



SDG: Location: 170923-97

Client Reference: Chartered Land - Heuston Order Number:

2921-028 COC3-G

Report Number: Superseded Report:

426773

# 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		
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		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
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		
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		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

<sup>&</sup>lt;sup>1</sup> Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

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



Validated

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# **Test Completion Dates**

Lab Sample No(s)	16241281
Customer Sample Ref.	2921-BH1-SS3
AGS Ref.	
Depth	0.60 - 1.30
Туре	Soil/Solid (S)
Anions by Kone (w)	29-Sep-2017
Asbestos ID in Solid Samples	03-Oct-2017
Boron Water Soluble	28-Sep-2017
CEN 10:1 Leachate (1 Stage)	27-Sep-2017
CEN Readings	28-Sep-2017
Cyanide Comp/Free/Total/Thiocyanate	29-Sep-2017
Dissolved Metals by ICP-MS	29-Sep-2017
Dissolved Organic/Inorganic Carbon	29-Sep-2017
EPH CWG (Aliphatic) GC (S)	28-Sep-2017
EPH CWG (Aromatic) GC (S)	28-Sep-2017
Fluoride	29-Sep-2017
GRO by GC-FID (S)	30-Sep-2017
Hexavalent Chromium (s)	29-Sep-2017
on Ignition in soils	04-Oct-2017
ry Dissolved	29-Sep-2017
is by iCap-OES Dissolved (W)	29-Sep-2017
Metals in solid samples by OES	29-Sep-2017
Mineral Oil	29-Sep-2017
PAH by GCMS	28-Sep-2017
PCBs by GCMS	28-Sep-2017
pH	27-Sep-2017
Phenois by HPLC (S)	28-Sep-2017
Phenois by HPLC (W)	29-Sep-2017
Sample description	26-Sep-2017
Total Dissolved Solids	28-Sep-2017
Total Organic Carbon	28-Sep-2017
Total Sulphate	29-Sep-2017
Total Sulphur	28-Sep-2017
TPH CWG GC (S)	30-Sep-2017

### **CERTIFICATE OF ANALYSIS**



SDG: Location: 170923-97

Client Reference: Chartered Land - Heuston Order Number:

2921-028 COC3-G

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Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

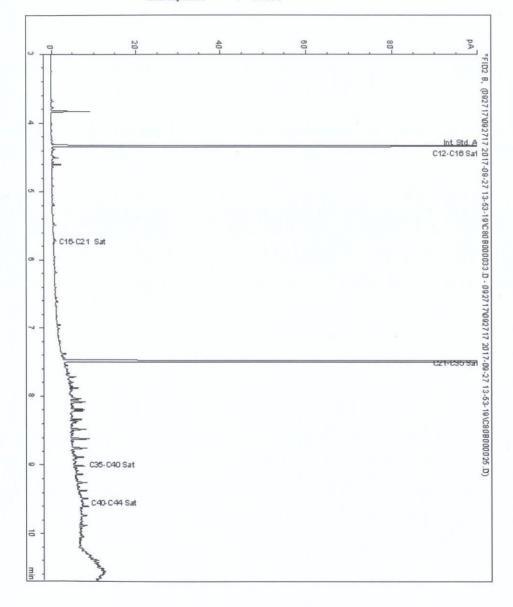
Sample No : Sample ID :

16251134 2921-BH1-SS3 Depth: 0.60 - 1.30

Alcontrol/Geochem Analytical Services Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 15212904-Date Acquired : 27/09/17 23:50:47

Units ppb Dilution CF 1.000 Multiplier





Validated

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2921-028 COC3-G

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# Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

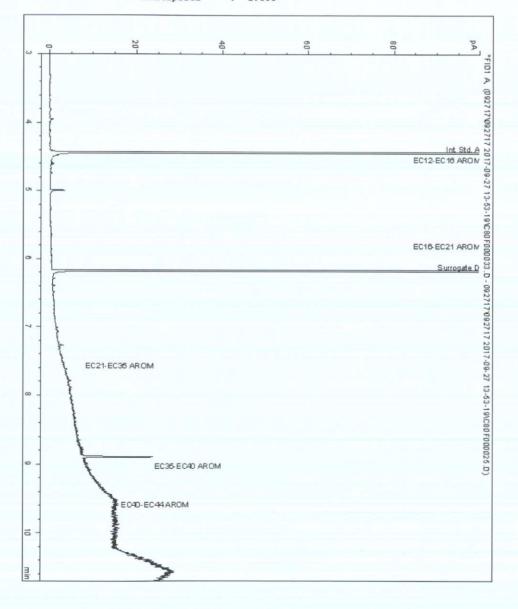
Sample No: 16251134 Sample ID: 2921-BH1-SS3 Depth: 0.60 - 1.30

Speciated TPH - AROMS ( C12 - C44)

Sample Identity: 15212905-

Date Acquired : 27/09/17 23:50:47

Units : ppb Dilution CF : 1 Multiplier 1.000 :



#### **CERTIFICATE OF ANALYSIS**



SDG: Location: 170923-97

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# Chromatogram

Analysis: Mineral Oil

Sample No : Sample ID:

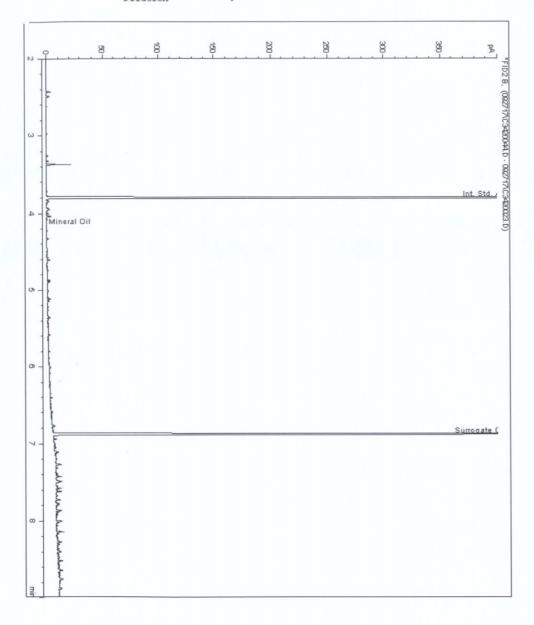
16258198 2921-BH1-SS3 Depth: 0.60 - 1.30

Mineral Oil Range Organics ( C10 - C40 )

Sample Identity Date Acquired Units Sample Multiplier

: 15212907-: 28/09/17 17:45:11 PM : mg/kg : 0.000

Dilution





Validated

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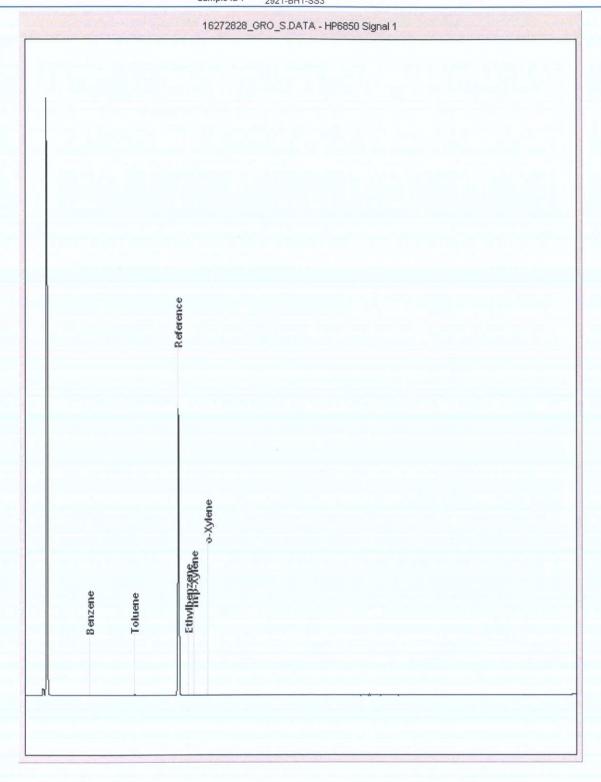
# Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : Sample ID :

16272828 2921-BH1-SS3

Depth: 0.60 - 1.30



SDG: Location:

170923-97 Client Reference: rtered Land - Heuston South Qua Order Number:

2921-028 COC3-G

Report Number: Superseded Report 426773

# Appendix

#### General

- 1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except 21. For the BSEN 12457-3 two batch process to allow the cumulative release to be 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. ALS 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.
- 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
- 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
- 20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur

- 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.
- 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

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	Holding time exceeded before sample received
5	Samples exceeded holding time before presevation 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 ALS (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 ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysot le	White Asbestos
Amosite	BrownAsbests
Cro d dolite	Blue Asbe stos
Fibrous Adinolite	
Ribious 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.



Minerex Environmental Taney hall Eglinton Terrace Dundrum Dublin Dublin 14

Attention: Sven Klinkenbergh

Unit 7-8 Hawarden Business Park Manor Road (off Manor Lane) Hawarden Deeside CH5 3US Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com Website: www.alsenvironmental.co.uk

## **CERTIFICATE OF ANALYSIS**

Date:

Customer:

Sample Delivery Group (SDG):

Location: Report No:

Your Reference:

04 October 2017

D\_MINEREX\_DUB 170923-92

2921-028 COC3-H

Chartered Land - Heuston South Quarter

426771

We received 1 sample on Saturday September 23, 2017 and 1 of these samples were scheduled for analysis which was completed on Wednesday October 04, 2017. 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 Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S)

Approved By:

Sonia McWhan

Operations Manager







ALS Environmental is part of ALS Life Sciences Limited. ALS Life Sciences Limited registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No. 4057291.



Validated

SDG: Location: 170923-92

Client Reference: Chartered Land - Heuston Order Number:

2921-028 COC3-H

Report Number: Superseded Report:

426771

# **Received Sample Overview**

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
16241093	2921-BH4-SS2			21/09/2017

Maximum Sample/Coolbox Temperature (°C):

16.4

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of  $(5\pm3)^{\circ}C$ .

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



Validated

SDG: 170923-92 Client Reference: 2921-028 COC3-H Report Number: 426771
Location: Chartered Land - Heuston Order Number: Superseded Report:

Results Legend					
	Lah San	nple No(s)			1624
No Determination	Lab Jan	Tpie No(3)			16241093
Possible					N
Sample Tuese		tomer Reference			2921-BH4-SS2
Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate	AGS R	eference			
PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage	Dep	th (m)			
- Recreational Water - Drinking Water Non-regulatory - L - Unspecified Liquid SL - Sludge G - Gas	Con	tainer	250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)
OTH - Other	Samp	le Type	S	S	S
Anions by Kone (w)	All	NDPs: 0 Tests: 1		Х	
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 1		X	
Boron Water Soluble	All	NDPs: 0 Tests: 1	X		
CEN Readings	All	NDPs: 0 Tests: 1		X	
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1	Х		
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1		X	
olved Organic/Inorganic	All	NDPs: 0 Tests: 1		Х	
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 1	X		
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 1	Х		
Fluoride	All	NDPs: 0 Tests: 1		X	
GRO by GC-FID (S)	All	NDPs: 0 Tests: 1			Х
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 1	Х		
Loss on Ignition in soils	All	NDPs: 0 Tests: 1	х		
Mercury Dissolved	All	NDPs: 0 Tests: 1		X	
als by iCap-OES Dissolved (W)	All	NDPs: 0 Tests: 1		х	

## **CERTIFICATE OF ANALYSIS**



SDG: 170923-92 Client Reference: 2921-028 COC3-H Report Number: 426771
Location: Chartered Land - Heuston Order Number: Superseded Report: 426771

Location:	Criai	tered Land - Heusto	n Ora	er Nu	mber	
Results Legend  X Test	Lab Sa	Lab Sample No(s)  Customer Sample Reference				
N No Determination Possible						
Sample Types -					2921-BH4-SS2	
S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SV - Surface Water LE - Land Leachate PL - Prepared Leachate	AGS	Reference				
PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage	De	epth (m)	(ALE210)			
RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas	Co	Container				
OTH - Other	Sam	Sample Type				
Metals in solid samples by OES	All	NDPs: 0 Tests: 1	Х			
Mineral Oil	All	NDPs: 0 Tests: 1	X			
PAH by GCMS	All	NDPs: 0 Tests: 1	х			
PCBs by GCMS	All	NDPs: 0 Tests: 1	X			
рН	All	NDPs: 0 Tests: 1	х			
Phenois by HPLC (S)	All	NDPs: 0 Tests: 1	х			
Phenois by HPLC (W)	All	NDPs: 0 Tests: 1		X		
Sample description	All	NDPs: 0 Tests: 1	x			
Total Dissolved Solids	All	NDPs: 0 Tests: 1		Х		
Total Organic Carbon	All	NDPs: 0 Tests: 1	X			
Total Sulphate	All	NDPs: 0 Tests: 1	х			
Total Sulphur	All	NDPs: 0 Tests: 1	X			
TPH CWG GC (S)	All	NDPs: 0 Tests: 1	X			



Validated

SDG: Location:

170923-92

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# Sample Descriptions

#### **Grain Sizes**

very fine <0.0	63mm fine	0.063mm - 0.1mm	medium 0.1n	nm - 2mm coa	arse 2mm -	10mm very coarse	>10
Lab Sample No(s)	Customer Sample Ref	f. Depth (m)	Colour	Description	Inclusions	Inclusions 2	
16241093	2921-BH4-SS2		Grey	Loamy Sand	Stones	Vegetation	

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.

