Appendix 4

Groundwater and Surface Water Sampling Analysis Results

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
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Fehily Timoney
3rd Floor
North Park Offices
North Park Business Park
North Road
Dublin
Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date:	20 November 2018
Customer:	D_FTIM_DUB
Sample Delivery Group (SDG):	181002-48
Your Reference:	P1679
Location:	Scotch Corner Landfill
Report No:	481781

We received 5 samples on Tuesday October 02, 2018 and 5 of these samples were scheduled for analysis which was completed on Wednesday October 10, 2018. 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 Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan
Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18442340	SI6		0.00 - 0.00	01/10/2018
18442356	SI7		0.00 - 0.00	01/10/2018
18442367	SI8		0.00 - 0.00	01/10/2018
18442375	SI9		0.00 - 0.00	01/10/2018
18442388	SI10		0.00 - 0.00	01/10/2018

Maximum Sample/Coolbox Temperature (°C) : **13.5**

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°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

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)									18442340							18442356					18442367
Customer Sample Reference									SI6							SI7					SI8
AGS Reference																					
Depth (m)									0.00 - 0.00							0.00 - 0.00					0.00 - 0.00
Container									1000ml glass bottle (ALE220)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	1000ml glass bottle (ALE220)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	1000ml glass bottle (ALE220)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)
Sample Type									LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE
Alkalinity as CaCO3	All	NDPs: 0 Tests: 5									X							X					X		
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 5										X							X						X	
Anions by Kone (w)	All	NDPs: 0 Tests: 5									X							X					X		
BOD True Total	All	NDPs: 0 Tests: 5								X							X						X		
COD Unfiltered	All	NDPs: 0 Tests: 5								X							X						X		
Coliforms (W)	All	NDPs: 1 Tests: 0									N														
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 5									X							X					X		
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 5												X											
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 5											X												X
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 5									X							X					X		
Fluoride	All	NDPs: 0 Tests: 5									X							X					X		
Mercury Dissolved	All	NDPs: 0 Tests: 5											X												X
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 5							X							X					X				
Nitrite by Kone (w)	All	NDPs: 0 Tests: 5												X											
Organotins in Aqueous Samples	All	NDPs: 0 Tests: 5							X							X					X				

18442388	SI10		0.00 - 0.00	Vial (ALE297)	LE																	
				NaOH (ALE245)	LE										X						X	
				HNO3 Filtered (ALE204)	LE											X				X		
				H2SO4 (ALE244)	LE		X															
				500ml Plastic (ALE208)	LE	X		X					X				X		X			
				250ml BOD (ALE212)	LE				X		X											
				1000ml glass bottle (ALE220)	LE															X		X
18442375	SI9		0.00 - 0.00	Vial (ALE297)	LE																	
				NaOH (ALE245)	LE										X						X	
				H2SO4 (ALE244)	LE		X															
				500ml Plastic (ALE208)	LE	X		X					X			X	X		X			
				250ml BOD (ALE212)	LE				X		X											
				1000ml glass bottle (ALE220)	LE														X	X		X
18442367	SI8		0.00 - 0.00	Vial (ALE297)	LE																	
				NaOH (ALE245)	LE										X						X	

Validated

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)									18442340							18442356					18442367
Customer Sample Reference									SI6							SI7					SI8
AGS Reference																					
Depth (m)									0.00 - 0.00							0.00 - 0.00					0.00 - 0.00
Container									1000ml glass bottle (ALE220)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	1000ml glass bottle (ALE220)	250ml BOD (ALE212)	500ml Plastic (ALE208)	NaOH (ALE245)	Vial (ALE297)	1000ml glass bottle (ALE220)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)
Sample Type									LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 5							X							X					X				
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 5							X							X					X				
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 5							X							X					X				
pH Value	All	NDPs: 0 Tests: 5									X							X					X		
Phosphate by Kone (w)	All	NDPs: 0 Tests: 5									X							X					X		
Silicon Dissolved by ICP-OES	All	NDPs: 0 Tests: 5											X												X
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 5							X							X					X				
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 5																							
VOC MS (W)	All	NDPs: 0 Tests: 5																							

18442388	SI10		0.00 - 0.00	Vial (ALE297)	LE																		X
				NaOH (ALE245)	LE																		
				HNO3 Filtered (ALE204)	LE												X						
				H2SO4 (ALE244)	LE																X		
				500ml Plastic (ALE208)	LE								X		X								
				250ml BOD (ALE212)	LE																		
				1000ml glass bottle (ALE220)	LE		X		X		X								X				
18442375	SI9		0.00 - 0.00	Vial (ALE297)	LE																		X
				NaOH (ALE245)	LE																		
				H2SO4 (ALE244)	LE																X		
				500ml Plastic (ALE208)	LE								X		X		X						
				250ml BOD (ALE212)	LE																		
				1000ml glass bottle (ALE220)	LE		X		X		X								X				
18442367	SI8		0.00 - 0.00	Vial (ALE297)	LE																		X
				NaOH (ALE245)	LE																		

