

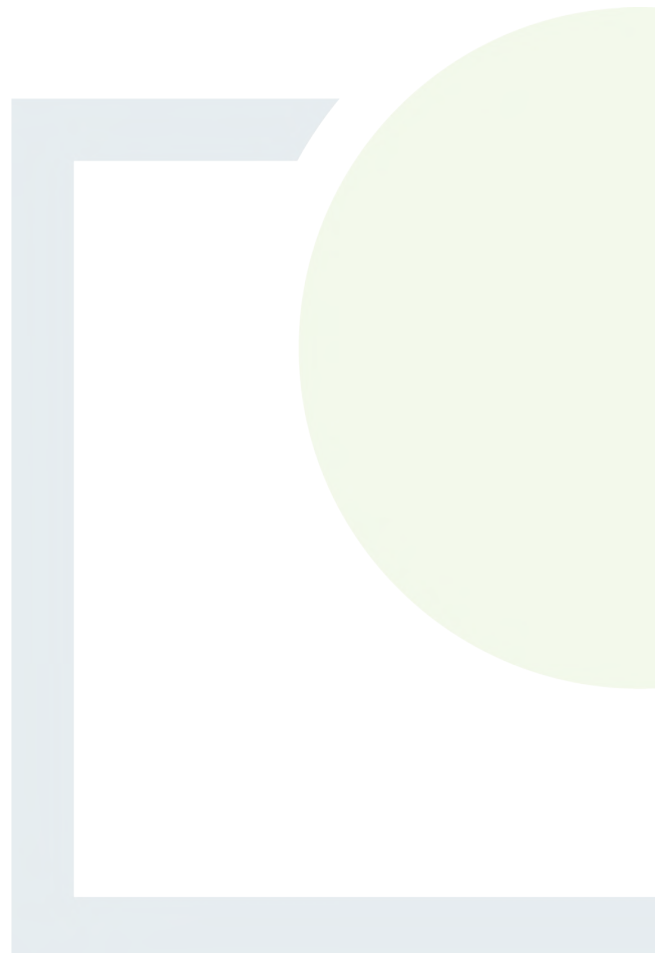


**FEHILY
TIMONEY**

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE & PLANNING

APPENDIX 7

Groundwater, Leachate and
Surface Water Sampling
Analysis Results





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Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date of report Generation: 10 July 2020
Customer: Fehily Timoney
Sample Delivery Group (SDG): 200702-49
Your Reference: P2282
Location: Tuam Landfill
Report No: 558533

This report has been revised and directly supersedes 558532 in its entirety.

We received 4 samples on Thursday July 02, 2020 and 4 of these samples were scheduled for analysis which was completed on Friday July 10, 2020. 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).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533
Location: Tuam Landfill	Order Number:	Superseded Report: 558532

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22408403	SW1		0.00 - 0.00	01/07/2020
22408424	SW2		0.00 - 0.00	01/07/2020
22408437	SW3		0.00 - 0.00	01/07/2020
22408448	SW4		0.00 - 0.00	01/07/2020

Maximum Sample/Coolbox Temperature (°C) :

15.2

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.



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49
Location: Tuam Landfill

Client Reference: P2282
Order Number:

Report Number: 558533
Superseded Report: 558532

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)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
22408403	SW1		0.00 - 0.00	0.5l glass bottle (ALE227)	SW
22408424	SW2		0.00 - 0.00	Vial (ALE297)	SW
22408437	SW3		0.00 - 0.00	Vial (ALE297)	SW
22408448	SW4		0.00 - 0.00	0.5l glass bottle (ALE227)	SW

Parameter	All	NDPs: 0 Tests: 4	Container													
			0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	H2SO4 (ALE244)	500ml Plastic (ALE208)	250ml BOD (ALE212)	0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	H2SO4 (ALE244)	500ml Plastic (ALE208)	250ml BOD (ALE212)		
Acid Herbicides by GCMS			X					X								X
Ammonium Low					X					X					X	
Anions by Kone (w)			X					X						X		X
BOD True Total				X					X						X	
COD Unfiltered				X					X						X	
Conductivity (at 20 deg.C)					X					X					X	
Cyanide Comp/Free/Total/Thiocyanate						X				X					X	
Dissolved Metals by ICP-MS					X					X					X	
Dissolved Oxygen by Probe					X					X					X	
Fluoride					X					X					X	
Mercury Dissolved					X					X					X	
Mineral Oil C10-40 Aqueous (W)					X					X					X	
PCB Congeners - Aqueous (W)					X					X					X	
Pesticides (Suite I) by GCMS			X						X						X	X
Pesticides (Suite II) by GCMS			X						X						X	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533	
Location: Tuam Landfill	Order Number:	Superseded Report: 558532	

Results Legend <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; align-items: center;">X Test</div> <div style="display: flex; align-items: center;">N No Determination Possible</div> </div> 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)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
		22409403	SW1		0.00 - 0.00	0.5l glass bottle (ALE227)	SW
		22409424	SW2		0.00 - 0.00	Vial (ALE297)	SW
		22409437	SW3		0.00 - 0.00	NaOH (ALE245)	SW
		22409448	SW4		0.00 - 0.00	500ml Plastic (ALE208)	SW
						250ml BOD (ALE212)	SW
						0.5l glass bottle (ALE227)	SW
					Vial (ALE297)	SW	
					NaOH (ALE245)	SW	
					H2SO4 (ALE244)	SW	
					500ml Plastic (ALE208)	SW	
					250ml BOD (ALE212)	SW	
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CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533	
Location: Tuam Landfill	Order Number:	Superseded Report: 558532	

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4			
#	ISO17025 accredited.		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)			
aq	Aqueous / settled sample.		01/07/2020	01/07/2020	01/07/2020	01/07/2020			
diss.filt	Dissolved / filtered sample.		02/07/2020	02/07/2020	02/07/2020	02/07/2020			
tot.unfilt	Total / unfiltered sample.		200702-49	200702-49	200702-49	200702-49			
-	Subcontracted - refer to subcontractor report for accreditation status.		22408403	22408424	22408437	22408448			
--	% 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								
1-3*5@	Sample deviation (see appendix)								
Component	LOD/Units		Method						
Suspended solids, Total	<2 mg/l		TM022	24.8	6.27	5.94	9.4	#	#
BOD, unfiltered	<1 mg/l	TM045	2.25	<1	<1	1.9	#	#	
Oxygen, dissolved	<0.3 mg/l	TM046	8.26	10.1	9.93	9.99			
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	1.86	0.174	0.123	0.16	#	#	
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	<0.5	<0.5			
COD, unfiltered	<7 mg/l	TM107	40.5	60.9	76.5	52.2	#	#	
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.714	0.951	1.07	0.581	#	#	
Arsenic (diss.filt)	<0.5 µg/l	TM152	1.4	1.35	1.28	2.14	2 #	2 #	
Barium (diss.filt)	<0.2 µg/l	TM152	26	75.4	64.8	35.8	2 #	2 #	
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	2 #	2 #	
Chromium (diss.filt)	<1 µg/l	TM152	1.94	6.63	6.74	7.33	2 #	2 #	
Copper (diss.filt)	<0.3 µg/l	TM152	1.96	3.9	3.7	3.71	2 #	2 #	
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	<0.2	<0.2	<0.2	2 #	2 #	
Manganese (diss.filt)	<3 µg/l	TM152	132	122	132	11.2	2 #	2 #	
Nickel (diss.filt)	<0.4 µg/l	TM152	3.64	4.33	3.88	6.18	2 #	2 #	
Phosphorus (diss.filt)	<10 µg/l	TM152	371	34.4	27.7	30.9	2 #	2 #	
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	2 #	2 #	
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2	<2	2 #	2 #	
Zinc (diss.filt)	<1 µg/l	TM152	1.88	5.54	6.44	8.16	2 #	2 #	
Sodium (Dis.Filt)	<0.076 mg/l	TM152	12.6	44.5	38.3	22.3	2 #	2 #	
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	8.03	18.5	16.5	9.37	2 #	2 #	
Potassium (Dis.Filt)	<0.2 mg/l	TM152	8.94	18.8	15.5	6.99	2 #	2 #	
Calcium (Dis.Filt)	<0.2 mg/l	TM152	157	135	132	128	2 #	2 #	
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.186	0.149	0.143	0.287	2 #	2 #	
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172	<100	<100	<100	<100			
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	0.0131	<0.01	<0.01	2	2	
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184	1.01	<0.05	<0.05	<0.05	#	#	
Sulphate	<2 mg/l	TM184	14.8	52.8	56.9	76.8	#	#	
Chloride	<2 mg/l	TM184	29.1	65.4	55.9	37.7	#	#	
PCB congener 28	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015			
PCB congener 52	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015			
PCB congener 101	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015			
PCB congener 118	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015			



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533	
Location: Tuam Landfill	Order Number:	Superseded Report: 558532	

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference								
			0.00 - 0.00 Surface Water (SW) 01/07/2020 00:00:00 02/07/2020 200702-49 22408403	0.00 - 0.00 Surface Water (SW) 01/07/2020 00:00:00 02/07/2020 200702-49 22408424	0.00 - 0.00 Surface Water (SW) 01/07/2020 00:00:00 02/07/2020 200702-49 22408437	0.00 - 0.00 Surface Water (SW) 01/07/2020 00:00:00 02/07/2020 200702-49 22408448			
Component	LOD/Units	Method							
PCB congener 138	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015			
PCB congener 153	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015			
PCB congener 180	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015			
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.105	<0.105	<0.105	<0.105			
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05			
pH	<1 pH Units	TM256	7.59	7.99	8.08	7.85			
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			
delta-HCH	<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			
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	<0.02	<0.02	<0.02	<0.02			
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	<0.02	<0.02	<0.02	<0.02			
o,p'-Methoxychlor	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.02			
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.02			
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.04	<0.04	<0.04	<0.04			
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			
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01			



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533
Location: Tuam Landfill	Order Number:	Superseded Report: 558532

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Surface Water (SW) 01/07/2020 01/07/2020 00:00:00 02/07/2020 200702-49 22408403	0.00 - 0.00 Surface Water (SW) 01/07/2020 01/07/2020 00:00:00 02/07/2020 200702-49 22408424	0.00 - 0.00 Surface Water (SW) 01/07/2020 01/07/2020 00:00:00 02/07/2020 200702-49 22408437	0.00 - 0.00 Surface Water (SW) 01/07/2020 01/07/2020 00:00:00 02/07/2020 200702-49 22408448		
Component	LOD/Units	Method							
Hexachlorobutadiene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Dichlorvos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Dichlobenil	<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		
Demeton-S-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Phorate	<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		0.0139	<0.01	<0.01	<0.01		
Simazine	<0.01 µg/l	TM344		<0.01	<0.01	0.026	<0.01		
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		
Chlorpyrifos-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		
Chlorpyrifos	<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	<0.01	<0.01		
trans-Chlordane	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
cis-Chlordane	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
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		



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533	Superseded Report: 558532
Location: Tuam Landfill	Order Number:		

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
Component	LOD/Units	Method							
Phosalone	<0.01 µg/l	TM344	0.00 - 0.00 Surface Water (SW) 01/07/2020	<0.02	<0.02	<0.02	<0.02		
Azinphos methyl	<0.02 µg/l	TM344	0.00 - 0.00 Surface Water (SW) 01/07/2020	<0.04	<0.04	<0.04	<0.04		
Azinphos ethyl	<0.02 µg/l	TM344	00:00:00 02/07/2020	<0.02	<0.02	<0.02	<0.02		
Etridiazole	<0.01 µg/l	TM345	200702-49 22408403	<0.02	<0.02	<0.02	<0.02		
Pentachlorobenzene	<0.01 µg/l	TM345	200702-49 22408424	<0.01	<0.01	<0.01	<0.01		
Propachlor	<0.01 µg/l	TM345	200702-49 22408437	<0.01	<0.01	<0.01	<0.01		
Quintozene (PCNB)	<0.01 µg/l	TM345	200702-49 22408448	<0.01	<0.01	<0.01	<0.01		
Omethoate	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Propazine	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Propyzamide	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Alachlor	<0.01 µg/l	TM345		<0.02	<0.02	<0.02	<0.02		
Prometryn	<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		
Terbutryn	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Chlorothalonil	<0.01 µg/l	TM345		<0.02	<0.02	<0.02	<0.02		
Etrimphos	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Metazachlor	<0.01 µg/l	TM345		<0.02	<0.02	<0.02	<0.02		
Cyanazine	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Trietazine	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Coumaphos	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Phosphamidon I	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Phosphamidon II	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Dinitro-o-cresol	<0.1 µg/l	TM411		<0.2	<0.1	<0.1	0.285		
Clopyralid	<0.04 µg/l	TM411		0.44	0.0453	<0.04	<0.04		
MCPA	<0.05 µg/l	TM411		<0.1	<0.05	<0.05	0.0855		
Mecoprop	<0.04 µg/l	TM411		<0.08	0.0627	0.0588	<0.04		
Dicamba	<0.04 µg/l	TM411		<0.08	<0.04	<0.04	<0.04		
MCPB	<0.05 µg/l	TM411		<0.1	<0.05	<0.05	<0.05		
2,4-DB	<0.1 µg/l	TM411		<0.2	<0.1	<0.1	<0.1		
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411		<0.1	<0.05	<0.05	<0.05		
Dichlorprop	<0.1 µg/l	TM411		<0.2	<0.1	<0.1	<0.1		
Triclopyr	<0.05 µg/l	TM411		<0.75	<0.05	<0.05	<0.75		
Fenoprop (Silvex)	<0.1 µg/l	TM411		<0.2	<0.1	<0.1	<0.1		



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533	
Location: Tuam Landfill	Order Number:	Superseded Report: 558532	

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4			
#	ISO17025 accredited.		SW1	SW2	SW3	SW4			
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
aq	Aqueous / settled sample.		Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)			
diss.filt	Dissolved / filtered sample.		01/07/2020	01/07/2020	01/07/2020	01/07/2020			
tot.unfilt	Total / unfiltered sample.		00:00:00	00:00:00	00:00:00	00:00:00			
-	Subcontracted - refer to subcontractor report for accreditation status.		02/07/2020	02/07/2020	02/07/2020	02/07/2020			
--	% 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		200702-49	200702-49	200702-49	200702-49			
(F)	Trigger breach confirmed		22408403	22408424	22408437	22408448			
1-3*5@	Sample deviation (see appendix)								
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	<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	<1	#	#	
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	<1	<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	<1	<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	<2	<2	#	#	
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	<1	<1	<1	#	#	
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	#	#	



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533	
Location: Tuam Landfill	Order Number:	Superseded Report: 558532	

VOC MS (W)

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. - Subcontracted - refer to subcontractor report for accreditation status. -- % 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 1-3*#@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Surface Water (SW) 01/07/2020	0.00 - 0.00 Surface Water (SW) 01/07/2020 00:00:00	0.00 - 0.00 Surface Water (SW) 01/07/2020	0.00 - 0.00 Surface Water (SW) 01/07/2020		
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208		113	114	111	112		
Toluene-d8**	%	TM208		100	100	99	100		
4-Bromofluorobenzene**	%	TM208		95	95.2	93.2	97.9		
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	<1	<1	<1	#	#
Bromomethane	<1 µg/l	TM208		<1	<1	<1	<1	#	#
Chloroethane	<1 µg/l	TM208		<1	<1	<1	<1	#	#
Trichlorofluoromethane	<1 µg/l	TM208		<1	<1	<1	<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	<1	#	#
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	<1	<1	#	#
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	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533	
Location: Tuam Landfill	Order Number:	Superseded Report: 558532	

VOC MS (W)

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference								
Component	LOD/Units	Method							
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	<1	<1	<1	#	#
m,p-Xylene	<1 µg/l	TM208	<1	<1	<1	<1	<1	#	#
o-Xylene	<1 µg/l	TM208	<1	<1	<1	<1	<1	#	#
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	<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	<1	<1	#	#
2-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	#	#
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	#	#
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	<1	<1	<1	#	#
sec-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	#	#
4-iso-Propyltoluene	<1 µg/l	TM208	<1	<1	<1	<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	<1	<1	<1	#	#
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	#	#
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533
Location: Tuam Landfill	Order Number:	Superseded Report: 558532

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
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
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
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
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
TM411	Acid_Herbs_GCMS	Acid Herbs in Water 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

Validated

SDG: 200702-49	Client Reference: P2282	Report Number: 558533	Superseded Report: 558532
Location: Tuam Landfill	Order Number:		

Test Completion Dates

Lab Sample No(s)	22408403	22408424	22408437	22408448
Customer Sample Ref.	SW1	SW2	SW3	SW4
AGS Ref.				
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water

Acid Herbicides by GCMS	07-Jul-2020	10-Jul-2020	10-Jul-2020	07-Jul-2020
Ammonium Low	06-Jul-2020	07-Jul-2020	07-Jul-2020	07-Jul-2020
Anions by Kone (w)	05-Jul-2020	05-Jul-2020	05-Jul-2020	05-Jul-2020
BOD True Total	08-Jul-2020	08-Jul-2020	08-Jul-2020	08-Jul-2020
COD Unfiltered	06-Jul-2020	06-Jul-2020	06-Jul-2020	06-Jul-2020
Conductivity (at 20 deg.C)	03-Jul-2020	03-Jul-2020	03-Jul-2020	03-Jul-2020
Cyanide Comp/Free/Total/Thiocyanate	07-Jul-2020	07-Jul-2020	10-Jul-2020	07-Jul-2020
Dissolved Metals by ICP-MS	07-Jul-2020	07-Jul-2020	07-Jul-2020	07-Jul-2020
Dissolved Oxygen by Probe	03-Jul-2020	03-Jul-2020	03-Jul-2020	03-Jul-2020
Fluoride	03-Jul-2020	07-Jul-2020	07-Jul-2020	07-Jul-2020
Mercury Dissolved	08-Jul-2020	08-Jul-2020	08-Jul-2020	08-Jul-2020
Mineral Oil C10-40 Aqueous (W)	07-Jul-2020	07-Jul-2020	07-Jul-2020	07-Jul-2020
PCB Congeners - Aqueous (W)	09-Jul-2020	08-Jul-2020	08-Jul-2020	09-Jul-2020
Pesticides (Suite I) by GCMS	09-Jul-2020	09-Jul-2020	09-Jul-2020	09-Jul-2020
Pesticides (Suite II) by GCMS	07-Jul-2020	07-Jul-2020	07-Jul-2020	07-Jul-2020
Pesticides (Suite III) by GCMS	09-Jul-2020	09-Jul-2020	09-Jul-2020	09-Jul-2020
pH Value	03-Jul-2020	03-Jul-2020	03-Jul-2020	03-Jul-2020
Phosphate by Kone (w)	03-Jul-2020	03-Jul-2020	03-Jul-2020	03-Jul-2020
Suspended Solids	08-Jul-2020	08-Jul-2020	08-Jul-2020	08-Jul-2020
SVOC MS (W) - Aqueous	05-Jul-2020	05-Jul-2020	05-Jul-2020	08-Jul-2020
VOC MS (W)	06-Jul-2020	06-Jul-2020	06-Jul-2020	06-Jul-2020



CERTIFICATE OF ANALYSIS

SDG: 200702-49	Client Reference: P2282	Report Number: 558533
Location: Tuam Landfill	Order Number:	Superseded Report: 558532

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. 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.