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

## CERTIFICATE OF ANALYSIS



SDG: 170923-92 Client Reference: 2921-028 COC3-H Report Number: 426771
Location: Chartered Land - Heuston Order Number: Superseded Report:

		ustomer Sample Ref.	2921-BH4-SS2
# ISO17025 accredited.  M mCERTS accredited.			
aq Aqueous / settled sample.  diss.filt Dissolved / filtered sample.		Depth (m)	
tot.unfilt Total / unfiltered sample.  * Subcontracted test.		Sample Type Date Sampled	Soil/Solid (S) 21/09/2017
" % recovery of the surrogate sta check the efficiency of the meth		Sampled Time Date Received	23/09/2017
results of individual compounds samples aren't corrected for the	within	SDG Ref	170923-92
(F) Trigger breach confirmed \$8.+§@ Sample deviation (see appendix		Lab Sample No.(s) AGS Reference	16241093
omponent	LOD/Units	Method	
oisture Content Ratio (% of as ceived sample)	%	PM024	17
oss on ignition	<0.7 %	TM018	5.01
Mineral oil >C10-C40	<1 mg/kg	TM061	22.8
Mineral Oil Surrogate % ecovery**	%	TM061	87.9
Phenol	<0.01 mg/kg	TM062 (S)	<0.01
Organic Carbon, Total	<0.2 %	TM132	1.12
Sulphur, Total	<0.02 %	TM132	0.0565
Sulphate, Total potential	<0.06 %	TM132	0.17
pH	1 pH Units	TM133	8.5
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6
	<1 mg/kg	TM153	<1
Cyanide, Total			
Cyanide, Free	<1 mg/kg	TM153	<1
PCB congener 28	<3 µg/kg	TM168	<3
PCB congener 52	<3 µg/kg	TM168	<3
PCB congener 101	<3 µg/kg	TM168	<3
PCB congener 118	<3 µg/kg	TM168	<3
PCB congener 138	<3 µg/kg	TM168	<3
PCB congener 153	<3 µg/kg	TM168	<3
PCB congener 180	<3 µg/kg	TM168	<3
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21
Antimony	<0.6 mg/kg	TM181	1.22
Arsenic	<0.6 mg/kg	TM181	10.4
Barium	<0.6 mg/kg	TM181	62
Cadmium	<0.02 mg/kg	TM181	3.14
Chromium	<0.9 mg/kg	TM181	21.3
Copper	<1.4 mg/kg	TM181	26.7
Iron	<1000	TM181	21200
Lead	mg/kg <0.7 mg/kg	TM181	47.7
Manganese	<0.13	TM181	891
Morouni	mg/kg	TRAADA	0.504
Mercury	<0.14 mg/kg	TM181	0.594
Molybdenum	<0.1 mg/kg	TM181	3.23
Nickel	<0.2 mg/kg	TM181	44.8

Validated



SDG: Location:

170923-92 Client Reference Chartered Land - Heuston Order Number: Client Reference:

2921-028 COC3-H

Report Number: Superseded Report:

	Results Legend		Customer Sample Ref.	2921-BH4-SS2				
m M	ISO17025 accredited. mCERTS accredited.							
aq diss filt	Aqueous / settled sample. Dissolved / filtered sample.		Depth (m)					
tot.unfilt	Total / unfiltered sample.		Sample Type	Soil/Solid (S)				
:	Subcontracted test. % recovery of the surrogate stand	fard to	Date Sampled Sampled Time	21/09/2017				
	check the efficiency of the method results of individual compounds w	d. The	Date Received	23/09/2017				
	samples aren't corrected for the re	ecovery	SDG Ref	170923-92 16241093				
(F) 1-5&+§@	Trigger breach confirmed Sample deviation (see appendix)		Lab Sample No.(s) AGS Reference	10241000				
Compo		LOD/Unit						
Seleniu	n	<1 mg/kg	g TM181	<1				
					9		-	
Zinc		<1.9 mg/l	kg TM181	101				
				N.				
Sulphat	e, Total	<48 mg/k	g TM221	426				
				Λ.				
Sulphide	e, Oxidisable	<0.03 %	TM221	0.127				
Danas	unter maluble	ed in all	- TM000					
Boron, V	vater soluble	<1 mg/kg	g TM222	<1				
				N				
4								
_								
							-	

426771

## **CERTIFICATE OF ANALYSIS**



170923-92 Client Referenc Chartered Land - Heuston Order Number: Report Number: Superseded Report: SDG: Client Reference: 2921-028 COC3-H Location:

PAH by GCMS Results Legend	V-STATE OF	Customer Sample Ref.	2921-BH4-SS2
# ISO17025 accredited.  M mCERTS accredited.			U 1900 000 12 (5 <del>000 0</del>
aq Aqueous / settled sample.		Depth (m)	
ss.filt Dissolved / filtered sample. .unfilt Total / unfiltered sample.		Sample Type	Soll/Solid (S)
<ul> <li>Subcontracted test.</li> </ul>		Date Sampled	21/09/2017
** % recovery of the surrogate state check the efficiency of the meth	ndard to od. The	Sampled Time Date Received	23/09/2017
results of Individual compounds	within	SDG Ref	170923-92
samples aren't corrected for the (F) Trigger breach confirmed		Lab Sample No.(s)	16241093
1-58+5@ Sample deviation (see appendix		AGS Reference	
Component	LOD/Unit		
Naphthalene-d8 % recovery**	%	TM218	98.3
Acenaphthene-d10 % recovery**	%	TM218	90.4
Phenanthrene-d10 % recovery**	%	TM218	86.5
Chrysene-d12 % recovery**	%	TM218	95.2
Perylene-d12 % recovery**	%	TM218	92.5
Naphthalene	<9 µg/kg		13.5
1000			
Acenaphthylene	<12 µg/k		18
Acenaphthene	<8 µg/kį	g TM218	<8
Fluorene	<10 µg/k	g TM218	<10
Phenanthrene	<15 µg/k	g TM218	96.9
Anthracene	<16 µg/k	g TM218	<16
Fluoranthene	<17 µg/k		129
Pyrene			122
	<15 µg/k	<u> </u>	
Benz(a)anthracene	<14 µg/k		70.8
Chrysene	<10 µg/k	rg TM218	70.5
Benzo(b)fluoranthene	<15 µg/k	kg TM218	85
Benzo(k)fluoranthene	<14 µg/k	kg TM218	40.2
Benzo(a)pyrene	<15 µg/k	kg TM218	81.5
Indeno(1,2,3-cd)pyrene	<18 µg/k	kg TM218	34.8
Dibenzo(a,h)anthracene	<23 µg/k		<23
Benzo(g,h,i)perylene	<24 µg/k		51.6
Coronene	<200 µg/	kg TM218	<200
PAH, Total Detected USEPA 16	<118 µg/	kg TM218	814
PAH, Total Detected USEPA 16	<318 µg/	kg TM218	814
+ Coronene			

426771

#### CERTIFICATE OF ANALYSIS

ALS

SDG: 170923-92 Client Reference: 2921-028 COC3-H Report Number:
Location: Chartered Land - Heuston Order Number: Superseded Report:

TPH CWG (S) Customer Sample Ref. 2921-BH4-SS2 # ISO17025 accredited.

M mCERTS accredited.

M mCERTS accredited.

Aqueous / settled 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+§ Sample deviation (see appendix) Depth (m) Sample Type Soil/Solid (S) Date Sampled Sampled Time 21/09/2017 23/09/2017 Date Received 170923-92 16241093 SDG Ref Lab Sample No.(s) AGS Reference Component LOD/Units Method GRO Surrogate % recovery\*\* TM089 70 TM089 GRO TOT (Moisture Corrected) <44 <44 µg/kg TM089 <5 Methyl tertiary butyl ether <5 µg/kg (MTBE) Benzene <10 µg/kg TM089 <10 M Toluene <2 µg/kg TM089 2 42 TM089 Ethylbenzene <3 µg/kg <3 Xylene TM089 <6 <6 µg/kg M o-Xylene <3 µg/kg TM089 <3 M TM089 sum of detected mpo xylene by <9 µg/kg <9 <24 µg/kg TM089 <24 sum of detected BTEX by GC Aliphatics >C5-C6 <10 µg/kg TM089 <10 Aliphatics >C6-C8 <10 µg/kg TM089 <10 Aliphatics >C8-C10 TM089 <10 <10 µg/kg Aliphatics >C10-C12 <10 µg/kg TM089 <10 Aliphatics >C12-C16 <100 µg/kg TM173 1630 Aliphatics >C16-C21 <100 µg/kg TM173 5540 Aliphatics >C21-C35 <100 µg/kg TM173 58100 Aliphatics >C35-C44 <100 µg/kg TM173 44100 I Aliphatics >C12-C44 TM173 109000 <100 µg/kg Aromatics >EC5-EC7 <10 µg/kg TM089 <10 Aromatics >EC7-EC8 <10 µg/kg TM089 <10 Aromatics >EC8-EC10 <10 µg/kg TM089 <10 Aromatics >EC10-EC12 TM089 <10 µg/kg Aromatics >EC12-EC16 <100 µg/kg TM173 <100 Aromatics >EC16-EC21 TM173 3470 <100 µg/kg TM173 67300 Aromatics >EC21-EC35 <100 µg/kg

Aromatics >EC35-EC44

Aromatics >EC40-EC44

Total Aromatics >EC12-EC44

Total Aliphatics & Aromatics

>C5-C44

65400

29200 136000

246000

TM173

TM173

TM173

TM173

<100 µg/kg

<100 µg/kg

<100 µg/kg

<100 µg/kg



Validated

SDG: 170923-92 Client Reference: Location: Chartered Land - Heuston Order Number:

2921-028 COC3-H

Report Number: Superseded Report: 426771

# **Asbestos Identification - Soil**

		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 Receieved SDG Original Sample Method Number	2921-BH4-SS2  SOLID 21/09/2017 00:00:00 26/09/2017 13:24:10 170923-92 16241093 TM048	03/10/17	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

### CERTIFICATE OF ANALYSIS



Case

SDG

Lab Sample Number(s)

Sampled Date

SDG: Location: 170923-92

170923-92

16241093

21-Sep-2017

Client Reference: Chartered Land - Heuston Order Number:

2921-028 COC3-H

Report Number: Superseded Report:

426771

Landfill Waste Acceptance Criteria Limits

Stable

Non-reactive

## **CEN 10:1 SINGLE STAGE LEACHATE TEST**

CEN ANALYTICAL RESU	JLTS		REF: BS EN 12457/2
Client Reference		Site Location	Chartered Land - Heuston South Qu
Mass Sample taken (kg)	0.109	Natural Moisture Content (%)	20.5
Mass of dry sample (kg)	0.090	Dry Matter Content (%)	83
Particle Size <4mm	>95%		
THE CONTRACTOR OF THE PARTY OF		NOTE THE RESIDENCE OF THE PROPERTY OF THE PARTY OF THE PA	

Inert Waste Hazardous 2921-BH4-SS2 Customer Sample Ref. Hazardous Waste Landfill Waste Landfill in Non-Hazardous Depth (m) Landfill Solid Waste Analysis Result 1.12 3 Organic Carbon (%) 5.01 Loss on Ignition (%) Sum of BTEX (mg/kg) < 0.024 6 Sum of 7 PCBs (mg/kg) <0.021 Mineral Oil (mg/kg) 22.8 500 PAH Sum of 17 (mg/kg) pH (pH Units) 8.5 ANC to pH 6 (mol/kg)

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in :	10:1 eluate (mg/l)	A2 10:1 cor	A2 10:1 conc <sup>n</sup> leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 I/kg		
	Result	Limit of Detection	Result	Limit of Detection				
Arsenic	0.00139	<0.0005	0.0139	<0.005	0.5	2	25	
Barium	0.00747	<0.0002	0.0747	<0.002	20	100	300	
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5	
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70	
Copper	0.00194	<0.0003	0.0194	<0.003	2	50	100	
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2	
Molybdenum	0.0125	<0.0005	0.125	<0.005	0.5	10	30	
Nickel	0.00104	<0.0004	0.0104	<0.004	0.4	10	40	
Lead	0.000358	<0.0002	0.00358	<0.002	0.5	10	50	
nony	0.000757	<0.0001	0.00757	<0.001	0.06	0.7	5	
nium	0.00096	<0.0005	0.0096	<0.005	0.1	0.5	7	
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200	
Chloride	<2	<2	<20	<20	800	15000	25000	
Fluoride	<0.5	<0.5	<5	<5	10	150	500	
Sulphate (soluble)	8.9	<2	89	<20	1000	20000	50000	
Total Dissolved Solids	86.2	<5	862	<50	4000	60000	10000	
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	27-Sep-2017
pH (pH Units)	8.79
Conductivity (µS/cm)	107.00
Temperature (°C)	15.20
Volume Leachant (Litres)	0.882

J Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation Mcerts Certification does not apply to leachates

04/10/2017 13:02:00





SDG: Location: 170923-92

Client Reference: Chartered Land - Heuston Order Number:

2921-028 COC3-H

Report Number: Superseded Report:

426771

# Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample '	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis	Campie	Somected
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		
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		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
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		
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		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

<sup>&</sup>lt;sup>1</sup> Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

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



Validated

SDG: Location:

170923-92 Client Reference: Chartered Land - Heuston Order Number:

2921-028 COC3-H

Report Number: Superseded Report:

426771

# **Test Completion Dates**

Lab Sample N	lo(s) 16241093
Customer Sample	Ref. 2921-BH4-SS2
AGS	Ref.
De	epth
	Type Soil/Solid (S
Anions by Kone (w)	29-Sep-2017
Asbestos ID in Solid Samples	03-Oct-2017
Boron Water Soluble	28-Sep-2017
CEN 10:1 Leachate (1 Stage)	27-Sep-2017
CEN Readings	28-Sep-2017
Cyanide Comp/Free/Total/Thiocyanate	29-Sep-2017
Dissolved Metals by ICP-MS	29-Sep-2017
Dissolved Organic/Inorganic Carbon	29-Sep-2017
EPH CWG (Aliphatic) GC (S)	28-Sep-2017
EPH CWG (Aromatic) GC (S)	28-Sep-2017
Fluoride	29-Sep-2017
GRO by GC-FID (S)	30-Sep-2017
Hexavalent Chromium (s)	29-Sep-2017
rs on Ignition in soils	04-Oct-2017
ry Dissolved	29-Sep-2017
als by iCap-OES Dissolved (W)	29-Sep-2017
Metals in solid samples by OES	02-Oct-2017
Mineral Oil	29-Sep-2017
PAH by GCMS	28-Sep-2017
PCBs by GCMS	28-Sep-2017
pH	27-Sep-2017
Phenois by HPLC (S)	29-Sep-2017
Phenois by HPLC (W)	29-Sep-2017
Sample description	26-Sep-2017
Total Dissolved Solids	28-Sep-2017
Total Organic Carbon	28-Sep-2017
Total Sulphate	29-Sep-2017
Total Sulphur	28-Sep-2017
TPH CWG GC (S)	30-Sep-2017

### CERTIFICATE OF ANALYSIS



SDG: Location: 170923-92

Client Reference: Chartered Land - Heuston Order Number:

2921-028 COC3-H

Report Number: Superseded Report:

426771

# Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : Sample ID:

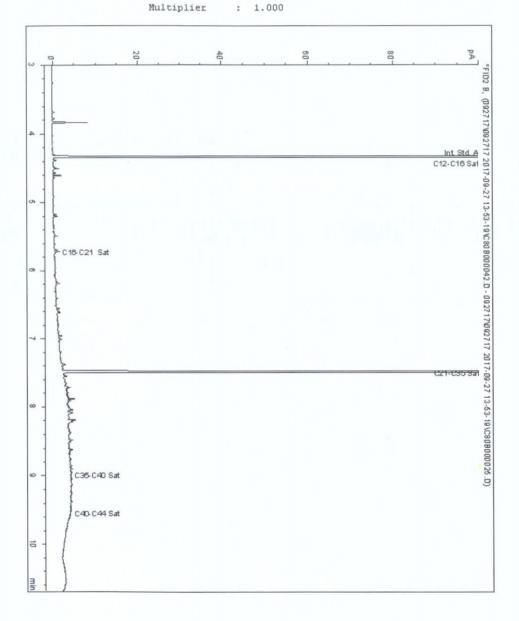
16251125 2921-BH4-SS2 Depth:

Alcontrol/Geochem Analytical Services Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 15212834-

Date Acquired : 28/09/17 02:11:51

Units ppb Dilution CF





Validated

SDG: Location: 170923-92

Client Reference: Chartered Land - Heuston Order Number:

2921-028 COC3-H

Report Number: Superseded Report:

426771

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

Sample No: Sample ID:

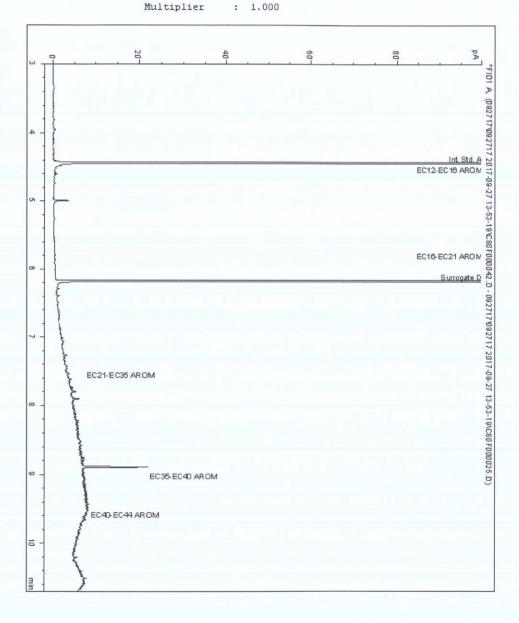
16251125 2921-BH4-SS2 Depth:

Speciated TPH - AROMS ( C12 - C44)

Sample Identity: 15212835-

Date Acquired : 28/09/17 02:11:51

Units : ppb Dilution CF : 1 1.000







SDG: Location: 170923-92

Chartered Land - Heuston Order Number:

Client Reference:

2921-028 COC3-H

Report Number: Superseded Report:

426771

# Chromatogram

Analysis: Mineral Oil

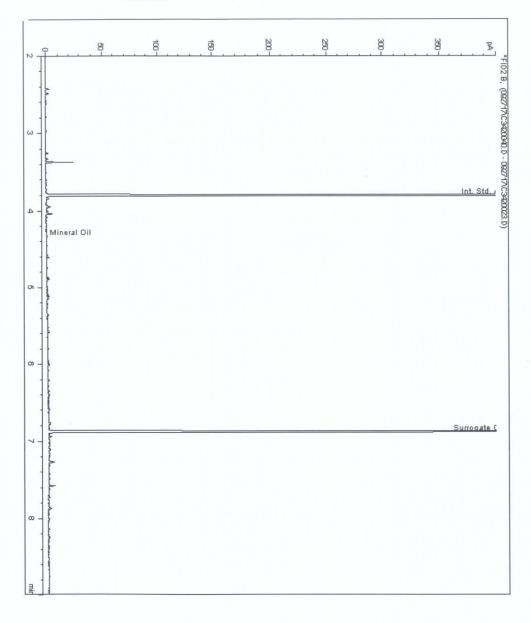
Sample No: Sample ID:

16256227 2921-BH4-SS2 Depth:

Mineral Oil Range Organics ( ClO - C40 )

15212837-28/09/17 15:43:07 PM mg/kg 0.000

Sample Identity Date Acquired Units Sample Multiplier Dilution





Validated

SDG: Location:

170923-92

Client Reference: Chartered Land - Heuston Order Number:

2921-028 COC3-H

Report Number: Superseded Report:

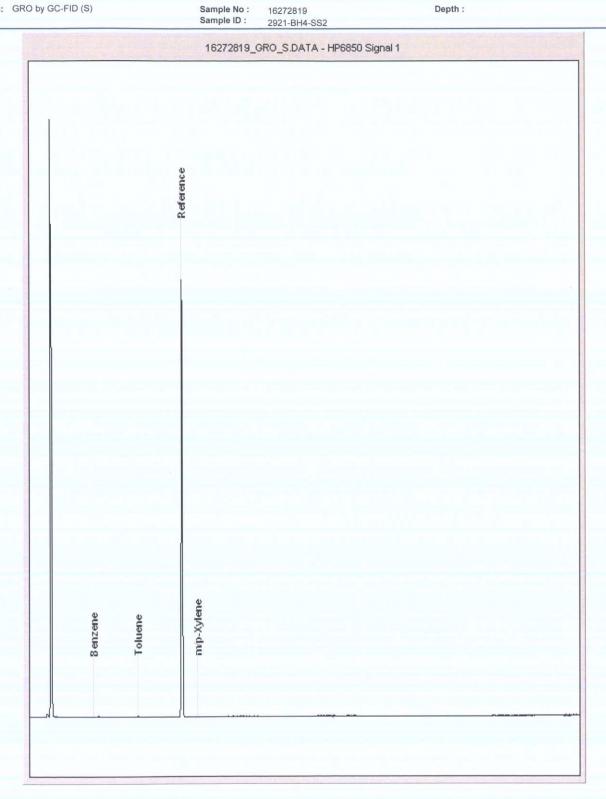
426771

# Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : Sample ID :

Depth:





SDG: Location: 170923-92 Client Reference: rtered Land - Heuston South Qua Order Number:

2921-028 COC3-H

Report Number: Superseded Report: 426771

# **Appendix**

#### General

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

- 21. 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.
- 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

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	Holding time exceeded before sample received
5	Samples exceeded holding time before presevation was performed
§	Sampled on date not provided
	Sample holding time exceeded in laboratory
<u>a</u>	Sample holding time exceeded due to sampled on date
ž	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 ALS (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 ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotle	White Asbestos
Amosite	Brown Asbests
Cro d dolite	Blue Asbe stos
Fibrous Act nolite	
Ribrous 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 th scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park Manor Road (off Manor Lane) Hawarden Deeside CH5 3US

> Tel: (01244) 528700 Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com Website: www.alsenvironmental.co.uk

Minerex Environmental Taney hall Eglinton Terrace Dundrum Dublin Dublin 14

Attention: Caitriona Keogh

## **CERTIFICATE OF ANALYSIS**

Date:

Customer:

Sample Delivery Group (SDG):

Your Reference:

Location:

Report No:

05 October 2017

D\_MINEREX\_DUB

170926-68

2921-028 COC4-B

CHARTERED LAND - HEUSTON SOUTH QUARTER

427005

We received 1 sample on Tuesday September 26, 2017 and 1 of these samples were scheduled for analysis which was completed on Thursday October 05, 2017. 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 Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:

Sonia McWhan
Operations Manager





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Validated

SDG: Location: 170926-68

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-B

Report Number: Superseded Report:

427005

# **Received Sample Overview**

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
16252119	2921-BH4-COMP-SS9		1.85 - 4.00	21/09/2017

Maximum Sample/Coolbox Temperature (°C):

13.8

ISO5667-3 Water quality - Sampling - Part3 - During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of  $(5\pm3)^{\circ}$ C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



SDG: Location: 170926-68 Client Reference: CHARTERED LAND - HElOrder Number: 2921-028 COC4-B

Report Number: Superseded Report:

Results Legend						
X Test	Test Lab Sample No(s)					
No Determination Possible					61175791	
Sample Types	Customer Sample Reference				2921-BH4-COMP-SS	
S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate	Soil/Solid US - Unspecified Solid V - Ground Water V - Surface Water  AGS Reference				0	
PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage	Depth (					
US - Untreated Sewage  - Recreational Water  - Drinking Water Non-regulatory	Contain	ner	250g Amber Jar (ALE210)	400g Tub (ALE214)	(ALE215)	
OTH - Other	Sample 1	уре	S	S	U.	
Anions by Kone (w)	All	NDPs: 0 Tests: 1		X		
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 1		X		
Boron Water Soluble	All	NDPs: 0 Tests: 1	X			
CEN Readings	All	NDPs: 0 Tests: 1		X		
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1	Х			
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1		Х		
olved Organic/Inorganic	All	NDPs: 0 Tests: 1		Х		
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 1	Х			
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 1	х			
Fluoride	All	NDPs: 0 Tests: 1		Х		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 1			X	
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 1	X			
Loss on Ignition in soils	All	NDPs: 0 Tests: 1	X			
Mercury Dissolved	All	NDPs: 0 Tests: 1		X		
als by iCap-OES Dissolved (W)	All	NDPs: 0 Tests: 1		X		

## **CERTIFICATE OF ANALYSIS**



 SDG:
 170926-68
 Client Reference:
 2921-028 COC4-B
 Report Number:
 427005

 Location:
 CHARTERED LAND - HElOrder Number:
 Superseded Report:

(ALS) Location:	CHARTERED LAND - HEIOrder Number:							
Results Legend  X Test  No Determination	Lab Sa	ample No(s)	16252119 2921-BH4-COMP-SS					
Possible  Sample Types -		Customer Sample Reference						
S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate	AGS	Reference						
PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage	De	epth (m)			1.85 - 4.00			
US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas	Co	ontainer	250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)			
OTH - Other	Sam	ple Type	S	S	S			
Metals in solid samples by OES	All	NDPs: 0 Tests: 1	Х					
Mineral Oil	All	NDPs: 0 Tests: 1	х					
PAH by GCMS	All	NDPs: 0 Tests: 1	X					
PCBs by GCMS	All	NDPs: 0 Tests: 1	X					
рН	All	NDPs: 0 Tests: 1	X					
Phenois by HPLC (S)	All	NDPs: 0 Tests: 1	X					
Phenois by HPLC (W)	All	NDPs: 0 Tests: 1		X				
Sample description	All	NDPs: 0 Tests: 1	Х					
Total Dissolved Solids	All	NDPs: 0 Tests: 1		X				
Total Organic Carbon	All	NDPs: 0 Tests: 1	X					
Total Sulphate	All	NDPs: 0 Tests: 1	X					
Total Sulphur	All	NDPs: 0 Tests: 1	X					
TPH CWG GC (S)	All	NDPs: 0 Tests: 1	X					



Validated

SDG: Location: 170926-68

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-B

Report Number: Superseded Report:

427005

# **Sample Descriptions**

#### **Grain Sizes**

very fine <0.0	63mm fine	0.063mm - 0.1mm	medium 0.1	mm - 2mm c	oarse 2mm -	10mm very coarse	>10mr
Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2	
16252119	2921-BH4-COMP-SS9	1.85 - 4.00	Grey	Stone/Soil	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.

