



Royal Haskoning
Rightwell House
Bretton
Bretton
Peterborough
Cambridgeshire
PE3 8DW

Attention: Darren Banner-Perry

CERTIFICATE OF ANALYSIS

Date: 29 December 2015
Customer: H_RHASKON_PTB
Sample Delivery Group (SDG): 151212-38
Your Reference: 9Y0074
Location: Cole Green Inert Landfill
Report No: 343601

We received 2 samples on Saturday December 12, 2015 and 1 of these samples were scheduled for analysis which was completed on Tuesday December 29, 2015. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

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

Approved By:

Sonia McWhan

Operations Manager



SDG: 151212-38
Job: H_RHASKON_PTB-95
Client Reference: 9Y0074

Location: Cole Green Inert Landfill
Customer: Royal Haskoning
Attention: Darren Banner-Perry

Order Number: 9Y0074-105-100
Report Number: 343601
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
12632496	BHIL03		5.00	11/12/2015
12632495	BHIL04		6.50	11/12/2015



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



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Location: Cole Green Inert Landfill
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 Superseded Report:

LIQUID Results Legend  Test  No Determination Possible	Lab Sample No(s)	12632495						
	Customer Sample Reference	BHLL04						
	AGS Reference							
	Depth (m)	6.50						
	Container	Vial (ALE297) H2SO4 (ALE244) Dissolved Metals Pt 1(l)plastic (ALE221) 1000ml glass bottle						
Alkalinity as CaCO3	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>					
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 1					<input checked="" type="checkbox"/>	
Anions by Kone (w)	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>					
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>					
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>					
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>					
EPH CWG (Aromatic) Aqueous GC (W)	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>					
GRO by GC-FID (W)	All	NDPs: 0 Tests: 1						<input checked="" type="checkbox"/>
Mercury Dissolved	All	NDPs: 0 Tests: 1				<input checked="" type="checkbox"/>		
Metals by iCap-OES Dissolved (W)	All	NDPs: 0 Tests: 1			<input checked="" type="checkbox"/>			
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>					
pH Value	All	NDPs: 0 Tests: 1			<input checked="" type="checkbox"/>			
Phenols by HPLC (W)	All	NDPs: 0 Tests: 1						<input checked="" type="checkbox"/>
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>					
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>					



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Validated

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LIQUID Results Legend <input checked="" type="checkbox"/> Test <input type="checkbox"/> No Determination Possible	Lab Sample No(s)		12632495			
	Customer Sample Reference		BHLL04			
	AGS Reference					
	Depth (m)		6.50			
	Container		Vial (ALE297) H2SO4 (ALE244) Dissolved Metals Pt 11plastic (ALE221) 1000ml glass bottle			
TPH CWG (W)	All	NDPs: 0 Tests: 1	<input checked="" type="checkbox"/>			
VOC MS (W)	All	NDPs: 0 Tests: 1				<input checked="" type="checkbox"/>