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018
			Sample Time	.	.	.	.	.
			Date Received	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
			SDG Ref	181002-48	181002-48	181002-48	181002-48	181002-48
			Lab Sample No.(s)	18442340	18442356	18442367	18442375	18442388
			AGS Reference					
Alkalinity, Total as CaCO3	<2 mg/l	TM043		1060 #	467 #	1750 #	338 #	1470 #
BOD, unfiltered	<1 mg/l	TM045		23.8 #	<1.5 #	17.3 #	13.8 #	34 #
Oxygen, dissolved	<0.3 mg/l	TM046		3.69	7	0.92	1.7	1.83
Organic Carbon, Total	<3 mg/l	TM090		32.8	21.3	115	28.4	54.6
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099		180	47.4	268	6.54	237
Fluoride	<0.5 mg/l	TM104		<0.5	<0.5	<0.5	<0.5	<0.5
COD, unfiltered	<7 mg/l	TM107		126 #	82.8 #	420 #	595 #	508 #
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120		2.11 #	1.32 #	3.18 #	0.659 #	2.9 #
Antimony (diss.filt)	<1 µg/l	TM152		<1	<1	<1	1.2 2	<1
Arsenic (diss.filt)	<0.5 µg/l	TM152		1.08 #	1.37 #	25.5 #	7.7 2 #	3.12 #
Barium (diss.filt)	<0.2 µg/l	TM152		119 #	163 #	285 #	54.2 2 #	146 #
Beryllium (diss.filt)	<0.1 µg/l	TM152		<0.1 #	<0.1 #	<0.1 #	<0.1 2 #	<0.1 #
Boron (diss.filt)	<10 µg/l	TM152		214 #	202 #	463 #	21.1 2 #	489 #
Cadmium (diss.filt)	<0.08 µg/l	TM152		<0.08 #	0.313 #	0.087 #	<0.08 2 #	<0.08 #
Chromium (diss.filt)	<1 µg/l	TM152		3.65 #	1.98 #	6.78 #	<1 2 #	9.96 #
Cobalt (diss.filt)	<0.5 µg/l	TM152		2 #	5.91 #	8.77 #	1.89 2 #	3.6 #
Copper (diss.filt)	<0.3 µg/l	TM152		<0.3 #	9.55 #	1.39 #	0.373 2 #	<0.3 #
Lead (diss.filt)	<0.2 µg/l	TM152		0.212 #	1.91 #	2.07 #	<0.2 2 #	0.269 #
Manganese (diss.filt)	<3 µg/l	TM152		2450 #	1170 #	2560 #		2100 #
Molybdenum (diss.filt)	<3 µg/l	TM152		<3 #	<3 #	<3 #	<3 2 #	<3 #
Nickel (diss.filt)	<0.4 µg/l	TM152		6.83 #	43.5 #	20.1 #	4.8 2 #	16.3 #
Phosphorus (diss.filt)	<10 µg/l	TM152		1140 #	24 #	823 #	25.3 2 #	1600 #
Selenium (diss.filt)	<1 µg/l	TM152		<1 #	<1 #	<1 #	<1 2 #	<1 #
Tellurium (diss.filt)	<2 µg/l	TM152		<2	<2	<2	<2 2	<2
Thallium (diss.filt)	<2 µg/l	TM152		<2 #	<2 #	<2 #	<2 2 #	<2 #
Titanium (diss.filt)	<1 µg/l	TM152		10.9 #	3.37 #	16.4 #	8.96 2 #	32 #
Uranium (diss.filt)	<0.5 µg/l	TM152		<0.5 #	1.11 #	0.791 #	1.63 2 #	<0.5 #
Vanadium (diss.filt)	<1 µg/l	TM152		2.82 #	<1 #	4.35 #	2.88 2 #	4.69 #
Zinc (diss.filt)	<1 µg/l	TM152		48.4 #	24.4 #	165 #	1.29 2 #	8.58 #
Tin (Diss.Filt)	<1 µg/l	TM152		<1 #	<1 #	3.67 #	<1 2 #	1.76 #
Silver (diss.filt)	<0.5 µg/l	TM152		<0.5 #	<0.5 #	<0.5 #	<0.5 2 #	<0.5 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152		26.1 #	39.4 #	68.8 #		85.3 #
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		22.9 #	23.9 #	40.6 #		41 #

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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)

Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
Date Sampled	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018
Sample Time	-	-	-	-	-
Date Received	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
SDG Ref	181002-48	181002-48	181002-48	181002-48	181002-48
Lab Sample No.(s)	18442340	18442356	18442367	18442375	18442388
AGS Reference					

Component	LOD/Units	Method					
Potassium (Dis.Filt)	<0.2 mg/l	TM152	20.7 #	22.5 #	54.3 #		75 #
Calcium (Dis.Filt)	<0.2 mg/l	TM152	159 #	150 #	235 #		198 #
Iron (Dis.Filt)	<0.019 mg/l	TM152	34.8 #	0.271 #	27.1 #		48.8 #
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172	238	<100	425	6430	898
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01 #	<0.01 #	<0.01 #	<0.01 2 #	<0.01 #
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184	<0.05	<0.05	<0.05	<0.05	<0.05
Chloride	<2 mg/l	TM184	36.8	60.1	102	13.9	136
Nitrite as N	<0.0152 mg/l	TM184	<0.0152	0.491	<0.0152	<0.0152	<0.0152
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.1	44.7	<0.1	<0.1	<0.1
Sulphate (soluble) as S	<1 mg/l	TM184	17.1	6.47	<1	26.7	18.1
Cyanide, Total	<0.05 mg/l	TM227	<0.05 #	<0.05 #	<0.05 #	<0.05 #	<0.05 #
Cyanide, Free	<0.05 mg/l	TM227	<0.05 #	<0.05 #	<0.05 #	<0.05 #	<0.05 #
pH	<1 pH Units	TM256	7.04 #	7.16 #	7.24 #	7.03 #	7.07 #
Silicon (diss.filt)	<0.05 mg/l	TM284	10.9	4.38	9.63	4.38	11.8
Dibutyl tin	<5 ng/l	TM328	15.8	<5	<15	<10	<15
Tributyl tin	<1 ng/l	TM328	<3	<1	7.97	<2	<3
Tetrabutyl tin	<2 ng/l	TM328	<6	<2	<6	<4	<6
Triphenyl tin	<1 ng/l	TM328	<3	<1	<3	<2	<3
Surrogate	%	TM328	85.8	90.3	75.8	86.7	79.8
Trifluralin	<0.01 µg/l	TM343	<0.04	<0.02	<0.02	<0.02	<0.02
alpha-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01
gamma-HCH (Lindane)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor	<0.01 µg/l	TM343	<0.04	<0.04	<0.04	<0.04	<0.04
Aldrin	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.02	<0.02
beta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01
Isodrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor epoxide	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01
o,p'-DDE	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.02	<0.02
Endosulphan I	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01
trans-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01
cis-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01
p,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01

