

REF: 1600/PYB/DVW01/mjs

John Small
DMR (North Wales) Ltd
Unit 3
Five Crosses Industrial Estate
Minera
Wrexham LL11 3RD

31st August 2016

Dear John,

RE: PEN Y BRYN, WREXHAM: CONTAMINATED LAND QUERIES

Regarding the Letter from NRW to DMR dated 11th August 2016, Reference CAS-22174-L7D4, queries raised are presented below.

We have revisited site to take samples of the underlying natural ground to confirm that it is not contaminated and is suitable to be used in the proposed landscaping area on site. Trial pit 01 was excavated beneath the proposed retail units fronting Pen y Bryn, with trial pit 03 excavated at the location of the proposed soakaway where most material will be won for the landscaped area. Trial pit 2 was abandoned as old foundations were encountered and is not presented. The location of the trial pits is presented on the attached plan showing the proposed development and drainage details. In addition, the trial pits logs are attached.

The laboratory test results are attached, which prove the underlying sand and gravel to be uncontaminated when compared to the residential guidance values used in the geo-environmental report.

In addition, a sample of the made ground was taken from TP 03 and sent for Waste Acceptance Criteria testing. This proved the made ground to be inert, therefore confirming that any made ground left beneath the proposed building will not have an affect on controlled waters.

At present, following the demolition of the previous buildings on site the ground is open to the environment and all rainwater currently falling onto site is infiltrating into the ground and potentially leaching contaminants into controlled waters.

It therefore makes sense with regard to the drainage strategy that the soakaway should be constructed early in the development, which will be founded in the underlying natural sand and gravel. As the buildings and hardstandings are constructed they can feed into the soakaways and into the underlying sand and gravel. Therefore rainfall goes immediately from roof/hardstanding

straight into the ground through a series of pipes. As the site is to be covered with buildings and hardstanding's the risk to controlled water is considered to be negligible following the development.

Once this has been agreed, we will be in a position to up date the remediation strategy.

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

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Mike Scott', with a stylized, flowing script.

M J Scott

Enc

CC Angela Guy WCBC

TRIAL PIT 01

Depth (m)	Strata
0.00-0.50	Loose to medium dense light brown becoming brown sandy gravelly SILT with some sub rounded cobble and a little rootlets. Gravel is sub angular to rounded fine to coarse (MADE GROUND)
0.50-1.10	Loose to medium dense brown slightly clayey gravelly medium SAND with a little coarse sand. Gravel is sub angular to rounded fine to coarse including brick (MADE GROUND)
1.10-1.50	Loose to medium dense brown locally slightly clayey gravelly fine to medium SAND with a little coarse sand. Gravel is sub angular to rounded fine to coarse including a little coal (GLACIAL DEPOSITS)

Notes

1. Pit dimensions 0.70m x 3.00m x 1.50m,
2. Pit sides were stable,
3. Groundwater was not encountered,
4. Tub, Bulk and Jar samples taken at 0.00-0.40m and Jar samples taken at 1.30-1.50m.



Trial Pit 01



Trial Pit 01

TRIAL PIT 03

Depth (m)	Strata
0.00-0.05	Loose light grey silty sandy angular to rounded coarse GRAVEL (MADE GROUND)
0.05-0.10	Dense light grey gravelly SILT. Gravel is angular to sub rounded fine to coarse (MADE GROUND)
0.10-1.00/1.80	Loose to medium dense dark brown mottled brown slightly gravelly becoming gravelly slightly clayey slightly sandy SILT. Gravel is sub angular fine to medium including ceramic (MADE GROUND)
1.00/1.80-2.10	Loose to medium dense brown locally slightly clayey gravelly fine to medium SAND with a little coarse sand. Gravel is sub angular to rounded fine to coarse including a little coal (GLACIAL DEPOSITS)
1. Pit dimensions 0.70m x 2.50m x 2.10m, 2. Pit sides were slightly unstable between 0.70-1.00m, 3. Groundwater not encountered, 4. Jar samples taken at 1.90-2.00m.	