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

# **CERTIFICATE OF ANALYSIS**



SDG: Location:

170926-68 Client Reference: CHARTERED LAND - HEl**Order Number**:

2921-028 COC4-B

Report Number: Superseded Report:

Results Legend	Cu	ustomer Sample Ref.	2921-BH4-COMP-S				
# ISO17025 accredited.  M mCERTS accredited.			S9				
aq Aqueous / settled sample.		Depth (m)	1.85 - 4.00				
iss.filt Dissolved / filtered sample. t.unfilt Total / unfiltered sample.		Sample Type	Soil/Solid (S)				
<ul> <li>Subcontracted test.</li> </ul>		Date Sampled	21/09/2017				
" % recovery of the surrogate stand check the efficiency of the metho		Sampled Time	26/09/2017				
results of individual compounds	within	Date Received SDG Ref	170926-68				
samples aren't corrected for the r (F) Trigger breach confirmed	ecovery	Lab Sample No.(s)	16252119				
-5&+§@ Sample deviation (see appendix)		AGS Reference					
Component	LOD/Units	Method					
Noisture Content Ratio (% of as	%	PM024	12				
eceived sample)							
oss on ignition	<0.7 %	TM018	1.37				
Mineral oil >C10-C40	<1 mg/kg	TM061	144	#			
Mineral Oil Surrogate %	%	TM061	79.3				
recovery**							
Phenol	<0.01 mg/kg	TM062 (S)	<0.01	#			
Organic Carbon, Total	<0.2 %	TM132	0.66	#			
Sulphur, Total	<0.02 %	TM132	0.132	п			
Sulphate, Total potential	<0.06 %	TM132	0.396				
			20000000				
pH	1 pH Units	TM133	8.82	#			
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6	#			
Cyanide, Total	<1 mg/kg	TM153	<1	#			
Cyanide, Free	<1 mg/kg	TM153	<1				
PCB congener 28	<3 µg/kg	TM168	<3	#			
PCB congener 52	<3 µg/kg	TM168	<3	#			
PCB congener 101	<3 µg/kg	TM168	<3	#			
PCB congener 118	<3 µg/kg	TM168	<3	#	1		
PCB congener 138	<3 µg/kg	TM168	<3	#			
				#			
PCB congener 153	<3 µg/kg	TM168	<3	#			
PCB congener 180	<3 µg/kg	TM168	<3	#			
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21				
Antimony	<0.6 mg/kg	TM181	0.639				
Arsenic	<0.6 mg/kg	TM181	7.48	#			
Barium	<0.6 mg/kg	TM181	54.9	#			
Cadmium	<0.02	TM181	1.15	#			
	mg/kg			#			
Chromium	<0.9 mg/kg	TM181	4.56	#			
Copper	<1.4 mg/kg	TM181	13.7	#			
ron	<1000 mg/kg	TM181	11600	#			
_ead	<0.7 mg/kg	TM181	30				
Manganese	<0.13	TM181	711	#			
Mercury	mg/kg <0.14	TM181	0.417	#			
	mg/kg			#			
Molybdenum	<0.1 mg/kg	TM181	2.14	#			
Nickel	<0.2 mg/kg	TM181	19.7				1



SDG: Location:

170926-68 Client Reference: CHARTERED LAND - HEl**Order Number**:

2921-028 COC4-B

Report Number: Superseded Report:

	Results Legend		Customer Sample Ref.	2921-BH4-COMP-S			
# M	ISO17025 accredited. mCERTS accredited.			S9			
aq	Aqueous / settled sample. Dissolved / filtered sample.		Depth (m)	1.85 - 4.00			
tot.unfilt	Total / unfiltered sample.		Sample Type	Soil/Solid (S)			
	Subcontracted test.		Date Sampled	21/09/2017			
	% recovery of the surrogate stand check the efficiency of the method	ard to	Sampled Time Date Received	26/09/2017			
	results of individual compounds w	rithin	SDG Ref	170926-68			
(F)	samples aren't corrected for the re Trigger breach confirmed	covery	Lab Sample No.(s)	16252119			
1-5&+5@	Sample deviation (see appendix)		AGS Reference				
Compo	nent	LOD/Unit	ts Method				
Seleniu	m	<1 mg/k	g TM181	<1			
				#			
Zinc		<1.9 mg/	kg TM181	69.6			
Lino		T.o mg/	1111101	#			
Sulphat	in Total	<48 mg/l	g TM221	297			
Sulphat	e, rotal	<46 mg/r	(g   11/1221				
	CONTRACTOR DE CONTRACTOR			#			
Sulphid	e, Oxidisable	<0.03 %	5 TM221	0.366			
Boron,	water soluble	<1 mg/k	g TM222	<1			
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## **CERTIFICATE OF ANALYSIS**



SDG: Location:

170926-68 Client Referenc CHARTERED LAND - HEl**Order Number:** Client Reference:

2921-028 COC4-B

Report Number: Superseded Report:

PAH by GCMS Results Legend		ustomer Comple Det I	2004 2014 2017	_			
# ISO17025 accredited.  M mCERTS accredited.	C	Customer Sample Ref.	2921-BH4-COMP-S S9				
aq Aqueous / settled sample.							
diss.filt Dissolved / filtered sample.		Depth (m)	1.85 - 4.00				
ot.unfilt Total / unfiltered sample.  * Subcontracted test.		Sample Type Date Sampled	Soil/Solid (S) 21/09/2017				
** % recovery of the surrogate stand	dard to	Sampled Time	2110312017				
check the efficiency of the metho	d. The	Date Received	26/09/2017				
results of individual compounds amples aren't corrected for the r	within	SDG Ref	170926-68				
<ul><li>(F) Trigger breach confirmed</li></ul>	ocoroly	Lab Sample No.(s)	16252119				
1-5&+§@ Sample deviation (see appendix)		AGS Reference					
Component	LOD/Units	Method			_		
Naphthalene-d8 % recovery**	%	TM218	98.8				
Acenaphthene-d10 %	%	TM218	93.8				
recovery**			0.00000				
Phenanthrene-d10 % recovery**	%	TM218	91.7				
Chrysene-d12 % recovery**	%	TM218	94.1				
Perylene-d12 % recovery**	%	TM218	96.1				
Naphthalene	<9 µg/kg	TM218	<9				
Acenaphthylene	<12 ua/ka	TM218	<12				
	<12 µg/kg		#				
Acenaphthene	<8 µg/kg	TM218	<8 #				
Fluorene	<10 µg/kg	TM218	<10				
Phenanthrene	<15 µg/kg	TM218	17.4				
Anthracene	<16 µg/kg	TM218	<16				
Anthracene			#				
Fluoranthene	<17 µg/kg	TM218	<17 #				
Pyrene	<15 µg/kg	TM218	25 #				
Benz(a)anthracene	<14 µg/kg	TM218	17.9 #				
Chrysene	<10 µg/kg	TM218	15.5				
Benzo(b)fluoranthene	<15 µg/kg	TM218	29.5				
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14				
Benzo(a)pyrene	<15 µg/kg	TM218	20.1				
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18				
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23				
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24				
Coronene	<200 µg/kg	TM218	<200				
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	125				
PAH, Total Detected USEPA 16 + Coronene	<318 µg/kg	TM218	<318				

### **CERTIFICATE OF ANALYSIS**

SDG: Location:

170926-68 Client Reference CHARTERED LAND - HElOrder Number: Client Reference: 2921-028 COC4-B

Report Number: Superseded Report:

427005

# ISO17025 accredited.  M mCERTS accredited. aq Aqueous / settled sample. Dissolved / filtered sample. tot.unfilt Total / unfiltered sample.						
diss.filt Dissolved / filtered sample.			S9			
		Depth (m)	1.85 - 4.00			
ot.unfilt Total / unfiltered sample.		Sample Type	Soll/Solid (S)			
* Subcontracted test.		Date Sampled	21/09/2017			
** % recovery of the surrogate stands	ard to	Sampled Time	2110312011			
check the efficiency of the method	. The		26/00/2017			
results of individual compounds w	rithin	Date Received	26/09/2017			
samples aren't corrected for the re	covery	SDG Ref	170926-68			
(F) Trigger breach confirmed		Lab Sample No.(s)	16252119			
-5&+§@ Sample deviation (see appendix)		AGS Reference				
Component	LOD/Units	Method				
GRO Surrogate % recovery**	%	TM089	65			
onto carrogato in receiving		1111000	55			
GRO TOT (Moisture Corrected)	<44 µg/kg	TM089	2240 #			
Methyl tertiary butyl ether	<5 µg/kg	TM089	<5			
(MTBE)	- 15 5	Indiana.	#			
Benzene	<10 µg/kg	TM089	<10			
			#			
Toluene	<2 µg/kg	TM089	2.26			
variable of the second	- 69,19					
			#			
Ethylbenzene	<3 µg/kg	TM089	<3			
			#			
Videne	4C N	TMOOO				
Xylene	<6 µg/kg	TM089	<6			
			#			
o-Xylene	<3 µg/kg	TM089	<3			
	o pg/ng	1,11000				- 25
			#			
sum of detected mpo xylene by	<9 µg/kg	TM089	<9			
GC						
	0.1	W11000			_	
sum of detected BTEX by GC	<24 µg/kg	TM089	<24			
Aliphatics >C5-C6	<10 µg/kg	TM089	15.8			
Aliphatics >05-00	∼то µд/кд	110009	10.0			
Aliphatics >C6-C8	<10 µg/kg	TM089	29.4			
•	100	NA DARKOWSKI			A CONTRACTOR OF THE PARTY OF TH	
Aliphatics >C8-C10	<10 µg/kg	TM089	271			
Aliphatics >C10-C12	<10 µg/kg	TM089	1040			
IIIpriatics - 010-012	то ружу	110000	1040			
Aliphatics >C12-C16	<100 µg/kg	TM173	53300			
	1,0					
11.1.1. 010.001	100 11	T11170			_	
Aliphatics >C16-C21	<100 µg/kg	TM173	88000	The second second second second		
Aliphatics >C21-C35	<100 µg/kg	TM173	41900			
	, oo pg/kg	1.00	71000			
Aliphatics >C35-C44	<100 µg/kg	TM173	694			
		1111/11/11/11/11/11				
LARLE R. GOOGLE	-100 "	711170	404000			
! Aliphatics >C12-C44	<100 µg/kg	TM173	184000			
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10			
	pg/ng	1111000	-10			
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10			
		0.0000000000000000000000000000000000000				
	-40 "	TAIOCC	404			
Aromatics >EC8-EC10	<10 µg/kg	TM089	181			
Aromatics >EC10-EC12	<10 µg/kg	TM089	695			
	, o pg/ng		000			
Aromatics >EC12-EC16	<100 µg/kg	TM173	12100			
	, , ,					
	100 -	T14470	00700			
Aromatics >EC16-EC21	<100 µg/kg	TM173	36700			
WINNEY TO MESSAGE TO THE PROPERTY OF THE PROPE						
	100 0	TM173	30100			
COLORDO EL MARANTE A COMPANION EL MESTANO EL MARANTE DE CARRESTA D		LIMIT O	30100			
Aromatics >EC21-EC35	<100 µg/kg					
COLORDO EL MARANTE A COMPANION EL MESTANO EL MARANTE DE CARRESTA D	<100 µg/kg					
COLORDO EL MARANTE A COMPANION EL MESTANO EL MARANTE DE CARRESTA D		TM173	6980			
Aromatics >EC21-EC35	<100 µg/kg	TM173	6980			
Aromatics >EC21-EC35		TM173	6980			

Total Aromatics >EC12-EC44

Total Aliphatics & Aromatics >C5-C44

<100 µg/kg

<100 µg/kg

TM173

TM173

85900



Validated

 SDG:
 170926-68
 Client Reference:
 2921-028 COC4-B
 Report Number:
 427005

 Location:
 CHARTERED LAND - HElOrder Number:
 Superseded Report:

