

REF: 1782/CML/VAL1-6/erw

Angela Guy
Public Protection Service
Wrexham County Borough Council
Ruthin Road
Wrexham LL13 7TU

31st October 2016

Dear Angela,

RE: CAE-GWILYM LANE, CEFN MAWR : VALIDATION PLOTS 1 - 6

The validation for these plots was carried out on the 6th October 2016 and comprised a hand dug trial pit in the rear garden of Plot 5. A sample of the topsoil was taken, stored in appropriate containers and delivered to the laboratory at ALcontrol in Hawarden, in accordance with BS10175.

The photographs below were taken during the site visit, demonstrating the consistency of the topsoil used for the garden areas of all six plots.



Photograph 1 – From Plot 1 towards Plot 6



Photograph 2 – From Plot 5 towards Plot1 (Location of trial pit seen bottom right of photo)



Photograph 3 – Trial Pit in topsoil

A summary of the test results follows and the Post Certification Report from ALcontrol received on 28th October 2016 is presented in full in Appendix A.

Summary of Chemical Test Results

CLEA Contaminants

Determinant	No of Tests	Value (mg/kg)	LQM/CIEH/C4SL Guidelines* (mg/kg)	% exceeding Guidelines
Arsenic	1	8.68	37 (C4SL)	0
Cadmium	1	0.746	22 (C4SL)	0
Chromium (Total)	1	15	910	0
Lead	1	161	200 (C4SL)	0
Mercury	1	<0.14	40	0
Nickel	1	17.4	127	0
Selenium	1	1.24	595	0
Phenol	1	<0.01	415	0
Benzene	1	<0.01	0.87 (C4SL)	0
Toluene	1	<0.002	611	0
Ethylbenzene	1	<0.003	354	0
o-Xylene	1	<0.003	246	0
m p- xylene	1	<0.006	228	0

6% SOM for residential use with plant uptake.

None of the above values exceed the guideline values for residential use with plant uptake.

GAC Contaminants

Determinant	No of Tests	Value (mg/kg)	GAC (mg/kg)	% exceeding GAC
Boron	1	7.13	291	0
Zinc	1	185	3750	0
Copper	1	33	2330	0
Chromium (Hexa)	1	<0.6	21(C4SL)	0
Chromium (Triv)	1	15	3000	0

None of the above test results exceed the relevant GAC values.

PAH Speciation

Determinant (GAC Speciated PAH)	No of Tests	Value (mg/kg)	CLAE Value (mg/kg)	% exceeding Values
Anthracene	1	0.0697	9190	0
Acenaphthylene	1	0.0364	851	0
Acenaphthene	1	0.012	1010	0
Benz(a)anthracene	1	0.299	5.88	0
Benzo(a)pyrene	1	0.398	3	0
Benzo(b)fluoranthene	1	0.513	7.02	0
Benzo(ghi)perylene	1	0.310	46.8	0
Benzo(k)fluoranthene	1	0.25	10	0
Chrysene	1	0.382	9.27	0
Dibenzo(ah)anthracene	1	0.0791	0.90	0
Fluoranthene	1	0.64	674	0
Fluorene	1	0.0166	776	0
Indeno(123cd)pyrene	1	0.264	4.19	0
Naphthalene	1	0.0431	8.71	0
Phenanthrene	1	0.465	376	0
Pyrene	1	0.521	1550	0

None of the above results exceed the relevant guidance values.

Other Contaminants

Determinant	No of Tests	Value	Guidance Values	% exceeding Guidance
Total Cyanide (mg/kg)	1	<1	NA	0
Sulphur (mg/kg)	1	<10	0.5% UU	0
Water Sol Sulphate (g/l)	1	1.45	NA	0
Organic matter (%)	1	4.69	6% (EA)	2
pH (no units)	1	8.18	0 (UU)	0

Notes UU – United Utilities

EA – Environment Agency

None of the above results give cause for concern.

Hydrocarbons

LQM 6% Organic Content	No of Tests	Range (mg/kg)	Published Guidelines (mg/kg)
Aliphatic C 5-6	1	<0.01	113
Aliphatic C >6-8	1	<0.01	372
Aliphatic C >8-10	1	<0.01	109
Aliphatic C >10-12	1	<0.01	537
Aliphatic C >12-16	1	<0.1	3030
Aliphatic C >16-35	1	23.6	88400
Aliphatic C >35-44	1	8.46	88400
Aromatic EC 5-7(benzene)	1	<0.01	0.87 (C4SL)
Aromatic EC >7-8(toluene)	1	<0.01	611
Aromatic EC >8-10	1	<0.01	151
Aromatic EC >10-12	1	<0.01	346
Aromatic EC >12-16	1	0.972	593
Aromatic EC >16-21	1	5.87	770
Aromatic EC >21-35	1	55	1230
Aromatic EC >35-44	1	35.5	1230

Guideline values for 6% SOM

None of the above values exceeded the relevant guidance.

We trust this is satisfactory, should you have any queries please call Mike Scott / Elgan Williams on 01244 661361.