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Results Legend		Customer Sample R	BHIL04				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	6.50				
M	mCERTS accredited.		Water(GW/SW)				
aq	Aqueous / settled sample.		11/12/2015				
diss.filt	Dissolved / filtered sample.		00:00:00				
tot.unfilt	Total / unfiltered sample.		12/12/2015				
*	Subcontracted test.		151212-38				
**	% 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		12632495				
(F)	Trigger breach confirmed						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units		Method				
Alkalinity, Total as CaCO3	<2 mg/l	TM043	1790	#			
Organic Carbon, Total	<3 mg/l	TM090	85.3	& #			
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	198	#			
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	3.61	#			
Arsenic (diss.filt)	<0.12 µg/l	TM152	7.24	#			
Barium (diss.filt)	<0.03 µg/l	TM152	403	#			
Beryllium (diss.filt)	<0.07 µg/l	TM152	<0.07	#			
Boron (diss.filt)	<9.4 µg/l	TM152	4070	#			
Cadmium (diss.filt)	<0.1 µg/l	TM152	<0.1	#			
Chromium (diss.filt)	<0.22 µg/l	TM152	28.7	#			
Copper (diss.filt)	<0.85 µg/l	TM152	1.12	#			
Lead (diss.filt)	<0.02 µg/l	TM152	0.172	#			
Manganese (diss.filt)	<0.04 µg/l	TM152	430	#			
Nickel (diss.filt)	<0.15 µg/l	TM152	33.3	#			
Selenium (diss.filt)	<0.39 µg/l	TM152	10.9	#			
Vanadium (diss.filt)	<0.24 µg/l	TM152	7.72	#			
Zinc (diss.filt)	<0.41 µg/l	TM152	13.8	#			
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	#			
Sulphate	<2 mg/l	TM184	<2	#			
Chloride	<2 mg/l	TM184	306	#			
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.1	#			
Calcium (diss.filt)	<0.012 mg/l	TM228	228	#			
Sodium (diss.filt)	<0.076 mg/l	TM228	227	#			
Magnesium (diss.filt)	<0.036 mg/l	TM228	63.7	#			
Potassium (diss.filt)	<1 mg/l	TM228	105	#			
Iron (diss.filt)	<0.019 mg/l	TM228	0.297	#			
pH	<1 pH Units	TM256	8.19	#			
Phenol	<0.002 mg/l	TM259	0.01	#			
Cresols	<0.006 mg/l	TM259	0.02	#			
Xylenols	<0.008 mg/l	TM259	0.01	#			
Phenols, Total Detected monohydric	<0.016 mg/l	TM259	0.04	#			



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Superseded Report:

PAH Spec MS - Aqueous (W)

Table with columns: Component, LOD/Units, Method, and concentration values for various PAHs like Naphthalene, Acenaphthene, etc. Includes a Results Legend and sample information.



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Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample R	BHIL04					
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	6.50 Water(GW/SW) 11/12/2015 00:00:00 12/12/2015 151212-38 12632495					
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-5&	Sample deviation (see appendix)							
Component	LOD/Units			Method				
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1	#				
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#				
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#				
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	1.64					
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#				
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#				
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	#				
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	#				
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#				
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#				
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	#				
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	#				
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	#				
2-Methylphenol (aq)	<1 µg/l	TM176	<1	#				
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	#				
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	#				
3-Nitroaniline (aq)	<1 µg/l	TM176	<1	#				
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	#				
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	#				
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	#				
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	#				
4-Methylphenol (aq)	<1 µg/l	TM176	<1	#				
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	#				
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	#				
Azobenzene (aq)	<1 µg/l	TM176	<1	#				
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	#				
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1	#				
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2	#				
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	#				
Carbazole (aq)	<1 µg/l	TM176	1.36	#				
Dibenzofuran (aq)	<1 µg/l	TM176	<1	#				
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<1	#				



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SVOC MS (W) - Aqueous

Table with columns: Component, LOD/Units, Method, and results for various SVOCs like Diethyl phthalate, Dimethyl phthalate, etc. Includes a Results Legend and Customer Sample R details.



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TPH CWG (W)

