55	1,700	590(90.8)[vap]
	6.0% SOM	1.90	1.90	140	130	1,800	860(217)[vap]

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)	POSresi (mg/kg)	POSpark (mg/kg)
Chlorobenzenes (cont.)							
1,2,3,4,-Tetrachlorobenzene	1.0% SOM	15	24	4.40	1,700(122)[vap]	830	1,500(122)[vap]
	2.5% SOM	36	56	11	3,080(304)[vap]	830	1,600
	6.0% SOM	78	120	26	4,400(728)[vap]	830	1,600
1,2,3,5,-Tetrachlobenzene	1.0% SOM	0.66	0.75	0.38	49(39.4)[vap]	78	110(39)[vap]
	2.5% SOM	1.60	1.90	0.90	120(98.1)[vap]	79	120
	6.0% SOM	3.70	4.30	2.20	240(235)[vap]	79	130
1,2,4, 5,-Tetrachlobenzene	1.0% SOM	0.33	0.73	0.06	42(19.7)[sol]	13	25
	2.5% SOM	0.77	1.70	0.16	72(49.1)[sol]	13	26
	6.0% SOM	1.60	3.50	0.37	96	13	26
Pentachlrobenzene	1.0% SOM	5.80	19	1.20	640(43.0)[sol]	100	190
	2.5% SOM	12	30	3.10	770(107)[sol]	100	190
	6.0% SOM	22	38	7.00	830	100	190
Hexachlorobenzene	1.0% SOM	1.80(0.20)[vap]	4.10 (0.20)[vap]	0.47	110(0.20)[vap]	16	30
	2.5% SOM	3.30(0.50)[vap]	5.70 (0.50)[vap]	1.10	120	16	30
	6.0% SOM	4.90	6.70 (1.2)[vap]	2.50	120	16	30
Phenols & Chlorophenols							
BTEX	1.0% SOM	280	750	66	760[dir](31,000)	760[dir](11,000)	760[dir](8,600)
	2.5% SOM	550	1,300	140	1,500[dir](35,000)	1,500[dir](11,000)	1,500[dir](9,700)
	6.0% SOM	1100	2,300	280	3,200[dir](37,000)	3,200[dir](11,000)	3,200[dir](11,000)
Chlorophenols (4 Congeners)	1.0% SOM	0.87	94	0.13	3,500	620	1,100
	2.5% SOM	2.00	150	0.30	4,000	620	1,100
	6.0% SOM	4.50	210	0.70	4,300	620	1,100
Pentachlorophenols	1.0% SOM	0.22	27(16.4)[vap]	0.03	400	60	110
	2.5% SOM	0.52	29	0.08	400	60	120
	6.0% SOM	1.20	31	0.19	400	60	120
Others							
Carbon Disulphide	1.0% SOM	0.14	0.14	4.80	11	11,000	1,300
	2.5% SOM	0.29	0.29	10	22	11,000	1,900
	6.0% SOM	0.62	0.62	23	47	12,000	2,700
Hexachloro-1,3-Butadiene	1.0% SOM	0.29	0.32	0.25	31	25	48
	2.5% SOM	0.70	0.78	0.61	68	25	50
	6.0% SOM	1.60	1.80	1.40	120	25	51

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)
1,1,2 Trichloroethane	1.0% SOM	0.60	0.88	0.28	94
	2.5% SOM	1.20	1.8	0.61	190
	6.0% SOM	2.70	3.9	1.40	400
1,1-Dichloroethane	1.0% SOM	2.40	2.50	9.20	280
	2.5% SOM	3.90	4.10	17	450
	6.0% SOM	7.40	7.70	35	850
1,1-Dichloroethene	1.0% SOM	0.23	0.23	2.80	26
	2.5% SOM	0.40	0.41	5.60	46
	6.0% SOM	0.82	0.82	12	92
1,2,4-Trimethylbenzene	1.0% SOM	0.35	0.41	0.38	42
	2.5% SOM	0.85	0.99	0.93	99
	6.0% SOM	2.00	2.30	2.20	220
1,2-Dichloropropane	1.0% SOM	0.024	0.024	0.62	3.3
	2.5% SOM	0.042	0.042	1.20	5.9
	6.0% SOM	0.084	0.085	2.60	12
2,4-Dimethylphenol	1.0% SOM	19	210	3.10	16000*
	2.5% SOM	43	410	7.20	24000*
	6.0% SOM	97	730	17	30000*
2,4-Dinitrotoluene	1.0% SOM	1.50	170*	0.22	3700*
	2.5% SOM	3.20	170	0.49	3700*
	6.0% SOM	7.20	170	1.10	3800*
2,6-Dinitrotoluene	1.0% SOM	0.78	78	0.12	1900*
	2.5% SOM	1.70	84	0.27	1900*
	6.0% SOM	3.90	87	0.61	1900*
2-Chloronapthalene	1.0% SOM	3.70	3.80	40	390*
	2.5% SOM	9.20	9.30	98	960*
	6.0% SOM	22	22	230	2200*
Biphenyl	1.0% SOM	66*	220*	14	18000*
	2.5% SOM	160	500*	35	33000*
	6.0% SOM	360	980*	83	48000*
Bis (2-ethylhexyl) phthalate	1.0% SOM	280*	2700*	47*	85000*
	2.5% SOM	610*	2800*	120*	86000*
	6.0% SOM	1100*	2800*	280*	86000*
Bromobenzene	1.0% SOM	0.87	0.91	3.2	97
	2.5% SOM	2.0	2.1	7.6	220
	6.0% SOM	4.7	4.9	18	520
Bromodichloromethane	1.0% SOM	0.016	0.019	0.016	2.1
	2.5% SOM	0.030	0.034	0.032	3.7
	6.0% SOM	0.061	0.070	0.068	7.6
Bromoform	1.0% SOM	2.8	5.2	0.95	760
	2.5% SOM	5.9	11	2.1	1500
	6.0% SOM	13	23	4.6	3100
Butyl benzyl phthalate	1.0% SOM	1400*	42000*	220*	940000*
	2.5% SOM	3300*	44000*	550*	940000*
	6.0% SOM	7200*	44000*	1300*	950000*

