Morgan Advanced Materials, Swansea

Factual Annual Groundwater and Soil Report

05 March 2019

T1.02

Morgan Advanced Materials, Swansea

Prepared for

Morgan Advanced Materials plc
Upper Fforest Way
Morriston
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Report reference:

66803R1, March 2019

Report status:

Final

CONFIDENTIAL

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Morgan Advanced Materials, Swansea

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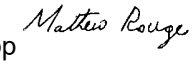
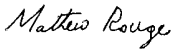
Author	Green, Joshua	pp 
Checked by	Rouge, Mathew	
Reviewed by	Mortimer, James	

Revision record:

Issue	Date	Status	Comment	Author	Checker	Reviewer

Contents

1 Introduction

1.1 Background

Stantec UK Ltd (Stantec) was commissioned by Morgan Advanced Materials plc (the Client) to undertake groundwater monitoring and soil sampling at their Morganite Electrical Carbon facility in Swansea, South Wales (the Site).

The Site is located next to the River Tawe in Llansamlet, approximately 5km north east of Swansea city centre. The primary operations at the Site are the manufacture and sale of a variety of carbon components for electrical and mechanical engineering purposes.

Groundwater monitoring was undertaken in accordance with the Site Protection and Monitoring Programme (SPMP) required as part of the Site's Environmental Permit (Ref. EPR/VP3339PD). Groundwater monitoring and sampling was undertaken at 7no. boreholes: BH1, BH2a, BHD, WS11, BH5CH2M, BH7CH2M and BHA. It should be noted that BH2a was constructed as a replacement borehole for BH6CH2M, which was included within the SPMP, but has subsequently been lost. Additionally, borehole BH1 was constructed in September 2018 and, it is understood, this borehole will be included as part of a revised SPMP to be prepared by the Client.

In accordance with the requirements of the Environmental Permit variation (Ref. VP3339PD/V008, April 2017) soil sampling was also undertaken at 7no. locations (HP101 to HP107) agreed between the Client and Natural Resources Wales (NRW).

The locations of the boreholes monitored, and the soil sampling undertaken are presented in Figure 1. Monitoring was carried out in January 2019.

2 Groundwater monitoring and sampling

2.1 Groundwater monitoring

The methodology and results from the groundwater monitoring, purging and sampling are detailed below. Monitoring was undertaken on the 8th January 2019, with a follow-up visit on the 25th January for those boreholes not monitored on the first visit.

Prior to purging and groundwater sampling, the depth to water and depth to the base of the borehole was measured using a dip meter. The results of the monitoring are presented in Table 2-1.

Table 2-1 Results of groundwater monitoring

Borehole	Date and time of monitoring/ sampling	Depth to groundwater (m bgl*)	Depth to base of borehole (m bgl)	Notes
BH1	08/01/2019 11:15	3.88	7.09	N/A
BH2a	08/01/2019 09:40	4.21	4.96	N/A
BHD	25/01/2019 13:51	2.94	4.92	Sampled with a peristaltic pump due to partial blockage in borehole preventing access with a bailer.
WS11	25/01/2019 12:45	3.16	4.75	Sampled with a peristaltic pump due to narrow diameter borehole.
BH5CH2M	08/01/2019 11:40	3.12	4.68	N/A
BH7CH2M	25/01/2019 11:59	3.03	3.31	Sampled with a peristaltic pump as insufficient water for a bailer.
BHA	08/01/2019 09:00	2.86	4.28	N/A

* m bgl: metres below ground level

2.2 Well purging

Prior to sampling, the boreholes were purged to remove potentially stagnant water and enable a representative sample to be collected.

Purging comprised the removal of 3 times the well volume (calculated from borehole diameter and the depths presented in Table 2-1) using a dedicated bailer or a peristaltic pump with dedicated tubing. In the event that a borehole was purged dry, it was left to recharge to 90% of the initial volume (or for two hours, whichever occurred first).