3. 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.

4. 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.

5. 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.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **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.

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

11. 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.

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

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

14. 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.

15. 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.

16. 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.

17. **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.

18. 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
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

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.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

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

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date of report Generation: 15 September 2020
Customer: Fehily Timoney
Sample Delivery Group (SDG): 200828-75
Your Reference: P2282
Location: Tuam Landfill
Report No: 567304

This report has been revised and directly supersedes 566281 in its entirety.

We received 6 samples on Friday August 28, 2020 and 4 of these samples were scheduled for analysis which was completed on Tuesday September 15, 2020. 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).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-75 **Client Reference:** P2282 **Report Number:** 567304
Location: Tuam Landfill **Order Number:** Z2189 **Superseded Report:** 566281

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22736783	SW1		0.00 - 0.00	26/08/2020
22736793	SW2		0.00 - 0.00	26/08/2020
22736803	SW3		0.00 - 0.00	26/08/2020
22736823	SW4		0.00 - 0.00	26/08/2020
22736838	SW5			
22736845	SW6			

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-75	Client Reference: P2282	Report Number: 567304
Location: Tuam Landfill	Order Number: Z2189	Superseded Report: 566281

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4	
#	ISO17025 accredited.		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	
M	mCERTS accredited.	Depth (m) 0.00 - 0.00 Sample Type Surface Water (SW) Date Sampled 26/08/2020 Sample Time 26/08/2020 Date Received 26/08/2020 SDG Ref 200828-75 Lab Sample No.(s) 22736783 AGS Reference 22736793	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	
aq	Aqueous / settled sample.		26/08/2020	26/08/2020	26/08/2020	26/08/2020	
diss.filt	Dissolved / filtered sample.		26/08/2020	26/08/2020	26/08/2020	26/08/2020	
tot.unfilt	Total / unfiltered sample.		200828-75	200828-75	200828-75	200828-75	
-	Subcontracted - refer to subcontractor report for accreditation status.		22736783	22736793	22736803	22736823	
**	% 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						
1-3*5@	Sample deviation (see appendix)						
Component	LOD/Units		Method				
Suspended solids, Total	<2 mg/l		TM022	13.5	18.3	<6	5.85
BOD, unfiltered	<1 mg/l	TM045	59.9	2.88	<1	<1	
Oxygen, dissolved	<0.3 mg/l	TM046	0.74	7.95	10	11.5	
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	3.42	4.79	0.0873	0.0791	
Fluoride	<0.5 mg/l	TM104	0.562	<0.5	<0.5	<0.5	
COD, unfiltered	<7 mg/l	TM107	119	128	87.8	107	
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.619	0.678	0.376	0.396	
Arsenic (diss.filt)	<0.5 µg/l	TM152	2.63	2.75	1.32	2.07	
Barium (diss.filt)	<0.2 µg/l	TM152	25.8	63.5	14.2	16.4	
Cadmium (diss.filt)	<0.08 µg/l	TM152	0.448	<0.08	0.136	0.476	
Chromium (diss.filt)	<1 µg/l	TM152	1.39	1.27	1.18	2.13	
Copper (diss.filt)	<0.3 µg/l	TM152	3.32	5.26	2.47	4.8	
Lead (diss.filt)	<0.2 µg/l	TM152	0.223	0.681	0.231	0.65	
Manganese (diss.filt)	<3 µg/l	TM152	208	483	34.9	30	
Nickel (diss.filt)	<0.4 µg/l	TM152	7.04	3.4	4.36	9.3	
Phosphorus (diss.filt)	<10 µg/l	TM152	1010	191	58.1	233	
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2	<2	
Zinc (diss.filt)	<1 µg/l	TM152	9.81	16.6	10.8	20.9	
Sodium (Dis.Filt)	<0.076 mg/l	TM152	11.4	40.6	9.96	8.85	
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	6.89	16.4	3.71	3.33	
Potassium (Dis.Filt)	<0.2 mg/l	TM152	13.8	20.8	1.45	2.25	
Calcium (Dis.Filt)	<0.2 mg/l	TM152	129	87.5	71.8	90.4	
Iron (Dis.Filt)	<0.019 mg/l	TM152	1.79	1.43	0.439	0.767	
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172	<100	<100	<100	<100	
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	0.114	<0.01	0.0178	
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184	2.18	0.169	0.074	0.374	
Sulphate	<2 mg/l	TM184	<10	<10	2.5	<2	
Chloride	<2 mg/l	TM184	25.8	55.9	15	15.1	
PCB congener 28	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	
PCB congener 52	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	
PCB congener 101	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	
PCB congener 118	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	



CERTIFICATE OF ANALYSIS

Validated

SDG:	200828-75	Client Reference:	P2282	Report Number:	567304
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566281

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4		
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
dis.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% 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							
1-3*§@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
PCB congener 138	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015		
PCB congener 153	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015		
PCB congener 180	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015		
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.105	<0.105	<0.105	<0.105		
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05		
pH	<1 pH Units	TM256	6.94	7.37	7.12	7.23	#	#
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	<0.02	<0.01	<0.02	<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		
delta-HCH	<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		
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	<0.02	<0.01	<0.02	<0.01		
o,p'-Methoxychlor	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01		
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.02	<0.01	<0.02	<0.01		
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.04	<0.02	<0.04	<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		
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02		



CERTIFICATE OF ANALYSIS

Validated

SDG:	200828-75	Client Reference:	P2282	Report Number:	567304
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566281

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference								
			0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020			
			28/08/2020 200828-75 22736783	28/08/2020 200828-75 22736793	28/08/2020 200828-75 22736803	28/08/2020 200828-75 22736823			
Component	LOD/Units	Method							
Hexachlorobutadiene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Dichlorvos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Dichlobenil	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Mevinphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Tecnazene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Hexachlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Demeton-S-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Phorate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Diazinon	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Triallate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Atrazine	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Simazine	<0.01 µg/l	TM344	0.0981	<0.01	0.0458	<0.02			
Disulfoton	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Propetamphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Chlorpyrifos-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Dimethoate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Pirimiphos-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Chlorpyrifos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Methyl Parathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Malathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Fenthion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Fenitrothion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Triadimefon	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Pendimethalin	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Parathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Chlorfenvinphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
trans-Chlordane	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
cis-Chlordane	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Ethion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Carbophenothion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			
Triazophos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.02			



CERTIFICATE OF ANALYSIS

Validated

SDG:	200828-75	Client Reference:	P2282	Report Number:	567304
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566281

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*5@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference								
			0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020		
Component	LOD/Units	Method							
Phosalone	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.02		
Azinphos methyl	<0.02 µg/l	TM344	<0.04	<0.04	<0.04	<0.04	<0.04		
Azinphos ethyl	<0.02 µg/l	TM344	<0.02	<0.02	<0.02	<0.02	<0.04		
Etridiazole	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Pentachlorobenzene	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Tributylphosphate	<0.01 µg/l	TM345					<0.15		
Propachlor	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Quintozene (PCNB)	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Omethoate	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Propazine	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Propyzamide	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Alachlor	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Prometryn	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Telodrin	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Terbutryn	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Chlorothalonil	<0.01 µg/l	TM345	<0.04	<0.04	<0.04	<0.04	<0.04		
Etrimphos	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Metazachlor	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Cyanazine	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Trietazine	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Coumaphos	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Phosphamidon I	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Phosphamidon II	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.02	<0.02		
Dinitro-o-cresol	<0.1 µg/l	TM411	0.274	<0.5	<0.1	<1			
Clopyralid	<0.04 µg/l	TM411	0.387	<0.2	<0.04	<0.4			
MCPA	<0.05 µg/l	TM411	<0.05	<0.25	<0.05	<0.5			
Mecoprop	<0.04 µg/l	TM411	<0.04	0.791	<0.04	<0.4			
Dicamba	<0.04 µg/l	TM411	0.0459	<0.2	<0.04	<0.4			
MCPB	<0.05 µg/l	TM411	<0.05	<0.25	<0.05	<0.5			
2,4-DB	<0.1 µg/l	TM411	<0.1	<0.5	<0.1	<1			
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.05	<0.25	<0.05	<0.5			
Dichlorprop	<0.1 µg/l	TM411	<0.1	<0.5	<0.1	<1			
Triclopyr	<0.05 µg/l	TM411	<0.05	<0.25	<0.05	<0.5			



CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-75	Client Reference: P2282	Report Number: 567304
Location: Tuam Landfill	Order Number: Z2189	Superseded Report: 566281

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4		
#	ISO17025 accredited.		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
M	mCERTS accredited.	Depth (m)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
aq	Aqueous / settled sample.	Sample Type	26/08/2020	26/08/2020	26/08/2020	26/08/2020		
diss.filt	Dissolved / filtered sample.	Date Sampled	26/08/2020	26/08/2020	26/08/2020	26/08/2020		
tot.unfilt	Total / unfiltered sample.	Sample Time	26/08/2020	26/08/2020	26/08/2020	26/08/2020		
-	Subcontracted - refer to subcontractor report for accreditation status.	Date Received	200828-75	200828-75	200828-75	200828-75		
..	% 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	SDG Ref	22736783	22736793	22736803	22736823		
(F)	Trigger breach confirmed	Lab Sample No.(s)						
1-3*5@	Sample deviation (see appendix)	AGS Reference						
Component	LOD/Units	Method						
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2-Chlorophenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2-Methylphenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2-Nitroaniline (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
2-Nitrophenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
3-Nitroaniline (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
4-Chloroaniline (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
4-Methylphenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
4-Nitroaniline (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
4-Nitrophenol (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
Azobenzene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
Acenaphthylene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
Acenaphthene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
Anthracene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<8	<16	<20	<8	#	#
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<4	<8	<10	<4	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-75
Location: Tuam Landfill

Client Reference: P2282
Order Number: Z2189

Report Number: 567304
Superseded Report: 566281

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4		
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
dis.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% 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							
1-3*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Carbazole (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Chrysene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Dibenzofuran (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Diethyl phthalate (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Dimethyl phthalate (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<20 #	<40 #	<50 #	<20 #		
Fluoranthene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Fluorene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Hexachlorobenzene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Pentachlorophenol (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Phenol (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Hexachloroethane (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Nitrobenzene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Naphthalene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Isophorone (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Phenanthrene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		
Pyrene (aq)	<1 µg/l	TM176	<4 #	<8 #	<10 #	<4 #		



CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-75
Location: Tuam Landfill

Client Reference: P2282
Order Number: Z2189

Report Number: 567304
Superseded Report: 566281

VOC MS (W)

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. - Subcontracted - refer to subcontractor report for accreditation status. - % 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 1-3*#@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020	0.00 - 0.00 Surface Water (SW) 26/08/2020		
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208		114	112	113	113		
Toluene-d8**	%	TM208		100	100	100	100		
4-Bromofluorobenzene**	%	TM208		96	97.6	95.9	97.5		
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	<1	<1	<1		
Bromomethane	<1 µg/l	TM208		<1	<1	<1	<1		
Chloroethane	<1 µg/l	TM208		<1	<1	<1	<1		
Trichlorofluoromethane	<1 µg/l	TM208		<1	<1	<1	<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	<1		
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		2.1	<1	<1	<1		
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		



CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-75	Client Reference: P2282	Report Number: 567304
Location: Tuam Landfill	Order Number: Z2189	Superseded Report: 566281

VOC MS (W)

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)	Depth (m)	Sample Type							
	Date Sampled	Sample Time							
	Date Received	SDG Ref							
	Lab Sample No.(s)	AGS Reference							
Component	LOD/Units	Method							
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	<1	<1			
m,p-Xylene	<1 µg/l	TM208	<1	<1	<1	<1			
o-Xylene	<1 µg/l	TM208	<1	<1	<1	<1			
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	<1			
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	<1			
2-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	<1			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1			
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	<1	<1	<1	<1			
sec-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1			
4-iso-Propyltoluene	<1 µg/l	TM208	<1	<1	<1	<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	<1			
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1			
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1			



CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-75	Client Reference: P2282	Report Number: 567304
Location: Tuam Landfill	Order Number: Z2189	Superseded Report: 566281

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
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
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
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
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
TM411	Acid_Herbs_GCMS	Acid Herbs in Water 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

Validated

SDG: 200828-75	Client Reference: P2282	Report Number: 567304
Location: Tuam Landfill	Order Number: Z2189	Superseded Report: 566281

Test Completion Dates

Lab Sample No(s)	22736783	22736793	22736803	22736823
Customer Sample Ref.	SW1	SW2	SW3	SW4
AGS Ref.				
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water

Acid Herbicides by GCMS	05-Sep-2020	05-Sep-2020	05-Sep-2020	05-Sep-2020
Ammonium Low	03-Sep-2020	04-Sep-2020	15-Sep-2020	07-Sep-2020
Anions by Kone (w)	04-Sep-2020	04-Sep-2020	09-Sep-2020	04-Sep-2020
BOD True Total	02-Sep-2020	03-Sep-2020	02-Sep-2020	03-Sep-2020
COD Unfiltered	30-Aug-2020	30-Aug-2020	30-Aug-2020	30-Aug-2020
Conductivity (at 20 deg.C)	02-Sep-2020	02-Sep-2020	11-Sep-2020	02-Sep-2020
Cyanide Comp/Free/Total/Thiocyanate	07-Sep-2020	07-Sep-2020	07-Sep-2020	07-Sep-2020
Dissolved Metals by ICP-MS	03-Sep-2020	05-Sep-2020	10-Sep-2020	05-Sep-2020
Dissolved Oxygen by Probe	03-Sep-2020	03-Sep-2020	10-Sep-2020	03-Sep-2020
Fluoride	01-Sep-2020	01-Sep-2020	10-Sep-2020	01-Sep-2020
Mercury Dissolved	07-Sep-2020	04-Sep-2020	09-Sep-2020	04-Sep-2020
Mineral Oil C10-40 Aqueous (W)	07-Sep-2020	07-Sep-2020	07-Sep-2020	07-Sep-2020
PCB Congeners - Aqueous (W)	06-Sep-2020	06-Sep-2020	06-Sep-2020	06-Sep-2020
Pesticides (Suite I) by GCMS	03-Sep-2020	02-Sep-2020	03-Sep-2020	04-Sep-2020
Pesticides (Suite II) by GCMS	02-Sep-2020	02-Sep-2020	02-Sep-2020	03-Sep-2020
Pesticides (Suite III) by GCMS	07-Sep-2020	07-Sep-2020	07-Sep-2020	07-Sep-2020
pH Value	02-Sep-2020	02-Sep-2020	08-Sep-2020	02-Sep-2020
Phosphate by Kone (w)	01-Sep-2020	01-Sep-2020	09-Sep-2020	01-Sep-2020
Suspended Solids	01-Sep-2020	01-Sep-2020	15-Sep-2020	01-Sep-2020
SVOC MS (W) - Aqueous	02-Sep-2020	02-Sep-2020	01-Sep-2020	02-Sep-2020
VOC MS (W)	07-Sep-2020	07-Sep-2020	07-Sep-2020	07-Sep-2020



CERTIFICATE OF ANALYSIS

SDG:	200828-75	Client Reference:	P2282	Report Number:	567304
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566281

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. 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.