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Results Legend

#	ISO17025 accredited.
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*	Subcontracted test.
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(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018
			Sample Time	-	-	-	-	-
			Date Received	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
			SDG Ref	181002-48	181002-48	181002-48	181002-48	181002-48
			Lab Sample No.(s)	18442340	18442356	18442367	18442375	18442388
			AGS Reference					
Dieldrin	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01	<0.01
o,p'-DDD (TDE)	<0.01 µg/l	TM343		<0.02	<0.02	<0.02	<0.02	<0.02
Endrin	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01	<0.01
o,p'-DDT	<0.01 µg/l	TM343		<0.02	<0.02	<0.02	<0.02	<0.02
p,p'-DDD (TDE)	<0.01 µg/l	TM343		<0.02	<0.02	<0.02	<0.02	<0.02
Endosulphan II	<0.02 µg/l	TM343		<0.02	<0.02	<0.02	<0.02	<0.02
p,p'-DDT	<0.01 µg/l	TM343		<0.03	<0.03	<0.03	<0.03	<0.03
p,p'-Methoxychlor	<0.01 µg/l	TM343		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulphan Sulphate	<0.02 µg/l	TM343		<0.02	<0.02	<0.02	<0.02	<0.02
Permethrin I	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01	<0.01
Permethrin II	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01	<0.01
Dichlorvos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Mevinphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Tecnazene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Hexachlorobenzene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Diazinon	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Triallate	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Atrazine	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Simazine	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	0.016	0.0772
Disulfoton	<0.01 µg/l	TM344		<0.02	<0.02	<0.02	<0.02	<0.02
Propetamphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Chlorpyriphos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Dimethoate	<0.01 µg/l	TM344		<0.02	<0.02	<0.02	<0.02	<0.02
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Chlorpyriphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Methyl Parathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Malathion	<0.01 µg/l	TM344		<0.03	<0.03	<0.03	<0.03	<0.03
Fenthion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Fenitrothion	<0.01 µg/l	TM344		<0.02	<0.02	<0.02	<0.02	<0.02
Triadimefon	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01	<0.01
Pendimethalin	<0.01 µg/l	TM344		<0.03	<0.03	<0.03	<0.03	<0.03
Parathion	<0.01 µg/l	TM344		<0.02	<0.02	<0.02	<0.02	<0.02

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018
			Sample Time	-	-	-	-	-
			Date Received	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
			SDG Ref	181002-48	181002-48	181002-48	181002-48	181002-48
			Lab Sample No.(s)	18442340	18442356	18442367	18442375	18442388
			AGS Reference					
Chlorfenvinphos	<0.01 µg/l	TM344		<0.02	<0.02	0.987	0.0217	<0.02
Ethion	<0.01 µg/l	TM344		<0.03	<0.03	<0.03	<0.03	<0.03
Carbophenothion	<0.01 µg/l	TM344		<0.04	<0.04	<0.04	<0.04	<0.04
Triazophos	<0.01 µg/l	TM344		<0.03	<0.03	<0.03	<0.03	<0.03
Phosalone	<0.01 µg/l	TM344		<0.04	<0.04	<0.04	<0.04	<0.04
Azinphos methyl	<0.02 µg/l	TM344		<0.12	<0.12	<0.12	<0.12	<0.12
Azinphos ethyl	<0.02 µg/l	TM344		<0.1	<0.1	<0.1	<0.1	<0.1
Quintozene (PCNB)	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01	<0.01
Telodrin	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01	<0.01
Chlorothalonil	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01	<0.01
Etrimphos	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01	<0.01

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018
			Sample Time	.	.	.	.	.
			Date Received	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
			SDG Ref	181002-48	181002-48	181002-48	181002-48	181002-48
			Lab Sample No.(s)	18442340	18442356	18442367	18442375	18442388
			AGS Reference					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2,4-Dichlorophenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2,4-Dimethylphenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2-Chloronaphthalene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2-Chlorophenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2-Methylnaphthalene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2-Methylphenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2-Nitroaniline (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
2-Nitrophenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
3-Nitroaniline (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
4-Bromophenylphenylether (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
4-Chloroaniline (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
4-Methylphenol (aq)	<1 µg/l	TM176		<1	<2	49.6	<1	10.7
4-Nitroaniline (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
4-Nitrophenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Azobenzene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Acenaphthylene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Acenaphthene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Anthracene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176		4.11	5.94	45.3	<2	<2
Butylbenzyl phthalate (aq)	<1 µg/l	TM176		<1	<2	7.92	<1	<1
Benzo(a)anthracene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018
			Sample Time	-	-	-	-	-
			Date Received	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
			SDG Ref	181002-48	181002-48	181002-48	181002-48	181002-48
			Lab Sample No.(s)	18442340	18442356	18442367	18442375	18442388
			AGS Reference					
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Carbazole (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Chrysene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Dibenzofuran (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1	<2	<5	1.01	<1
Diethyl phthalate (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5	<10	<25	<5	<5
Fluoranthene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Fluorene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Phenol (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Hexachloroethane (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Nitrobenzene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Naphthalene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	1.31
Isophorone (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Phenanthrene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1
Pyrene (aq)	<1 µg/l	TM176		<1	<2	<5	<1	<1

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018
			Sample Time	.	.	.	.	.
			Date Received	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
			SDG Ref	181002-48	181002-48	181002-48	181002-48	181002-48
			Lab Sample No.(s)	18442340	18442356	18442367	18442375	18442388
			AGS Reference					
Dibromofluoromethane**	%	TM208		109	111	111	107	110
Toluene-d8**	%	TM208		98.6	101	99.5	99.3	99.8
4-Bromofluorobenzene**	%	TM208		98.9	98.8	98.3	97.5	98.7
Dichlorodifluoromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Chloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Vinyl chloride	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Bromomethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Chloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Trichlorofluoromethane	<1 µg/l	TM208		<1 #	<1 #	2.81 #	<1 #	<1 #
1,1-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Carbon disulphide	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Dichloromethane	<3 µg/l	TM208		<3 #	<3 #	<3 #	<3 #	<3 #
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,2-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,2-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
2,2-Dichloropropane	<1 µg/l	TM208		<1	<1	<1	<1	<1
Bromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Chloroform	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1-Trichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Carbontetrachloride	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Benzene	<1 µg/l	TM208		<1 #	<1 #	1.77 #	<1 #	1.61 #
Trichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Dibromomethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Bromodichloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,3-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Toluene	<1 µg/l	TM208		<1 #	<1 #	41.3 #	<1 #	26.6 #
trans-1,3-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2-Trichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018
			Sample Time	-	-	-	-	-
			Date Received	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
			SDG Ref	181002-48	181002-48	181002-48	181002-48	181002-48
			Lab Sample No.(s)	18442340	18442356	18442367	18442375	18442388
			AGS Reference					
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	81.3 #	<1 #	<1 #
m,p-Xylene	<1 µg/l	TM208		<1 #	5.83 #	206 #	<1 #	6.32 #
o-Xylene	<1 µg/l	TM208		<1 #	2.29 #	42.8 #	<1 #	1.02 #
Styrene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Bromoform	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Isopropylbenzene	<1 µg/l	TM208		<1 #	<1 #	1.28 #	<1 #	<1 #
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Bromobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Propylbenzene	<1 µg/l	TM208		<1 #	<1 #	1.65 #	<1 #	<1 #
2-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	4.35 #	<1 #	2.04 #
4-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
tert-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	21.2 #	<1 #	7.18 #
sec-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
4-iso-Propyltoluene	<1 µg/l	TM208		<1 #	<1 #	16.6 #	<1 #	<1 #
1,3-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,4-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
n-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene	<1 µg/l	TM208		<1 #	<1 #	2.87 #	<1 #	1.36 #
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	01/10/2018	01/10/2018	01/10/2018	01/10/2018	01/10/2018
			Sample Time	-	-	-	-	-
			Date Received	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018
			SDG Ref	181002-48	181002-48	181002-48	181002-48	181002-48
			Lab Sample No.(s)	18442340	18442356	18442367	18442375	18442388
			AGS Reference					
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