2.3 Groundwater sampling

Following purging, groundwater samples were collected from boreholes using a bailer or peristaltic pump. Samples were placed into labelled containers provided by the appointed laboratory (Chemtest, a UKAS accredited laboratory). The samples were stored below 8°C in a cool box and delivered to the laboratory by a courier.

2.4 Groundwater analysis

The groundwater samples were scheduled to be analysed for the chemical species presented in Table 2-2 (which was the same suite as had been previously analysed as part of the SPMP).

The results of the analysis are presented in Appendix A.

Table 2-2 Chemical species analysed within groundwater samples

pH	Iron	Total Petroleum Hydrocarbons (TPH)
Chloride	Calcium	Speciated Polycyclic Aromatic Hydrocarbons (PAH)
Ammoniacal Nitrogen	Potassium	Volatile organic Compound (VOC) suite
Nitrate	Magnesium	
Alkalinity	Sodium	
Total Organic Carbon		

3 Hand pitting and soil sampling

3.1 Hand pitting

To enable collection of soil samples hand pits were excavated at 7no. locations identified by the Client. Soil samples were collected at depths of between 0.4m bgl and 0.5m bgl and the soil arisings were logged in accordance with BS5930:2015. Logs of the hand pits are presented in Appendix B and their locations are presented on Figure 1.

The soil samples collected were placed in labelled containers provided by the appointed laboratory (Chemtest, a UKAS and MCERTS accredited laboratory). The samples were stored below 8°C in a cool box and delivered to the laboratory by a courier.

3.2 Soil analysis

The Environment Permit variation does not prescribe the suite of chemical species for soil analysis. Therefore, the samples were analysed for a suite of chemical species commonly associated with an industrial land-use.

The soil samples collected were scheduled to be analysed for the chemical species presented in Table 3-1. The results of the analysis are presented in Appendix C

Table 3-1 Chemical species analysed within soil samples

Asbestos Identification	Beryllium	Speciated PAH
Arsenic	Vanadium	Petrol range organics, diesel range organics, Extractable petroleum hydrocarbons
Boron	Selenium	
Cadmium	Zinc	Total Phenols
Chromium	Free Cyanide	Benzene
Copper	Total Sulphate	Toluene
Mercury	Acid soluble sulphate	Ethylbenzene
Nickel	**pH**	Xylene
Lead		

FIGURES

Figure 1
Exploratory Hole Location Plan

Legend

- Monitoring boreholes
- Hand pit

N

0 15 30 60 Meters

Date: January 2019	Drawn: ERE
Scale: 1:1,500	Checked: ERE
Original: A3	Revision: V2

File Reference
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APPENDICES

Appendix A

Results of groundwater analysis

Report Reference: 66803R1

Report Status: Final

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
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CB8 0AL
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Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	19-00505-1
Initial Date of Issue:	15-Jan-2019
Client	Stantec UK Limited
Client Address:	Vision Court Caxton Place Pentwyn Cardiff CF23 8HA
Contact(s):	Edwards Evans
Project	Morgan Advanced Materials, Swansea

Quotation No.:		**Date Received:**	09-Jan-2019
Order No.:		**Date Instructed:**	09-Jan-2019
No. of Samples:	4		
Turnaround (Wkdays):	5	**Results Due:**	15-Jan-2019
Date Approved:	15-Jan-2019		

Approved By:

Details: Robert Monk, Technical Manager

Chemtest
The right chemistry to deliver results

Results - Water

Project: Morgan Advanced Materials, Swansea

Client: Stantec UK Limited		**Chemtest Job No.:**			19-00505	19-00505	19-00505	19-00505
Quotation No.:		**Chemtest Sample ID.:**			750461	750462	750463	750464
				Sample Location:	BH5 CH2M	BHA	BH2A	BH1
				Sample Type:	WATER	WATER	WATER	WATER
				Date Sampled:	08-Jan-2019	08-Jan-2019	08-Jan-2019	08-Jan-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
pH	U	1010		N/A	8.2	7.9	11.6	8.1
Alkalinity (Total)	U	1220	mg/l	10	180	130	110	240
Chloride	U	1220	mg/l	1.0	26	740	73	27
Ammoniacal Nitrogen	U	1220	mg/l	0.050	1.9	1.8	0.93	3.3
Nitrate	U	1220	mg/l	0.50	15	3.2	6.7	< 0.50
Calcium	U	1415	mg/l	5.0	110	130	190	81
Potassium	U	1415	mg/l	0.50	14	10	76	6.2
Magnesium	U	1415	mg/l	0.50	11	12	0.99	11
Sodium	U	1415	mg/l	0.50	16	450	66	16
Iron (Dissolved)	N	1450	µg/l	20	360	340	620	350
Total Organic Carbon	U	1610	mg/l	2.0	11	7.5	8.3	7.5
Total TPH >C6-C40	U	1670	µg/l	10	< 10	< 10	< 10	
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10				< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10				< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10				< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10				18
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10				230
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10				440
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10				190
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10				< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0				870
Aromatic TPH >C5-C7	N	1675	µg/l	0.10				< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10				< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10				< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10				< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10				44
Aromatic TPH >C16-C21	N	1675	µg/l	0.10				< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10				< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10				< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0				44
Total Petroleum Hydrocarbons	N	1675	µg/l	10				920
Naphthalene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10

Chemtest
The right chemistry to deliver results

Results - Water

Project: Morgan Advanced Materials, Swansea

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Quotation No.:		**Chemtest Sample ID.:**			750461	750462	750463	750464
			Sample Location:		BH5 CH2M	BHA	BH2A	BH1
			Sample Type:		WATER	WATER	WATER	WATER
			Date Sampled:		08-Jan-2019	08-Jan-2019	08-Jan-2019	08-Jan-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Benzo[b]fluoranthene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10		< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0		< 2.0	< 2.0	< 2.0
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Water

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			Sample Location:		BH5 CH2M	BHA	BH2A	BH1
			Sample Type:		WATER	WATER	WATER	WATER
			Date Sampled:		08-Jan-2019	08-Jan-2019	08-Jan-2019	08-Jan-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	19-03052-1
Initial Date of Issue:	04-Feb-2019
Client	Stantec UK Limited
Client Address:	Vision Court Caxton Place Pentwyn Cardiff CF23 8HA
Contact(s):	Matthew Rouge
Project	66803 MAM Swansea

Quotation No.:		**Date Received:**	28-Jan-2019
Order No.:		**Date Instructed:**	28-Jan-2019
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	01-Feb-2019
Date Approved:	04-Feb-2019		

Approved By:

Details: Martin Dyer, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Water

Project: 66803 MAM Swansea

Client: Stantec UK Limited		**Chemtest Job No.:**			19-03052	19-03052	19-03052
Quotation No.:		**Chemtest Sample ID.:**			762468	762469	762470
				Sample Location:	BH7C2HM	WS11	BHD
				Sample Type:	WATER	WATER	WATER
				Date Sampled:	25-Jan-2019	25-Jan-2019	25-Jan-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
pH	U	1010		N/A	7.2	7.8	7.6
Alkalinity (Total)	U	1220	mg/l	10	110	160	140
Chloride	U	1220	mg/l	1.0	310	95	25
Nitrate	U	1220	mg/l	0.50	< 0.50	17	5.3
Sulphate	U	1220	mg/l	1.0	190	97	41
Total Organic Carbon	U	1610	mg/l	2.0	11	3.5	4.4
Total TPH >C6-C40	U	1670	µg/l	10	89		
Naphthalene	U	1700	µg/l	0.10	4.8	< 0.10	
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	
Total Of 16 PAH's	N	1700	µg/l	2.0	4.8	< 2.0	
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0		
Chloromethane	U	1760	µg/l	1.0	< 1.0		
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0		
Bromomethane	U	1760	µg/l	5.0	< 5.0		
Chloroethane	U	1760	µg/l	2.0	< 2.0		
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0		
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0		
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0		
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0		
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0		
Bromochloromethane	U	1760	µg/l	5.0	< 5.0		
Trichloromethane	U	1760	µg/l	1.0	< 1.0		
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0		
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0		
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0		
Benzene	U	1760	µg/l	1.0	< 1.0		
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0		