3. 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.

4. 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.

5. 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.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **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.

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

11. 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.

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

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

14. 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.

15. 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.

16. 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.

17. **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.

18. 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
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

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.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

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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North Park Business Park
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Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date of report Generation: 10 July 2020
Customer: Fehily Timoney
Sample Delivery Group (SDG): 200702-48
Your Reference: Galway Historic Landfills
Location: Tuam Landfill
Report No: 558588

This report has been revised and directly supersedes 558045 in its entirety.

We received 4 samples on Thursday July 02, 2020 and 4 of these samples were scheduled for analysis which was completed on Friday July 10, 2020. 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).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-48	Client Reference: Galway Historic Landfills	Report Number: 558588
Location: Tuam Landfill	Order Number:	Superseded Report: 558045

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22408325	5A		0.00 - 0.00	01/07/2020
22408337	8A		0.00 - 0.00	01/07/2020
22408350	RC2		0.00 - 0.00	01/07/2020
22408370	RC3		0.00 - 0.00	01/07/2020

Maximum Sample/Coolbox Temperature (°C) : **15.2**
 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.



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-48	Client Reference: Galway Historic Landfills	Report Number: 558588	
Location: Tuam Landfill	Order Number:	Superseded Report: 558045	

Results Legend <div style="margin-top: 5px;"> X Test N No Determination Possible </div> 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)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
		22408325	5A		0.00 - 0.00	H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227)	GW
		22408337	8A		0.00 - 0.00	NaOH (ALE245) STL 19 (ALS) Vial (ALE297)	GW
		22408350	RC2		0.00 - 0.00	H2SO4 (ALE244) NaOH (ALE245) Vial (ALE297)	GW
		22408370	RC3		0.00 - 0.00	H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227)	GW
						H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227)	GW
						H2SO4 (ALE244) NaOH (ALE245) Vial (ALE297)	GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 4					
Alkalinity as CaCO3	All	NDPs: 0 Tests: 4					
Ammonium Low	All	NDPs: 0 Tests: 4					
Anions by Kone (w)	All	NDPs: 0 Tests: 4					
BOD True Total	All	NDPs: 0 Tests: 4					
COD Unfiltered	All	NDPs: 0 Tests: 4					
Coliforms (W)	All	NDPs: 0 Tests: 3					
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 4					
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 4					
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4					
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 4					
Faecal Coliforms (W)*	All	NDPs: 0 Tests: 1					
Fluoride	All	NDPs: 0 Tests: 4					
Mercury Dissolved	All	NDPs: 0 Tests: 4					
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 4					



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-48	Client Reference: Galway Historic Landfills	Report Number: 558588
Location: Tuam Landfill	Order Number:	Superseded Report: 558045

Results Legend		Customer Sample Ref.	5A	8A	RC2	RC3
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*5@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	5A	8A	RC2	RC3	
		0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	
		02/07/2020 200702-48 22408325	02/07/2020 200702-48 22408337	02/07/2020 200702-48 22408350	02/07/2020 200702-48 22408370	
Component	LOD/Units	Method				
Faecal coliforms confirmed (M7M)*	0 CFU/100ml	SUB		0		
Coliforms, Total*	MPN/100ml	SUB	914		>2420	>2420
Total Coliform Presumptive (M16)*	CFU/100ml	SUB		0		
Coliforms, Faecal*	CFU/100ml	SUB	12		<1	<100
Total Coliform Confirmed (M14)*	CFU/100ml	SUB		0		
Alkalinity, Total as HCO3	<2 mg/l	TM043	967	485	783	641
BOD, unfiltered	<1 mg/l	TM045	<1	<1	1.91	4.89
Oxygen, dissolved	<0.3 mg/l	TM046	7.57	6.76	5.98	8.56
Organic Carbon, Total	<3 mg/l	TM090	15.5	10.6	26.7	37.8
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	1.31	1.8	3.48	1.62
Fluoride	<0.5 mg/l	TM104	<0.5	0.693	<0.5	<0.5
COD, unfiltered	<7 mg/l	TM107	217	51.5	213	4660
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.666	0.87	0.769	0.423
Arsenic (diss.filt)	<0.5 µg/l	TM152	2.84	4.98	2.58	5.08
Barium (diss.filt)	<0.2 µg/l	TM152	53.1	51.5	59	29.1
Boron (diss.filt)	<10 µg/l	TM152	<10	11.2	17.1	<10
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	0.103
Chromium (diss.filt)	<1 µg/l	TM152	<1	<1	2.29	1.17
Copper (diss.filt)	<0.3 µg/l	TM152	0.357	<0.3	0.579	6.59
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	<0.2	0.584	1.52
Manganese (diss.filt)	<3 µg/l	TM152	91.9	231	128	34.3
Nickel (diss.filt)	<0.4 µg/l	TM152	7.98	19.4	11.7	15.3
Phosphorus (diss.filt)	<10 µg/l	TM152	<10	<10	12.1	37.2
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2	<2
Zinc (diss.filt)	<1 µg/l	TM152	2.38	2.81	2.53	8.86
Sodium (Dis.Filt)	<0.076 mg/l	TM152	10.4	27.2	13.3	8.34
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	4.92	9.41	8.65	3.64
Potassium (Dis.Filt)	<0.2 mg/l	TM152	0.865	1.56	2.99	1.13
Calcium (Dis.Filt)	<0.2 mg/l	TM152	160	187	177	97
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.33	1.32	1.87	3.04
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	<0.01
Sulphate	<2 mg/l	TM184	<2	18.2	<2	<4



CERTIFICATE OF ANALYSIS

Validated

SDG:	200702-48	Client Reference:	Galway Historic Landfills
Location:	Tuam Landfill	Order Number:	
		Report Number:	558588
		Superseded Report:	558045

Results Legend			Customer Sample Ref.	5A	8A	RC2	RC3		
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% 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								
1-3*§@	Sample deviation (see appendix)								
		AGS Reference							
Component	LOD/Units	Method							
Chloride	<2 mg/l	TM184	12.5	57.3	20.1	17.2			
			#	#	#	#			
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.1	<0.1	<0.1	<0.1			
			#	#	#	#			
PCB congener 28	<0.015 µg/l	TM197	<0.015	<0.03	<0.03	<0.03			
PCB congener 52	<0.015 µg/l	TM197	<0.015	<0.03	<0.03	<0.03			
PCB congener 101	<0.015 µg/l	TM197	<0.015	<0.03	<0.03	<0.03			
PCB congener 118	<0.015 µg/l	TM197	<0.015	<0.03	<0.03	<0.03			
PCB congener 138	<0.015 µg/l	TM197	<0.015	<0.03	<0.03	<0.03			
PCB congener 153	<0.015 µg/l	TM197	<0.015	<0.03	<0.03	<0.03			
PCB congener 180	<0.015 µg/l	TM197	<0.015	<0.03	<0.03	<0.03			
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.105	<0.21	<0.21	<0.21			
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05			
			◆ #	◆ #	◆ #	◆ #			
pH	<1 pH Units	TM256	7.22	6.93	6.86	6.99			
			#	#	#	#			
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			
delta-HCH	<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			
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01			
Endrin	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.02			
o,p'-DDT	<0.01 µg/l	TM343	<0.03	<0.03	<0.03	<0.03			
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	<0.05	<0.05	<0.05	<0.05			



CERTIFICATE OF ANALYSIS

Validated

SDG:	200702-48	Client Reference:	Galway Historic Landfills	Report Number:	558588
Location:	Tuam Landfill	Order Number:		Superseded Report:	558045

Results Legend			Customer Sample Ref.	5A	8A	RC2	RC3		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020		
Component	LOD/Units	Method							
o,p'-Methoxychlor	<0.01 µg/l	TM343		<0.03	<0.03	<0.03	<0.03		
p,p'-Methoxychlor	<0.01 µg/l	TM343		<0.05	<0.05	<0.05	<0.05		
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		
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Hexachlorobutadiene	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Dichlorvos	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Dichlobenil	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Mevinphos	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Tecnazene	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Hexachlorobenzene	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Demeton-S-methyl	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Phorate	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Diazinon	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Triallate	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Atrazine	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Simazine	<0.01 µg/l	TM344		0.082	<0.01	0.132	0.133		
Disulfoton	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Propetamphos	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Chlorpyrifos-methyl	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Dimethoate	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Chlorpyrifos	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Methyl Parathion	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Malathion	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Fenthion	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Fenitrothion	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Triadimefon	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Pendimethalin	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		
Parathion	<0.01 µg/l	TM344		<0.05	<0.01	<0.01	<0.01		



CERTIFICATE OF ANALYSIS

Validated

SDG:	200702-48	Client Reference:	Galway Historic Landfills	Report Number:	558588
Location:	Tuam Landfill	Order Number:		Superseded Report:	558045

Results Legend			Customer Sample Ref.	5A	8A	RC2	RC3			
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)										
		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference								
Component	LOD/Units	Method								
Chlorfenvinphos	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	<0.05	<0.01	<0.01	<0.01
trans-Chlordane	<0.01 µg/l	TM344					<0.05	<0.01	<0.01	<0.01
cis-Chlordane	<0.01 µg/l	TM344					<0.05	<0.01	<0.01	<0.01
Ethion	<0.01 µg/l	TM344					<0.05	<0.01	<0.01	<0.01
Carbophenothion	<0.01 µg/l	TM344					<0.05	<0.01	<0.01	<0.01
Triazophos	<0.01 µg/l	TM344					<0.05	<0.01	<0.01	<0.01
Phosalone	<0.01 µg/l	TM344					<0.1	<0.02	<0.01	<0.01
Azinphos methyl	<0.02 µg/l	TM344					<0.2	<0.04	<0.02	<0.02
Azinphos ethyl	<0.02 µg/l	TM344					<0.1	<0.02	<0.02	<0.02
Etridiazole	<0.01 µg/l	TM345					<0.2	<0.02	<0.1	<0.4
Pentachlorobenzene	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Propachlor	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Quintozene (PCNB)	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Omethoate	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Propazine	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Propyzamide	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Alachlor	<0.01 µg/l	TM345					<0.2	<0.02	<0.05	<0.4
Prometryn	<0.01 µg/l	TM345					<0.1	<0.01	<0.1	<0.2
Telodrin	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Terbutryn	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Chlorothalonil	<0.01 µg/l	TM345					<10	<1	<5	<20
Etrimphos	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Metazachlor	<0.01 µg/l	TM345					<0.2	<0.02	<0.05	<0.4
Cyanazine	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Trietazine	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Coumaphos	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Phosphamidon I	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Phosphamidon II	<0.01 µg/l	TM345					<0.1	<0.01	<0.05	<0.2
Dinitro-o-cresol	<0.1 µg/l	TM411					<0.2	<0.2	<0.1	<0.1
Clopyralid	<0.04 µg/l	TM411					<0.04	<0.08	<0.04	<0.04
MCPA	<0.05 µg/l	TM411					<0.05	<0.1	<0.05	<0.05
Mecoprop	<0.04 µg/l	TM411					<0.04	<0.08	<0.04	<0.04
Dicamba	<0.04 µg/l	TM411					<0.04	<0.08	<0.04	<0.04



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-48	Client Reference: Galway Historic Landfills	Report Number: 558588
Location: Tuam Landfill	Order Number:	Superseded Report: 558045

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	5A	8A	RC2	RC3		
#	ISO17025 accredited.	Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
M	mCERTS accredited.	Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
aq	Aqueous / settled sample.	Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
diss.filt	Dissolved / filtered sample.	Sample Time	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
tot.unfilt	Total / unfiltered sample.	Date Received	200702-48	200702-48	200702-48	200702-48		
-	Subcontracted - refer to subcontractor report for accreditation status.	SDG Ref	22408325	22408337	22408350	22408370		
--	% 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	Lab Sample No.(s)						
(F)	Trigger breach confirmed	AGS Reference						
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2-Chlorophenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2-Methylphenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2-Nitroaniline (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
2-Nitrophenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
3-Nitroaniline (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
4-Chloroaniline (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
4-Methylphenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
4-Nitroaniline (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
4-Nitrophenol (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
Azobenzene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
Acenaphthylene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
Acenaphthene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
Anthracene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<100	<4	<20	<200	#	#
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<50	<2	<10	<100	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-48 Client Reference: Galway Historic Landfills Report Number: 558588
 Location: Tuam Landfill Order Number: Superseded Report: 558045

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	5A	8A	RC2	RC3		
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% 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								
1-3*5@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Benzo(a)pyrene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Carbazole (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Chrysene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Dibenzofuran (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Diethyl phthalate (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Dimethyl phthalate (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	0.00 - 0.00	<250	<10	<50	<500	#	#
Fluoranthene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Fluorene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Hexachlorobenzene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Hexachlorobutadiene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Pentachlorophenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Phenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Hexachloroethane (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Nitrobenzene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Naphthalene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Isophorone (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Phenanthrene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#
Pyrene (aq)	<1 µg/l	TM176	0.00 - 0.00	<50	<2	<10	<100	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG:	200702-48	Client Reference:	Galway Historic Landfills
Location:	Tuam Landfill	Order Number:	Report Number: 558588
			Superseded Report: 558045

VOC MS (W)

Results Legend			Customer Sample Ref.			
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*#@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	5A	8A	RC2	RC3	
		0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	0.00 - 0.00 Ground Water (GW) 01/07/2020	
		02/07/2020 200702-48 22408325	02/07/2020 200702-48 22408337	02/07/2020 200702-48 22408350	02/07/2020 200702-48 22408370	
Component	LOD/Units	Method				
Dibromofluoromethane**	%	TM208	113	112	112	113
Toluene-d8**	%	TM208	100	99.8	100	101
4-Bromofluorobenzene**	%	TM208	95.7	95	93.7	94
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 #	<1 #	<1 #	<1 #
Bromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #
Chloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<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 #	<1 #
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 #	<1 #	<1 #
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 #



CERTIFICATE OF ANALYSIS

Validated

SDG:	200702-48	Client Reference:	Galway Historic Landfills
Location:	Tuam Landfill	Order Number:	Report Number: 558588
			Superseded Report: 558045

VOC MS (W)

Results Legend			Customer Sample Ref.			
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	5A	8A	RC2	RC3	
Component	LOD/Units	Method				
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	<1	<1
m,p-Xylene	<1 µg/l	TM208	<1	<1	<1	<1
o-Xylene	<1 µg/l	TM208	<1	<1	<1	<1
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	<1
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	<1
2-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	<1
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1
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	<1	<1	<1	<1
sec-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1
4-iso-Propyltoluene	<1 µg/l	TM208	<1	<1	<1	<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	<1
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

Validated

SDG: 200702-48 **Client Reference:** Galway Historic Landfills **Report Number:** 558588
Location: Tuam Landfill **Order Number:** **Superseded Report:** 558045

Table of Results - Appendix

Method No	Reference	Description
SUB		Subcontracted Test
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
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
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
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
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
TM411	Acid_Herbs_GCMS	Acid Herbs in Water 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

Validated

SDG: 200702-48	Client Reference: Galway Historic Landfills	Report Number: 558588	
Location: Tuam Landfill	Order Number:	Superseded Report: 558045	

Test Completion Dates

Lab Sample No(s)	22408325	22408337	22408350	22408370
Customer Sample Ref.	5A	8A	RC2	RC3
AGS Ref.				
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Ground Water	Ground Water	Ground Water	Ground Water

Test Name	22408325	22408337	22408350	22408370
Acid Herbicides by GCMS	10-Jul-2020	10-Jul-2020	10-Jul-2020	10-Jul-2020
Alkalinity as CaCO3	07-Jul-2020	07-Jul-2020	07-Jul-2020	07-Jul-2020
Ammonium Low	06-Jul-2020	06-Jul-2020	06-Jul-2020	06-Jul-2020
Anions by Kone (w)	04-Jul-2020	04-Jul-2020	04-Jul-2020	04-Jul-2020
BOD True Total	08-Jul-2020	08-Jul-2020	08-Jul-2020	08-Jul-2020
COD Unfiltered	06-Jul-2020	06-Jul-2020	06-Jul-2020	06-Jul-2020
Coliforms (W)	06-Jul-2020		06-Jul-2020	06-Jul-2020
Conductivity (at 20 deg.C)	03-Jul-2020	03-Jul-2020	03-Jul-2020	03-Jul-2020
Cyanide Comp/Free/Total/Thiocyanate	07-Jul-2020	07-Jul-2020	07-Jul-2020	07-Jul-2020
Dissolved Metals by ICP-MS	08-Jul-2020	08-Jul-2020	08-Jul-2020	08-Jul-2020
Dissolved Oxygen by Probe	03-Jul-2020	03-Jul-2020	03-Jul-2020	03-Jul-2020
Faecal Coliforms (W)*		07-Jul-2020		
Fluoride	07-Jul-2020	07-Jul-2020	07-Jul-2020	07-Jul-2020
Mercury Dissolved	03-Jul-2020	03-Jul-2020	03-Jul-2020	03-Jul-2020
PCB Congeners - Aqueous (W)	09-Jul-2020	09-Jul-2020	09-Jul-2020	09-Jul-2020
Pesticides (Suite I) by GCMS	09-Jul-2020	09-Jul-2020	09-Jul-2020	09-Jul-2020
Pesticides (Suite II) by GCMS	07-Jul-2020	07-Jul-2020	07-Jul-2020	07-Jul-2020
Pesticides (Suite III) by GCMS	10-Jul-2020	10-Jul-2020	10-Jul-2020	10-Jul-2020
pH Value	09-Jul-2020	03-Jul-2020	03-Jul-2020	03-Jul-2020
SVOC MS (W) - Aqueous	05-Jul-2020	05-Jul-2020	05-Jul-2020	05-Jul-2020
Total Coliforms(W)*		07-Jul-2020		
Total Organic and Inorganic Carbon	04-Jul-2020	06-Jul-2020	04-Jul-2020	04-Jul-2020
VOC MS (W)	06-Jul-2020	06-Jul-2020	06-Jul-2020	06-Jul-2020

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Certificate Of Analysis

Job Number: 20-79340
Issue Number: 1
Report Date: 2 July 2020

Site: Galway Historic Landfills
PO Number: Not Supplied
Date Samples Received: 01/07/2020

Please find attached the results for the samples received at our laboratory on 01/07/2020.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By:



Debbie Kelly
Laboratory Supervisor

Authorised Date: 2 July 2020

Notes are not INAB accredited

Results relate only to the items tested.
Information on methods of analysis and uncertainty of measurement is available on request.
Any opinions or interpretations indicated are outside the scope of our INAB accreditation.
This test report shall not be reproduced except in full or with written approval of City Analysts Limited.