Notification of NDPs (No determination possible)

Date Received : 02/10/2018 10:46:21

Sample No	Customer Sample Ref.	Depth (m)	Test	Comment
18442340	SI6	0.00 - 0.00	Coliforms (W)	See Comments for cancellation details

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

Table of Results - Appendix

Method No	Reference	Description
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM046	Method 4500G, AWWA/APHA, 20th Ed., 1999	Measurement of Dissolved Oxygen by Oxygen Meter
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
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
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
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
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
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
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
TM284		
TM328		
TM343	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of Selected Pesticides (Suite I) in Liquids by GCMS
TM344	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite II) by GCMS
TM345	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite III) by GCMS

NA = not applicable.

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

CERTIFICATE OF ANALYSIS

SDG:	181002-48	**Client Reference:**	P1679	**Report Number:**	481781
Location:	Scotch Corner Landfill	**Order Number:**	Z1283	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	18442340	18442356	18442367	18442375	18442388
Customer Sample Ref.	SI6	SI7	SI8	SI9	SI10
AGS Ref.					
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate
Alkalinity as CaCO3	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018
Ammoniacal Nitrogen	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018
Anions by Kone (w)	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018
BOD True Total	07-Oct-2018	07-Oct-2018	07-Oct-2018	07-Oct-2018	07-Oct-2018
COD Unfiltered	08-Oct-2018	08-Oct-2018	08-Oct-2018	09-Oct-2018	08-Oct-2018
Conductivity (at 20 deg.C)	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018
Cyanide Comp/Free/Total/Thiocyanate	04-Oct-2018	08-Oct-2018	08-Oct-2018	08-Oct-2018	08-Oct-2018
Dissolved Metals by ICP-MS	10-Oct-2018	10-Oct-2018	10-Oct-2018	09-Oct-2018	10-Oct-2018
Dissolved Oxygen by Probe	05-Oct-2018	04-Oct-2018	04-Oct-2018	05-Oct-2018	04-Oct-2018
Fluoride	09-Oct-2018	10-Oct-2018	10-Oct-2018	09-Oct-2018	09-Oct-2018
Mercury Dissolved	05-Oct-2018	05-Oct-2018	05-Oct-2018	08-Oct-2018	05-Oct-2018
Mineral Oil C10-40 Aqueous (W)	09-Oct-2018	09-Oct-2018	09-Oct-2018	09-Oct-2018	09-Oct-2018
Nitrite by Kone (w)	06-Oct-2018	06-Oct-2018	06-Oct-2018	06-Oct-2018	06-Oct-2018
Organotins in Aqueous Samples	09-Oct-2018	09-Oct-2018	09-Oct-2018	09-Oct-2018	09-Oct-2018
Pesticides (Suite I) by GCMS	09-Oct-2018	09-Oct-2018	09-Oct-2018	09-Oct-2018	09-Oct-2018
Pesticides (Suite II) by GCMS	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018
Pesticides (Suite III) by GCMS	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018
pH Value	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018
Phosphate by Kone (w)	08-Oct-2018	08-Oct-2018	08-Oct-2018	08-Oct-2018	08-Oct-2018
Silicon Dissolved by ICP-OES	04-Oct-2018	04-Oct-2018	04-Oct-2018	04-Oct-2018	04-Oct-2018
SVOC MS (W) - Aqueous	09-Oct-2018	10-Oct-2018	09-Oct-2018	09-Oct-2018	09-Oct-2018
Total Organic and Inorganic Carbon	05-Oct-2018	03-Oct-2018	05-Oct-2018	05-Oct-2018	03-Oct-2018
VOC MS (W)	08-Oct-2018	08-Oct-2018	08-Oct-2018	08-Oct-2018	08-Oct-2018

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) 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%. 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 Dimethyphenol, 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**
@	**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
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.

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Website: www.alsenvironmental.co.uk

Fehily Timoney
3rd Floor
North Park Offices
North Park Business Park
North Road
Dublin
Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date:	11 October 2018
Customer:	D_FTIM_DUB
Sample Delivery Group (SDG):	181003-47
Your Reference:	P1679
Location:	Scotch Corner Landfill
Report No:	476317

We received 1 sample on Wednesday October 03, 2018 and 1 of these samples were scheduled for analysis which was completed on Thursday October 11, 2018. 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 Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan
Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	181003-47	**Client Reference:**	P1679	**Report Number:**	476317
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18449679	G8		0.00 - 0.00	02/10/2018

Maximum Sample/Coolbox Temperature (°C) : **11.0**

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°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

CERTIFICATE OF ANALYSIS

SDG:	181003-47	**Client Reference:**	P1679	**Report Number:**	476317
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Results Legend

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			18449679				
Customer Sample Reference			G8				
AGS Reference							
Depth (m)			0.00 - 0.00				
Container			250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	
Sample Type			SW	SW	SW	SW	
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 1			X		
Anions by Kone (w)	All	NDPs: 0 Tests: 1		X			
BOD True Total	All	NDPs: 0 Tests: 1	X				
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 1		X			
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1				X	
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 1		X			
pH Value	All	NDPs: 0 Tests: 1		X			

Validated

CERTIFICATE OF ANALYSIS

SDG:	181003-47	**Client Reference:**	P1679	**Report Number:**	476317
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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)