Chemtest
The right chemistry to deliver results

Results - Water

Project: 66803 MAM Swansea

Client: Stantec UK Limited		**Chemtest Job No.:**			19-03052	19-03052	19-03052
Quotation No.:		**Chemtest Sample ID.:**			762468	762469	762470
				Sample Location:	BH7C2HM	WS11	BHD
				Sample Type:	WATER	WATER	WATER
				Date Sampled:	25-Jan-2019	25-Jan-2019	25-Jan-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Trichloroethene	N	1760	µg/l	1.0	< 1.0		
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0		
Dibromomethane	U	1760	µg/l	10	< 10		
Bromodichloromethane	U	1760	µg/l	5.0	< 5.0		
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10		
Toluene	U	1760	µg/l	1.0	< 1.0		
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10		
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10		
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0		
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0		
Dibromochloromethane	U	1760	µg/l	10	< 10		
1,2-Dibromoethane	U	1760	µg/l	5.0	< 5.0		
Chlorobenzene	N	1760	µg/l	1.0	< 1.0		
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0		
Ethylbenzene	U	1760	µg/l	1.0	< 1.0		
m & p-Xylene	U	1760	µg/l	1.0	< 1.0		
o-Xylene	U	1760	µg/l	1.0	< 1.0		
Styrene	U	1760	µg/l	1.0	< 1.0		
Tribromomethane	U	1760	µg/l	1.0	< 1.0		
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0		
Bromobenzene	U	1760	µg/l	1.0	< 1.0		
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50		
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0		
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0		
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0		
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0		
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0		
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0		
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0		
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0		
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0		
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0		
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0		
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0		
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50		
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0		
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0		
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0		
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0		

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix B

Hand-excavated trial pit logs

Trial Pit Log

Trialpit No
HP101
Sheet 1 of 1

Project Name: Morgan Advanced Materials, Swansea	Project No. 66803.01	Co-ords: - Level:	Date 07/01/2019
Location: Llansamlet, Swansea		Dimensions (m): Depth 0.50	Scale 1:25
Client: Morgan Advanced Materials plc			Logged ERE

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50	ES		0.50			Grass over black very clayey sandy GRAVEL. Sand is fine to medium. Gravel is fine to coarse, sub-angular to sub-rounded of red brick and concrete. (MADE GROUND).
							End of pit at 0.50 m

Remarks: Terminated at target depth

Stability: Good stability.

Trial Pit Log

Trialpit No **HP102**

Sheet 1 of 1

Project Name: Morgan Advanced Materials, Swansea	Project No. 66803.01	Co-ords: - Level:	Date 07/01/2019
Location: Llansamlet, Swansea		Dimensions (m): Depth 0.50	Scale 1:25
Client: Morgan Advanced Materials plc			Logged ERE

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50	ES		0.50			Grass over soft black sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse, angular to sub-rounded of red brick, concrete and mudstone. (MADE GROUND).
							End of pit at 0.50 m

1
2
3
4
5

Remarks: Terminated at target depth

Stability: Good stability.

Trial Pit Log

Trialpit No **HP103**

Sheet 1 of 1

Project Name: Morgan Advanced Materials, Swansea	Project No. 66803.01	Co-ords: - Level:	Date 07/01/2019
Location: Llansamlet, Swansea		Dimensions (m): Depth 0.50	Scale 1:25
Client: Morgan Advanced Materials plc			Logged ERE

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40	ES		0.50			Grass over soft black sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse, sub-angular to sub-rounded of red brick, concrete and occasional metal fragments. (MADE GROUND).
							End of pit at 0.50 m

1
2
3
4
5

Remarks: Terminated at target depth

Stability: Good stability

Trial Pit Log

Trialpit No
HP104
Sheet 1 of 1

Project Name: Morgan Advanced Materials, Swansea	Project No. 66803.01	Co-ords: - Level:	Date 07/01/2019
Location: Llansamlet, Swansea		Dimensions (m): Depth 0.50	Scale 1:25
Client: Morgan Advanced Materials plc			Logged ERE

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.50	ES		0.50			Pink gravel over soft black sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse, sub-angular to sub-rounded of red brick, concrete, mudstone and occasional fabric. (MADE GROUND).
							End of pit at 0.50 m

1
2
3
4
5

Remarks: Terminated at target depth

Stability: Good stability.