*soil concentration above saturation limit

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		RwHP (mg/kg)	RwoHP (mg/kg)	Allotment (mg/kg)	Commercial (mg/kg)
Chloroethane	1.0% SOM	8.3	8.4	110	960
	2.5% SOM	11	11	200	1300
	6.0% SOM	18	18	380	2100
Chloromethane	1.0% SOM	0.0083	0.0085	0.066	1.0
	2.5% SOM	0.0098	0.0099	0.13	1.2
	6.0% SOM	0.013	0.013	0.23	1.6
Cis 1,2 Dichloroethene	1.0% SOM	0.11	0.12	0.26	14
	2.5% SOM	0.19	0.20	0.50	24
	6.0% SOM	0.37	0.39	1.0	47
Dichloromethane	1.0% SOM	0.58	2.10	0.10	270
	2.5% SOM	0.98	2.80	0.19	360
	6.0% SOM	1.70	4.50	0.34	560
Diethyl Phthalate	1.0% SOM	120*	1800*	19*	150000*
	2.5% SOM	260*	3500*	41*	220000*
	6.0% SOM	570*	6300*	94*	290000*
Di-n-butyl phthalate	1.0% SOM	13*	450*	2.00	15000*
	2.5% SOM	31*	450*	5.00	15000*
	6.0% SOM	67*	450*	12	15000*
Di-n-octyl phthalate	1.0% SOM	2300*	3400*	940*	89000*
	2.5% SOM	2800*	3400*	2100*	89000*
	6.0% SOM	3100*	3400*	3900*	89000*
Hexachloroethane	1.0% SOM	0.20	0.22	0.27	22*
	2.5% SOM	0.48	0.54	0.67	53*
	6.0% SOM	1.10	1.30	1.60	120*
Isopropylbenzene	1.0% SOM	11	12	32	1400*
	2.5% SOM	27	28	79	3300*
	6.0% SOM	64	67	190	7700*
Methyl tert-butyl ether (MTBE)	1.0% SOM	49	73	23	7900
	2.5% SOM	84	120	44	13000
	6.0% SOM	160	220	90	24000
Propylbenzene	1.0% SOM	34	40	34	4100*
	2.5% SOM	82	97	83	9700*
	6.0% SOM	190	230	200	21000*
Styrene	1.0% SOM	8.10	35	1.60	3300*
	2.5% SOM	19	78	3.70	6500*
	6.0% SOM	43	170	8.70	11000*
Total Cresols (2-, 3-, and 4-methylphenol)	1.0% SOM	80	3700	12	160000
	2.5% SOM	180	5400	27	180000*
	6.0% SOM	400	6900	63	180000*
Trans 1,2 Dichloroethene	1.0% SOM	0.19	0.19	0.93	22
	2.5% SOM	0.34	0.35	1.90	40
	6.0% SOM	0.70	0.71	0.24	81
Tributyl tin oxide	1.0% SOM	0.25	1.40	0.042	130*
	2.5% SOM	0.59	3.10	0.100	180*
	6.0% SOM	1.30	5.70	0.240	200*

*soil concentration above saturation limit

APPENDIX G
Site Photographs

B1 Pit excavation	B1 Pit excavation	Validation of B1 depth	Placed Topsoil for pit B1

Project: Former Colt International, New Lane, Havant PO9 2LZ		ground&water
Client: Drew Smith Limited	Date: March 2023	
Appendix G – Photo Sheet	Ref: GWPR4409	