Customer Sample Ref.	G8
Depth (m)	0.00 - 0.00
Sample Type	Surface Water (SW)
Date Sampled	02/10/2018
Sample Time	.
Date Received	03/10/2018
SDG Ref	181003-47
Lab Sample No.(s)	18449679
AGS Reference	

Component	LOD/Units	Method	
BOD, unfiltered	<1 mg/l	TM045	<5 #
Oxygen, dissolved	<0.3 mg/l	TM046	6.99
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2 #
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	0.204 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152	14.8 #
Potassium (Dis.Filt)	<0.2 mg/l	TM152	0.63 #
Chloride	<2 mg/l	TM184	21.1 #
Sulphate (soluble) as S	<1 mg/l	TM184	14.2 #
pH	<1 pH Units	TM256	6.62 #

CERTIFICATE OF ANALYSIS

SDG:	181003-47	**Client Reference:**	P1679	**Report Number:**	476317
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Table of Results - Appendix

Method No	Reference	Description
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM046	Method 4500G, AWWA/APHA, 20th Ed., 1999	Measurement of Dissolved Oxygen by Oxygen Meter
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
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
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

NA = not applicable.

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

CERTIFICATE OF ANALYSIS

SDG:	181003-47	**Client Reference:**	P1679	**Report Number:**	476317
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	18449679
Customer Sample Ref.	G8
AGS Ref.	
Depth	0.00 - 0.00
Type	Surface Water
Ammoniacal Nitrogen	11-Oct-2018
Anions by Kone (w)	11-Oct-2018
BOD True Total	09-Oct-2018
Conductivity (at 20 deg.C)	10-Oct-2018
Dissolved Metals by ICP-MS	10-Oct-2018
Dissolved Oxygen by Probe	04-Oct-2018
pH Value	10-Oct-2018

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) 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%. 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 Dimethyphenol, 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**
@	**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
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.

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
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Website: www.alsenvironmental.co.uk

Fehily Timoney
3rd Floor
North Park Offices
North Park Business Park
North Road
Dublin
Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date:	19 October 2018
Customer:	D_FTIM_DUB
Sample Delivery Group (SDG):	181012-1
Your Reference:	P1679
Location:	Scotch Corner Landfill
Report No:	477702

We received 6 samples on Friday October 12, 2018 and 6 of these samples were scheduled for analysis which was completed on Friday October 19, 2018. 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 Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan
Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18508267	G3		0.00 - 0.00	10/10/2018
18508273	G8		0.00 - 0.00	10/10/2018
18508225	SI6		0.00 - 0.00	10/10/2018
18508239	SI7		0.00 - 0.00	10/10/2018
18508249	SI8		0.00 - 0.00	10/10/2018
18508257	SI10		0.00 - 0.00	10/10/2018

Maximum Sample/Coolbox Temperature (°C) : **9.4**

ISO5667-3 Water quality - Sampling - Part3 -
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°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

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)					18508267				18508273				18508225						18508239	
Customer Sample Reference					G3				G8				SI6						SI7	
AGS Reference																				
Depth (m)					0.00 - 0.00				0.00 - 0.00				0.00 - 0.00						0.00 - 0.00	
Container					0.5l glass bottle (ALE227)	250ml BOD (ALE212)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)
Sample Type					SW	SW	SW	SW	SW	SW	SW	SW	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 6					X				X				X						X		
Anions by Kone (w)	All	NDPs: 0 Tests: 6			X				X				X						X				
BOD True Total	All	NDPs: 0 Tests: 6				X				X				X						X			
COD Unfiltered	All	NDPs: 0 Tests: 6				X				X				X						X			
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 6			X				X				X						X				
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 4															X						X
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6						X				X				X						X	
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 6			X				X				X						X				
Fluoride	All	NDPs: 0 Tests: 4											X						X				
Mercury Dissolved	All	NDPs: 0 Tests: 4														X						X	
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 4											X						X				
Nitrite by Kone (w)	All	NDPs: 0 Tests: 4															X						X
Organotins in Aqueous Samples	All	NDPs: 0 Tests: 4											X						X				
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 4											X						X				
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 4											X						X				

18508257	SI10		0.00 - 0.00	Vial (ALE297)	LE															
				NaOH (ALE245)	LE						X						X			
				HNO3 Filtered (ALE204)	LE							X			X					
				H2SO4 (ALE244)	LE	X														
				250ml BOD (ALE212)	LE			X	X											
				0.5l glass bottle (ALE227)	LE		X			X			X	X		X		X	X	X
18508249	SI8		0.00 - 0.00	Vial (ALE297)	LE															
				NaOH (ALE245)	LE						X						X			
				HNO3 Filtered (ALE204)	LE							X			X					
				H2SO4 (ALE244)	LE	X														
				250ml BOD (ALE212)	LE			X	X											
				0.5l glass bottle (ALE227)	LE		X			X			X	X		X		X	X	X
18508239	SI7		0.00 - 0.00	Vial (ALE297)	LE															

Validated

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)					18508267				18508273				18508225				18508239			
Customer Sample Reference					G3				G8				SI6				SI7			
AGS Reference																				
Depth (m)					0.00 - 0.00				0.00 - 0.00				0.00 - 0.00				0.00 - 0.00			
Container					0.5l glass bottle (ALE227)	250ml BOD (ALE212)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)
Sample Type					SW	SW	SW	SW	SW	SW	SW	SW	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 4											X						X				
pH Value	All	NDPs: 0 Tests: 6	X						X				X						X				
Phosphate by Kone (w)	All	NDPs: 0 Tests: 4											X						X				
Silicon Dissolved by ICP-OES	All	NDPs: 0 Tests: 4														X						X	
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 4											X						X				
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 4													X						X		
VOC MS (W)	All	NDPs: 0 Tests: 4																X					

18508257	SI10		0.00 - 0.00	Vial (ALE297)	LE							X
				NaOH (ALE245)	LE							
				HNO3 Filtered (ALE204)	LE				X			
				H2SO4 (ALE244)	LE						X	
				250ml BOD (ALE212)	LE							
				0.5l glass bottle (ALE227)	LE	X	X	X		X		
18508249	SI8		0.00 - 0.00	Vial (ALE297)	LE							X
				NaOH (ALE245)	LE							
				HNO3 Filtered (ALE204)	LE				X			
				H2SO4 (ALE244)	LE						X	
				250ml BOD (ALE212)	LE							
				0.5l glass bottle (ALE227)	LE	X	X	X		X		
18508239	SI7		0.00 - 0.00	Vial (ALE297)	LE							X