# **Asbestos Identification - Soil**

		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 Receieved SDG Original Sample Method Number	2921-BH4-COMP-SS 9 1.85 - 4.00 SOLID 21/09/2017 00:00:00 27/09/2017 12:43:36 170926-68 16252119 TM048	04/10/17	Eva Guerra		Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



Validated

SDG: 170926-68 Client Reference: Location: CHARTERED LAND - HElOrder Number:

2921-028 COC4-B

Report Number: Superseded Report:

427005

### **CEN 10:1 SINGLE STAGE LEACHATE TEST**

CEN ANALYTICAL RESU	LTS					REF : BS	EN 12457/	
Client Reference		Site Location		CHARTERED LAND - HEUSTON				
/lass Sample taken (kg)	0.103		Natural Moistu	re Content (%)	13.6			
	0.090				88			
Mass of dry sample (kg)			Dry Matter Cor	itent (%)	88			
Particle Size <4mm	>95%							
Case					Land	fill Waste Acce	otance	
BDG	170926-68					Criteria Limits		
ab Sample Number(s)	16252119					The same of the same		
Sampled Date	21-Sep-2017					Stable		
Customer Sample Ref.	2921-BH4-COM	AP-SS9			Inert Waste	Non-reactive Hazardous Waste	Hazardous	
10.7	1.85 - 4.00	WI -003			Landfill	in Non-	Waste Landfill	
Depth (m)	1.65 - 4.00					Hazardous Landfill		
Solid Waste Analysis	Result							
Organic Carbon (%)	0.66	7 7 1 1	-		3	5	6	
uss on Ignition (%)	1.37				-	-	10	
ium of BTEX (mg/kg)	<0.024				6			
sum of 7 PCBs (mg/kg)	<0.021				500			
fineral Oil (mg/kg) AH Sum of 17 (mg/kg)	144				500			
H (pH Units)	8.82				-	>6		
NC to pH 6 (mol/kg)					-		-	
NC to pH 4 (mol/kg)	-							
Tuete Analysis	C <sub>2</sub> Conc <sup>n</sup> in	10:1 eluate (mg/l)	A2 10:1 cor	ic <sup>n</sup> leached (mg/kg)		ues for compliance lea		
Eluate Analysis	Result	Limit of Detection	Result	Limit of Detection	using BS EN 12457-3 at L/S 10 I/kg			
rsenic	0.00246	<0.0005	0.0246	<0.005	0.5	2	25	
Barium	0.00717	<0.0002	0.0717	<0.002	20	100	300	
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5	
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70	
Copper	0.00111	< 0.0003	0.0111	< 0.003	2	50	100	
Mercury Dissolved (CVAF)	< 0.00001	<0.00001	< 0.0001	<0.0001	0.01	0.2	2	
Molybdenum	0.00928	<0.0005	0.0928	<0.005	0.5	10	30	
lickel	0.000953	<0.0004	0.00953	<0.004	0.4	10	40	
ead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50	
nony	0.00155	<0.0001	0.0155	<0.001	0.06	0.7	5	
nium	0.00164	<0.0005	0.0164	<0.005	0.1	0.5	7	
line	<0.001	<0.001	<0.01	<0.01	4	50	200	
Chloride	2.5	<2	25	<20	800	15000	25000	
luoride	<0.5	<0.5	<5	<5	10	150	500	
Sulphate (soluble)	23.3	<2	233	<20	1000	20000	50000	
otal Dissolved Solids	90.6	<5	906	<50	4000	60000	100000	
otal Monohydric Phenols (W)	< 0.016	<0.016	< 0.16	<0.16	1	-		
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000	
				DCC PLAN RECETVED	MT - 4420			

#### **Leach Test Information**

Date Prepared 01-Oct-2017 pH (pH Units) 8.97 Conductivity (µS/cm) 116.00 Temperature (°C) 18.60 Volume Leachant (Litres) 0.888

Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation Mcerts Certification does not apply to leachates

05/10/2017 13:51:55





SDG: Location: 170926-68 Client Referenc CHARTERED LAND - HElOrder Number:

Client Reference:

2921-028 COC4-B

Report Number: Superseded Report:

427005

# Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample 1	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis	Jampie	Corrected
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		
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		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
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		
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		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

<sup>&</sup>lt;sup>1</sup> Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

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



Validated

SDG:

SDG: 170926-6 Location: CHARTE

170926-68 Client Reference: CHARTERED LAND - HElOrder Number: 2921-028 COC4-B

Report Number: Superseded Report: 427005

## **Test Completion Dates**

Lab S	ample No(s)	16252119
Customer	Sample Ref.	2921-BH4-COMP-S S9
	AGS Ref.	
	Depth	1.85 - 4.00
	Type	Soil/Solid (S)
Anions by Kone (w)		03-Oct-2017
Asbestos ID in Solid Samples		04-Oct-2017
Boron Water Soluble		03-Oct-2017
CEN 10:1 Leachate (1 Stage)		01-Oct-2017
CEN Readings		03-Oct-2017
Cyanide Comp/Free/Total/Thiocyanate		02-Oct-2017
Dissolved Metals by ICP-MS		04-Oct-2017
Dissolved Organic/Inorganic Carbon		03-Oct-2017
EPH CWG (Aliphatic) GC (S)		02-Oct-2017
EPH CWG (Aromatic) GC (S)		02-Oct-2017
Fluoride		04-Oct-2017
GRO by GC-FID (S)		03-Oct-2017
Hexavalent Chromium (s)		02-Oct-2017
' ass on Ignition in soils		05-Oct-2017
ary Dissolved		03-Oct-2017
als by iCap-OES Dissolved (W)		04-Oct-2017
Metals in solid samples by OES		04-Oct-2017
Mineral Oil		04-Oct-2017
PAH by GCMS		04-Oct-2017
PCBs by GCMS		03-Oct-2017
pH		27-Sep-2017
Phenols by HPLC (S)		02-Oct-2017
Phenois by HPLC (W)		05-Oct-2017
Sample description		27-Sep-2017
Total Dissolved Solids		02-Oct-2017
Total Organic Carbon		04-Oct-2017
Total Sulphate		03-Oct-2017
Total Sulphur		02-Oct-2017
TPH CWG GC (S)		03-Oct-2017

#### **CERTIFICATE OF ANALYSIS**



SDG: Location: 170926-68

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-B

Report Number: Superseded Report:

427005

## Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

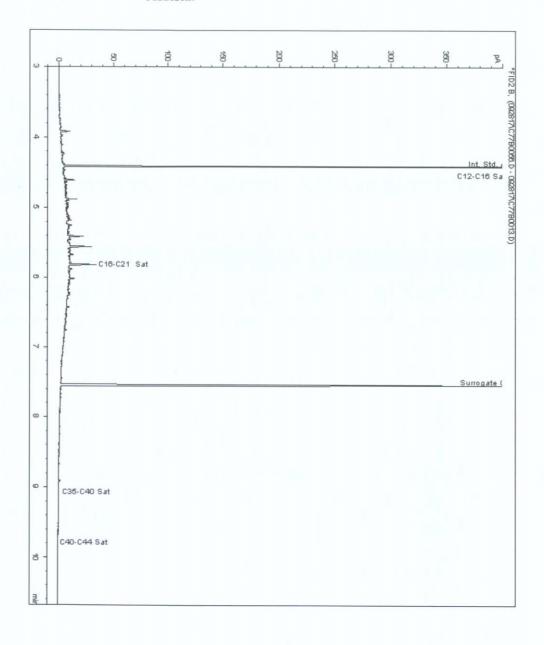
Sample No : Sample ID : 16258006

2921-BH4-COMP-SS9

Depth: 1.85 - 4.00

Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 15223363-Date Acquired : 29/09/2017 07:14:39 PM Units : ppb Dilution:





Validated

SDG: Location: 170926-68

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-B

Report Number: Superseded Report:

427005

## Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

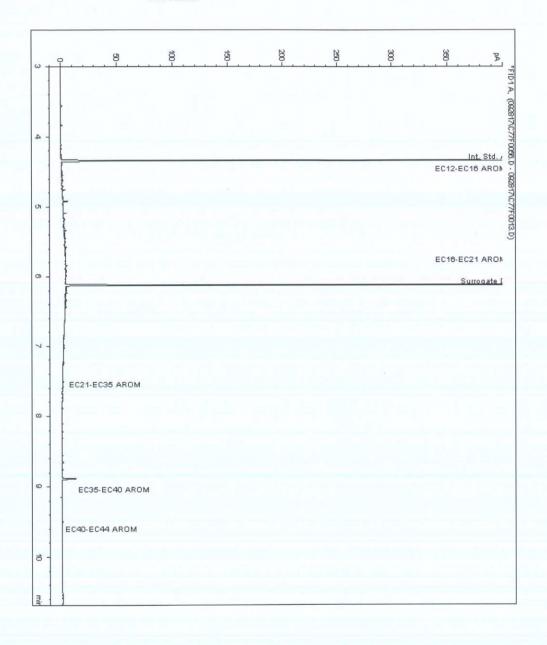
Sample No : 16258006

Sample ID: 2921-BH4-COMP-SS9 Depth: 1.85 - 4.00

Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 15223364-Date Acquired : 29/09/2017 07:14:39 PM Units : ppb

Dilution:







SDG: Location:

170926-68 Client Referenc CHARTERED LAND - HElOrder Number: Client Reference:

2921-028 COC4-B

Report Number: Superseded Report:

427005

Chromatogram

Analysis: Mineral Oil

Sample No : Sample ID :

16268975

Depth: 1.85 - 4.00

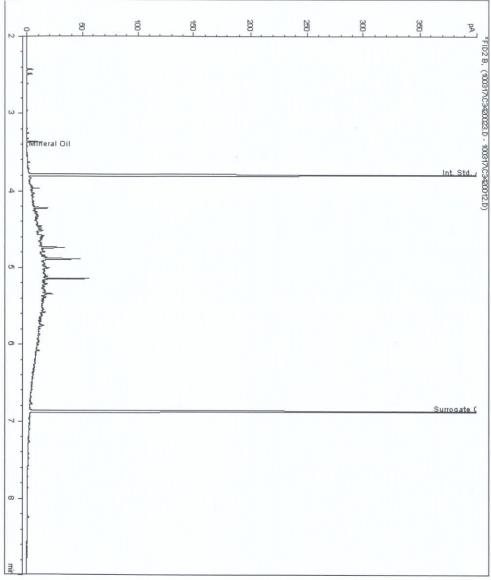
2921-BH4-COMP-SS9 Mineral Oil Range Organics ( ClO - C40 )

Sample Identity Date Acquired Units

15223366-03/10/17 19:23:46 PM mg/kg 0.000

Sample Multiplier Dilution







Validated

SDG: Location:

170926-68 Client Reference
CHARTERED LAND - HEIOrder Number: Client Reference: 2921-028 COC4-B

Report Number: Superseded Report:

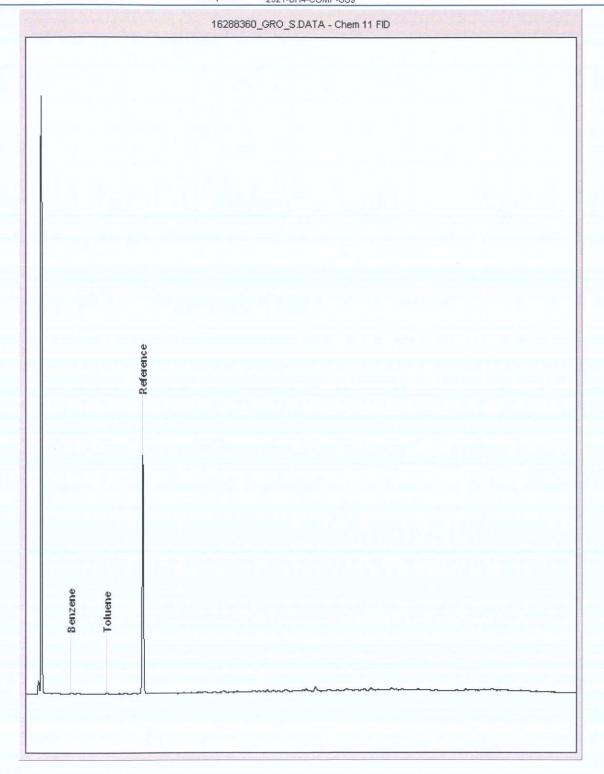
427005

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : Sample ID :

16288360 2921-BH4-COMP-SS9 Depth: 1.85 - 4.00





SDG: Location: 170926-68 Client Reference: ED LAND - HEUSTON SOUTH | Order Number: 2921-028 COC4-B

Report Number: Superseded Report: 427005

## **Appendix**

#### General

- 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. ALS reserve the right to charge for samples received and stored but not analysed.
- 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 TMO48 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.
- 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).
- 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.
- 20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

- 21. 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.
- 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

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	Holding time exceeded before sample received
5	Samples exceeded holding time before presevation 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 ALS (Hawarden) in-house method of transmitted/polarised light microscopy an 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 ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysofile	White Asbests
Amosite	BrownAsbestos
Cro d dolite	Blue Asbe stos
Fibrous Aclinolite	3
Rb to us Anthop hyll ite	
ibrous Tremalite	9