Results Legend		Customer Sample R	BHIL04					
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	6.50 Water(GW/SW) 11/12/2015 00:00:00 12/12/2015 151212-38 12632495					
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units			Method				
GRO Surrogate % recovery**	%	TM245	76					
GRO >C5-C12	<50 µg/l	TM245	246	#				
Methyl tertiary butyl ether (MTBE)	<3 µg/l	TM245	<3	#				
Benzene	<7 µg/l	TM245	<7	#				
Toluene	<4 µg/l	TM245	<4	#				
Ethylbenzene	<5 µg/l	TM245	<5	#				
m,p-Xylene	<8 µg/l	TM245	9	#				
o-Xylene	<3 µg/l	TM245	<3	#				
Sum of detected Xylenes	<11 µg/l	TM245	<11					
Sum of detected BTEX	<28 µg/l	TM245	<28					
Aliphatics >C5-C6	<10 µg/l	TM245	14					
Aliphatics >C6-C8	<10 µg/l	TM245	25					
Aliphatics >C8-C10	<10 µg/l	TM245	41					
Aliphatics >C10-C12	<10 µg/l	TM245	73					
Aliphatics >C12-C16 (aq)	<10 µg/l	TM174	<10					
Aliphatics >C16-C21 (aq)	<10 µg/l	TM174	<10					
Aliphatics >C21-C35 (aq)	<10 µg/l	TM174	70					
Total Aliphatics >C12-C35 (aq)	<10 µg/l	TM174	70					
Aromatics >EC5-EC7	<10 µg/l	TM245	<10					
Aromatics >EC7-EC8	<10 µg/l	TM245	<10					
Aromatics >EC8-EC10	<10 µg/l	TM245	39					
Aromatics >EC10-EC12	<10 µg/l	TM245	48					
Aromatics >EC12-EC16 (aq)	<10 µg/l	TM174	18					
Aromatics >EC16-EC21 (aq)	<10 µg/l	TM174	<10					
Aromatics >EC21-EC35 (aq)	<10 µg/l	TM174	<10					
Total Aromatics >EC12-EC35 (aq)	<10 µg/l	TM174	18					
Total Aliphatics & Aromatics >C5-35 (aq)	<10 µg/l	TM174	334					



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Report Number: 343601
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample R	BHIL04					
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	6.50 Water(GW/SW) 11/12/2015 00:00:00 12/12/2015 151212-38 12632495					
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units			Method				
Dibromofluoromethane**	%	TM208	109					
Toluene-d8**	%	TM208	97.9					
4-Bromofluorobenzene**	%	TM208	94.6					
Dichlorodifluoromethane	<1 µg/l	TM208	<1					
Chloromethane	<1 µg/l	TM208	<1	#				
Vinyl chloride	<1 µg/l	TM208	<1	#				
Bromomethane	<1 µg/l	TM208	<1	#				
Chloroethane	<1 µg/l	TM208	2.13	#				
Trichlorofluoromethane	<1 µg/l	TM208	<1	#				
1,1-Dichloroethene	<1 µg/l	TM208	<1	#				
Carbon disulphide	<1 µg/l	TM208	<1	#				
Dichloromethane	<3 µg/l	TM208	<3	#				
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	#				
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	#				
1,1-Dichloroethane	<1 µg/l	TM208	<1	#				
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	#				
2,2-Dichloropropane	<1 µg/l	TM208	<1	#				
Bromochloromethane	<1 µg/l	TM208	<1	#				
Chloroform	<1 µg/l	TM208	<1	#				
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	#				
1,1-Dichloropropene	<1 µg/l	TM208	<1	#				
Carbontetrachloride	<1 µg/l	TM208	<1	#				
1,2-Dichloroethane	<1 µg/l	TM208	<1	#				
Benzene	<1 µg/l	TM208	4.55	#				
Trichloroethene	<1 µg/l	TM208	<1	#				
1,2-Dichloropropane	<1 µg/l	TM208	<1	#				
Dibromomethane	<1 µg/l	TM208	<1	#				
Bromodichloromethane	<1 µg/l	TM208	<1	#				
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	#				
Toluene	<1 µg/l	TM208	1.47	#				
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	#				
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	#				



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VOC MS (W)