Trial Pit Log

Trialpit No **HP105**

Sheet 1 of 1

Project Name: Morgan Advanced Materials, Swansea	Project No. 66803.01	Co-ords: - Level:	Date 07/01/2019
Location: Llansamlet, Swansea		Dimensions (m): Depth 0.50	Scale 1:25
Client: Morgan Advanced Materials plc			Logged ERE

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40	ES		0.50			Grey slightly clayey very sandy GRAVEL. Sand is medium to coarse. Gravel is fine to coarse, angular to sub-angular of limestone aggregate. (MADE GROUND).
							End of pit at 0.50 m

Remarks: Terminated at target depth

Stability: Good stability.

Trial Pit Log

Trialpit No **HP106**

Sheet 1 of 1

Project Name: Morgan Advanced Materials, Swansea	Project No. 66803.01	Co-ords: - Level:	Date 07/01/2019
Location: Llansamlet, Swansea		Dimensions (m): Depth 0.50	Scale 1:25
Client: Morgan Advanced Materials plc			Logged ERE

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50	ES		0.50			Grey limestone aggregate over soft dark brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse, angular to sub-rounded of red brick, concrete and mudstone. Occasional metal fragments. (MADE GROUND).
							End of pit at 0.50 m

1
2
3
4
5

Remarks: Terminated at target depth

Stability: Poor stability.

Trial Pit Log

Trialpit No **HP107**

Sheet 1 of 1

Project Name: Morgan Advanced Materials, Swansea	Project No. 66803.01	Co-ords: - Level:	Date 07/01/2019
Location: Llansamlet, Swansea		Dimensions (m): Depth 0.50	Scale 1:25
Client: Morgan Advanced Materials plc			Logged ERE

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40	ES		0.50			Pink aggregate chippings over slightly clayey very sandy GRAVEL. Sand is medium to coarse. Gravel is fine to coarse, sub-angular to angular of aggregate chippings (MADE GROUND). End of pit at 0.50 m

Remarks: Terminated at target depth.

Stability: Good stability.

Appendix C

Results of soil analysis

Report Reference: 66803R1

Report Status: Final

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	19-00506-1
Initial Date of Issue:	15-Jan-2019
Client	Stantec UK Limited
Client Address:	Vision Court Caxton Place Pentwyn Cardiff CF23 8HA
Contact(s):	Edwards Evans
Project	Morgan Advanced Materials, Swansea

Quotation No.:		**Date Received:**	09-Jan-2019
Order No.:		**Date Instructed:**	09-Jan-2019
No. of Samples:	7		
Turnaround (Wkdays):	5	**Results Due:**	15-Jan-2019
Date Approved:	15-Jan-2019		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Chemtest
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Results - Soil