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-79340

Report Version: 1

Site: Galway Historic Landfills

Sample Description: 5A Tuam

Date of Sampling: 01/07/2020

Sample Type: Ground

Date Sample Received: 01/07/2020

Lab Reference Number: 517821

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	01/07/2020	Coliforms	913.9	MPN/100ml	-
D/D3221#	01/07/2020	Faecal Coliforms	12	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-79340

Report Version: 1

Site: Galway Historic Landfills

Sample Description: RC2 Tuam

Date of Sampling: 01/07/2020

Sample Type: Ground

Date Sample Received: 01/07/2020

Lab Reference Number: 517822

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	01/07/2020	Coliforms	> 2419.6	MPN/100ml	-
D/D3221#	01/07/2020	Faecal Coliforms	< 1	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-79340

Report Version: 1

Site: Galway Historic Landfills

Sample Description: RC3 Tuam

Date of Sampling: 01/07/2020

Sample Type: Ground

Date Sample Received: 01/07/2020

Lab Reference Number: 517823

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	01/07/2020	Coliforms	> 2419.6	MPN/100ml	-
D/D3221#	01/07/2020	Faecal Coliforms	< 100	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-79340

Report Version: 1

Site: Galway Historic Landfills

Sample Description: Holywell Gort

Date of Sampling: 01/07/2020

Sample Type: Ground

Date Sample Received: 01/07/2020

Lab Reference Number: 517824

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	01/07/2020	Coliforms	> 2419.6	MPN/100ml	-
D/D3221#	01/07/2020	Faecal Coliforms	10	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon



ALS Environmental Ltd
Torrington Avenue
Coventry
CV4 9GU

T: +44 (0)24 7642 1213
F: +44 (0)24 7685 6575
www.alsenvironmental.co.uk

Subcon Results
ALS Life Sciences Limited
Torrington Avenue
Tile Hill CV4 9GU

07 July 2020

Test Report: COV/1891189/2020

Dear Subcon Results

Analysis of your sample(s) received on 04 July 2020 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using ALS Environmental Ltd and we look forward to receiving your next samples.

Yours Sincerely,

Signed: *Elizabeth Parker.*

Name: E. Parker

Title: Potable Micro Team Leader



EMS 675527

OHS 542058

This communication has been sent to you by ALS Environmental Ltd. Registered in England and Wales. Registration No.02148934. Registered Office: ALS Environmental Limited, Torrington Avenue, Coventry, CV4 9GU.

Report Summary

**Hawarden Subcon Results
ALS Life Sciences Limited
Torrington Avenue
Tile Hill
CV4 9GU**



ANALYSED BY



Date of Issue: **07 July 2020**

Report Number: **COV/1891189/2020**

Issue **1**

This issue replaces
all previous issues

Job Description: 2017-2018 Analysis

Number of Samples
included in this report **2**

Job Received: **04 July 2020**

Number of Test Results
included in this report **3**

Analysis Commenced: **04 July 2020**

Signed: *Elizabeth Parker*

Name: **E. Parker**

Date: **07 July 2020**

Title: **Potable Micro Team Leader**

ALS Environmental Ltd was not responsible for sampling unless otherwise stated.

Information on the methods of analysis and performance characteristics are available on request.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested and where relevant sampled.

Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.

This test report is not a statement of conformity to any specification or standard.

This communication has been sent to you by ALS Environmental Ltd. Registered in England and Wales. Registration No. 02148934. Registered Office: ALS Environmental Limited, Torrington Avenue, Coventry, CV4 9GU.

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ALS Environmental Ltd

Torrington Avenue, Coventry, CV4 9GU
Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575

Page 1 of 6

Certificate of Analysis

ANALYSED BY



Report Number: **COV/1891189/2020**
Laboratory Number: **19450519**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **22416094**
Sample Matrix: **Ground Water**
Sample Date/Time: **01 July 2020**
Sample Received: **04 July 2020**
Analysis Complete: **07 July 2020**
SDG: **200702-48**
Sample Reference: **8A**

Issue **1**
Sample **1** of **2**

Test Description	Result	Units	Analysis Date	Accreditation	Method
Faecal coliforms confirmed	0	cfu/100ml	07/07/2020	N Cov	W57

Analyst Comments for 19450519:

This sample has been analysed for Faecal coliforms confirmed outside recommended stability times. It is therefore possible that the results provided may be compromised.

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2SW), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: *Elizabeth Parker*

Name: **E. Parker**

Date: **07 July 2020**

Title: **Potable Micro Team Leader**

ALS Environmental Ltd

Torrington Avenue, Coventry, CV4 9GU
Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575

Page 2 of 6

Certificate of Analysis

ANALYSED BY



Report Number: **COV/1891189/2020**
Laboratory Number: **19450520**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **22416095**
Sample Matrix: **Ground Water**
Sample Date/Time: **01 July 2020**
Sample Received: **04 July 2020**
Analysis Complete: **07 July 2020**
SDG: **200702-48**
Sample Reference: **8A**

Issue **1**
Sample **2** of **2**

Test Description	Result	Units	Analysis Date	Accreditation	Method
Total Coliform presumpt	0	cfu/100ml	05/07/2020	Y Cov	W10
Total Coliforms confirmed	0	cfu/100ml	05/07/2020	Y Cov	W10

Analyst Comments for 19450520:

This sample has been analysed for Total Coliforms confirmed, Total Coliform presumpt outside recommended stability times. It is therefore possible that the results provided may be compromised.

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2SW), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: *Elizabeth Parker*

Name: **E. Parker**

Date: **07 July 2020**

Title: **Potable Micro Team Leader**

ALS Environmental Ltd

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Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575

Page 3 of 6



ANALYST COMMENTS FOR REPORT COV/1891189/2020

Issue 1

This issue replaces all previous issues

Date of Issue: 07 July 2020

Sample No	Analysis Comments
19450519	This sample has been analysed for Faecal coliforms confirmed outside recommended stability times. It is therefore possible that the results provided may be compromised.
19450520	This sample has been analysed for Total Coliforms confirmed, Total Coliform presumpt outside recommended stability times. It is therefore possible that the results provided may be compromised.

Signed: *Elizabeth Parker.*

Name: **E. Parker**

Date: **07 July 2020**

Title: **Potable Micro Team Leader**



DETERMINAND COMMENTS FOR REPORT COV/1891189/2020

ISSUE 1

This issue replaces
all previous issues

Date of Issue: 07 July 2020

Sample No	Description	Determinand	Comments

Signed: <i>Elizabeth Parker.</i>	Name: E. Parker	Date: 07 July 2020
	Title: Potable Micro Team Leader	

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CERTIFICATE OF ANALYSIS

SDG: 200702-48	Client Reference: Galway Historic Landfills	Report Number: 558588
Location: Tuam Landfill	Order Number:	Superseded Report: 558045

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. 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.

3. 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.

4. 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.

5. 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.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **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.

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

11. 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.

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

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

14. 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.

15. 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.

16. 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.

17. **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.

18. 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
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

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.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

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

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date of report Generation: 10 September 2020
Customer: Fehily Timoney
Sample Delivery Group (SDG): 200828-74
Your Reference: Galway Historic Landfills
Location: Tuam Landfill
Report No: 566861

This report has been revised and directly supersedes 566323 in its entirety.

We received 6 samples on Friday August 28, 2020 and 6 of these samples were scheduled for analysis which was completed on Thursday September 10, 2020. 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).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-74 **Client Reference:** Galway Historic Landfills **Report Number:** 566861
Location: Tuam Landfill **Order Number:** Z2189 **Superseded Report:** 566323

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22736761	3AP		0.00 - 0.00	27/08/2020
22736754	4AP		0.00 - 0.00	27/08/2020
22736713	5AP		0.00 - 0.00	27/08/2020
22736728	8AP		0.00 - 0.00	27/08/2020
22736738	RC2		0.00 - 0.00	27/08/2020
22736745	RC3		0.00 - 0.00	27/08/2020

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



CERTIFICATE OF ANALYSIS

Validated

SDG:	200828-74	Client Reference:	Galway Historic Landfills	Report Number:	566861
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566323

Results Legend			Customer Sample Ref.		3AP	4AP	5AP	8AP	RC2	RC3
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. - Subcontracted - refer to subcontractor report for accreditation status. -- % 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 1-3*5@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	
Component	LOD/Units	Method								
Coliforms, Total*	MPN/100ml	SUB	17300	15.5	74.9	64.2	817	52000		
Coliforms, Faecal*	CFU/100ml	SUB	740	1	7	4	9	2		
Alkalinity, Total as HCO3	<2 mg/l	TM043	383	666	994	439	610	16.5		
BOD, unfiltered	<1 mg/l	TM045	2.83	6.71	2.44	2.83	<1	3.26		
Oxygen, dissolved	<0.3 mg/l	TM046	11.2	3.21	6.34	9.13	10.1			
Organic Carbon, Total	<3 mg/l	TM090	50.7	83	17.7	7.31	33.1	99.9		
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	0.361	2.04	1.24	0.854	3.56	0.1		
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	<0.5	0.768	<0.5	<1		
COD, unfiltered	<7 mg/l	TM107	186	432	234	34.2	153	384		
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.525	0.966	0.568	0.866	0.762			
Arsenic (diss.filt)	<0.5 µg/l	TM152	1.02	4.33	4.35	31.2	2.74	2.88		
Barium (diss.filt)	<0.2 µg/l	TM152	9.75	138	53.7	63.4	53.5	25.4		
Boron (diss.filt)	<10 µg/l	TM152	<10	13.9	10.4	25.6	18	<10		
Cadmium (diss.filt)	<0.08 µg/l	TM152	0.172	<0.08	0.115	0.17	0.519	1.68		
Chromium (diss.filt)	<1 µg/l	TM152	<1	2.37	3.72	<1	5.33	1.3		
Copper (diss.filt)	<0.3 µg/l	TM152	5.2	0.397	1.2	11.7	2.31	11.3		
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	1.58	0.668	2.48	1.52	4.88		
Manganese (diss.filt)	<3 µg/l	TM152	181	876	146	204	179	12.8		
Nickel (diss.filt)	<0.4 µg/l	TM152	5.92	7.66	8.89	22.2	12	9.3		
Phosphorus (diss.filt)	<10 µg/l	TM152	31.8	682	262	89	171	94.9		
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	<1	<1		
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2	<2	<2	<2		
Zinc (diss.filt)	<1 µg/l	TM152	3.36	4.13	6.5	18.4	8.67	37.9		
Sodium (Dis.Filt)	<0.076 mg/l	TM152	6.46	88	10.3	47.1	12.7	12.7		
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	4.37	11.9	5.26	9.1	11	3.25		
Potassium (Dis.Filt)	<0.2 mg/l	TM152	0.466	53.7	0.916	1.64	3.12	0.237		
Calcium (Dis.Filt)	<0.2 mg/l	TM152	107	91.4	169	154	355	35.9		
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.657	30.2	7.79	16.9	11.1	1.9		
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Sulphate	<2 mg/l	TM184	<10	<2	2.1	42.5	<2	<4		
Chloride	<2 mg/l	TM184	14.7	48.5	13.1	90.2	21.8	14.8		
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1		
PCB congener 28	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015		



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SDG:	200828-74	Client Reference:	Galway Historic Landfills	Report Number:	566861
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566323

Results Legend			Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
Component	LOD/Units	Method							
PCB congener 52	<0.015 µg/l	TM197	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020
PCB congener 101	<0.015 µg/l	TM197							
PCB congener 118	<0.015 µg/l	TM197							
PCB congener 138	<0.015 µg/l	TM197							
PCB congener 153	<0.015 µg/l	TM197							
PCB congener 180	<0.015 µg/l	TM197							
Sum of detected EC7 PCB's	<0.105 µg/l	TM197							
Cyanide, Total	<0.05 mg/l	TM227							
pH	<1 pH Units	TM256	7.11	6.69	7.16	7.17	6.9	5.68	
Trifluralin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
alpha-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<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	<0.01	<0.01
Heptachlor	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aldrin	<0.01 µg/l	TM343	<0.02	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02
beta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<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	<0.01	<0.01
delta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<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	<0.01	<0.01
o,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endosulphan I	<0.01 µg/l	TM343	<0.01	<0.01	<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	<0.01	<0.01
cis-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<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	<0.01	<0.01
Dieldrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o,p'-DDT	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<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	<0.01	<0.01	<0.01
Endosulphan II	<0.02 µg/l	TM343	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
p,p'-DDT	<0.01 µg/l	TM343	<0.02	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02
o,p'-Methoxychlor	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.02	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.04	<0.02	<0.02	<0.02	<0.04	<0.04	<0.04



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SDG:	200828-74	Client Reference:	Galway Historic Landfills	Report Number:	566861
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566323

Results Legend			Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
Component	LOD/Units	Method							
Permethrin I	<0.01 µg/l	TM343	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Permethrin II	<0.01 µg/l	TM343	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Hexachlorobutadiene	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	0.113	<0.1	<0.01	<0.01	<0.05
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Dichlorvos	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Dichlobenil	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Mevinphos	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Tecnazene	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Hexachlorobenzene	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Demeton-S-methyl	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Phorate	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Diazinon	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Triallate	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Atrazine	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Simazine	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Disulfoton	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Propetamphos	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Chlorpyrifos-methyl	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Dimethoate	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Pirimiphos-methyl	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Chlorpyrifos	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Methyl Parathion	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Malathion	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Fenthion	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Fenitrothion	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Triadimefon	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Pendimethalin	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Parathion	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Chlorfenvinphos	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
trans-Chlordane	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
cis-Chlordane	<0.01 µg/l	TM344	0.00 - 0.00 Ground Water (GW) 27/08/2020	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05



CERTIFICATE OF ANALYSIS

Validated

SDG:	200828-74	Client Reference:	Galway Historic Landfills	Report Number:	566861
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566323