Results Legend		Customer Sample R	BHIL04					
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	6.50 Water(GW/SW) 11/12/2015 00:00:00 12/12/2015 151212-38 12632495					
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-5&	Sample deviation (see appendix)							
Component	LOD/Units			Method				
1,3-Dichloropropane	<1 µg/l	TM208	<1	#				
Tetrachloroethene	<1 µg/l	TM208	<1	#				
Dibromochloromethane	<1 µg/l	TM208	<1	#				
1,2-Dibromoethane	<1 µg/l	TM208	<1	#				
Chlorobenzene	<1 µg/l	TM208	1.76	#				
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	#				
Ethylbenzene	<1 µg/l	TM208	1.32	#				
m,p-Xylene	<1 µg/l	TM208	6.41	#				
o-Xylene	<1 µg/l	TM208	<1	#				
Styrene	<1 µg/l	TM208	<1	#				
Bromoform	<1 µg/l	TM208	<1	#				
Isopropylbenzene	<1 µg/l	TM208	1.23	#				
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	#				
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	#				
Bromobenzene	<1 µg/l	TM208	<1	#				
Propylbenzene	<1 µg/l	TM208	1.81	#				
2-Chlorotoluene	<1 µg/l	TM208	<1	#				
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	#				
4-Chlorotoluene	<1 µg/l	TM208	<1	#				
tert-Butylbenzene	<1 µg/l	TM208	<1	#				
1,2,4-Trimethylbenzene	<1 µg/l	TM208	16.4	#				
sec-Butylbenzene	<1 µg/l	TM208	<1	#				
4-iso-Propyltoluene	<1 µg/l	TM208	<1	#				
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	#				
1,4-Dichlorobenzene	<1 µg/l	TM208	2.21	#				
n-Butylbenzene	<1 µg/l	TM208	<1	#				
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	#				
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	#				
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	#				
Hexachlorobutadiene	<1 µg/l	TM208	<1	#				
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	#				
Naphthalene	<1 µg/l	TM208	5.51	#				

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VOC MS (W)

Results Legend		Customer Sample R					
#	ISO17025 accredited.		BHIL04				
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1-5÷	Sample deviation (see appendix)						
		Depth (m)	6.50				
		Sample Type	Water(GW/SW)				
		Date Sampled	11/12/2015				
		Sampled Time	00:00:00				
		Date Received	12/12/2015				
		SDG Ref	151212-38				
		Lab Sample No.(s)	12632495				
		AGS Reference					
Component	LOD/Units	Method					
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1				
			#				
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1				



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SDG: 151212-38
Job: H_RHASKON_PT8-95
Client Reference: 9Y0074

Location: Cole Green Inert Landfill
Customer: Royal Haskoning
Attention: Darren Banner-Perry

Order Number: 9Y0074-105-100
Report Number: 343601
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
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		
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser		
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID		
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
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		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM245	By GC-FID	Determination of GRO by Headspace in waters		
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

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



SDG: 151212-38
Job: H_RHASKON_PTB-95
Client Reference: 9Y0074

Location: Cole Green Inert Landfill
Customer: Royal Haskoning
Attention: Darren Banner-Perry

Order Number: 9Y0074-105-100
Report Number: 343601
Superseded Report:

Test Completion Dates

Lab Sample No(s)	12632495
Customer Sample Ref.	BHIL04
AGS Ref.	
Depth	6.50
Type	LIQUID

Alkalinity as CaCO3	29-Dec-2015
Ammoniacal Nitrogen	17-Dec-2015
Anions by Kone (w)	23-Dec-2015
Conductivity (at 20 deg.C)	29-Dec-2015
Dissolved Metals by ICP-MS	24-Dec-2015
EPH CWG (Aliphatic) Aqueous GC (W)	29-Dec-2015
EPH CWG (Aromatic) Aqueous GC (W)	29-Dec-2015
GRO by GC-FID (W)	18-Dec-2015
Mercury Dissolved	18-Dec-2015
Metals by iCap-OES Dissolved (W)	21-Dec-2015
PAH Spec MS - Aqueous (W)	24-Dec-2015
pH Value	24-Dec-2015
Phenols by HPLC (W)	19-Dec-2015
SVOC MS (W) - Aqueous	29-Dec-2015
Total Organic and Inorganic Carbon	23-Dec-2015
TPH CWG (W)	29-Dec-2015
VOC MS (W)	17-Dec-2015



SDG: 151212-38
Job: H_RHASKON_PTB-95
Client Reference: 9Y0074

Location: Cole Green Inert Landfill
Customer: Royal Haskoning
Attention: Darren Banner-Perry

Order Number: 9Y0074-105-100
Report Number: 343601
Superseded Report:

Chromatogram

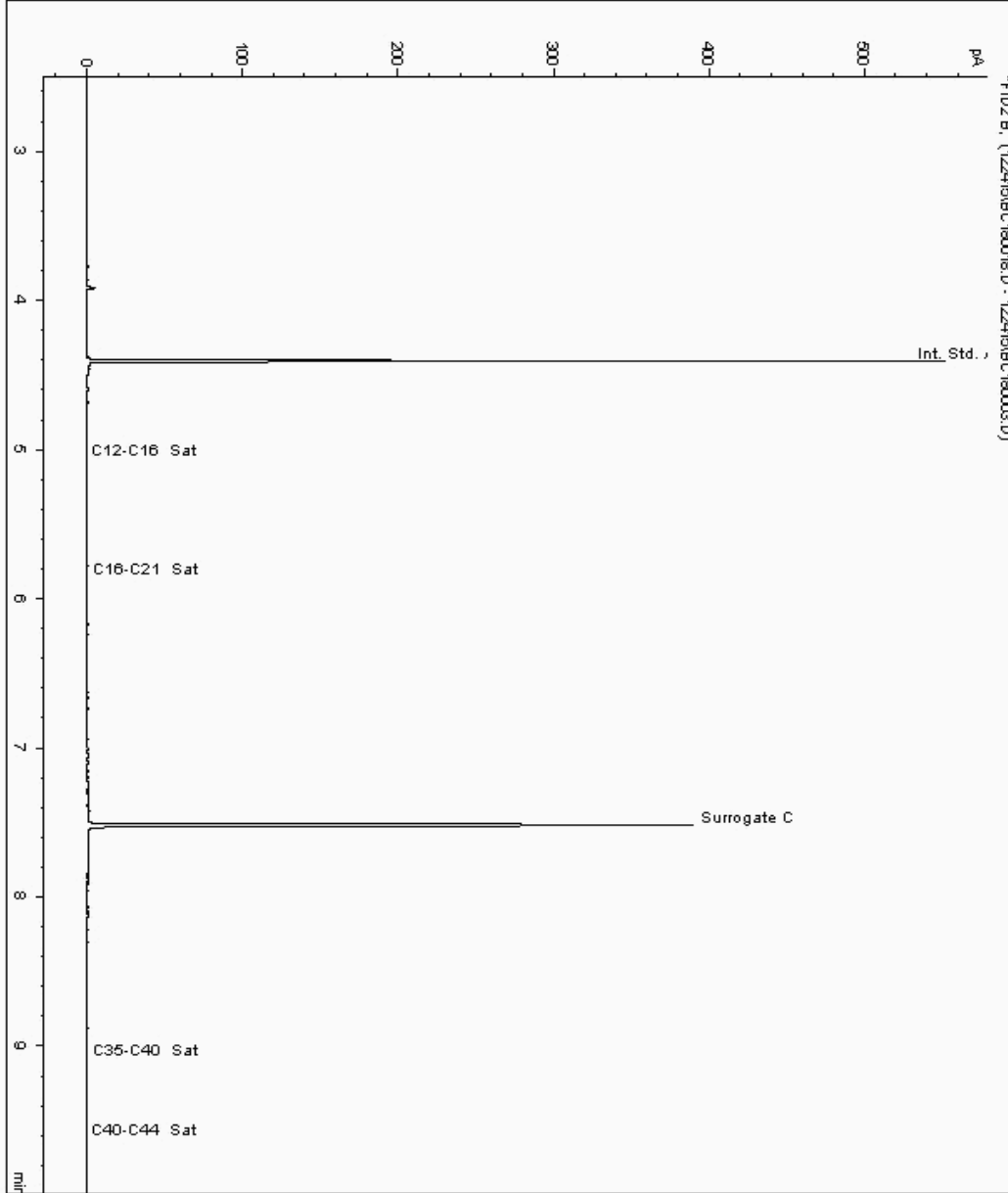
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 12661324
Sample ID : BHIL04

Depth : 6.50

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

Sample Identity: 11954357-
Date Acquired : 24/12/2015 18:19:53 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.009





SDG: 151212-38
Job: H_RHASKON_PTB-95
Client Reference: 9Y0074

Location: Cole Green Inert Landfill
Customer: Royal Haskoning
Attention: Darren Banner-Perry