Trial Pit 03



Trial Pit 03



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

CERTIFICATE OF ANALYSIS

Date: 26 August 2016
Customer: H_GRSOLVE_BRE
Sample Delivery Group (SDG): 160817-96
Your Reference:
Location: Pen Y Bryn, Wrexham
Report No: 375183

We received 3 samples on Tuesday August 16, 2016 and 3 of these samples were scheduled for analysis which was completed on Friday August 26, 2016. 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.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan
Operations Manager





SDG: 160817-96
Job: H_GRSOLVE_BRE-202
Client Reference:

Location: Pen Y Bryn, Wrexham
Customer: Ground Solve
Attention: Phil Green

Order Number: 1600/pbg
Report Number: 375183
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
13987329	TP01		0.00 - 0.40	16/08/2016
13987330	TP01		1.30 - 1.50	16/08/2016
13987331	TP03		1.80 - 2.00	16/08/2016

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



SDG: 160817-96
 Job: H_GRSOLVE_BRE-202
 Client Reference:

Location: Pen Y Bryn, Wrexham
 Customer: Ground Solve
 Attention: Phil Green

Order Number: 1600/pbg
 Report Number: 375183
 Superseded Report:

SOLID

Results Legend



Test



No Determination Possible

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

13987331
 13987330
 13987329
 TP03
 TP01
 TP01
 1.80 - 2.00
 1.30 - 1.50
 0.00 - 0.40
 250g Amber Jar (AL)
 250g Amber Jar (AL)
 250g Amber Jar (AL)
 1kg TUB

ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 1	X		
Anions by Kone (soil)	All	NDPs: 0 Tests: 2		X	X
Anions by Kone (w)	All	NDPs: 0 Tests: 1	X		
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 2		X	X
CEN Readings	All	NDPs: 0 Tests: 1	X		
Chromium III	All	NDPs: 0 Tests: 2		X	X
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 2		X	X
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1	X		
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 1	X		
Easily Liberated Sulphide	All	NDPs: 0 Tests: 2		X	X
Elemental Sulphur	All	NDPs: 0 Tests: 2		X	X
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 2		X	X
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 2		X	X
Fluoride	All	NDPs: 0 Tests: 1	X		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 3	X	X	X



SDG: 160817-96
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Location: Pen Y Bryn, Wrexham
 Customer: Ground Solve
 Attention: Phil Green

Order Number: 1600/pbg
 Report Number: 375183
 Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		13987331 13987330 13987329	
	Customer Sample Reference		TP03 TP01 TP01	
	AGS Reference			
	Depth (m)		1.80 - 2.00 1.30 - 1.50 0.00 - 0.40	
	Container		250g Amber Jar (AL) 250g Amber Jar (AL) 250g Amber Jar (AL) 1kg TUB	
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 2		X X
Loss on Ignition in soils	All	NDPs: 0 Tests: 1	X	
Mercury Dissolved	All	NDPs: 0 Tests: 1	X	
Metals in solid samples by OES	All	NDPs: 0 Tests: 2		X X
Mineral Oil	All	NDPs: 0 Tests: 1	X	
PAH by GCMS	All	NDPs: 0 Tests: 2		X X
PAH Value of soil	All	NDPs: 0 Tests: 1	X	
PCBs by GCMS	All	NDPs: 0 Tests: 1	X	
pH	All	NDPs: 0 Tests: 3	X	X X
Phenols by HPLC (S)	All	NDPs: 0 Tests: 2		X X
Phenols by HPLC (W)	All	NDPs: 0 Tests: 1	X	
Sample description	All	NDPs: 0 Tests: 3		X X X
Total Dissolved Solids	All	NDPs: 0 Tests: 1	X	
Total Organic Carbon	All	NDPs: 0 Tests: 3		X X X
TPH CWG GC (S)	All	NDPs: 0 Tests: 2		X X



SDG: 160817-96
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Superseded Report:

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	Grain size	Inclusions	Inclusions 2
13987329	TP01			0.00 - 0.40	Dark Brown	Sandy Loam	0.002 - 0.063 mm	Vegetation	N/A
13987330	TP01			1.30 - 1.50	Dark Brown	Sandy Clay Loam	0.063 - 2.00 mm	Stones	None
13987331	TP03			1.80 - 2.00	Dark Brown	Loamy Sand	0.063 - 2.00 mm	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 occurring 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.