#### 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.



Minerex Environmental Taney hall Eglinton Terrace Dundrum Dublin Dublin 14

Attention: Caitriona Keogh

Unit 7-8 Hawarden Business Park Manor Road (off Manor Lane) Hawarden Deeside CH5 3US

> Tel: (01244) 528700 Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com Website: www.alsenvironmental.co.uk

### **CERTIFICATE OF ANALYSIS**

Date:

Customer:

Sample Delivery Group (SDG):

Your Reference:

Location:

Report No:

05 October 2017

D\_MINEREX\_DUB

170926-70

2921-028 COC4-E

CHARTERED LAND - HEUSTON SOUTH QUARTER

427006

We received 1 sample on Tuesday September 26, 2017 and 1 of these samples were scheduled for analysis which was completed on Thursday October 05, 2017. 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 Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager









Validated

SDG: Location: 170926-70

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-E

Report Number: Superseded Report:

427006

# **Received Sample Overview**

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
16252184	2921-BH5-COMP-SS6		0.30 - 2.50	21/09/2017

Maximum Sample/Coolbox Temperature (°C):

13.8

ISO5667-3 Water quality - Sampling - Part3 - During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of  $(5\pm3)^{\circ}$ C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



Validated

 SDG:
 170926-70
 Client Reference:
 2921-028 COC4-E
 Report Number:
 427006

 Location:
 CHARTERED LAND - HElOrder Number:
 Superseded Report:

Results Leger	nd					7
X Test		Lab Sa	mple No(s)			10202104
No Do Poss	etermination ible					
		Cu				
Comple Tunca		Sample	Reference			6
Sample Types S - Soil/Solid UNS - Unspecifi GW - Ground W SW - Surface W	ed Solid ater	AGS I	Reference			-
LE - Land Leach PL - Prepared Li PR - Process W	eachate ater					0.0
SA - Saline Wate TE - Trade Efflue TS - Treated Se US - Untreated S	ent wage Sewage	De	pth (m)			
- Recreation - Drinking Wa - NL - Unspecific SL - Sludge G - Gas	ter Non-regulatory	Co	ntainer	250g Amber Jar (ALE210)	400g Tub (ALE214)	(ALE215)
OTH - Other		Sam	ple Type	(y)	co	(
Anions by Kone	(w)	All	NDPs: 0 Tests: 1		X	
Asbestos ID in S	olid Samples	All	NDPs: 0 Tests: 1		X	
Boron Water Sol	uble	All	NDPs: 0 Tests: 1		^	
CEN Readings		All	NDPs: 0 Tests: 1	X	X	
Cyanide Comp/Free/Tota	I/Thiocyanate	All	NDPs: 0 Tests: 1	X		
Dissolved Metals	s by ICP-MS	All	NDPs: 0 Tests: 1		X	
olved Organ	ic/Inorganic	All	NDPs: 0 Tests: 1		X	
EPH CWG (Aliph	natic) GC (S)	All	NDPs: 0 Tests: 1	X	^	
EPH CWG (Aror	natic) GC (S)	All	NDPs: 0 Tests: 1	X		
Fluoride		All	NDPs: 0 Tests: 1		X	
GRO by GC-FID	(S)	All	NDPs: 0 Tests: 1			X
Hexavalent Chro	omium (s)	All	NDPs: 0 Tests: 1	X		
Loss on Ignition	in soils	All	NDPs: 0 Tests: 1	X		
Mercury Dissolve	ed	All	NDPs: 0 Tests: 1		X	
als by iCan-0	DES Dissolved (W)	All	NDPs: 0		222	

## **CERTIFICATE OF ANALYSIS**



SDG: 170926-70 Client Reference: 2921-028 COC4-E Report Number: 427006
Location: CHARTERED LAND - HElOrder Number: Superseded Report:

(ALS) Location:	CHA	ARTERED LAND - H	ElOrd	er Nu	mbe
Results Legend  X Test	Lab S	ample No(s)			16252184
No Determination					4
Possible  Sample Types -		ustomer le Reference			2921-BH5-COMP-SS 6
S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate	AGS	Reference			
PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage	De	epth (m)			0.30 - 2.50
RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas	Co	ontainer	250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)
OTH - Other	San	ple Type	co	co	S
Metals in solid samples by OES	All	NDPs: 0 Tests: 1	Х		
Mineral Oil	All	NDPs: 0 Tests: 1	X		
PAH by GCMS	All	NDPs: 0 Tests: 1	X		
PCBs by GCMS	All	NDPs: 0 Tests: 1	x		
рН	All	NDPs: 0 Tests: 1	X		
Phenois by HPLC (S)	All	NDPs: 0 Tests: 1	X		
Phenois by HPLC (W)	All	NDPs: 0 Tests: 1		X	
Sample description	All	NDPs: 0 Tests: 1	х		
Total Dissolved Solids	All	NDPs: 0 Tests: 1		Х	
Total Organic Carbon	All	NDPs: 0 Tests: 1	X		
Total Sulphate	All	NDPs: 0 Tests: 1	X		
Total Sulphur	All	NDPs: 0 Tests: 1	X		
TPH CWG GC (S)	All	NDPs: 0 Tests: 1	X		



Validated

SDG: Location: 170926-70

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-E

Report Number: Superseded Report:

427006

## **Sample Descriptions**

#### **Grain Sizes**

very fine <0.0	63mm fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 1	10mm	very coarse
Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Descript	ion I	nclusions	Inclusio	ons 2
16252184	2921-BH5-COMP-SS6	0.30 - 2.50	Grey	Silt Loa	m	Stones	None	е

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.

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

### **CERTIFICATE OF ANALYSIS**



SDG: Location:

170926-70 Client Reference: CHARTERED LAND - HEl**Order Number**:

2921-028 COC4-E

Report Number: Superseded Report:

427006

Results Legend # ISO17025 accredited.		Customer Sample Ref.	2921-BH5-COMP-S S6				
M mCERTS accredited.			90				
aq Aqueous / settled sample.		Depth (m)	0.30 - 2.50				
diss.filt Dissolved / filtered sample. ot.unfilt Total / unfiltered sample.		Sample Type	Soil/Solid (S)				
* Subcontracted test.		Date Sampled	21/09/2017				
** % recovery of the surrogate stand	tard to	Sampled Time	2110012011				
check the efficiency of the metho	d. The		26100/2017				
results of individual compounds	within	Date Received	26/09/2017	1 1			
samples aren't corrected for the r	ecovery	SDG Ref	170926-70	1 1			
(F) Trigger breach confirmed	3.35.00.0	Lab Sample No.(s)	16252184				
1-5&+§@ Sample deviation (see appendix)		AGS Reference		1 1		1	
Component	LOD/Units	Method					
Moisture Content Ratio (% of as	%	PM024	12				
received sample)	-0.7.0/	T14040	0.00				
Loss on ignition	<0.7 %	TM018	3.22	1			
Mineral oil >C10-C40	<1 mg/kg	TM061	79.6				
Mineral Oil Surrogate % recovery**	%	TM061	83				
Phenol	<0.01 mg/kg	TM062 (S)	<0.01	1			
Organic Carbon, Total	<0.2 %	TM132	0.553				
Sulphur, Total	<0.02 %	TM132	0.0454	1			
Sulphate, Total potential	<0.06 %	TM132	0.136				-
pH	1 pH Units	TM133	8.5				
				1			
Chromium, Hexavalent	<0.6 mg/kg			#			
Cyanide, Total	<1 mg/kg	TM153	<1	1			
Cyanide, Free	<1 mg/kg	TM153	<1	1			
PCB congener 28	<3 µg/kg	TM168	<3	1			
PCB congener 52	<3 µg/kg	TM168	<3	1			
PCB congener 101	<3 µg/kg	TM168	<3	4			
PCB congener 118	<3 µg/kg	TM168	<3	1			
PCB congener 138	<3 µg/kg	TM168	<3	4			
PCB congener 153	<3 µg/kg	TM168	<3	4			
PCB congener 180	<3 µg/kg	TM168	<3	1			
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21				
Antimony	<0.6 mg/kg	TM181	1.16	<b>#</b>			
Arsenic	<0.6 mg/kg	TM181	9.05	1			
Barium	<0.6 mg/kg	TM181	38.7	<b>*</b>			
Cadmium	<0.02 mg/kg	TM181	1.43	1			
Chromium	<0.9 mg/kg	TM181	4.87	4			
Copper	<1.4 mg/kg	TM181	18.4	4			
Iron	<1000 mg/kg	TM181	16200	#			
Lead	<0.7 mg/kg	TM181	38	1			
Manganese	<0.13 mg/kg	TM181	593				
Mercury	< 0.14	TM181	0.412				
Molybdenum	mg/kg <0.1 mg/kg	TM181	3.4	M			
Nickel	<0.2 mg/kg	TM181	33.2	#			



Validated

SDG: 170926-70 Client Reference: 2921-028 COC4-E Report Number: 427006
Location: CHARTERED LAND - HElOrder Number: Superseded Report:

# ISO17025 accredited.		Customer Sample Ref.	2921-BH5-COMP-S S6			
M mCERTS accredited.			50			
aq Aqueous / settled sample. diss.filt Dissolved / filtered sample.		Depth (m)	0.30 - 2.50			
tot.unfilt Total / unfiltered sample.		Sample Type	Soil/Solid (S)			
* Subcontracted test.		Date Sampled	21/09/2017			
** % recovery of the surrogate	standard to	Sampled Time				
check the efficiency of the m	nethod. The	Date Received	26/09/2017			
results of individual compou	ands within	SDG Ref	170926-70			
samples aren't corrected for	the recovery		16252184			
(F) Trigger breach confirmed	neffw)	Lab Sample No.(s)	10202104			
-5&+6@ Sample deviation (see apper		AGS Reference				
Component	LOD/Units	Method				
Calanium	of malks	T84104	-1			
Selenium	<1 mg/kg	TM181	<1 #			
Zinc	<1.9 mg/kg	TM181	83.1			
Sulphate, Total	<48 mg/kg	TM221	239			
Sulphide, Oxidisable	<0.03 %	TM221	0.112			
2100						
Boron, water soluble	<1 mg/kg	TM222	<1 M			
3						
Part -						

### **CERTIFICATE OF ANALYSIS**



SDG: Location:

170926-70 Client Reference: CHARTERED LAND - HEl**Order Number**:

2921-028 COC4-E

Report Number: Superseded Report:

427006

PAH by GCMS Results Legend		Customer Sample Ref.	2921-BH5-COMP-S			
# ISO17025 accredited.  M mCERTS accredited.			S6			
aq Aqueous / settled sample.		Depth (m)	0.30 - 2.50			
diss.filt Dissolved / filtered sample. ot.unfilt Total / unfiltered sample.		Sample Type	Soil/Solid (S)			
<ul> <li>Subcontracted test.</li> </ul>		Date Sampled	21/09/2017			
" % recovery of the surrogate stan check the efficiency of the metho		Sampled Time				
results of individual compounds	within	Date Received SDG Ref	26/09/2017 170926-70			
samples aren't corrected for the ( {F} Trigger breach confirmed	recovery	Lab Sample No.(s)	16252184			
1-5&+5@ Sample deviation (see appendix)		AGS Reference				
Component	LOD/Units	Method				
Naphthalene-d8 % recovery**	%	TM218	96.5			
4	0/	711040	05.7			
Acenaphthene-d10 %	%	TM218	85.7			
recovery** Phenanthrene-d10 % recovery**	%	TM218	80.4			
AND THE RESERVE AND THE PROPERTY OF THE PROPER						
Chrysene-d12 % recovery**	%	TM218	80			
Perylene-d12 % recovery**	%	TM218	82.5			
Naphthalene	<9 µg/kg	TM218	<9			
Acenaphthylene	<12 µg/kg	TM218	<12			
			M			
Acenaphthene	<8 µg/kg	TM218	<8 M			
Fluorene	<10 µg/kg	TM218	<10			
Phenanthrene	<15 µg/kg	TM218	35.8			
			M			
Anthracene	<16 µg/kg	TM218	<16 M			
Fluoranthene	<17 µg/kg	TM218	46.9 M			
Pyrene	<15 µg/kg	TM218	44.1 M			
Benz(a)anthracene	<14 µg/kg	TM218	49.8 M			
Chrysene	<10 µg/kg	TM218	28.5 M			
Benzo(b)fluoranthene	<15 µg/kg	TM218	50.5 M			
Benzo(k)fluoranthene	<14 µg/kg	TM218	17.2 M			
Benzo(a)pyrene	<15 µg/kg	TM218	37.1 M			
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18 M			
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 M			
Benzo(g,h,i)perylene	<24 µg/kg	TM218	30.6			
Coronene	<200 µg/kg	TM218	<200			
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	340			
PAH, Total Detected USEPA 16	<318 µg/kg	TM218	340			
+ Coronene						
						No.