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	G3	G8	SI6	SI7	SI8	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Surface Water (SW)	Surface Water (SW)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	10/10/2018	10/10/2018	10/10/2018	10/10/2018	10/10/2018	10/10/2018
			Sample Time	.	.	.	.	.	.
			Date Received	12/10/2018	12/10/2018	12/10/2018	12/10/2018	12/10/2018	12/10/2018
			SDG Ref	181012-1	181012-1	181012-1	181012-1	181012-1	181012-1
			Lab Sample No.(s)	18508267	18508273	18508225	18508239	18508249	18508257
			AGS Reference						
BOD, unfiltered	<1 mg/l	TM045		<2.5 #	6.05 #	7.77 #	3.75 #	103 #	61.2 #
Oxygen, dissolved	<0.3 mg/l	TM046		7.68	8.24	7.54	7.38	7.4	6.54
Organic Carbon, Total	<3 mg/l	TM090				30.7	21.2	102	56.8
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099		46.9 #	<0.2 #	204	45	229	269
Fluoride	<0.5 mg/l	TM104				<0.5	<0.5	<0.5	<0.5
COD, unfiltered	<7 mg/l	TM107		97.9 #	148 #	91.2 #	82 #	537 #	380 #
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120		0.927 #	0.218 #	2.24 #	1.15 #	2.57 #	2.93 #
Antimony (diss.filt)	<1 µg/l	TM152				<1	<1	<1	<1
Arsenic (diss.filt)	<0.5 µg/l	TM152				1.19 #	1.44 #	23.9 #	2.57 #
Barium (diss.filt)	<0.2 µg/l	TM152				131 #	152 #	359 #	126 #
Beryllium (diss.filt)	<0.1 µg/l	TM152				<0.1 #	<0.1 #	<0.1 #	<0.1 #
Boron (diss.filt)	<10 µg/l	TM152				242 #	240 #	498 #	589 #
Cadmium (diss.filt)	<0.08 µg/l	TM152				<0.08 #	0.143 #	<0.08 #	<0.08 #
Chromium (diss.filt)	<1 µg/l	TM152				2.75 #	1.28 #	4.98 #	10.8 #
Cobalt (diss.filt)	<0.5 µg/l	TM152				1.89 #	4.74 #	7.17 #	2.46 #
Copper (diss.filt)	<0.3 µg/l	TM152				<0.3 #	4.31 #	<0.3 #	<0.3 #
Lead (diss.filt)	<0.2 µg/l	TM152				0.201 #	1.14 #	<0.2 #	<0.2 #
Manganese (diss.filt)	<3 µg/l	TM152				2580 #	1320 #	2550 #	1250 #
Molybdenum (diss.filt)	<3 µg/l	TM152				10.5 #	<3 #	<3 #	<3 #
Nickel (diss.filt)	<0.4 µg/l	TM152				3.67 #	28 #	14.7 #	4.89 #
Phosphorus (diss.filt)	<10 µg/l	TM152				1390 #	21.4 #	1270 #	1260 #
Selenium (diss.filt)	<1 µg/l	TM152				<1 #	<1 #	<1 #	<1 #
Tellurium (diss.filt)	<2 µg/l	TM152				5.89	<2	<2	<2
Thallium (diss.filt)	<2 µg/l	TM152				<2 #	<2 #	<2 #	<2 #
Titanium (diss.filt)	<1 µg/l	TM152				15 #	6.02 #	21.2 #	23.7 #
Uranium (diss.filt)	<0.5 µg/l	TM152				<0.5 #	1.26 #	0.714 #	<0.5 #
Vanadium (diss.filt)	<1 µg/l	TM152				3.27 #	<1 #	4.88 #	4.58 #
Zinc (diss.filt)	<1 µg/l	TM152				2.23 #	13 #	3.01 #	2.69 #
Tin (Diss.Filt)	<1 µg/l	TM152				4.76 #	<1 #	3.04 #	1.98 #
Silver (diss.filt)	<0.5 µg/l	TM152				<0.5 #	<0.5 #	<0.5 #	<0.5 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152		26.1 #	17.3 #	25.3 #	39.6 #	55.5 #	79.5 #
Magnesium (Dis.Filt)	<0.036 mg/l	TM152				23.5 #	25.2 #	41.5 #	41.2 #
Potassium (Dis.Filt)	<0.2 mg/l	TM152		15.5 #	1.22 #	19.8 #	20.1 #	46.8 #	72 #