Order Number: 9Y0074-105-100
Report Number: 343601
Superseded Report:

Chromatogram

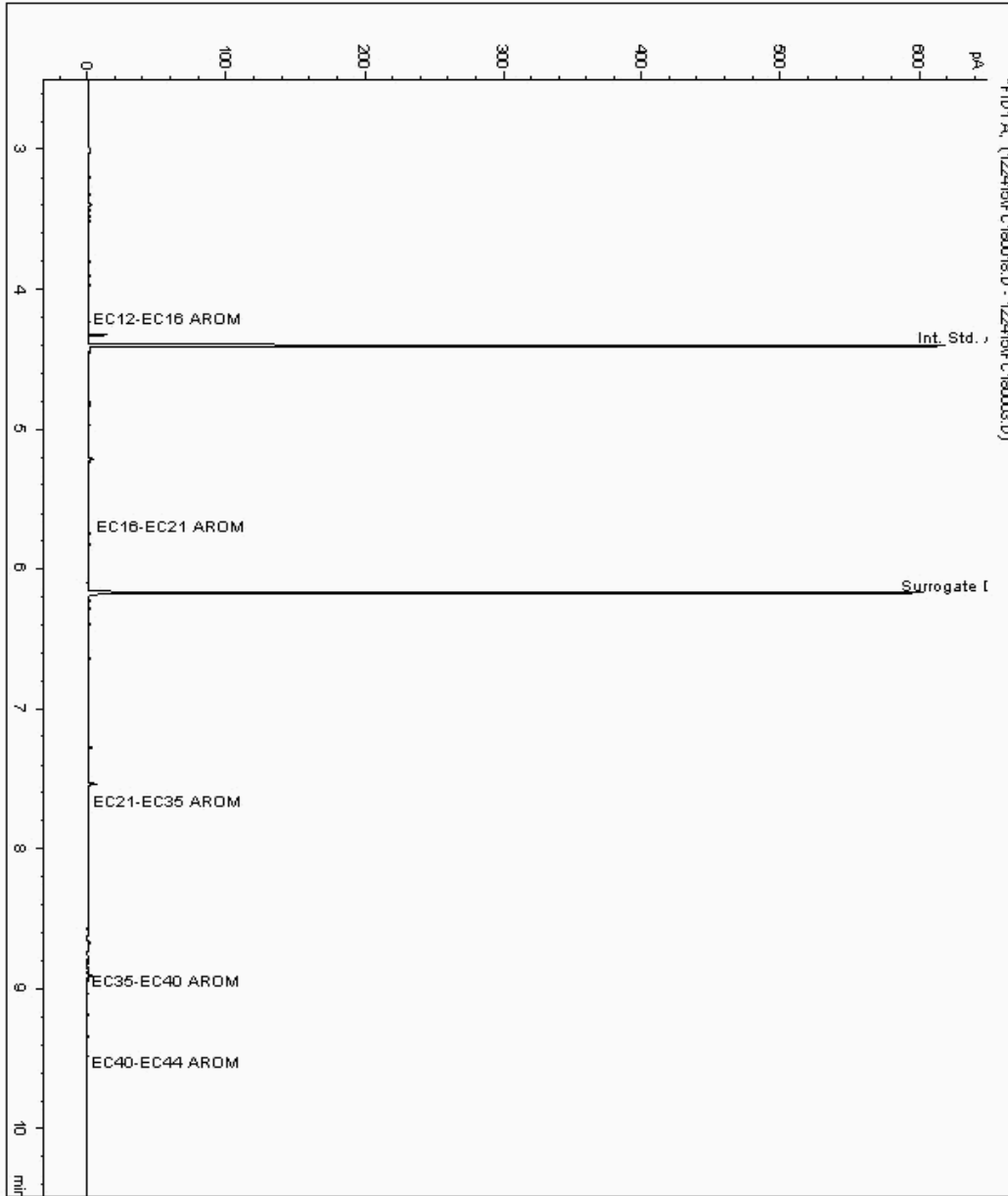
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 12661324
Sample ID : BHIL04