Yours sincerely



E Rh Williams

APPENDIX A

ALcontrol Laboratories
Post Certification Report



Ground Solve
Unit 1
Well House Barns
Chester Road
Bretton
Cheshire
CH4 0DH
Attention: Mike Scott

Post Certification Report

Date:	28/10/2016	Location:	Cefn Mawr, Wrexham
Customer:	H_GRSOLVE_BRE	No. Of Samples Received:	1
Your Reference:		Samples Scheduled:	1

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.

Chemical testing (unless subcontracted) performed at ALcontrol Laboratories Hawarden (Method codes TM) or ALcontrol Laboratories Aberdeen (Method codes S).



Customer : H_GRSOLVE_BRE

Client Reference :

Location : Cefn Mawr, Wrexham

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
14280624	PLOT 5		0.00 - 0.15	06/10/2016

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



Customer : H_GRSOLVE_BRE

Client Reference :

Location : Cefn Mawr, Wrexham

Results Legend  Test  No Determination Possible	Lab Sample No(s)		14280624
	Customer Sample Reference		Plot 5
	AGS Reference		
	Depth (m)		0.00 - 0.15
	Container		250g Amber Jar
Anions by Kone (soil)	All	NDPs: 0 Tests: 1	
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 1	
Chromium III	All	NDPs: 0 Tests: 1	
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1	
Elemental Sulphur	All	NDPs: 0 Tests: 1	
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 1	
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 1	
GRO by GC-FID (S)	All	NDPs: 0 Tests: 1	
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 1	
Metals in solid samples by OES	All	NDPs: 0 Tests: 1	
PAH by GCMS	All	NDPs: 0 Tests: 1	
pH	All	NDPs: 0 Tests: 1	
Phenols by HPLC (S)	All	NDPs: 0 Tests: 1	
Sample description	All	NDPs: 0 Tests: 1	
Total Organic Carbon	All	NDPs: 0 Tests: 1	
Total Sulphate	All	NDPs: 0 Tests: 1	
Total Sulphur	All	NDPs: 0 Tests: 1	
TPH CWG GC (S)	All	NDPs: 0 Tests: 1	

Customer : H_GRSOLVE_BRE

Client Reference :

Location : Cefn Mawr, Wrexham

[illegible]

Customer : H_GRSOLVE_BRE

Client Reference :

Location : Cefn Mawr, Wrexham

[illegible]

Customer : H_GRSOLVE_BRE

Client Reference :

Location : Cefn Mawr, Wrexham

[illegible]



Customer : H_GRSOLVE_BRE

Client Reference :

Location : Cefn Mawr, Wrexham

Asbestos Identification

Asbestos Identification - Soil

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthrophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PLOT 5 NS Z 0.00 - 0.15 SOLID 06/10/2016 00:00:00 11/10/2016 11:08:35 161006-150 14,280,624 TM048	17/10/16	Lauren Sargeant	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected



Customer : H_GRSOLVE_BRE

Client Reference :

Location : Cefn Mawr, Wrexham

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
ASB_PREP				
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC		
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser		
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM218	Determination of PAH by GCMS Microwave extraction	The determination of PAH in soil samples by microwave extraction and GC-MS		
TM221	Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd	Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer		
TM243		Mixed Anions In Soils By Kone		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALcontrol Laboratories Hawarden (Method codes TM) or ALcontrol Laboratories Aberdeen (Method codes S).



Customer : H_GRSOLVE_BRE

Client Reference :

Location : Cefn Mawr, Wrexham

Test Completion Dates

Lab Sample No(s)	14280624
Customer Sample Ref.	PLOT 5
AGS Ref.	
Depth	0.00 - 0.15
Type	SOLID

Anions by Kone (soil)	14-Oct-2016
Asbestos ID in Solid Samples	17-Oct-2016
Chromium III	14-Oct-2016
Cyanide Comp/Free/Total/Thiocyanate	13-Oct-2016
Elemental Sulphur	14-Oct-2016
EPH CWG (Aliphatic) GC (S)	14-Oct-2016
EPH CWG (Aromatic) GC (S)	14-Oct-2016
GRO by GC-FID (S)	13-Oct-2016
Hexavalent Chromium (s)	14-Oct-2016
Metals in solid samples by OES	14-Oct-2016
PAH by GCMS	13-Oct-2016
pH	13-Oct-2016
Phenols by HPLC (S)	17-Oct-2016
Sample description	11-Oct-2016
Total Organic Carbon	13-Oct-2016
Total Sulphate	14-Oct-2016
Total Sulphur	14-Oct-2016
TPH CWG GC (S)	14-Oct-2016



Appendix

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

2. Samples will be run in duplicate upon request, but an additional charge may be incurred

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

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

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

6. 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 (2005), 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.

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

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

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

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

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

13. **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%, they are generally wider for volatiles analysis, 50-150%. 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.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

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

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

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

General

20. 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.

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

22. 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.

23. 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 (BTX). 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.

24. **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

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
+	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

Visual Estimation Of Fibre Content

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

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.