Results Legend		Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3		
#	ISO17025 accredited.									
M	mCERTS accredited.									
sq	Aqueous / settled sample.									
dis.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted - refer to subcontractor report for accreditation status.									
**	% 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									
1-3*§@	Sample deviation (see appendix)									
Component	LOD/Units	Method	Depth (m)	Sample Type	Date Sampled	Sample Time	Date Received	SDG Ref	Lab Sample No.(s)	AGS Reference
Ethion	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	27/08/2020		27/08/2020		22736761	
Carbophenothion	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	27/08/2020		27/08/2020		22736754	
Triazophos	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	27/08/2020		27/08/2020		22736713	
Phosalone	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	27/08/2020		27/08/2020		22736728	
Azinphos methyl	<0.02 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	27/08/2020		27/08/2020		22736738	
Azinphos ethyl	<0.02 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	27/08/2020		27/08/2020		22736745	
Etridiazole	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Pentachlorobenzene	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Propachlor	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Quintozene (PCNB)	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Omethoate	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Propazine	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Propyzamide	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Alachlor	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Prometryn	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Telodrin	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Terbutryn	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Chlorothalonil	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Etrimphos	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Metazachlor	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Cyanazine	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Trietazine	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Coumaphos	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Phosphamidon I	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Phosphamidon II	<0.01 µg/l	TM345	0.00 - 0.00	Ground Water (GW)	28/08/2020		28/08/2020		200828-74	
Dinitro-o-cresol	<0.1 µg/l	TM411	<1	<1	<1	<0.2	<1	<1		
Clopyralid	<0.04 µg/l	TM411	<0.4	<0.4	<0.4	<0.08	<0.4	<0.4		
MCPA	<0.05 µg/l	TM411	<0.5	<0.5	<0.5	<0.1	<0.5	<0.5		
Mecoprop	<0.04 µg/l	TM411	<0.4	2.64	<0.2	<0.08	<0.4	<0.2		
Dicamba	<0.04 µg/l	TM411	<0.4	<0.2	<0.2	<0.08	<0.4	<0.2		
MCPB	<0.05 µg/l	TM411	<0.5	<0.25	<0.25	<0.1	<0.5	<0.25		
2,4-DB	<0.1 µg/l	TM411	<1	<0.5	<0.5	<0.2	<1	<0.5		
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.5	<0.25	<0.25	<0.1	<0.5	<0.25		



CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-74 **Client Reference:** Galway Historic Landfills **Report Number:** 566861
Location: Tuam Landfill **Order Number:** Z2189 **Superseded Report:** 566323

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.		3AP	4AP	5AP	8AP	RC2	RC3
#	ISO17025 accredited.		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
M	mCERTS accredited.		Sample Type		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.		Date Sampled		27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
diss.filt	Dissolved / filtered sample.		Sample Time							
tot.unfilt	Total / unfiltered sample.		Date Received		28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
-	Subcontracted - refer to subcontractor report for accreditation status.		SDG Ref		200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
..	% 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		Lab Sample No.(s)		22736761	22736754	22736713	22736728	22736738	22736745
(F)	Trigger breach confirmed		AGS Reference							
1-3*5@	Sample deviation (see appendix)									
Component	LOD/Units	Method								
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2-Chlorophenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2-Methylphenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2-Nitroaniline (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
2-Nitrophenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
3-Nitroaniline (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
4-Chloroaniline (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
4-Methylphenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
4-Nitroaniline (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
4-Nitrophenol (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
Azobenzene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
Acenaphthylene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
Acenaphthene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
Anthracene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<40	<100	<20	<8	<8	<8	<40	
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<20	<50	<10	<4	<4	<4	<20	



CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-74	Client Reference: Galway Historic Landfills	Report Number: 566861
Location: Tuam Landfill	Order Number: Z2189	Superseded Report: 566323

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
# ISO17025 accredited.									
M mCERTS accredited.									
aq Aqueous / settled sample.									
diss.filt Dissolved / filtered sample.									
tot.unfilt Total / unfiltered sample.									
* Subcontracted - refer to subcontractor report for accreditation status.									
** % 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									
1-3*§@ Sample deviation (see appendix)									
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Carbazole (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Chrysene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Dibenzofuran (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Diethyl phthalate (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Dimethyl phthalate (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<100 #	<250 #	<50 #	<20 #	<20 #	<100 #
Fluoranthene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Fluorene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachlorobenzene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Pentachlorophenol (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Phenol (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachloroethane (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Nitrobenzene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Naphthalene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Isophorone (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Phenanthrene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Pyrene (aq)	<1 µg/l	TM176	0.00 - 0.00 Ground Water (GW) 27/08/2020	<20 #	<50 #	<10 #	<4 #	<4 #	<20 #



CERTIFICATE OF ANALYSIS

Validated

SDG:	200828-74	Client Reference:	Galway Historic Landfills	Report Number:	566861
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566323

VOC MS (W)

Results Legend			Customer Sample Ref.		3AP	4AP	5AP	8AP	RC2	RC3
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. - Subcontracted - refer to subcontractor report for accreditation status. - % 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 1-3*5@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference							
Component	LOD/Units	Method								
Dibromofluoromethane**	%	TM208	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020	0.00 - 0.00 Ground Water (GW) 27/08/2020
Toluene-d8**	%	TM208	113	110	106	115	112	111		
4-Bromofluorobenzene**	%	TM208	102	102	104	99.7	100	101		
Dichlorodifluoromethane	<1 µg/l	TM208	101	96.8	98.8	95.6	94.9	94.6		
Chloromethane	<1 µg/l	TM208	<1 ◆ #	<1 ◆ #	<1 ◆ #	<1 ◆ #	<1 ◆ #	<1 ◆ #	<1 ◆ #	<1 ◆ #
Vinyl chloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbon disulphide	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dichloromethane	<3 µg/l	TM208	<3 #	<3 #	<3 #	<3 #	<3 #	<3 #	<3 #	<3 #
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroform	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbontetrachloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromodichloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Toluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG:	200828-74	Client Reference:	Galway Historic Landfills	Report Number:	566861
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566323

VOC MS (W)

Results Legend			Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% 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								
1-3*§@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			0.00 - 0.00	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Type						
			Date Sampled						
			Sample Time						
			Date Received						
			SDG Ref						
			Lab Sample No.(s)						
			AGS Reference						
Tetrachloroethene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Dibromochloromethane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Chlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Ethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
m,p-Xylene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
o-Xylene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Styrene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Bromoform	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Isopropylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Bromobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Propylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
2-Chlorotoluene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
4-Chlorotoluene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
tert-Butylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
sec-Butylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
4-iso-Propyltoluene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
n-Butylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Naphthalene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

Validated

SDG:	200828-74	Client Reference:	Galway Historic Landfills	Report Number:	566861
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566323

Notification of NDPs (No determination possible)

Date Received : 28/08/2020 11:22:32

Sample No	Customer Sample Ref.	Depth (m)	Test	Comment
22736745	RC3	0.00 - 0.00	Dissolved Oxygen by Probe	Insufficient Sample



CERTIFICATE OF ANALYSIS

Validated

SDG: 200828-74 **Client Reference:** Galway Historic Landfills **Report Number:** 566861
Location: Tuam Landfill **Order Number:** Z2189 **Superseded Report:** 566323

Table of Results - Appendix

Method No	Reference	Description
SUB		Subcontracted Test
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
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
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
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
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
TM411	Acid_Herbs_GCMS	Acid Herbs in Water 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

Validated

SDG: 200828-74	Client Reference: Galway Historic Landfills	Report Number: 566861
Location: Tuam Landfill	Order Number: Z2189	Superseded Report: 566323

Test Completion Dates

Lab Sample No(s)	22736761	22736754	22736713	22736728	22736738	22736745
Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
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	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water

Acid Herbicides by GCMS	05-Sep-2020	05-Sep-2020	05-Sep-2020	05-Sep-2020	05-Sep-2020	05-Sep-2020
Alkalinity as CaCO3	03-Sep-2020	03-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	07-Sep-2020
Ammonium Low	07-Sep-2020	05-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	05-Sep-2020
Anions by Kone (w)	03-Sep-2020	03-Sep-2020	02-Sep-2020	02-Sep-2020	03-Sep-2020	07-Sep-2020
BOD True Total	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	04-Sep-2020
COD Unfiltered	30-Aug-2020	30-Aug-2020	30-Aug-2020	30-Aug-2020	30-Aug-2020	05-Sep-2020
Coliforms (W)	04-Sep-2020	04-Sep-2020	01-Sep-2020	10-Sep-2020	04-Sep-2020	04-Sep-2020
Conductivity (at 20 deg.C)	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	
Cyanide Comp/Free/Total/Thiocyanate	03-Sep-2020	03-Sep-2020	03-Sep-2020	07-Sep-2020	03-Sep-2020	07-Sep-2020
Dissolved Metals by ICP-MS	04-Sep-2020	04-Sep-2020	04-Sep-2020	05-Sep-2020	04-Sep-2020	04-Sep-2020
Dissolved Oxygen by Probe	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	
Fluoride	04-Sep-2020	04-Sep-2020	03-Sep-2020	01-Sep-2020	01-Sep-2020	08-Sep-2020
Mercury Dissolved	04-Sep-2020	07-Sep-2020	07-Sep-2020	04-Sep-2020	07-Sep-2020	07-Sep-2020
PCB Congeners - Aqueous (W)	06-Sep-2020	06-Sep-2020	06-Sep-2020	07-Sep-2020	07-Sep-2020	06-Sep-2020
Pesticides (Suite I) by GCMS	03-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	03-Sep-2020	03-Sep-2020
Pesticides (Suite II) by GCMS	08-Sep-2020	08-Sep-2020	07-Sep-2020	03-Sep-2020	02-Sep-2020	03-Sep-2020
Pesticides (Suite III) by GCMS	07-Sep-2020	07-Sep-2020	07-Sep-2020	03-Sep-2020	07-Sep-2020	07-Sep-2020
pH Value	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	07-Sep-2020
SVOC MS (W) - Aqueous	01-Sep-2020	01-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	03-Sep-2020
Total Organic and Inorganic Carbon	30-Aug-2020	30-Aug-2020	30-Aug-2020	30-Aug-2020	02-Sep-2020	01-Sep-2020
VOC MS (W)	07-Sep-2020	07-Sep-2020	07-Sep-2020	07-Sep-2020	07-Sep-2020	07-Sep-2020

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Certificate Of Analysis

Job Number: 20-82837
Issue Number: 1
Report Date: 1 September 2020

Site: Fehily Timoney
PO Number: ALS GLOBAL
Date Samples Received: 27/08/2020

Please find attached the results for the samples received at our laboratory on 27/08/2020.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By:



Louise Morrow

Authorised Date: 1 September 2020

Notes are not INAB accredited

Results relate only to the items tested.
Information on methods of analysis and uncertainty of measurement is available on request.
Any opinions or interpretations indicated are outside the scope of our INAB accreditation.
This test report shall not be reproduced except in full or with written approval of City Analysts Limited.

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-82837

Report Version: 1

Site: Fehily Timoney

Sample Description: 5AP

Date of Sampling: 27/08/2020

Sample Type: Ground

Date Sample Received: 27/08/2020

Lab Reference Number: 529056

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	27/08/2020	Coliforms	74.9	MPN/100ml	-
D/D3221#	27/08/2020	Faecal Coliforms	7	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-82837

Report Version: 1

Site: Fehily Timoney

Sample Description: 8AP

Date of Sampling: 27/08/2020

Sample Type: Ground

Date Sample Received: 27/08/2020

Lab Reference Number: 529057

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	27/08/2020	Coliforms	64.2	MPN/100ml	-
D/D3221#	27/08/2020	Faecal Coliforms	4	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

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TVC - Total viable count

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Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Certificate Of Analysis

Job Number: 20-82835
Issue Number: 2
Report Date: 4 September 2020

Reason for re-issuing report: Final Report

Site: Fehily Timoney
PO Number: ALS GLOBAL
Date Samples Received: 27/08/2020

Please find attached the results for the samples received at our laboratory on 27/08/2020.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By:



Louise Morrow

Authorised Date: 1 September 2020

Notes are not INAB accredited

Results relate only to the items tested.
Information on methods of analysis and uncertainty of measurement is available on request.
Any opinions or interpretations indicated are outside the scope of our INAB accreditation.
This test report shall not be reproduced except in full or with written approval of City Analysts Limited.

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: RC2 - TUAM

Date of Sampling: 27/08/2020

Sample Type: Ground

Date Sample Received: 27/08/2020

Lab Reference Number: 529048

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	27/08/2020	Coliforms	817.0	MPN/100ml	-
D/D3221#	27/08/2020	Faecal Coliforms	9	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: RC3- TUAM

Date of Sampling: 27/08/2020

Sample Type: Ground

Date Sample Received: 27/08/2020

Lab Reference Number: 529049

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	27/08/2020	Coliforms	52000.0	MPN/100ml	-
D/D3221#	27/08/2020	Faecal Coliforms	2	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: 3AP-TUAM

Date of Sampling: 27/08/2020

Sample Type: Ground

Date Sample Received: 27/08/2020

Lab Reference Number: 529050

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	27/08/2020	Coliforms	17329.0	MPN/100ml	-
D/D3221#	27/08/2020	Faecal Coliforms	740	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Certificate Of Analysis

Customer

Customer Services
ALS Life Sciences
Hawarden Business Park
Manor Lane
Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: 4AP- TUAM

Date of Sampling: 27/08/2020

Sample Type: Ground

Date Sample Received: 27/08/2020

Lab Reference Number: 529051

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	27/08/2020	Coliforms	15.5	MPN/100ml	-
D/D3221#	27/08/2020	Faecal Coliforms	1	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon



CERTIFICATE OF ANALYSIS

SDG:	200828-74	Client Reference:	Galway Historic Landfills	Report Number:	566861
Location:	Tuam Landfill	Order Number:	Z2189	Superseded Report:	566323

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. 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.

3. 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.

4. 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.

5. 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.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **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.

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

11. 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.

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

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

14. 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.

15. 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.

16. 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.

17. **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.

18. 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
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

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.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung. Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

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

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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 of report Generation:	17 June 2022
Customer:	Fehily Timoney
Sample Delivery Group (SDG):	220606-22
Your Reference:	Galway Historic Landfills P22-040
Location:	Tuam Landfill
Report No:	651143
Order Number:	Z3385

We received 4 samples on Monday June 06, 2022 and 4 of these samples were scheduled for analysis which was completed on Friday June 17, 2022. 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.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22

Report Number: 651143

Superseded Report:

Client Ref.: Galway Historic Landfills P22-040

Location: Tuam Landfill

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26388595	SW1		0.00 - 0.00	31/05/2022
26388621	SW2		0.00 - 0.00	31/05/2022
26388645	SW3		0.00 - 0.00	31/05/2022
26388663	SW4		0.00 - 0.00	31/05/2022

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22

Report Number: 651143

Superseded Report:
Client Ref.: Galway Historic Landfills P22-040

Location: Tuam Landfill

Results Legend <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; align-items: center;"> Test</div> <div style="display: flex; align-items: center;"> No Determination Possible</div> </div> 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)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
	26388595	SW1		0.00 - 0.00	HNO3 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 250ml BOD (ALE212) 0.5l glass bottle (ALE227) Vial (ALE297)	SW
	26388621	SW2		0.00 - 0.00	HNO3 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 250ml BOD (ALE212) 0.5l glass bottle (ALE227) Vial (ALE297)	SW
	26388645	SW3		0.00 - 0.00	HNO3 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 250ml BOD (ALE212) 0.5l glass bottle (ALE227) Vial (ALE297)	SW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 4				
Alkalinity as CaCO3	All	NDPs: 0 Tests: 4				
Ammonium Low	All	NDPs: 0 Tests: 4				
Anions by Kone (w)	All	NDPs: 0 Tests: 4				
BOD True Total	All	NDPs: 0 Tests: 4				
COD Unfiltered	All	NDPs: 0 Tests: 4				
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 4				
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4				
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 4				
Fluoride	All	NDPs: 0 Tests: 4				
Mercury Dissolved	All	NDPs: 0 Tests: 4				
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 4				
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 4				
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 4				
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 4				



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22
Client Ref.: Galway Historic Landfills P22-040

Report Number: 651143
Location: Tuam Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*\$@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022		
Component	LOD/Units	Method						
Alkalinity, Total as HCO3	<2 mg/l	TM043	492	422	434	425		
BOD, unfiltered	<1 mg/l	TM045	<1	<1	<1	<1	@ #	@ #
Oxygen, dissolved	<0.3 mg/l	TM046	10.1	6.07	6.81	11.4		
Organic Carbon, Total	<3 mg/l	TM090	9.75	11.2	11.3	11.7	@ #	@ #
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	0.0537	0.139	0.0285	0.0297	#	#
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	<0.5	<0.5	#	#
COD, unfiltered	<7 mg/l	TM107	17.9	35.5	25.1	29	#	#
Arsenic (diss.filt)	<0.5 µg/l	TM152	0.863	1.12	1.04	1.15	#	#
Barium (diss.filt)	<0.2 µg/l	TM152	17.7	20.7	24.4	25.4	#	#
Boron (diss.filt)	<10 µg/l	TM152	<10	<10	17.5	14.9	#	#
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	#	#
Chromium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	#	#
Copper (diss.filt)	<0.3 µg/l	TM152	6.16	0.4	0.442	0.731	#	#
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	<0.2	<0.2	<0.2	#	#
Manganese (diss.filt)	<3 µg/l	TM152	49.6	50.3	35.3	12.5	#	#
Nickel (diss.filt)	<0.4 µg/l	TM152	3.95	2.71	2.89	2.78	#	#
Phosphorus (diss.filt)	<10 µg/l	TM152	66.4	14.3	13.3	13.8	#	#
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	#	#
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2	<2	#	#
Zinc (diss.filt)	<1 µg/l	TM152	3.55	2.1	4.06	2.72	#	#
Sodium (Dis.Filt)	<0.076 mg/l	TM152	9.73	11.1	13.9	13.9	#	#
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	7.88	7.13	8.07	7.92	#	#
Potassium (Dis.Filt)	<0.2 mg/l	TM152	2.64	0.547	1.37	0.93	#	#
Calcium (Dis.Filt)	<0.2 mg/l	TM152	159	132	132	132	#	#
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.19	0.198	0.212	0.21	#	#
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	<0.01	#	#
Sulphate	<2 mg/l	TM184	9.9	<2	<2	<2	#	#
Chloride	<2 mg/l	TM184	20.3	20.1	24.6	23	#	#
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	0.265	0.126	0.22	<0.1	#	#
PCB congener 28	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	#	#
PCB congener 52	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	#	#
PCB congener 101	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	#	#
PCB congener 118	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22
Client Ref.: Galway Historic Landfills P22-040