Depth : 6.50

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

Sample Identity: 11954358-
Date Acquired : 24/12/2015 18:19:54 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.009





SDG: 151212-38
Job: H_RHASKON_PTB-95
Client Reference: 9Y0074

Location: Cole Green Inert Landfill
Customer: Royal Haskoning
Attention: Darren Banner-Perry

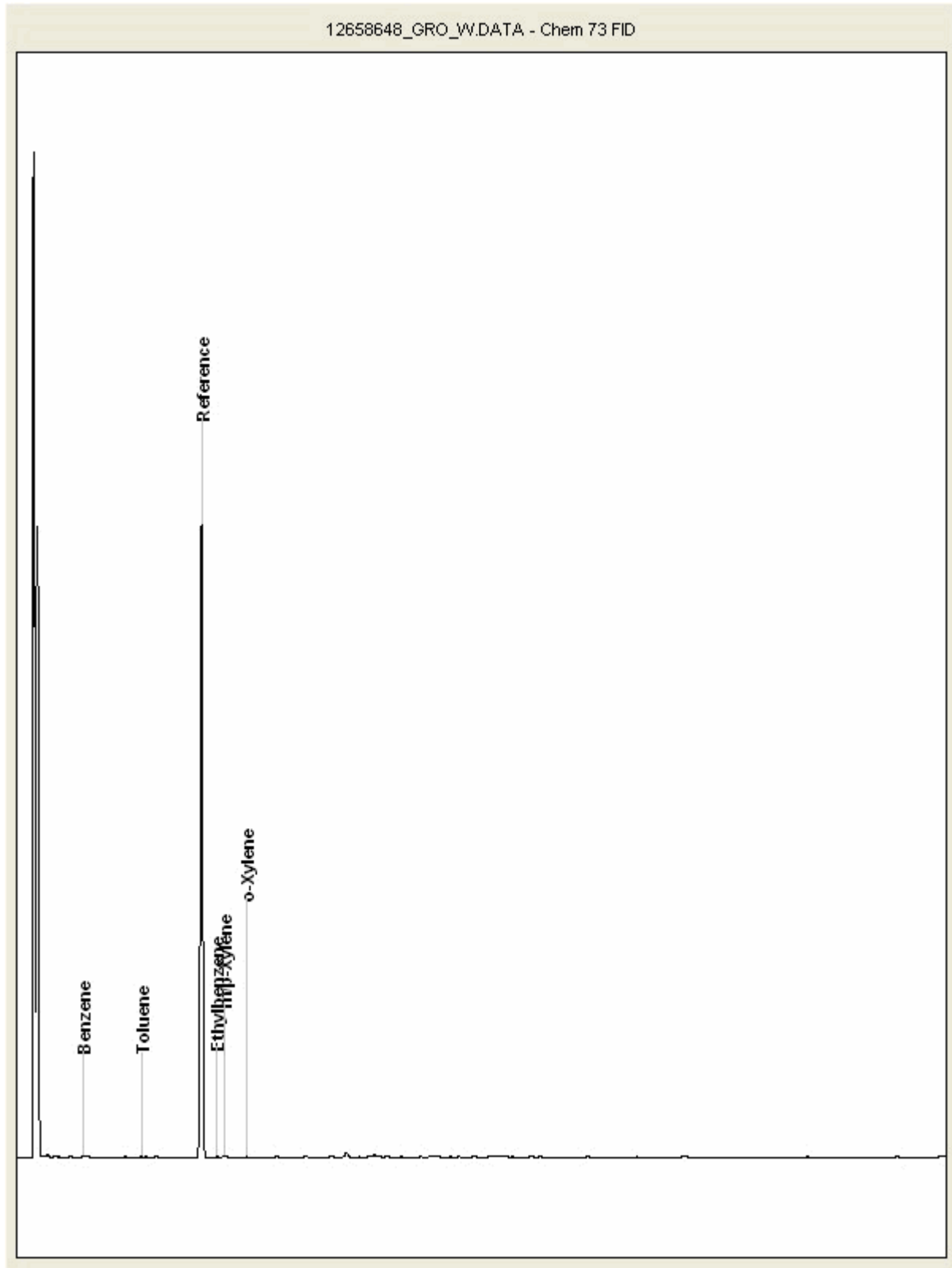
Order Number: 9Y0074-105-100
Report Number: 343601
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 12658648
Sample ID : BHIL04