## **CERTIFICATE OF ANALYSIS**



SDG: Location: 170926-70 Client Reference: CHARTERED LAND - HEl**Order Number**:

2921-028 COC4-E

Report Number: Superseded Report: 427006

TPH CWG (S)  Results Legend		uetomas Comal- Def	2004 515 255		T		
# ISO17025 accredited.		ustomer Sample Ref.	2921-BH5-COMP-S S6				
M mCERTS accredited.			50				
aq Aqueous / settled sample.		Depth (m)	0.30 - 2.50				
diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample.		Sample Type	Soil/Solid (S)				
* Subcontracted test.		Date Sampled	21/09/2017				
<ul> <li>Subcontracted test.</li> <li>" recovery of the surrogate standa</li> </ul>	rd to	Sampled Time	2 1709/2017				
check the efficiency of the method.	The						
results of individual compounds wi	thin	Date Received	26/09/2017				
samples aren't corrected for the rec		SDG Ref	170926-70				
(F) Trigger breach confirmed		Lab Sample No.(s)	16252184				
1-5&+§@ Sample deviation (see appendix)		AGS Reference					
Component	LOD/Units	Method					
		Wethod					
GRO Surrogate % recovery**	%	TM089	68				
GRO TOT (Moisture Corrected)	<44 µg/kg	TM089	1150	М			
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5	#			
Benzene	<10 µg/kg	TM089	<10				
Toluene	<2 µg/kg	TM089	<2	M .			
Ethylbenzene	<3 µg/kg	TM089	<3	M			
		TMOOO	<6	М			
Xylene	<6 µg/kg	TM089		М			
o-Xylene	<3 µg/kg	TM089	<3	М			
sum of detected mpo xylene by GC	<9 µg/kg	TM089	<9				
sum of detected BTEX by GC	<24 µg/kg	TM089	<24				
Aliphatics >C5-C6	<10 µg/kg	TM089	<10				
Aliphatics >C6-C8	<10 µg/kg	TM089	23.9				
Aliphatics >C8-C10	<10 µg/kg	TM089	131				
Aliphatics >C10-C12	<10 µg/kg	TM089	542				
Aliphatics >C12-C16	<100 µg/kg	TM173	17700				
Aliphatics >C16-C21	<100 µg/kg	TM173	23800				
Aliphatics >C21-C35	<100 µg/kg	TM173	13800				
12	4.5						
Aliphatics >C35-C44	<100 µg/kg	TM173	<100				
1 Aliphatics >C12-C44	<100 µg/kg	TM173	55400				
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10				
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10				
Aromatics >EC8-EC10	<10 µg/kg	TM089	87.8				
Aromatics >EC10-EC12	<10 µg/kg	TM089	361			T	
Aromatics >EC12-EC16	<100 µg/kg	TM173	5970				
Aromatics >EC16-EC21	<100 µg/kg	TM173	13200				
Aromatics >EC21-EC35	<100 µg/kg	TM173	10400				
Aromatics >EC35-EC44	<100 µg/kg	TM173	2720				
Aromatics >EC40-EC44	<100 µg/kg	TM173	1000	1		:	
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	32300				
Total Aliphatics & Aromatics	<100 µg/kg	TM173	88900				
>C5-C44	1.0		and the second				
No.							



Validated

 SDG:
 170926-70
 Client Reference:
 2921-028 COC4-E

 Location:
 CHARTERED LAND - HElOrder Number:

Report Number: Superseded Report: 427006

## **Asbestos Identification - Soil**

		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 Receieved SDG Original Sample Method Number	2921-BH5-COMP-SS 6 0.30 - 2.50 SOLID 21/09/2017 00:00:00 27/09/2017 12:40:14 170926-70 16252184 TM048	4/10/17	Neville Mann	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



Validated

**REF: BS EN 12457/2** 

Hazardous

Waste Landfill

SDG: Location: 170926-70

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-E

Report Number: Superseded Report:

427006

#### **CEN 10:1 SINGLE STAGE LEACHATE TEST**

#### **CEN ANALYTICAL RESULTS**

Client Reference Mass Sample taken (kg) 0.103

Mass of dry sample (kg) 0.090 Particle Size <4mm >95% Site Location

CHARTERED LAND - HEUSTON S

Natural Moisture Content (%)

13.6

Inert Waste

Landfill

Dry Matter Content (%) 88

Case Landfill Waste Acceptance **Criteria Limits** SDG 170926-70

Lab Sample Number(s) 16252184 Sampled Date 21-Sep-2017 Customer Sample Ref. 2921-BH5-COMP-SS6

0.30 - 2.50Depth (m)

Stable

Non-reactive

Hazardous Waste

in Non-

Hazardous

Landfill Result Solid Waste Analysis 0.553 Organic Carbon (%) 3 Loss on Ignition (%) 3.22 Sum of BTEX (mg/kg) < 0.024 6 Sum of 7 PCBs (mg/kg) < 0.021 1 Mineral Oil (mg/kg) 79.6 500 PAH Sum of 17 (mg/kg) pH (pH Units) 8.5 >6 ANC to pH 6 (mol/kg) ANC to pH 4 (mol/kg)

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in	10:1 eluate (mg/l)	A2 10:1 conc	n 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	0.0011	<0.0005	0.011	<0.005	0.5	2	25	
Barium	0.0061	<0.0002	0.061	<0.002	20	100	300	
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5	
Chromium	<0.001	<0.001 <0.01		<0.01	0.5	10	70	
Copper	0.0013	<0.0003	0.013	<0.003	2	50	100	
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2	
Molybdenum	0.00495	<0.0005	0.0495	<0.005	0.5	10	30	
Nickel	0.000878	<0.0004	0.00878	<0.004	0.4	10	40	
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50	
iony	0.000708	<0.0001	0.00708	<0.001	0.06	0.7	5	
∠nium	0.000585	<0.0005	0.00585	<0.005	0.1	0.5	7	
Zinc	0.00102	<0.001	0.0102	<0.01	4	50	200	
Chloride	6.8	<2	68	<20	800	15000	25000	
Fluoride	<0.5	<0.5	<5	<5	10	150	500	
Sulphate (soluble)	16	<2	160	<20	1000	20000	50000	
Total Dissolved Solids	101	<5	1010	<50	4000	60000	100000	
Total Monohydric Phenols (W)	< 0.016	<0.016	<0.16	<0.16	1	12	- L	
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000	

#### **Leach Test Information**

Date Prepared 01-Oct-2017 pH (pH Units) 8.63 Conductivity (µS/cm) 139.00 Temperature (°C) 18.10 Volume Leachant (Litres) 0.888

Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation Mcerts Certification does not apply to leachates

05/10/2017 13:52:55



Validated

170926-70 Client Referenc CHARTERED LAND - HElOrder Number: 2921-028 COC4-E Report Number: Superseded Report: 427006 SDG: Client Reference: Location:

## Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample 1	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis	Sample	Corrected
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		
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		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
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		
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		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

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

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



Validated

SDG: Location:

170926-70 Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-E

Report Number: Superseded Report:

427006

# **Test Completion Dates**

Lab Sample No	(s) 16252184
Customer Sample R	ef. 2921-BH5-COMP-S
AGS R	ef.
Dep	oth 0.30 - 2.50
Ту	pe Soil/Solid (S)
Anions by Kone (w)	03-Oct-2017
Asbestos ID in Solid Samples	04-Oct-2017
Boron Water Soluble	03-Oct-2017
CEN 10:1 Leachate (1 Stage)	01-Oct-2017
CEN Readings	03-Oct-2017
Cyanide Comp/Free/Total/Thiocyanate	02-Oct-2017
Dissolved Metals by ICP-MS	04-Oct-2017
Dissolved Organic/Inorganic Carbon	03-Oct-2017
EPH CWG (Aliphatic) GC (S)	02-Oct-2017
EPH CWG (Aromatic) GC (S)	02-Oct-2017
Fluoride	04-Oct-2017
GRO by GC-FID (S)	03-Oct-2017
Hexavalent Chromium (s)	02-Oct-2017
on Ignition in soils	05-Oct-2017
ry Dissolved	03-Oct-2017
as by iCap-OES Dissolved (W)	04-Oct-2017
Metals in solid samples by OES	04-Oct-2017
Mineral Oil	04-Oct-2017
PAH by GCMS	04-Oct-2017
PCBs by GCMS	03-Oct-2017
pH	28-Sep-2017
Phenois by HPLC (S)	29-Sep-2017
Phenois by HPLC (W)	05-Oct-2017
Sample description	27-Sep-2017
Total Dissolved Solids	02-Oct-2017
Total Organic Carbon	04-Oct-2017
Total Sulphate	03-Oct-2017
Total Sulphur	02-Oct-2017
TPH CWG GC (S)	03-Oct-2017

#### **CERTIFICATE OF ANALYSIS**



SDG: Location: 170926-70

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-E

Report Number: Superseded Report:

427006

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

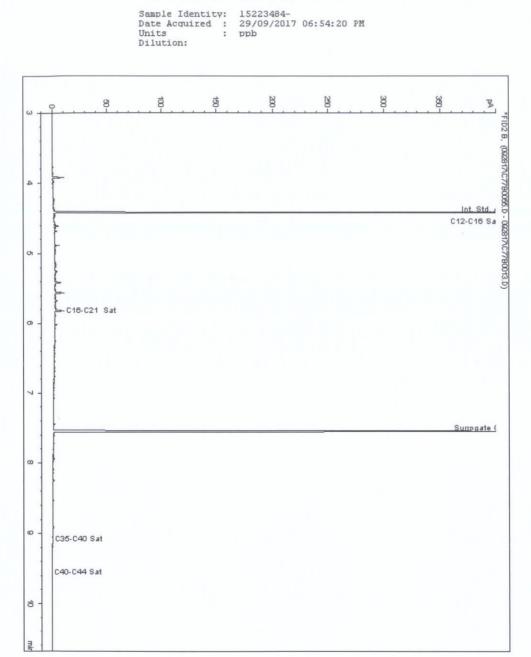
Sample No: Sample ID :

16257902

2921-BH5-COMP-SS6

Depth: 0.30 - 2.50

Speciated TPH - SATS ( C12 - C40 )





Validated

SDG: Location: 170926-70

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-E

Report Number: Superseded Report:

427006

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

Sample No : Sample ID :

16257902

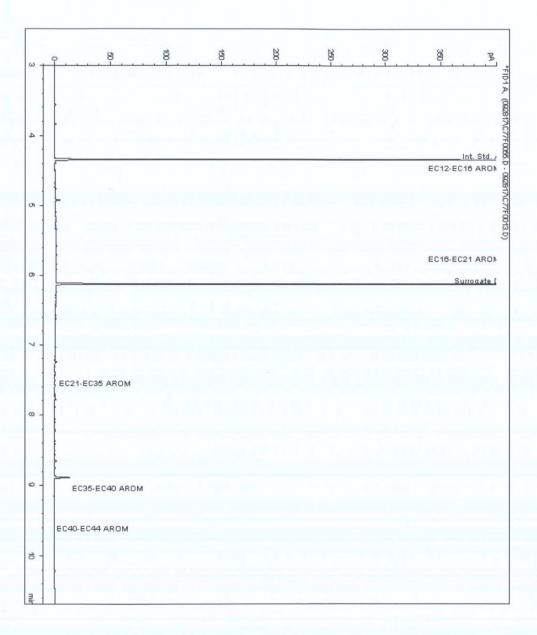
2921-BH5-COMP-SS6

Depth: 0.30 - 2.50

Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 15223485-Date Acquired : 29/09/2017 06:54:20 PM Units : ppb

Dilution:



#### **CERTIFICATE OF ANALYSIS**



SDG: Location: 170926-70

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-E

Report Number: Superseded Report:

427006

Chromatogram

Analysis: Mineral Oil

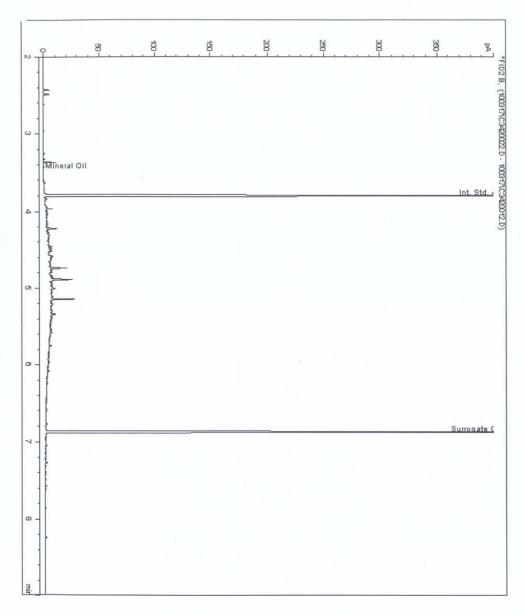
Sample No: Sample ID:

16268898 2921-BH5-COMP-SS6 Depth: 0.30 - 2.50

Mineral Oil Range Organics ( C10 - C40 )

15223487-03/10/17 19:01:58 PM mg/kg 0.000

Sample Identity Date Acquired Units Sample Multiplier Dilution





Validated

SDG: Location:

170926-70 Client Reference CHARTERED LAND - HELOrder Number: Client Reference: 2921-028 COC4-E