Report Number: 651143
Location: Tuam Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4* Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022		
Component	LOD/Units	Method						
PCB congener 138	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015		
PCB congener 153	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015		
PCB congener 180	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015		
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.105	<0.105	<0.105	<0.105		
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05		
pH	<1 pH Units	TM256	7.79	7.84	7.88	8.07	#	#
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.693	0.608	0.627	0.615	#	#
Trifluralin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
alpha-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
gamma-HCH (Lindane)	<0.01 µg/l	TM343	<0.01	<0.02	<0.03	<0.015		
Heptachlor	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
Aldrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
beta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
Isodrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
delta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
Heptachlor epoxide	<0.01 µg/l	TM343	<0.01	<0.02	<0.02	<0.015		
o,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.02	<0.02	<0.015		
Endosulphan I	<0.01 µg/l	TM343	<0.01	<0.02	<0.02	<0.015		
trans-Chlordane	<0.01 µg/l	TM343	<0.02	<0.01	<0.01	<0.03		
cis-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
p,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.02	<0.02	<0.015		
Dieldrin	<0.01 µg/l	TM343	<0.01	<0.01	0.0386	<0.015		
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
Endrin	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.03		
o,p'-DDT	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.03		
p,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.03		
Endosulphan II	<0.02 µg/l	TM343	<0.02	<0.02	<0.02	<0.03		
p,p'-DDT	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.03		
o,p'-Methoxychlor	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.03		
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.02	<0.02	<0.02	<0.03		
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.12	<0.02	<0.02	<0.18		
Permethrin I	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		
Permethrin II	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.015		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22
Client Ref.: Galway Historic Landfills P22-040

Report Number: 651143
Location: Tuam Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4* Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022		
Component	LOD/Units	Method							
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344	<0.02	<0.02	<0.02	<0.02	<0.02		
Hexachlorobutadiene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344	<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		
Dichlobenil	<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		
Demeton-S-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Phorate	<0.01 µg/l	TM344	<0.01	<0.02	<0.02	<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	0.0133	0.013	<0.01	<0.01		
Simazine	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Disulfoton	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Propetamphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Chlorpyrifos-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Dimethoate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Pirimiphos-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Chlorpyrifos	<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	<0.01	<0.01	<0.01	<0.01	<0.01		
Fenthion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Fenitrothion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Triadimefon	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Pendimethalin	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Parathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Chlorfenvinphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
trans-Chlordane	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
cis-Chlordane	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Ethion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01		
Carbophenothion	<0.01 µg/l	TM344	<0.01	<0.02	<0.02	<0.01	<0.01		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22
Client Ref.: Galway Historic Landfills P22-040

Report Number: 651143
Location: Tuam Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% 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								
1-4*#	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
Triazophos	<0.01 µg/l	TM344	0.00 - 0.00 Surface Water (SW) 31/05/2022	<0.01	<0.02	<1.53	<0.01		
Phosalone	<0.01 µg/l	TM344	0.00 - 0.00 Surface Water (SW) 31/05/2022	<0.01	<0.02	<0.02	<0.01		
Azinphos methyl	<0.02 µg/l	TM344	0.00 - 0.00 Surface Water (SW) 31/05/2022	<0.04	<0.02	<0.02	<0.04		
Azinphos ethyl	<0.02 µg/l	TM344	0.00 - 0.00 Surface Water (SW) 31/05/2022	<0.02	<0.02	<0.02	<0.02		
Etridiazole	<0.01 µg/l	TM345	06/06/2022 220606-22 26388595	<0.02	<0.02	<0.02	<0.02		
Pentachlorobenzene	<0.01 µg/l	TM345	06/06/2022 220606-22 26388621	<0.01	<0.01	<0.01	<0.01		
Propachlor	<0.01 µg/l	TM345	06/06/2022 220606-22 26388645	<0.01	<0.01	<0.01	<0.01		
Quintozene (PCNB)	<0.01 µg/l	TM345	06/06/2022 220606-22 26388663	<0.01	<0.01	<0.01	<0.01		
Omethoate	<0.01 µg/l	TM345		<0.02	<0.02	<0.02	<0.02		
Propazine	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Propyzamide	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Alachlor	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Prometryn	<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		
Terbutryn	<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		
Etrimpfos	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Metazachlor	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Cyanazine	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Trietazine	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Coumaphos	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Phosphamidon I	<0.01 µg/l	TM345		<0.02	<0.02	<0.02	<0.02		
Phosphamidon II	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Dinitro-o-cresol	<0.1 µg/l	TM411		<0.1	<0.1	<0.1	<0.1		
Clopyralid	<0.04 µg/l	TM411		<0.04	<0.04	<0.04	<0.04		
MCPA	<0.05 µg/l	TM411		<0.05	<0.05	<0.05	<0.05		
Mecoprop	<0.04 µg/l	TM411		<0.04	<0.04	<0.04	<0.04		
Dicamba	<0.04 µg/l	TM411		<0.04	<0.04	<0.04	<0.04		
MCPB	<0.05 µg/l	TM411		<0.05	<0.05	<0.05	<0.05		
2,4-DB	<0.1 µg/l	TM411		<0.1	<0.1	<0.1	<0.1		
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411		<0.05	<0.05	<0.05	<0.05		
Dichlorprop	<0.1 µg/l	TM411		<0.1	<0.1	<0.1	<0.1		
Triclopyr	<0.05 µg/l	TM411		<0.05	<0.05	<0.05	<0.05		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22
Client Ref.: Galway Historic Landfills P22-040

Report Number: 651143
Location: Tuam Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4		
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
M	mCERTS accredited.		Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
aq	Aqueous / settled sample.		31/05/2022	31/05/2022	31/05/2022	31/05/2022		
diss.filt	Dissolved / filtered sample.		06/06/2022	06/06/2022	06/06/2022	06/06/2022		
tot.unfilt	Total / unfiltered sample.		220606-22	220606-22	220606-22	220606-22		
*	Subcontracted - refer to subcontractor report for accreditation status.		26388595	26388621	26388645	26388663		
**	% 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							
1-4*§	Sample deviation (see appendix)							
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	<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	<1	#	#
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	<1	<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	<1	<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	<2	<2	#	#
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	<1	<1	<1	#	#
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22

Report Number: 651143

Superseded Report:

Client Ref.: Galway Historic Landfills P22-040

Location: Tuam Landfill

VOC MS (W)

Results Legend		Customer Sample Ref.	SW1	SW2	SW3	SW4		
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
M	mCERTS accredited.		Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
aq	Aqueous / settled sample.		31/05/2022	31/05/2022	31/05/2022	31/05/2022		
diss.filt	Dissolved / filtered sample.		06/06/2022	06/06/2022	06/06/2022	06/06/2022		
tot.unfilt	Total / unfiltered sample.		220606-22	220606-22	220606-22	220606-22		
*	Subcontracted - refer to subcontractor report for accreditation status.		26388595	26388621	26388645	26388663		
**	% 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							
1-4*§	Sample deviation (see appendix)							
Component	LOD/Units		Method					
Dibromofluoromethane**	%	TM208	111	107	113	99.4		
Toluene-d8**	%	TM208	99.2	102	97.5	103		
4-Bromofluorobenzene**	%	TM208	99.8	104	102	104		
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	<1	<1	<1	#	#
Bromomethane	<1 µg/l	TM208	<1	<1	<1	<1	#	#
Chloroethane	<1 µg/l	TM208	<1	<1	<1	<1	#	#
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	<1	<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	<5.5	<4	<5.5	<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	<1	#	#
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	<1	<1	#	#
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	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22
Client Ref.: Galway Historic Landfills P22-040

Report Number: 651143
Location: Tuam Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	SW1	SW2	SW3	SW4		
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% 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								
1-4*#	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022	0.00 - 0.00 Surface Water (SW) 31/05/2022		
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 #	<1 #	<1 #		
m,p-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
o-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
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 #	<1 #		
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 #	<1 #		
2-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
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		<1 #	<1 #	<1 #	<1 #		
sec-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
4-iso-Propyltoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<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 #	<1 #		
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22
Client Ref.: Galway Historic Landfills P22-040

Report Number: 651143
Location: Tuam Landfill

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
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
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
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, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
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
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-22
Client Ref.: Galway Historic Landfills P22-040

Report Number: 651143
Location: Tuam Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	26388595	26388621	26388645	26388663
Customer Sample Ref.	SW1	SW2	SW3	SW4
AGS Ref.				
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water

	26388595	26388621	26388645	26388663
Acid Herbicides by GCMS	15-Jun-2022	13-Jun-2022	13-Jun-2022	17-Jun-2022
Alkalinity as CaCO3	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022
Ammonium Low	09-Jun-2022	10-Jun-2022	09-Jun-2022	09-Jun-2022
Anions by Kone (w)	10-Jun-2022	09-Jun-2022	09-Jun-2022	10-Jun-2022
BOD True Total	11-Jun-2022	11-Jun-2022	11-Jun-2022	11-Jun-2022
COD Unfiltered	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
Cyanide Comp/Free/Total/Thiocyanate	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022
Dissolved Metals by ICP-MS	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
Dissolved Oxygen by Probe	07-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022
Fluoride	10-Jun-2022	10-Jun-2022	09-Jun-2022	10-Jun-2022
Mercury Dissolved	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
PCB Congeners - Aqueous (W)	13-Jun-2022	13-Jun-2022	13-Jun-2022	13-Jun-2022
Pesticides (Suite I) by GCMS	09-Jun-2022	10-Jun-2022	10-Jun-2022	09-Jun-2022
Pesticides (Suite II) by GCMS	08-Jun-2022	09-Jun-2022	09-Jun-2022	08-Jun-2022
Pesticides (Suite III) by GCMS	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
pH Value	07-Jun-2022	08-Jun-2022	08-Jun-2022	07-Jun-2022
SVOC MS (W) - Aqueous	08-Jun-2022	09-Jun-2022	09-Jun-2022	08-Jun-2022
Total Organic and Inorganic Carbon	08-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022
VOC MS (W)	13-Jun-2022	14-Jun-2022	13-Jun-2022	14-Jun-2022



CERTIFICATE OF ANALYSIS

SDG: 220606-22
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Location: Tuam Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. 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.

3. 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.

4. 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.

5. 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.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **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.

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

11. 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.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

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

14. 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.

15. 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.

16. 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.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **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.

19. 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	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

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 (2021), 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.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils 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 (2021).

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.

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.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

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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Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528777

email: hawardencustomerservices@alsglobal.com

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 of report Generation: 15 June 2022
Customer: Fehily Timoney
Sample Delivery Group (SDG): 220606-21
Your Reference: Galway Historic Landfills P22-040
Location: Tuam Landfill
Report No: 650615
Order Number:

We received 9 samples on Monday June 06, 2022 and 9 of these samples were scheduled for analysis which was completed on Wednesday June 15, 2022. 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.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21

Report Number: 650615

Superseded Report:

Client Ref.: Galway Historic Landfills P22-040

Location: Tuam Landfill

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26388593	3A		0.00 - 0.00	31/05/2022
26388531	5A		0.00 - 0.00	31/05/2022
26388541	8A		0.00 - 0.00	31/05/2022
26388633	4AP		0.00 - 0.00	31/05/2022
26388616	5AP		0.00 - 0.00	31/05/2022
26388574	GW01		0.00 - 0.00	31/05/2022
26388583	GW02		0.00 - 0.00	31/05/2022
26388558	RC2		0.00 - 0.00	31/05/2022
26388566	RC3		0.00 - 0.00	31/05/2022

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

26388574	GW01	0.00 - 0.00	HNO3 Filtered (ALE204)	GW						
			H2SO4 (ALE244)	GW						
			500ml Plastic (ALE208)	GW						
			0.5l glass bottle (ALE227)	GW	X					
			Vial (ALE297)	GW					X	
			NaOH (ALE245)	GW						
			HNO3 Filtered (ALE204)	GW						
			H2SO4 (ALE244)	GW						
			500ml Plastic (ALE208)	GW						
			0.5l glass bottle (ALE227)	GW	X					
26388616	SAP	0.00 - 0.00	Vial (ALE297)	GW						X
			NaOH (ALE245)	GW						
			HNO3 Filtered (ALE204)	GW						
			H2SO4 (ALE244)	GW						
			500ml Plastic (ALE208)	GW					X	
			0.5l glass bottle (ALE227)	GW						
			Vial (ALE297)	GW	X					
			NaOH (ALE245)	GW						
			HNO3 Filtered (ALE204)	GW						
			H2SO4 (ALE244)	GW						
26388633	4AP	0.00 - 0.00	Vial (ALE297)	GW						X
			NaOH (ALE245)	GW						
			HNO3 Filtered (ALE204)	GW						
			H2SO4 (ALE244)	GW						X
			500ml Plastic (ALE208)	GW						
			0.5l glass bottle (ALE227)	GW						
			Vial (ALE297)	GW	X					
			NaOH (ALE245)	GW						
			HNO3 Filtered (ALE204)	GW						
			H2SO4 (ALE244)	GW						



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

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)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
26388583	GM02		0.00 - 0.00	NaOH (ALE245) Vial (ALE297)	GW
26388558	RC2		0.00 - 0.00	0.5l glass bottle (ALE227) Vial (ALE297)	GW
26388566	RC3		0.00 - 0.00	Vial (ALE297) NaOH (ALE245)	GW

Parameter	All	NDPs: 0 Tests: 9	Container																
			NaOH (ALE245) Vial (ALE297)	0.5l glass bottle (ALE227) Vial (ALE297)	500ml Plastic (ALE208) GW	H2SO4 (ALE244) GW	HNO3 Filtered (ALE204) GW	NaOH (ALE245) GW	Vial (ALE297) GW	0.5l glass bottle (ALE227) GW	500ml Plastic (ALE208) GW	H2SO4 (ALE244) GW	HNO3 Filtered (ALE204) GW	NaOH (ALE245) GW	Vial (ALE297) GW				
Acid Herbicides by GCMS				X											X				
Alkalinity as CaCO3					X											X			
Ammonium Low						X										X			
Anions by Kone (w)				X											X				
BOD True Total					X											X			
COD Unfiltered				X											X				
Cyanide Comp/Free/Total/Thiocyanate			X							X								X	
Dissolved Metals by ICP-MS									X									X	
Dissolved Oxygen by Probe					X											X			
Fluoride					X											X			
Mercury Dissolved									X									X	
PCB Congeners - Aqueous (W)					X											X			
Pesticides (Suite I) by GCMS				X											X				
Pesticides (Suite II) by GCMS				X											X				
Pesticides (Suite III) by GCMS				X											X				