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	G3	G8	SI6	SI7	SI8	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Surface Water (SW)	Surface Water (SW)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	10/10/2018	10/10/2018	10/10/2018	10/10/2018	10/10/2018	10/10/2018
			Sample Time	-	-	-	-	-	-
			Date Received	12/10/2018	12/10/2018	12/10/2018	12/10/2018	12/10/2018	12/10/2018
			SDG Ref	181012-1	181012-1	181012-1	181012-1	181012-1	181012-1
			Lab Sample No.(s)	18508267	18508273	18508225	18508239	18508249	18508257
			AGS Reference						
Calcium (Dis.Filt)	<0.2 mg/l	TM152				149 #	136 #	223 #	161 #
Iron (Dis.Filt)	<0.019 mg/l	TM152				23.2 #	0.377 #	24.8 #	52.5 #
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172				<100	<100	223	2080
Mercury (diss.filt)	<0.01 µg/l	TM183				<0.01 #	<0.01 #	<0.01 #	<0.01 #
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184				0.096	<0.05	0.301	<0.05
Sulphate	<2 mg/l	TM184		15.6 #	36.4 #	74.8	23.4	<2	8.1
Chloride	<2 mg/l	TM184		46.2 #	22.4 #	39.7	60	91	156
Nitrite as N	<0.0152 mg/l	TM184				<0.0152	0.8	<0.0152	<0.0152
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184				<0.1	24.5	<0.1	<0.1
Cyanide, Total	<0.05 mg/l	TM227				<0.05 #	<0.05 #	<0.05 #	<0.05 #
Cyanide, Free	<0.05 mg/l	TM227				<0.05 #	<0.05 #	<0.05 #	<0.05 #
pH	<1 pH Units	TM256		8.01 #	7.26 #	7.09 #	7.01 #	7.48 #	7.92 #
Silicon (diss.filt)	<0.05 mg/l	TM284				8.67	3.49	10.4	10.4
Dibutyl tin	<5 ng/l	TM328				11.7	<5	<15	<15
Tributyl tin	<1 ng/l	TM328				<1	<1	<3	<3
Tetrabutyl tin	<2 ng/l	TM328				<2	<2	<6	<6
Triphenyl tin	<1 ng/l	TM328				<1	<1	<3	<3
Surrogate	%	TM328				95.9	95.8	59.3	72.9
Trifluralin	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
alpha-HCH	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
gamma-HCH (Lindane)	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Heptachlor	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Aldrin	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
beta-HCH	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Isodrin	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Heptachlor epoxide	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
o,p'-DDE	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Endosulphan I	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
trans-Chlordane	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
cis-Chlordane	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
p,p'-DDE	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Dieldrin	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	G3	G8	SI6	SI7	SI8	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Surface Water (SW)	Surface Water (SW)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	10/10/2018	10/10/2018	10/10/2018	10/10/2018	10/10/2018	10/10/2018
			Sample Time	-	-	-	-	-	-
			Date Received	12/10/2018	12/10/2018	12/10/2018	12/10/2018	12/10/2018	12/10/2018
			SDG Ref	181012-1	181012-1	181012-1	181012-1	181012-1	181012-1
			Lab Sample No.(s)	18508267	18508273	18508225	18508239	18508249	18508257
			AGS Reference						
o,p'-DDD (TDE)	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Endrin	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
o,p'-DDT	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
p,p'-DDD (TDE)	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Endosulphan II	<0.02 µg/l	TM343				<0.02	<0.02	<0.02	<0.02
p,p'-DDT	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
p,p'-Methoxychlor	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Endosulphan Sulphate	<0.02 µg/l	TM343				<0.02	<0.02	<0.02	<0.02
Permethrin I	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Permethrin II	<0.01 µg/l	TM343				<0.01	<0.01	<0.01	<0.01
Dichlorvos	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Mevinphos	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Tecnazene	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Hexachlorobenzene	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Diazinon	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Triallate	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Atrazine	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	0.087
Simazine	<0.01 µg/l	TM344				<0.01	0.0493	0.192	0.213
Disulfoton	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Propetamphos	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Chlorpyriphos-methyl	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Dimethoate	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Pirimiphos-methyl	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Chlorpyriphos	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Methyl Parathion	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Malathion	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Fenthion	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Fenitrothion	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Triadimefon	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Pendimethalin	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Parathion	<0.01 µg/l	TM344				<0.01	<0.01	<0.01	<0.01
Chlorfenvinphos	<0.01 µg/l	TM344				<0.01	<0.01	>0.688	<0.01

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	G3	G8	SI6	SI7	SI8	SI10
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Surface Water (SW)	Surface Water (SW)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)
			Date Sampled	10/10/2018	10/10/2018	10/10/2018	10/10/2018	10/10/2018	10/10/2018
			Sample Time	-	-	-	-	-	-
			Date Received	12/10/2018	12/10/2018	12/10/2018	12/10/2018	12/10/2018	12/10/2018
			SDG Ref	181012-1	181012-1	181012-1	181012-1	181012-1	181012-1
			Lab Sample No.(s)	18508267	18508273	18508225	18508239	18508249	18508257
			AGS Reference						
Ethion	<0.01 µg/l	TM344			<0.01	<0.01	<0.01	<0.01	
Carbophenothion	<0.01 µg/l	TM344			<0.01	<0.01	<0.01	<0.01	
Triazophos	<0.01 µg/l	TM344			<0.01	<0.01	<0.01	<0.01	
Phosalone	<0.01 µg/l	TM344			<0.01	<0.01	<0.01	<0.01	
Azinphos methyl	<0.02 µg/l	TM344			<0.02	<0.02	<0.02	<0.02	
Azinphos ethyl	<0.02 µg/l	TM344			<0.02	0.0931	<0.02	<0.02	
Quintozene (PCNB)	<0.01 µg/l	TM345			<0.01	<0.01	<0.01	<0.01	
Telodrin	<0.01 µg/l	TM345			<0.01	<0.01	<0.01	<0.01	
Chlorothalonil	<0.01 µg/l	TM345			<0.01	<0.01	<0.01	<0.01	
Etrimphos	<0.01 µg/l	TM345			<0.01	<0.01	<0.01	<0.01	

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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)

Customer Sample Ref.	SI6	SI7	SI8	SI10		
Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)		
Date Sampled	10/10/2018	10/10/2018	10/10/2018	10/10/2018		
Sample Time	.	.	.	.		
Date Received	12/10/2018	12/10/2018	12/10/2018	12/10/2018		
SDG Ref	181012-1	181012-1	181012-1	181012-1		
Lab Sample No.(s)	18508225	18508239	18508249	18508257		
AGS Reference						

Component	LOD/Units	Method						
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1	1.32	<1		
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	<1	1.21	1.39		
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
2-Methylphenol (aq)	<1 µg/l	TM176	<1	<1	2.16	<1		
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
3-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
4-Methylphenol (aq)	<1 µg/l	TM176	<1	<1	3.26	<1		
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
Azobenzene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
Acenaphthylene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
Acenaphthene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
Anthracene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2	<2	14.8	<2		
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	<1	6.38	<1		
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI10		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)		
			Date Sampled	10/10/2018	10/10/2018	10/10/2018	10/10/2018		
			Sample Time	-	-	-	-		
			Date Received	12/10/2018	12/10/2018	12/10/2018	12/10/2018		
			SDG Ref	181012-1	181012-1	181012-1	181012-1		
			Lab Sample No.(s)	18508225	18508239	18508249	18508257		
			AGS Reference						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Carbazole (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Chrysene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Dibenzofuran (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1	<1	2.77	<1		
Diethyl phthalate (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5	<5	<5	<5		
Fluoranthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Fluorene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Phenol (aq)	<1 µg/l	TM176		<1	<1	1.34	<1		
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Hexachloroethane (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Nitrobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Naphthalene (aq)	<1 µg/l	TM176		<1	<1	1.75	<1		
Isophorone (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Phenanthrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Pyrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		

Validated

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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)