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Order Number: 1600/pbg
 Report Number: 375183
 Superseded Report:

Results Legend		Customer Sample R	TP01	TP01	TP03			
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
-	Subcontracted test.							
**	% 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							
1-5	@	Sample deviation (see appendix)							
Component	LOD/Units	Method	Depth (m)	Sample Type	Date Sampled	Sample Time	Date Received	SDG Ref
Moisture Content Ratio (% of as received sample)	%	PM024	0.00 - 0.40	Soil/Solid	16/08/2016		16/08/2016	160817-96
Loss on ignition	<0.7 %	TM018	1.30 - 1.50	Soil/Solid	16/08/2016		16/08/2016	160817-96
Mineral oil >C10-C40	<1 mg/kg	TM061	1.80 - 2.00	Soil/Solid	16/08/2016		16/08/2016	160817-96
Mineral Oil Surrogate % recovery**	%	TM061						13987329
Phenol	<0.01 mg/kg	TM062 (S)						13987330
Cresols	<0.01 mg/kg	TM062 (S)						
Xylenols	<0.015 mg/kg	TM062 (S)						
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)						
Organic Carbon, Total	<0.2 %	TM132						
Soil Organic Matter (SOM)	<0.35 %	TM132						
pH	1 pH Units	TM133						
Sulphur, Elemental	<10 mg/kg	TM136						
Chromium, Hexavalent	<0.6 mg/kg	TM151						
Cyanide, Total	<1 mg/kg	TM153						
PCB congener 28	<3 µg/kg	TM168						
PCB congener 52	<3 µg/kg	TM168						
PCB congener 101	<3 µg/kg	TM168						
PCB congener 118	<3 µg/kg	TM168						
PCB congener 138	<3 µg/kg	TM168						
PCB congener 153	<3 µg/kg	TM168						
PCB congener 180	<3 µg/kg	TM168						
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168						
Sulphide, Easily liberated	<15 mg/kg	TM180						
Chromium, Trivalent	<0.9 mg/kg	TM181						
Arsenic	<0.6 mg/kg	TM181						
Boron	<0.7 mg/kg	TM181						
Cadmium	<0.02 mg/kg	TM181						
Chromium	<0.9 mg/kg	TM181						
Copper	<1.4 mg/kg	TM181						
Lead	<0.7 mg/kg	TM181						
Mercury	<0.14 mg/kg	TM181						
Nickel	<0.2 mg/kg	TM181						

SDG: 160817-96
Job: H_GRSOLVE_BRE-202
Client Reference:

Location: Pen Y Bryn, Wrexham
Customer: Ground Solve
Attention: Phil Green

Order Number: 1600/pbg
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Superseded Report:

[illegible]

SDG: 160817-96
Job: H_GRSOLVE_BRE-202
Client Reference:

Location: Pen Y Bryn, Wrexham
Customer: Ground Solve
Attention: Phil Green

Order Number: 1600/pbg
Report Number: 375183
Superseded Report:

GRO by GC-FID (S)

[illegible]

Order Number: 1600/pbg
Report Number: 375183
Superseded Report:

[illegible]



SDG: 160817-96
 Job: H_GRSOLVE_BRE-202
 Client Reference:

Location: Pen Y Bryn, Wrexham
 Customer: Ground Solve
 Attention: Phil Green

Order Number: 1600/pbg
 Report Number: 375183
 Superseded Report:

TPH CWG (S)