Depth : 6.50





SDG: 151212-38
Job: H_RHASKON_PTB-95
Client Reference: 9Y0074

Location: Cole Green Inert Landfill
Customer: Royal Haskoning
Attention: Darren Banner-Perry

Order Number: 9Y0074-105-100
Report Number: 343601
Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH₄ by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS 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 both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

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

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

6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

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. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.

12. Results relate only to the items tested

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

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 14).

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

18. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.

19. 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.

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

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. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

23. 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.

24. 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 C4 -C10 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.

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DOM	SOXHERM	GRAMMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOXHERM	GRAMMETRIC
THIN LAYER CHROMATOGRAPHY	D&C	DOM	SOXHERM	ATROSCAN
ELEMENTAL SULPHUR	D&C	DOM	SOXHERM	HPLC
PHENOLSBY GOMS	WET	DOM	SOXHERM	GCMS
HERBICIDES	D&C	HEXANEACETONE	SOXHERM	GCMS
PESTICIDES	D&C	HEXANEACETONE	SOXHERM	GCMS
EPH (DRO)	D&C	HEXANEACETONE	END OVEREND	GCFD
EPH (MINOL)	D&C	HEXANEACETONE	END OVEREND	GCFD
EPH (CLEANED UP)	D&C	HEXANEACETONE	END OVEREND	GCFD
EPH CAG BY GC	D&C	HEXANEACETONE	END OVEREND	GCFD
PCB TOT / PCB CON	D&C	HEXANEACETONE	END OVEREND	GCMS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANEACETONE	MICROWAVE TM18.	GCMS
C8-C40 (C8-C40) EZ FLASH	WET	HEXANEACETONE	SHAKER	GCEZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANEACETONE	SHAKER	GCEZ
SEM VOLATILE ORGANIC COMPOUNDS	WET	DOMACETONE	SONICATE	GCMS

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRREDEXTRACTION(STIR-BAR)	GCMS
EPH	HEXANE	STIRREDEXTRACTION(STIR-BAR)	GCFD
EPH CAG	HEXANE	STIRREDEXTRACTION(STIR-BAR)	GCFD
MINERAL OIL	HEXANE	STIRREDEXTRACTION(STIR-BAR)	GCFD
PCB 7 CONGENERS	HEXANE	STIRREDEXTRACTION(STIR-BAR)	GCMS
PCB TOTAL	HEXANE	STIRREDEXTRACTION(STIR-BAR)	GCMS
SVOC	DOM	LIQUID/LIQUID SHAKE	GCMS
FREE SULPHUR	DOM	SOLID PHASE EXTRACTION	HPLC
PEST COPP	DOM	LIQUID/LIQUID SHAKE	GCMS
TRIAZINE HERBS	DOM	LIQUID/LIQUID SHAKE	GCMS
PHENOLSMS	DOM	SOLID PHASE EXTRACTION	GCMS
TPH by INFRARED (R)	TCE	LIQUID/LIQUID SHAKE	HPLC
MINERAL OIL by R	TCE	LIQUID/LIQUID SHAKE	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GCMS

Identification of Asbestos in Bulk Materials

The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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 MDHS 100.

The identification of asbestos containing materials 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.

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

SDG: 151212-38
Job: H_RHASKON_PTB-95
Client Reference: 9Y0074

Location: Cole Green Inert Landfill
Customer: Royal Haskoning
Attention: Darren Banner-Perry

Order Number: 9Y0074-105-100
Report Number: 343601
Superseded Report:

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. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

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

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

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. 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 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 the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

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.

Sample Deviations

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

Asbestos

Identification of Asbestos in Bulk Materials & Soils

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

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

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