Report Number: Superseded Report:

427006

# Chromatogram

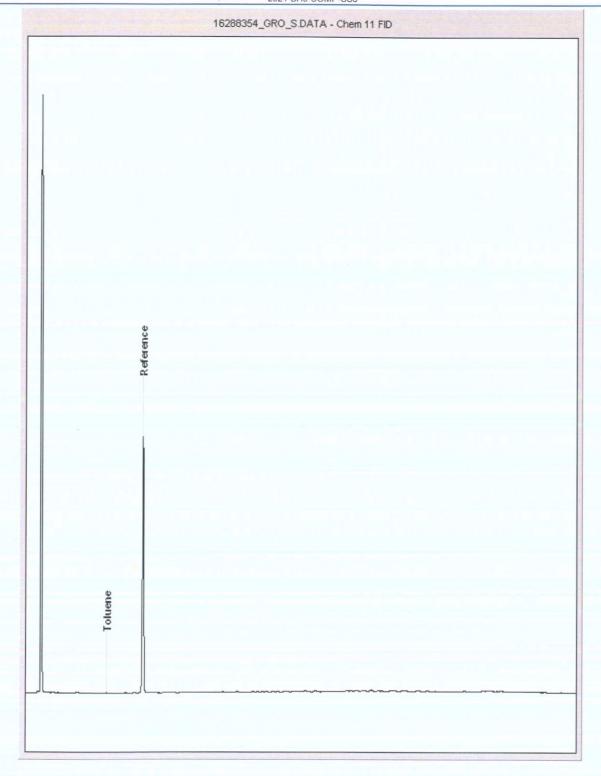
Analysis: GRO by GC-FID (S)

Sample No : Sample ID :

16288354

2921-BH5-COMP-SS6

Depth: 0.30 - 2.50





SDG Location:

170926-70 Client Reference: ED LAND - HEUSTON SOUTH | Order Number:

2921-028 COC4-E

Report Number: Superseded Report: 427006

## Appendix

#### General

- 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. ALS 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 Testing can be carried out on asbestos positive samples, but, due each fibre type found). 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
- 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, 3,6 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 Visual Estimation Of Fibre Content 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
- 20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

- 21. 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.
- 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

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	Holding time exceeded before sample received
5	Samples exceeded holding time before presevation 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

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 ALS (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 ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Aste stos Type	Common Name
Chrysofile	White Asbestis
Amosite	Brown Asbestos
Cro d dolite	Blue Asbe stos
Fibrous Actinolite	
Ribious Anthophyllite	6
Fibrous Tremolite	

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 second contained of the report are outside the second contained in the report are outside the second contained of the report are outside the second contained in the report are outside the second contained the second contained contained the second contained contained the second contained the second contained contained the second contained contained contained the second contained con scope of UKAS accreditation.



Minerex Environmental Taney hall Eglinton Terrace Dundrum Dublin Dublin 14

Attention: Caitriona Keogh

Unit 7-8 Hawarden Business Park Manor Road (off Manor Lane) Hawarden Deeside CH5 3US

> Tel: (01244) 528700 Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com Website: www.alsenvironmental.co.uk

### **CERTIFICATE OF ANALYSIS**

Date:

Customer:

Sample Delivery Group (SDG):

Your Reference:

Location: Report No: 05 October 2017

D\_MINEREX\_DUB

170926-63

2921-028 COC4-F

CHARTERED LAND - HEUSTON SOUTH QUARTER

427003

We received 1 sample on Tuesday September 26, 2017 and 1 of these samples were scheduled for analysis which was completed on Thursday October 05, 2017. 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 Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:

Sonia McWhan Operations Manager







Validated

SDG: Location:

170926-63

Client Reference: CHARTERED LAND - HElOrder Number:

2921-028 COC4-F

Report Number: Superseded Report:

427003

## **Received Sample Overview**

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
16251961	2921-BH5-SS4		2.60 - 5.90	21/09/2017

Maximum Sample/Coolbox Temperature (°C):

13.8

ISO5667-3 Water quality - Sampling - Part3 - During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of  $(5\pm3)^{\circ}$ C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



Validated

SDG: 170926-63 Client Reference: 2921-028 COC4-F Report Number: 427003
Location: CHARTERED LAND - HELOrder Number: Superseded Report:

Results Legend					16
X Test	Lab Sa	mple No(s)			16251961
No Determination Possible					
	0				292
		stomer Reference			2921-BH5-SS4
	Campic	Reference			SS-SS
Sample Types -			1.00		4
S - Soil/Solid UNS - Unspecified Solid					
GW - Ground Water	AGS Reference				
SW - Surface Water LE - Land Leachate					
PL - Prepared Leachate PR - Process Water					
SA - Saline Water	De	pth (m)			2.60 - 5.90
TE - Trade Effluent TS - Treated Sewage		pur (iii)			5,90
US - Untreated Sewage			2		
- Recreational Water - Drinking Water Non-regulatory	10		250g Amber Jai (ALE210)	(AL	(AL
SL - Sludge	Co	ntainer	(ALE210)	400g Tub (ALE214)	(ALE215)
G - Gas OTH - Other			Jar		
OTH - Other	Sam	ple Type	S	S	co
Anions by Kone (w)	All	NDPs: 0			
		Tests: 1		X	
Asbestos ID in Solid Samples	All	NDPs: 0			
		Tests: 1		Х	
Boron Water Soluble	All	NDPs: 0		^	
BOTOTT VVater Soluble	Oil	Tests: 1			
			X		
CEN Readings	All	NDPs: 0 Tests: 1			
				Х	
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0			
Compilitee/Total/Thiocyanate		Tests: 1	Х		
Dissolved Metals by ICP-MS	All	NDPs: 0			
		Tests: 1		Х	
olved Organic/Inorganic	All	NDPs: 0			
abon	10000	Tests: 1		v	
ERIL OLUM (ALL AL AGO (G)				X	
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 1			
			Х		
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 1			
		lesis. I	Х		
Fluoride	All	NDPs: 0	-		
		Tests: 1		Х	
GRO by GC-FID (S)	All	NDPs: 0		- "	
	1	Tests: 1			· ·
Have valent Observations (s)	All				X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 1			
			Х		
Loss on Ignition in soils	All	NDPs: 0 Tests: 1			
		16515. 1	Х		
Mercury Dissolved	All	NDPs: 0			
		Tests: 1		X	
als by iCap-OES Dissolved (W)	All	NDPs: 0			
, , , , , , , , , , , , , , , , , , , ,		Tests: 1		X	

## **CERTIFICATE OF ANALYSIS**



 SDG:
 170926-63
 Client Reference:
 2921-028 COC4-F
 Report Number:
 427003

 Location:
 CHARTERED LAND - HElOrder Number:
 Superseded Report:

(ALS) Location:	CHARTERED LAND - HEIOrder Number								
Results Legend  Test	Lab Sa	Lab Sample No(s)							
No Determination Possible					16251961				
	Cu Sample								
Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate	AGS	AGS Reference							
PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage	De	Depth (m)							
US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Studge G - Gas	Co	250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)					
OTH - Other	Sam	ple Type	S	S	S				
Metals in solid samples by OES	All	NDPs: 0 Tests: 1	Х						
Mineral Oil	All	NDPs: 0 Tests: 1	X						
PAH by GCMS	All	NDPs: 0 Tests: 1	X						
PCBs by GCMS	All	NDPs: 0 Tests: 1	X						
рН	All	NDPs: 0 Tests: 1	X						
Phenois by HPLC (S)	All	NDPs: 0 Tests: 1	X						
PhenoIs by HPLC (W)	All	NDPs: 0 Tests: 1		X					
Sample description	All	NDPs: 0 Tests: 1	X						
Total Dissolved Solids	All	NDPs: 0 Tests: 1		Х					
Total Organic Carbon	All	NDPs: 0 Tests: 1	Х						
Total Sulphate	All	NDPs: 0 Tests: 1	X						
Total Sulphur	All	NDPs: 0 Tests: 1	X						
TPH CWG GC (S)	All	NDPs: 0 Tests: 1	X						



Validated

SDG: Location:

170926-63 Client Referenc CHARTERED LAND - HEIOrder Number: Client Reference: 2921-028 COC4-F

Report Number: Superseded Report:

427003

## Sample Descriptions

#### **Grain Sizes**

very fine <0.0	63mm fine	0.063mm - 0.1mm	medium 0.1n	nm - 2mm	coarse	2mm - :	10mm ve	ry coarse
Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	on In	clusions	Inclusion	s 2
16251961	2921-BH5-SS4	2.60 - 5.90	Dark Brown	Stone/Soi	1	Stones	Oil/Petrole	um

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.

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

## **CERTIFICATE OF ANALYSIS**



SDG: Location: 170926-63 Client Reference: CHARTERED LAND - HEl**Order Number**:

2921-028 COC4-F

Report Number: Superseded Report: 427003

Results Legend # ISO17025 accredited.		Customer Sample Ref.	2921-BH5-SS4				
M mCERTS accredited. aq Aqueous / settled sample.							
diss.filt Dissolved / filtered sample.		Depth (m)	2.60 - 5.90				
tot.unfilt Total / unfiltered sample.		Sample Type	Soil/Solid (S)				
<ul> <li>Subcontracted test.</li> </ul>		Date Sampled	21/09/2017	74			
** % recovery of the surrogate standard check the efficiency of the method	dard to	Sampled Time					
results of individual compounds		Date Received	26/09/2017				
samples aren't corrected for the	recovery	SDG Ref	170926-63				
<ul><li>(F) Trigger breach confirmed</li></ul>		Lab Sample No.(s)	16251961				
1-5&+§@ Sample deviation (see appendix)		AGS Reference					
Component	LOD/Unit	s Method					
Moisture Content Ratio (% of as	%	PM024	6.2				
received sample)							
Loss on ignition	<0.7 %	TM018	2.58	#			
Mineral oil >C10-C40	<1 mg/kg	TM061	909	#			
Willieral Oil 2010-040	~ i mg/n	11001	303				
Minnes Oil Owner and W	0/	TMOC4	70.5	-			
Mineral Oil Surrogate %	%	TM061	78.5				
recovery**							
Phenol	< 0.01	TM062 (S)	< 0.01				
	mg/kg		0.01	- 11			
2 1 2 2 2 2				#			
Organic Carbon, Total	<0.2 %	TM132	0.535				
				#			
Sulphur, Total	<0.02 %	TM132	0.0847				
	-0.0£ /0	111102	5.0071				
0.1.1				_			
Sulphate, Total potential	<0.06 %	TM132	0.254		*		
pH	1 pH Unit	ts TM133	8.72				
P	1 pri oni	111100	0.12	-			
				#			
Chromium, Hexavalent	<0.6 mg/l	(g TM151	< 0.6				
				#			
Cyanide, Total	<1 mg/kg	TM153	<1				
Cyanido, rotai	- i mg/m	J 1111100	- 1				
	-	_		#			
Cyanide, Free	<1 mg/kg	g TM153	<1				
				#			
PCB congener 28	<3 µg/kg	TM168	<3	-			
1 Ob congener 20	-o pg/n	I INITOO	40				
	_			#			
PCB congener 52	<3 µg/kg	TM168	<3				
				#			
PCB congener 101	<3 µg/kg	TM168	<3				
r ob congener for	-o pg/n	j IIVIIOO	~5				
				#			
PCB congener 118	<3 µg/kg	TM168	<3				
				#			
PCB congener 138	<3 µg/kg	TM168	<3				
1 02 oonganor 100	-o pg///	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-0	- 17			
				#			
PCB congener 153	<3 µg/kg	TM168	<3				
				#			
PCB congener 180	<3 µg/kg	TM168	<3	-			
1 Ob congener 100	-s pg/kg	11000	-5				
	-			#			
Sum of detected PCB 7	<21 µg/k	g TM168	<21				
Congeners							
Antimony	<0.6 mg/l	g TM181	<0.6				
· · · · · · · · · · · · · · · · · · ·	-0.0 mg/r	'B IMIUI	-0.0				
				#			
Arsenic	<0.6 mg/l	(g TM181	5.59				
Haratan III and the later had been been been been been been been bee				#			
Barium	<0.6 mg/l	g TM181	16.9				
100 per 2000 100 11	and might		10.0	ш			
0-4-5		WALLEY.	2	#			
Cadmium	<0.02	TM181	0.576				
	mg/kg			#			
Chromium	<0.9 mg/k	g TM181	2.87				
		*					
Canaar		- W110		#			
Copper	<1.4 mg/l	rg TM181	5.7				
				#			
Iron	<1000	TM181	7550				
	mg/kg			#			
Load		T14401	2.25	#			
Lead	<0.7 mg/l	kg TM181	7.75				
				#			
Manganese	< 0.13	TM181	744				
	mg/kg			#			
Mercury	<0.14	TM181	0.040	#			
westury		1M181	0.242				
	mg/kg			#			
Molybdenum	<0.1 mg/l	(g TM181	0.81				18
				#			
Nickel	<0.2 mg/l	g TM181	10.6	-,,			
	J.L. mg/r		10.0	100			
				#			