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

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)	26388583	26388558	26388566
Customer Sample Reference	GM02	RC2	RC3
AGS Reference			
Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Container	NaOH (ALE245) Vial (ALE297)	0.5l glass bottle (ALE227) Vial (ALE297)	500ml Plastic (ALE208) 500ml Plastic (ALE244) H2SO4 (ALE204) HNO3 Filtered (ALE204) HNO3 (ALE245) NaOH (ALE245) Vial (ALE297)
Sample Type	GW	GW	GW

pH Value	All	NDPs: 0 Tests: 9	26388583	26388558	26388566
			X	X	
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 9	X	X	
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 9			X
VOC MS (W)	All	NDPs: 0 Tests: 9	X	X	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*\$@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022
Component	LOD/Units	Method						
Alkalinity, Total as HCO3	<2 mg/l	TM043	438	545	528	655	424	683
BOD, unfiltered	<1 mg/l	TM045	<2	<1	8.63	<2	2.87	<2
Oxygen, dissolved	<0.3 mg/l	TM046	4.56	7.18	2.98	6.18	5.78	5.36
Organic Carbon, Total	<3 mg/l	TM090	43.2	17	17.2	78	31.5	16
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	0.74	1.15	11.9	0.984	0.21	2.01
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	0.61	0.701	<0.5	0.922
COD, unfiltered	<7 mg/l	TM107	272	126	141	327	145	75.4
Arsenic (diss.filt)	<0.5 µg/l	TM152	0.889	3.7	64.7	4.48	2.63	3.14
Barium (diss.filt)	<0.2 µg/l	TM152	13.7	74.8	41.9	217	65.8	83.7
Boron (diss.filt)	<10 µg/l	TM152	<10	<10	34.6	10.9	<10	17.7
Cadmium (diss.filt)	<0.08 µg/l	TM152	0.0915	<0.08	<0.08	<0.08	<0.08	<0.08
Chromium (diss.filt)	<1 µg/l	TM152	<1	1.2	1.14	2.99	<1	1.35
Copper (diss.filt)	<0.3 µg/l	TM152	0.858	<0.3	<0.3	0.553	0.397	<0.3
Lead (diss.filt)	<0.2 µg/l	TM152	0.359	0.28	<0.2	0.235	<0.2	<0.2
Manganese (diss.filt)	<3 µg/l	TM152	327	170	364	926	439	112
Nickel (diss.filt)	<0.4 µg/l	TM152	3.33	12.9	3.58	4.08	1.56	8.22
Phosphorus (diss.filt)	<10 µg/l	TM152	25.1	50.1	1970	1940	26.1	143
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	<1	<1
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2	<2	<2	<2
Zinc (diss.filt)	<1 µg/l	TM152	4.98	12.9	2.18	5.84	2.76	3.61
Sodium (Dis.Filt)	<0.076 mg/l	TM152	7.5	9.29	34.4	93.2	7.67	21.5
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	4.74	4.93	8.55	14.7	4.64	14.3
Potassium (Dis.Filt)	<0.2 mg/l	TM152	0.325	0.733	6.56	54	0.649	2.26
Calcium (Dis.Filt)	<0.2 mg/l	TM152	139	160	142	107	134	130
Iron (Dis.Filt)	<0.019 mg/l	TM152	4.22	3.53	16.4	38.8	6.05	5.86
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sulphate	<2 mg/l	TM184	<2	<2	7.3	3.7	<2	<2
Chloride	<2 mg/l	TM184	14.9	13	66	45.6	12.2	31.2
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB congener 28	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 52	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 101	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 118	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
# ISO17025 accredited. M MCERTS accredited. sq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*# Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022
Component	LOD/Units	Method							
PCB congener 138	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 153	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 180	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.105	<0.105	<0.105	<0.105	<0.105	<0.105	<0.105
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	<1 pH Units	TM256	7.07	7.16	7.09	6.72	7.21	7.23	
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.608	0.698	0.898	0.953	0.566	0.7	
Trifluralin	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
alpha-HCH	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
gamma-HCH (Lindane)	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
Heptachlor	<0.01 µg/l	TM343	<0.2	<0.04	<0.04	<0.2	<0.4	<0.1	
Aldrin	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
beta-HCH	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
Isodrin	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
delta-HCH	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
Heptachlor epoxide	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
o,p'-DDE	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
Endosulphan I	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
trans-Chlordane	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.2	
cis-Chlordane	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
p,p'-DDE	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
Dieldrin	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	0.141	0.527	<0.1	
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	
Endrin	<0.01 µg/l	TM343	<0.5	<0.1	<0.1	<0.5	<1	<0.4	
o,p'-DDT	<0.01 µg/l	TM343	<0.4	<0.08	<0.08	<0.4	<0.8	<0.1	
p,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.2	<0.04	<0.04	<0.2	<0.4	<0.2	
Endosulphan II	<0.02 µg/l	TM343	<0.2	<0.04	<0.04	<0.2	<0.4	<0.2	
p,p'-DDT	<0.01 µg/l	TM343	<0.6	<0.12	<0.12	<0.6	<1.2	<0.1	
o,p'-Methoxychlor	<0.01 µg/l	TM343	<0.5	<0.1	<0.1	<0.5	<1	<0.2	
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.8	<0.16	<0.16	<0.8	<1.6	<0.1	
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.8	<0.16	<0.16	<0.8	<1.6	<0.4	
Permethrin I	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.2	
Permethrin II	<0.01 µg/l	TM343	<0.1	<0.02	<0.02	<0.1	<0.2	<0.1	



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% 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								
1-4*§@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m)	Sample Type	Date Sampled	Sample Time	Date Received	SDG Ref	Lab Sample No.(s)
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Hexachlorobutadiene	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Dichlorvos	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Dichlobenil	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Mevinphos	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Tecnazene	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Hexachlorobenzene	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Demeton-S-methyl	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Phorate	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Diazinon	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Triallate	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Atrazine	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Simazine	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Disulfoton	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Propetamphos	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Chlorpyrifos-methyl	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Dimethoate	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Pirimiphos-methyl	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Chlorpyrifos	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Methyl Parathion	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Malathion	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Fenthion	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Fenitrothion	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Triadimefon	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Pendimethalin	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Parathion	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Chlorfenvinphos	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
trans-Chlordane	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
cis-Chlordane	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Ethion	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				
Carbophenothion	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022				



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
# ISO17025 accredited.	M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
sq	A	Aqueous / settled sample.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
dis.filt		Dissolved / filtered sample.		31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
tot.unfilt		Total / unfiltered sample.		06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
*		Subcontracted - refer to subcontractor report for accreditation status.		220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
**		% 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		26388593	26388531	26388541	26388633	26388616	26388574
(F)		Trigger breach confirmed							
1-4**@		Sample deviation (see appendix)							
Component	LOD/Units	Method							
Triazophos	<0.01 µg/l	TM344		<0.4	<0.1	<0.1	<0.2	<0.1	<0.1
Phosalone	<0.01 µg/l	TM344	<0.4	<0.1	<0.1	<0.2	<0.1	<0.1	
Azinphos methyl	<0.02 µg/l	TM344	<0.4	<0.4	<0.4	<0.4	<0.4	<0.2	
Azinphos ethyl	<0.02 µg/l	TM344	<0.4	<0.2	<0.2	<0.4	<0.2	<0.2	
Etridiazole	<0.01 µg/l	TM345	<0.04	<0.04	<0.04	<0.4	<0.04	<0.2	
Pentachlorobenzene	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Propachlor	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Quintozene (PCNB)	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Omethoate	<0.01 µg/l	TM345	<0.04	<0.04	<0.04	<0.4	<0.04	<0.2	
Propazine	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Propyzamide	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Alachlor	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Prometryn	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Telodrin	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Terbutryn	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Chlorothalonil	<0.01 µg/l	TM345	<0.04	<0.04	<0.04	<0.2	<0.04	<0.2	
Etrimphos	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Metazachlor	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Cyanazine	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Trietazine	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Coumaphos	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Phosphamidon I	<0.01 µg/l	TM345	<0.04	<0.04	<0.04	<0.4	<0.04	<0.2	
Phosphamidon II	<0.01 µg/l	TM345	<0.02	<0.02	<0.02	<0.2	<0.02	<0.1	
Dinitro-o-cresol	<0.1 µg/l	TM411	<1	<0.5	<0.5	<1	<0.5	<1	
Clopyralid	<0.04 µg/l	TM411	<0.4	<0.2	<0.2	<0.4	<0.2	<0.4	
MCPA	<0.05 µg/l	TM411	<0.5	<0.25	<0.25	<0.5	<0.25	<0.5	
Mecoprop	<0.04 µg/l	TM411	<0.4	<0.2	<0.2	1.01	<0.2	<0.4	
Dicamba	<0.04 µg/l	TM411	<0.4	<0.2	<0.2	<0.4	<0.2	<0.4	
MCPB	<0.05 µg/l	TM411	<0.5	<0.25	<0.25	<0.5	<0.25	<0.5	
2,4-DB	<0.1 µg/l	TM411	<1	<0.5	<0.5	<1	<0.5	<1	
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.5	<0.25	<0.25	<0.5	<0.25	<0.5	
Dichlorprop	<0.1 µg/l	TM411	<1	<0.5	<0.5	<1	<0.5	<1	
Triclopyr	<0.05 µg/l	TM411	<0.5	<0.25	<0.25	<0.5	<0.25	<0.5	



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	GW02	RC2	RC3		
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*# Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 31/05/2022 06/06/2022 220606-21 26388583	0.00 - 0.00 Ground Water (GW) 31/05/2022 06/06/2022 220606-21 26388558	0.00 - 0.00 Ground Water (GW) 31/05/2022 06/06/2022 220606-21 26388566		
Component	LOD/Units	Method					
Alkalinity, Total as HCO3	<2 mg/l	TM043	28400	548	30.5		
BOD, unfiltered	<1 mg/l	TM045	6.12	49.8	2.37	@ #	@ #
Oxygen, dissolved	<0.3 mg/l	TM046	3.36	2.22	9.11		
Organic Carbon, Total	<3 mg/l	TM090	20.6	32.1	59.6	@ #	#
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	1.77	2.72	0.142	#	#
Fluoride	<0.5 mg/l	TM104	0.564	0.977	<0.5	#	#
COD, unfiltered	<7 mg/l	TM107	2360	102	390	#	#
Arsenic (diss.filt)	<0.5 µg/l	TM152	5.96	1.37	1.66	#	#
Barium (diss.filt)	<0.2 µg/l	TM152	64.9	35.9	4.9	#	#
Boron (diss.filt)	<10 µg/l	TM152	<10	16.5	<10	#	#
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	0.619	#	#
Chromium (diss.filt)	<1 µg/l	TM152	<1	3	1.39	#	#
Copper (diss.filt)	<0.3 µg/l	TM152	<0.3	<0.3	6.41	#	#
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	0.364	1.79	#	#
Manganese (diss.filt)	<3 µg/l	TM152	90.1	119	8.42	#	#
Nickel (diss.filt)	<0.4 µg/l	TM152	13.7	3.25	8.03	#	#
Phosphorus (diss.filt)	<10 µg/l	TM152	81.9	90.6	31.4	#	#
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	#	#
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2	#	#
Zinc (diss.filt)	<1 µg/l	TM152	5.14	3.7	10.5	#	#
Sodium (Dis.Filt)	<0.076 mg/l	TM152	18.2	11.1	8.36	#	#
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	16.2	7.73	2.61	#	#
Potassium (Dis.Filt)	<0.2 mg/l	TM152	2.17	2.44	1.9	#	#
Calcium (Dis.Filt)	<0.2 mg/l	TM152	106	166	22.8	#	#
Iron (Dis.Filt)	<0.019 mg/l	TM152	2.71	8.49	0.941	#	#
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	#	#
Sulphate	<2 mg/l	TM184	<2	<2	<10	#	#
Chloride	<2 mg/l	TM184	44.4	18.2	28.2	#	#
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.1	0.663	<0.1	#	#
PCB congener 28	<0.015 µg/l	TM197	<0.06	<0.015	<0.015		
PCB congener 52	<0.015 µg/l	TM197	<0.06	<0.015	<0.015		
PCB congener 101	<0.015 µg/l	TM197	<0.06	<0.015	<0.015		
PCB congener 118	<0.015 µg/l	TM197	<0.06	<0.015	<0.015		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	GW02	RC2	RC3			
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*# Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022			
Component	LOD/Units	Method						
PCB congener 138	<0.015 µg/l	TM197	<0.06	<0.015	<0.015			
PCB congener 153	<0.015 µg/l	TM197	<0.06	<0.015	<0.015			
PCB congener 180	<0.015 µg/l	TM197	<0.06	<0.015	<0.015			
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.42	<0.105	<0.105			
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	#	#	#
pH	<1 pH Units	TM256	7.06	7.04	6.06	#	#	#
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.805	0.679	0.141	#	#	#
Trifluralin	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
alpha-HCH	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
gamma-HCH (Lindane)	<0.01 µg/l	TM343	<0.31	<0.02	<0.02			
Heptachlor	<0.01 µg/l	TM343	<0.4	<0.04	<0.04			
Aldrin	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
beta-HCH	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
Isodrin	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
delta-HCH	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
Heptachlor epoxide	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
o,p'-DDE	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
Endosulphan I	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
trans-Chlordane	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
cis-Chlordane	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
p,p'-DDE	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
Dieldrin	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
Endrin	<0.01 µg/l	TM343	<1	<0.1	<0.1			
o,p'-DDT	<0.01 µg/l	TM343	<0.8	<0.08	<0.08			
p,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.4	<0.04	<0.04			
Endosulphan II	<0.02 µg/l	TM343	<0.4	<0.04	<0.04			
p,p'-DDT	<0.01 µg/l	TM343	<1.2	<0.12	<0.12			
o,p'-Methoxychlor	<0.01 µg/l	TM343	<1	<0.1	<0.1			
p,p'-Methoxychlor	<0.01 µg/l	TM343	<1.6	<0.16	<0.16			
Endosulphan Sulphate	<0.02 µg/l	TM343	<1.6	<0.16	<0.16			
Permethrin I	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			
Permethrin II	<0.01 µg/l	TM343	<0.2	<0.02	<0.02			



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	GW02	RC2	RC3			
# ISO17025 accredited. M mCERTS accredited. sq. Aqueous / settled sample. dis. fil. Dissolved / filtered sample. tot.unfil. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4* @ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022			
Component	LOD/Units	Method							
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344	<0.4	<0.1	<0.2				
Hexachlorobutadiene	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Dichlorvos	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Dichlobenil	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Mevinphos	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Tecnazene	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Hexachlorobenzene	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Demeton-S-methyl	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Phorate	<0.01 µg/l	TM344	<0.4	<0.05	<0.1				
Diazinon	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Triallate	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Atrazine	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Simazine	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Disulfoton	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Propetamphos	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Chlorpyrifos-methyl	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Dimethoate	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Pirimiphos-methyl	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Chlorpyrifos	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Methyl Parathion	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Malathion	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Fenthion	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Fenitrothion	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Triadimefon	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Pendimethalin	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Parathion	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Chlorfenvinphos	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
trans-Chlordane	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
cis-Chlordane	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Ethion	<0.01 µg/l	TM344	<0.2	<0.05	<0.1				
Carbophenothion	<0.01 µg/l	TM344	<0.4	<0.05	<0.1				



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	GW02	RC2	RC3			
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / filtered sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% 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								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m)	Sample Type	Date Sampled	Sample Time	Date Received	SDG Ref	Lab Sample No.(s)
Triazophos	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022		06/06/2022	220606-21	26388583
Phosalone	<0.01 µg/l	TM344	0.00 - 0.00	Ground Water (GW)	31/05/2022		06/06/2022	220606-21	26388558
Azinphos methyl	<0.02 µg/l	TM344							
Azinphos ethyl	<0.02 µg/l	TM344							
Etridiazole	<0.01 µg/l	TM345							
Pentachlorobenzene	<0.01 µg/l	TM345							
Propachlor	<0.01 µg/l	TM345							
Quintozene (PCNB)	<0.01 µg/l	TM345							
Omethoate	<0.01 µg/l	TM345							
Propazine	<0.01 µg/l	TM345							
Propyzamide	<0.01 µg/l	TM345							
Alachlor	<0.01 µg/l	TM345							
Prometryn	<0.01 µg/l	TM345							
Telodrin	<0.01 µg/l	TM345							
Terbutryn	<0.01 µg/l	TM345							
Chlorothalonil	<0.01 µg/l	TM345							
Etrimpfos	<0.01 µg/l	TM345							
Metazachlor	<0.01 µg/l	TM345							
Cyanazine	<0.01 µg/l	TM345							
Trietazine	<0.01 µg/l	TM345							
Coumaphos	<0.01 µg/l	TM345							
Phosphamidon I	<0.01 µg/l	TM345							
Phosphamidon II	<0.01 µg/l	TM345							
Dinitro-o-cresol	<0.1 µg/l	TM411							
Clopyralid	<0.04 µg/l	TM411							
MCPA	<0.05 µg/l	TM411							
Mecoprop	<0.04 µg/l	TM411							
Dicamba	<0.04 µg/l	TM411							
MCPB	<0.05 µg/l	TM411							
2,4-DB	<0.1 µg/l	TM411							
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411							
Dichlorprop	<0.1 µg/l	TM411							
Triclopyr	<0.05 µg/l	TM411							



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.		31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
diss.filt	Dissolved / filtered sample.		06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
tot.unfilt	Total / unfiltered sample.		220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
*	Subcontracted - refer to subcontractor report for accreditation status.		26388593	26388531	26388541	26388633	26388616	26388574
**	% 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							
1-4**@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2-Chlorophenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2-Methylphenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2-Nitroaniline (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
2-Nitrophenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
3-Nitroaniline (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
4-Chloroaniline (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
4-Methylphenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
4-Nitroaniline (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
4-Nitrophenol (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Azobenzene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Acenaphthylene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Acenaphthene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Anthracene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<16 #	<4 #	<8 #	<8 #	<8 #	<8 #
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*# Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022
Component	LOD/Units	Method							
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Carbazole (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Chrysene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Dibenzofuran (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Diethyl phthalate (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Dimethyl phthalate (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<40	<10	<20	<20	<20	<20	<20
Fluoranthene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Fluorene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Hexachlorobenzene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Pentachlorophenol (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Phenol (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Hexachloroethane (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Nitrobenzene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Naphthalene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Isophorone (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Phenanthrene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4
Pyrene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4	<4