Results Legend		Customer Sample R		TP01	TP03			
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-58*sg@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
GRO Surrogate % recovery**	%	TM089	110	104				
			2	2				
GRO TOT (Moisture Corrected)	<44 µg/kg	TM089	<44	73				
			2 M	2 M				
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5	<5				
			2 #	2 #				
Benzene	<10 µg/kg	TM089	<10	<10				
			2 M	2 M				
Toluene	<2 µg/kg	TM089	<2	2.18				
			2 M	2 M				
Ethylbenzene	<3 µg/kg	TM089	<3	<3				
			2 M	2 M				
m,p-Xylene	<6 µg/kg	TM089	<6	<6				
			2 M	2 M				
o-Xylene	<3 µg/kg	TM089	<3	<3				
			2 M	2 M				
sum of detected mpo xylene by GC	<9 µg/kg	TM089	-	-				
			2	2				
sum of detected BTEX by GC	<24 µg/kg	TM089	-	-				
			2	2				
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	<10				
			2	2				
Aliphatics >C6-C8	<10 µg/kg	TM089	<10	<10				
			2	2				
Aliphatics >C8-C10	<10 µg/kg	TM089	<10	22.9				
			2	2				
Aliphatics >C10-C12	<10 µg/kg	TM089	<10	10.9				
			2	2				
Aliphatics >C12-C16	<100 µg/kg	TM173	<100	<100				
Aliphatics >C16-C21	<100 µg/kg	TM173	<100	<100				
Aliphatics >C21-C35	<100 µg/kg	TM173	<100	<100				
Aliphatics >C35-C44	<100 µg/kg	TM173	<100	<100				
Total Aliphatics >C12-C44	<100 µg/kg	TM173	<100	<100				
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10				
			2	2				
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10				
			2	2				
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10	21.8				
			2	2				
Aromatics >EC10-EC12	<10 µg/kg	TM089	<10	<10				
			2	2				
Aromatics >EC12-EC16	<100 µg/kg	TM173	<100	<100				
Aromatics >EC16-EC21	<100 µg/kg	TM173	<100	<100				
Aromatics >EC21-EC35	<100 µg/kg	TM173	<100	<100				
Aromatics >EC35-EC44	<100 µg/kg	TM173	<100	1410				
Aromatics >EC40-EC44	<100 µg/kg	TM173	<100	981				
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	<100	1410				
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	<100	1440				



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Asbestos Identification - Solid Samples

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP01 1.30 - 1.50 SOLID 16/08/2016 00:00:00 20/08/2016 07:44:54 160817-96 13987330 TM048	25/8/16	Martin Cotterell	-	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	TP03 1.80 - 2.00 SOLID 16/08/2016 00:00:00 20/08/2016 08:02:11 160817-96 13987331 TM048	25/8/16	Simon Postlewhite	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



SDG: 160817-96
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CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference

Mass Sample taken (kg) 0.097
Mass of dry sample (kg) 0.090
Particle Size <4mm >95%

Site Location

Natural Moisture Content (%) 8.46
Dry Matter Content (%) 92.2

Pen Y Bryn, Wrexham

Case

SDG 160817-96
Lab Sample Number(s) 13987329
Sampled Date 16-Aug-2016
Customer Sample Ref. TP01
Depth (m) 0.00 - 0.40

Landfill Waste Acceptance
Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste In Non- Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	>6	-
-	-	-
-	-	-

Solid Waste Analysis

Result

Total Organic Carbon (%) 1.27
Loss on Ignition (%) 3.99
Sum of BTEX (mg/kg) <0.024
Sum of 7 PCBs (mg/kg) <0.021
Mineral Oil (mg/kg) 24.4
PAH Sum of 17 (mg/kg) <10
pH (pH Units) 8.1
ANC to pH 6 (mol/kg) 0.0669
ANC to pH 4 (mol/kg) 0.125

Eluate Analysis

C2 Concⁿ in 10:1 eluate (mg/l)A2 10:1 concⁿ leached (mg/kg)Limit values for compliance leaching test
using BS EN 12457-3 at L/S 10 l/kg