Customer Sample Ref.	SI6	SI7	SI8	SI10		
Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)		
Date Sampled	10/10/2018	10/10/2018	10/10/2018	10/10/2018		
Sample Time	.	.	.	.		
Date Received	12/10/2018	12/10/2018	12/10/2018	12/10/2018		
SDG Ref	181012-1	181012-1	181012-1	181012-1		
Lab Sample No.(s)	18508225	18508239	18508249	18508257		
AGS Reference						

Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM208	114	113	119	116		
Toluene-d8**	%	TM208	97.9	100	100	99.7		
4-Bromofluorobenzene**	%	TM208	98.7	97.1	98.1	96.8		
Dichlorodifluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Chloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Vinyl chloride	<1 µg/l	TM208	1.07 #	<1 #	<1 #	<1 #		
Bromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Chloroethane	<1 µg/l	TM208	<1 #	1.23 #	1.04 #	1.18 #		
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	1.12 #	3.02 #	<1 #		
1,1-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Carbon disulphide	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Dichloromethane	<3 µg/l	TM208	<3 #	<3 #	<3 #	<3 #		
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
1,1-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1		
Bromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Chloroform	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
1,1-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Carbontetrachloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
1,2-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Benzene	<1 µg/l	TM208	<1 #	<1 #	1.55 #	1.62 #		
Trichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
1,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Dibromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Bromodichloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
Toluene	<1 µg/l	TM208	<1 #	<1 #	46.1 #	26.9 #		
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #		

16:46:27 19/10/2018

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI10		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)		
			Date Sampled	10/10/2018	10/10/2018	10/10/2018	10/10/2018		
			Sample Time	-	-	-	-		
			Date Received	12/10/2018	12/10/2018	12/10/2018	12/10/2018		
			SDG Ref	181012-1	181012-1	181012-1	181012-1		
			Lab Sample No.(s)	18508225	18508239	18508249	18508257		
			AGS Reference						
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	43.2 #	<1 #		
m,p-Xylene	<1 µg/l	TM208		4.72 #	<1 #	111 #	8.59 #		
o-Xylene	<1 µg/l	TM208		1.12 #	2.63 #	25 #	1.15 #		
Styrene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Bromoform	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Isopropylbenzene	<1 µg/l	TM208		<1 #	<1 #	1.13 #	1.01 #		
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,2,3-Trichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Bromobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Propylbenzene	<1 µg/l	TM208		<1 #	<1 #	1.01 #	<1 #		
2-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	2.39 #	1.62 #		
4-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
tert-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,2,4-Trimethylbenzene	<1 µg/l	TM208		6.06 #	<1 #	10.6 #	6.29 #		
sec-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
4-iso-Propyltoluene	<1 µg/l	TM208		<1 #	<1 #	10.4 #	<1 #		
1,3-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,4-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
n-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,2-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1	<1	<1	<1		
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Hexachlorobutadiene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Naphthalene	<1 µg/l	TM208		<1 #	<1 #	1.61 #	1.4 #		
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS 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	Customer Sample Ref.	SI6	SI7	SI8	SI10		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)		
			Date Sampled	10/10/2018	10/10/2018	10/10/2018	10/10/2018		
			Sample Time	.	.	.	.		
			Date Received	12/10/2018	12/10/2018	12/10/2018	12/10/2018		
			SDG Ref	181012-1	181012-1	181012-1	181012-1		
			Lab Sample No.(s)	18508225	18508239	18508249	18508257		
			AGS Reference						
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1		

Table of Results - Appendix

Method No	Reference	Description
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM046	Method 4500G, AWWA/APHA, 20th Ed., 1999	Measurement of Dissolved Oxygen by Oxygen Meter
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
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
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
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
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
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
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
TM284		
TM328		
TM343	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of Selected Pesticides (Suite I) in Liquids by GCMS
TM344	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite II) by GCMS
TM345	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite III) by GCMS

NA = not applicable.

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

CERTIFICATE OF ANALYSIS

SDG:	181012-1	**Client Reference:**	P1679	**Report Number:**	477702
Location:	Scotch Corner Landfill	**Order Number:**		**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	18508267	18508273	18508225	18508239	18508249	18508257
Customer Sample Ref.	G3	G8	SI6	SI7	SI8	SI10
AGS Ref.						
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Land Leachate	Land Leachate	Land Leachate	Land Leachate
Ammoniacal Nitrogen	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018
Anions by Kone (w)	18-Oct-2018	18-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018
BOD True Total	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018
COD Unfiltered	15-Oct-2018	14-Oct-2018	14-Oct-2018	14-Oct-2018	14-Oct-2018	15-Oct-2018
Conductivity (at 20 deg.C)	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018
Cyanide Comp/Free/Total/Thiocyanate			15-Oct-2018	15-Oct-2018	15-Oct-2018	15-Oct-2018
Dissolved Metals by ICP-MS	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018
Dissolved Oxygen by Probe	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018
Fluoride			17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018
Mercury Dissolved			17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018
Mineral Oil C10-40 Aqueous (W)			18-Oct-2018	18-Oct-2018	18-Oct-2018	18-Oct-2018
Nitrite by Kone (w)			16-Oct-2018	16-Oct-2018	16-Oct-2018	16-Oct-2018
Organotins in Aqueous Samples			18-Oct-2018	18-Oct-2018	18-Oct-2018	18-Oct-2018
Pesticides (Suite I) by GCMS			17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018
Pesticides (Suite II) by GCMS			17-Oct-2018	19-Oct-2018	19-Oct-2018	19-Oct-2018
Pesticides (Suite III) by GCMS			17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018
pH Value	16-Oct-2018	16-Oct-2018	15-Oct-2018	16-Oct-2018	16-Oct-2018	16-Oct-2018
Phosphate by Kone (w)			16-Oct-2018	16-Oct-2018	16-Oct-2018	16-Oct-2018
Silicon Dissolved by ICP-OES			16-Oct-2018	16-Oct-2018	16-Oct-2018	16-Oct-2018
SVOC MS (W) - Aqueous			17-Oct-2018	17-Oct-2018	17-Oct-2018	17-Oct-2018
Total Organic and Inorganic Carbon			15-Oct-2018	13-Oct-2018	13-Oct-2018	15-Oct-2018
VOC MS (W)			15-Oct-2018	15-Oct-2018	15-Oct-2018	15-Oct-2018

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) 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%. 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 Dimethyphenol, 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**
@	**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
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.