Project: Morgan Advanced Materials, Swansea

Client: Stantec UK Limited		**Chemtest Job No.:**			19-00506	19-00506	19-00506	19-00506	19-00506	19-00506	19-00506
Quotation No.:		**Chemtest Sample ID.:**			750466	750467	750468	750469	750470	750471	750472
		Sample Location:			HP101	HP102	HP103	HP104	HP105	HP106	HP107
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.50	0.50	0.40	0.50	0.40	0.50	0.40
		Date Sampled:			07-Jan-2019	07-Jan-2019	07-Jan-2019	07-Jan-2019	07-Jan-2019	07-Jan-2019	07-Jan-2019
		Asbestos Lab:			COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
ACM Type	U	2192		N/A	-	Cement	-	-	-	Fibres/Clumps	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	Chrysotile	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	Amosite	No Asbestos Detected
Moisture	N	2030	%	0.020	10	17	9.1	9.1	9.8	4.5	6.7
pH	U	2010		N/A	8.6	8.2	8.1	9.1	9.4	9.0	8.9
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.46	< 0.40	0.88	0.48	0.52	0.49	0.55
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	U	2450	mg/kg	1.0	64	93	85	76	34	42	75
Beryllium	U	2450	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	U	2450	mg/kg	0.10	1.4	2.7	1.8	2.1	0.69	1.2	1.6
Chromium	U	2450	mg/kg	1.0	37	50	44	19	12	15	23
Copper	U	2450	mg/kg	0.50	190	240	330	230	1100	1300	220
Mercury	U	2450	mg/kg	0.10	0.23	0.34	0.21	0.20	0.15	3.0	0.25
Nickel	U	2450	mg/kg	0.50	22	39	29	32	17	18	28
Lead	U	2450	mg/kg	0.50	230	350	290	370	160	140	160
Selenium	U	2450	mg/kg	0.20	0.45	1.1	0.55	0.66	< 0.20	< 0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	29	33	45	25	19	10	33
Zinc	U	2450	mg/kg	0.50	500	550	480	1300	290	320	630
Chromium (Trivalent)	N	2490	mg/kg	1.0	37	50	44	19	12	15	23
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Fraction of Organic Carbon	U	2625		0.0010	0.082	0.060	0.062	0.029	0.027	0.028	0.028
TPH >C6-C10	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C21	N	2670	mg/kg	1.0	26	21	28	14	41	260	430
TPH >C21-C40	N	2670	mg/kg	1.0	97	95	70	39	130	1200	1600
Total TPH >C6-C40	U	2670	mg/kg	10	120	120	98	53	170	1400	2000
Naphthalene	N	2700	mg/kg	0.010	0.42	0.60	0.90	0.51	13	3.3	6.8
Acenaphthylene	N	2700	mg/kg	0.010	0.24	0.56	0.49	0.21	0.63	0.78	0.81
Acenaphthene	N	2700	mg/kg	0.010	0.65	0.52	1.7	0.66	11	9.8	9.4
Fluorene	N	2700	mg/kg	0.010	0.51	0.42	1.2	0.64	8.5	7.2	6.7
Phenanthrene	N	2700	mg/kg	0.010	4.7	4.2	11	5.6	54	54	48
Anthracene	N	2700	mg/kg	0.010	1.1	1.1	2.2	3.4	15	14	12
Fluoranthene	N	2700	mg/kg	0.010	9.9	6.3	19	13	140	110	76
Pyrene	N	2700	mg/kg	0.010	10	6.6	19	13	120	100	78
Benzo[a]anthracene	N	2700	mg/kg	0.010	7.3	7.9	11	8.2	86	56	44
Chrysene	N	2700	mg/kg	0.010	9.7	6.3	15	10	100	74	54
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	9.7	7.7	18	11	100	85	61
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	4.3	2.9	6.5	4.4	37	30	24
Benzo[a]pyrene	N	2700	mg/kg	0.010	7.9	4.0	12	8.9	60	57	48
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	6.9	3.9	11	8.7	42	47	35

Chemtest
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Results - Soil

Project: Morgan Advanced Materials, Swansea

Client: Stantec UK Limited		**Chemtest Job No.:**	19-00506	19-00506	19-00506	19-00506	19-00506	19-00506	19-00506
Quotation No.:		**Chemtest Sample ID.:**	750466	750467	750468	750469	750470	750471	750472
		Sample Location:	HP101	HP102	HP103	HP104	HP105	HP106	HP107
		Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):	0.50	0.50	0.40	0.50	0.40	0.50	0.40
		Date Sampled:	07-Jan-2019	07-Jan-2019	07-Jan-2019	07-Jan-2019	07-Jan-2019	07-Jan-2019	07-Jan-2019
		Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY

Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	2.1	1.4	3.3	2.8	12	13	9.6
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	6.4	4.2	12	7.7	37	46	36
Total Of 16 PAH's	N	2700	mg/kg	0.20	82	59	140	99	850	710	550
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.30	0.80	0.53	0.45	< 0.30	< 0.30	0.70	0.44

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Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com