	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.00644	<0.00051	0.0644	<0.0051	0.5	2	25
Barium	0.002	<0.0002	0.02	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.0012	<0.0012	<0.012	<0.012	0.5	10	70
Copper	0.00144	<0.00085	0.0144	<0.0085	2	50	100
Mercury Dissolved (CVAF)	0.0000157	<0.00001	0.000157	<0.0001	0.01	0.2	2
Molybdenum	0.00395	<0.00062	0.0395	<0.0062	0.5	10	30
Nickel	<0.00044	<0.00044	<0.0044	<0.0044	0.4	10	40
Lead	0.000548	<0.0001	0.00548	<0.001	0.5	10	50
Antimony	0.00187	<0.00016	0.0187	<0.0016	0.06	0.7	5
Selenium	<0.00081	<0.00081	<0.0081	<0.0081	0.1	0.5	7
Zinc	<0.0013	<0.0013	<0.013	<0.013	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	52.9	<5	529	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared 22-Aug-2016
pH (pH Units) 8.18
Conductivity (µS/cm) 75.00
Temperature (°C) 19.90
Volume Leachant (Litres) 0.892

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
26/08/2016 14:11:49
14:11:34 26/08/2016

SDG: 160817-96
Job: H_GRSOLVE_BRE-202
Client Reference:

Location: Pen Y Bryn, Wrexham
Customer: Ground Solve
Attention: Phil Green

Order Number: 1600/pbg
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Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
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)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
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		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
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		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM243		Mixed Anions In Soils By Kone		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

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



SDG: 160817-96
 Job: H_GRSOLVE_BRE-202
 Client Reference:

Location: Pen Y Bryn, Wrexham
 Customer: Ground Solve
 Attention: Phil Green

Order Number: 1600/pbg
 Report Number: 375183
 Superseded Report:

Test Completion Dates

Lab Sample No(s)	13987329	13987330	13987331
Customer Sample Ref.	TP01	TP01	TP03
AGS Ref.			
Depth	0.00 - 0.40	1.30 - 1.50	1.80 - 2.00
Type	SOLID	SOLID	SOLID
ANC at pH4 and ANC at pH 6	23-Aug-2016		
Anions by Kone (soil)		25-Aug-2016	25-Aug-2016
Anions by Kone (w)	24-Aug-2016		
Asbestos ID in Solid Samples		25-Aug-2016	25-Aug-2016
CEN 10:1 Leachate (1 Stage)	22-Aug-2016		
CEN Readings	23-Aug-2016		
Chromium III		25-Aug-2016	25-Aug-2016
Cyanide Comp/Free/Total/Thiocyanate		24-Aug-2016	24-Aug-2016
Dissolved Metals by ICP-MS	24-Aug-2016		
Dissolved Organic/Inorganic Carbon	24-Aug-2016		
Easily Liberated Sulphide		25-Aug-2016	25-Aug-2016
Elemental Sulphur		25-Aug-2016	25-Aug-2016
EPH CWG (Aliphatic) GC (S)		25-Aug-2016	26-Aug-2016
EPH CWG (Aromatic) GC (S)		25-Aug-2016	26-Aug-2016
Fluoride	24-Aug-2016		
GRO by GC-FID (S)	25-Aug-2016	25-Aug-2016	25-Aug-2016
Hexavalent Chromium (s)		25-Aug-2016	25-Aug-2016
Loss on Ignition in soils	25-Aug-2016		
Mercury Dissolved	24-Aug-2016		
Metals in solid samples by OES		25-Aug-2016	25-Aug-2016
Mineral Oil	25-Aug-2016		
PAH by GCMS		25-Aug-2016	25-Aug-2016
PAH Value of soil	23-Aug-2016		
PCBs by GCMS	24-Aug-2016		
pH	24-Aug-2016	25-Aug-2016	25-Aug-2016
Phenols by HPLC (S)		24-Aug-2016	24-Aug-2016
Phenols by HPLC (W)	24-Aug-2016		
Sample description	18-Aug-2016	20-Aug-2016	20-Aug-2016
Total Dissolved Solids	23-Aug-2016		
Total Organic Carbon	26-Aug-2016	26-Aug-2016	26-Aug-2016
TPH CWG GC (S)		25-Aug-2016	26-Aug-2016



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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 ISO 17025. 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 (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.

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 UKAS accreditation and are not moisture corrected.

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 Adinite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

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

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.