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	GW02	RC2	RC3		
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*# Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s)	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022		
Component	LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2-Chlorophenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2-Methylphenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2-Nitroaniline (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
2-Nitrophenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
3-Nitroaniline (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
4-Chloroaniline (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
4-Methylphenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
4-Nitroaniline (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
4-Nitrophenol (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
Azobenzene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
Acenaphthylene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
Acenaphthene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
Anthracene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<40 #	<2 #	<8 #		
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.		31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
diss.filt	Dissolved / filtered sample.		06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
tot.unfilt	Total / unfiltered sample.		220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
*	Subcontracted - refer to subcontractor report for accreditation status.		26388593	26388531	26388541	26388633	26388616	26388574
**	% 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							
1-4*§	Sample deviation (see appendix)							
Component	LOD/Units		Method					
Dibromofluoromethane**	%	TM208	103	100	114	107	102	116
Toluene-d8**	%	TM208	103	102	99.6	100	102	102
4-Bromofluorobenzene**	%	TM208	102	103	102	97.9	102	104
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Chloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Vinyl chloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Bromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Chloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Carbon disulphide	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Dichloromethane	<3 µg/l	TM208	<4	<4	<5.5	<5	<4	<4
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Bromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Chloroform	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Carbontetrachloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Benzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Trichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Dibromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Bromodichloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
Toluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4* @ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s)	0.00 - 0.00 Ground Water (GW) 31/05/2022 06/06/2022 220606-21 26388593	0.00 - 0.00 Ground Water (GW) 31/05/2022 06/06/2022 220606-21 26388531	0.00 - 0.00 Ground Water (GW) 31/05/2022 06/06/2022 220606-21 26388541	0.00 - 0.00 Ground Water (GW) 31/05/2022 06/06/2022 220606-21 26388633	0.00 - 0.00 Ground Water (GW) 31/05/2022 06/06/2022 220606-21 26388616	0.00 - 0.00 Ground Water (GW) 31/05/2022 06/06/2022 220606-21 26388574
Component	LOD/Units	Method							
Tetrachloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
m,p-Xylene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
o-Xylene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Styrene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Bromofom	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Propylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
4-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
4-iso-Propyltoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
Naphthalene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	GW02	RC2	RC3		
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4* @ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022		
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM208	113	115	113		
Toluene-d8**	%	TM208	102	97.9	98.4		
4-Bromofluorobenzene**	%	TM208	105	101	101		
Dichlorodifluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Chloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Vinyl chloride	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Bromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Chloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Carbon disulphide	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Dichloromethane	<3 µg/l	TM208	<4 #	<5.5 #	<5.5 #		
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #	<1 #	<1 #		
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
2,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Bromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Chloroform	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Carbontetrachloride	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,2-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Benzene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Trichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Dibromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Bromodichloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Toluene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	GW02	RC2	RC3		
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4# Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022	0.00 - 0.00 Ground Water (GW) 31/05/2022		
Component	LOD/Units	Method						
Tetrachloroethene	<1 µg/l	TM208	<1	<1	<1	#	#	#
Dibromochloromethane	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,2-Dibromoethane	<1 µg/l	TM208	<1	<1	<1	#	#	#
Chlorobenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1	<1	#	#	#
Ethylbenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
m,p-Xylene	<1 µg/l	TM208	<1	<1	<1	#	#	#
o-Xylene	<1 µg/l	TM208	<1	<1	<1	#	#	#
Styrene	<1 µg/l	TM208	<1	<1	<1	#	#	#
Bromoform	<1 µg/l	TM208	<1	<1	<1	#	#	#
Isopropylbenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	<1	<1	#	#	#
Bromobenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
Propylbenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
2-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
4-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	#	#	#
tert-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
sec-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
4-iso-Propyltoluene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
n-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
Hexachlorobutadiene	<1 µg/l	TM208	<1	<1	<1	#	#	#
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	<1	<1	#	#	#
Naphthalene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	#	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21

Report Number: 650615

Superseded Report:

Client Ref.: Galway Historic Landfills P22-040

Location: Tuam Landfill

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
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
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
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, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
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
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220606-21
Client Ref.: Galway Historic Landfills P22-040

Report Number: 650615
Location: Tuam Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	26388593	26388531	26388541	26388633	26388616	26388574	26388583	26388558	26388566
Customer Sample Ref.	3A	5A	8A	4AP	SAP	GW01	GW02	RC2	RC3
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	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	15-Jun-2022	13-Jun-2022	15-Jun-2022	15-Jun-2022	15-Jun-2022	13-Jun-2022	15-Jun-2022	13-Jun-2022	15-Jun-2022
Alkalinity as CaCO3	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022	13-Jun-2022	09-Jun-2022	13-Jun-2022
Ammonium Low	10-Jun-2022	09-Jun-2022	09-Jun-2022	07-Jun-2022	10-Jun-2022	09-Jun-2022	09-Jun-2022	07-Jun-2022	08-Jun-2022
Anions by Kone (w)	09-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	09-Jun-2022	10-Jun-2022	10-Jun-2022
BOD True Total	12-Jun-2022	12-Jun-2022	12-Jun-2022	12-Jun-2022	12-Jun-2022	12-Jun-2022	12-Jun-2022	12-Jun-2022	12-Jun-2022
COD Unfiltered	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
Cyanide Comp/Free/Total/Thiocyanate	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022	09-Jun-2022
Dissolved Metals by ICP-MS	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
Dissolved Oxygen by Probe	07-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022
Fluoride	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
Mercury Dissolved	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
PCB Congeners - Aqueous (W)	13-Jun-2022	08-Jun-2022	13-Jun-2022	13-Jun-2022	13-Jun-2022	13-Jun-2022	13-Jun-2022	13-Jun-2022	13-Jun-2022
Pesticides (Suite I) by GCMS	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	13-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
Pesticides (Suite II) by GCMS	09-Jun-2022	08-Jun-2022	08-Jun-2022	13-Jun-2022	08-Jun-2022	10-Jun-2022	09-Jun-2022	08-Jun-2022	08-Jun-2022
Pesticides (Suite III) by GCMS	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022	10-Jun-2022
pH Value	08-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022	08-Jun-2022	07-Jun-2022	07-Jun-2022
SVOC MS (W) - Aqueous	09-Jun-2022	08-Jun-2022	08-Jun-2022	08-Jun-2022	08-Jun-2022	08-Jun-2022	09-Jun-2022	08-Jun-2022	08-Jun-2022
Total Organic and Inorganic Carbon	08-Jun-2022	07-Jun-2022	07-Jun-2022	07-Jun-2022	08-Jun-2022	07-Jun-2022	08-Jun-2022	07-Jun-2022	07-Jun-2022
VOC MS (W)	14-Jun-2022	14-Jun-2022	13-Jun-2022	10-Jun-2022	14-Jun-2022	14-Jun-2022	14-Jun-2022	13-Jun-2022	13-Jun-2022



CERTIFICATE OF ANALYSIS

SDG: 220606-21
Client Ref: Galway Historic Landfills P22-

Report Number: 650615
Location: Tuam Landfill

Superseded
Report:

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. 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.

3. 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.

4. 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.

5. 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.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **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.

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

11. 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.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

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

14. 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.

15. 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.

16. 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.

18. **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

19. 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	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

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 (2021), 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

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method (transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

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

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.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

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 opinion 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 of report Generation: 26 August 2022
Customer: Fehily Timoney
Sample Delivery Group (SDG): 220811-71
Your Reference: Galway Historic Landfills P22-040
Location: Tuam Landfill
Report No: 659148
Order Number:

We received 3 samples on Thursday August 11, 2022 and 3 of these samples were scheduled for analysis which was completed on Friday August 26, 2022. 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.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220811-71
Client Ref.: Galway Historic Landfills P22-040

Report Number: 659148
Location: Tuam Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26714539	BH1		0.00 - 0.00	10/08/2022
26714550	BH2		0.00 - 0.00	10/08/2022
26714561	BH3		0.00 - 0.00	10/08/2022

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



CERTIFICATE OF ANALYSIS

SDG: 220811-71
Client Ref.: Galway Historic Landfills P22-040

Report Number: 659148
Location: Tuam Landfill

Superseded Report:

Results Legend	Lab Sample No(s)	26714539			26714550			26714561				
	Customer Sample Reference	BH1			BH2			BH3				
AGS Reference												
Depth (m)	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)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	HNO3 Filtered (ALE204)	H2SO4 (ALE244)	NaOH (ALE245)
Sample Type	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE
pH Value	All	NDPs: 0 Tests: 3	X				X			X		
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 3	X			X				X		
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 3		X				X			X	
VOC MS (W)	All	NDPs: 0 Tests: 3				X						X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220811-71
Client Ref.: Galway Historic Landfills P22-040

Report Number: 659148
Location: Tuam Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	BH1	BH2	BH3		
#	ISO17025 accredited.						
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted - refer to subcontractor report for accreditation status.						
**	% 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						
1-4*\$@	Sample deviation (see appendix)						
		Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
		Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)		
		Date Sampled	10/08/2022	10/08/2022	10/08/2022		
		Sample Time					
		Date Received	11/08/2022	11/08/2022	11/08/2022		
		SDG Ref	220811-71	220811-71	220811-71		
		Lab Sample No.(s)	26714539	26714550	26714561		
		AGS Reference					
Component	LOD/Units	Method					
Alkalinity, Total as HCO3	<2 mg/l	TM043	7130	2340	3310		
BOD, unfiltered	<1 mg/l	TM045	60.5	42.8	166		
Oxygen, dissolved	<0.3 mg/l	TM046	1.87	7.99	<0.3		
Organic Carbon, Total	<3 mg/l	TM090	91.8	47.2	233		
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	68	96.2	255		
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	<0.5		
COD, unfiltered	<7 mg/l	TM107	2380	1420	1860		
			#	#	#		
Arsenic (diss.filt)	<0.5 µg/l	TM152	3.01	2.54	6.35		
			#	#	#		
Barium (diss.filt)	<0.2 µg/l	TM152	261	215	233		
			#	#	#		
Boron (diss.filt)	<10 µg/l	TM152	904	456	1470		
			#	#	#		
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	0.163	<0.08		
			#	#	#		
Chromium (diss.filt)	<1 µg/l	TM152	3.22	3.03	27.1		
			#	#	#		
Copper (diss.filt)	<0.3 µg/l	TM152	<0.3	8.49	<0.3		
			#	#	#		
Lead (diss.filt)	<0.2 µg/l	TM152	0.644	14.6	0.224		
			#	#	#		
Manganese (diss.filt)	<3 µg/l	TM152	141	1790	3390		
			#	#	#		
Nickel (diss.filt)	<0.4 µg/l	TM152	13.2	10.7	57.5		
			#	#	#		
Phosphorus (diss.filt)	<10 µg/l	TM152	290	118	320		
			#	#	#		
Selenium (diss.filt)	<1 µg/l	TM152	8.45	1.88	3.99		
			#	#	#		
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2		
			#	#	#		
Zinc (diss.filt)	<1 µg/l	TM152	4.25	149	4.47		
			#	#	#		
Sodium (Dis.Filt)	<0.076 mg/l	TM152	1090	87.5	740		
			#	#	#		
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	64.9	55.6	184		
			#	#	#		
Potassium (Dis.Filt)	<0.2 mg/l	TM152	120	59.4	227		
			#	#	#		
Calcium (Dis.Filt)	<0.2 mg/l	TM152	56.7	210	165		
			#	#	#		
Iron (Dis.Filt)	<0.019 mg/l	TM152	3.3	2.01	6.48		
			#	#	#		
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	0.0531	<0.01		
			#	#	#		
Sulphate	<2 mg/l	TM184	176	133	513		
Chloride	<2 mg/l	TM184	440	70.2	739		
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.1	<0.1	<0.1		
PCB congener 28	<0.015 µg/l	TM197	<0.075	<0.03	<0.075		
PCB congener 52	<0.015 µg/l	TM197	<0.075	<0.03	<0.075		
PCB congener 101	<0.015 µg/l	TM197	<0.075	<0.03	<0.075		
PCB congener 118	<0.015 µg/l	TM197	<0.075	<0.03	<0.075		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220811-71
Client Ref.: Galway Historic Landfills P22-040

Report Number: 659148
Location: Tuam Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	BH1	BH2	BH3			
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*# Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Land Leachate (LE) 10/08/2022 . 11/08/2022 220811-71 26714539	0.00 - 0.00 Land Leachate (LE) 10/08/2022 . 11/08/2022 220811-71 26714550	0.00 - 0.00 Land Leachate (LE) 10/08/2022 . 11/08/2022 220811-71 26714561			
Component	LOD/Units	Method							
PCB congener 138	<0.015 µg/l	TM197	<0.075	<0.03	<0.075				
PCB congener 153	<0.015 µg/l	TM197	<0.075	<0.03	<0.075				
PCB congener 180	<0.015 µg/l	TM197	<0.075	<0.03	<0.075				
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.525	<0.21	<0.525				
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	#	#	#	
pH	<1 pH Units	TM256	8.06	7.79	7.56	#	#	#	
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	3.12	1.98	6.33	#	#	#	
Trifluralin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
alpha-HCH	<0.01 µg/l	TM343	<0.01	<0.01	0.121				
gamma-HCH (Lindane)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
Heptachlor	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
Aldrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
beta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
Isodrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
delta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
Heptachlor epoxide	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
o,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
Endosulphan I	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
trans-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
cis-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
p,p'-DDE	<0.01 µg/l	TM343	<0.4	<0.02	<0.4				
Dieldrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
Endrin	<0.01 µg/l	TM343	<0.4	<0.02	<0.4				
o,p'-DDT	<0.01 µg/l	TM343	<1	<0.05	<1				
p,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
Endosulphan II	<0.02 µg/l	TM343	<0.02	<0.02	<0.02				
p,p'-DDT	<0.01 µg/l	TM343	<2	<0.1	<2				
o,p'-Methoxychlor	<0.01 µg/l	TM343	<1	<0.05	<1				
p,p'-Methoxychlor	<0.01 µg/l	TM343	<2	<0.1	<2				
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.8	<0.04	<0.8				
Permethrin I	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				
Permethrin II	<0.01 µg/l	TM343	<0.01	<0.01	<0.01				



CERTIFICATE OF ANALYSIS

Validated

SDG: 220811-71
Client Ref.: Galway Historic Landfills P22-040

Report Number: 659148
Location: Tuam Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	BH1	BH2	BH3			
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*#@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Land Leachate (LE) 10/08/2022	0.00 - 0.00 Land Leachate (LE) 10/08/2022	0.00 - 0.00 Land Leachate (LE) 10/08/2022			
Component	LOD/Units	Method							
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Hexachlorobutadiene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Dichlorvos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Dichlobenil	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Mevinphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Tecnazene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Hexachlorobenzene	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Demeton-S-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Phorate	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Diazinon	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Triallate	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Atrazine	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Simazine	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Disulfoton	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Propetamphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Chlorpyrifos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Dimethoate	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Chlorpyrifos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Methyl Parathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Malathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Fenthion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Fenitrothion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Triadimefon	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Pendimethalin	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Parathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Chlorfenvinphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
trans-Chlordane	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
cis-Chlordane	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Ethion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			
Carbophenothion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01			



CERTIFICATE OF ANALYSIS

Validated

SDG: 220811-71
Client Ref.: Galway Historic Landfills P22-040

Report Number: 659148
Location: Tuam Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	BH1	BH2	BH3			
# ISO17025 accredited. M mCERTS accredited. sq. Aqueous / settled sample. dis.filt. Dissolved / filtered sample. tot.unfilt. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*# Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Land Leachate (LE) 10/08/2022 . 11/08/2022 220811-71 26714539	0.00 - 0.00 Land Leachate (LE) 10/08/2022 . 11/08/2022 220811-71 26714550	0.00 - 0.00 Land Leachate (LE) 10/08/2022 . 11/08/2022 220811-71 26714561			
Component	LOD/Units	Method						
Triazophos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01			
Phosalone	<0.01 µg/l	TM344	<0.01	<0.01	<0.01			
Azinphos methyl	<0.02 µg/l	TM344	<0.02	<0.02	<0.02			
Azinphos ethyl	<0.02 µg/l	TM344	<0.02	<0.02	<0.02			
Etridiazole	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Pentachlorobenzene	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Propachlor	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Quintozene (PCNB)	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Omethoate	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Propazine	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Propyzamide	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Alachlor	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Prometryn	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Telodrin	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Terbutryn	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Chlorothalonil	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Etrimpfos	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Metazachlor	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Cyanazine	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Trietazine	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Coumaphos	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Phosphamidon I	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Phosphamidon II	<0.01 µg/l	TM345	<0.01	<0.01	<0.01			
Dinitro-o-cresol	<0.1 µg/l	TM411	<10	<10	<10			
Clopyralid	<0.04 µg/l	TM411	<4	<4	<4			
MCPA	<0.05 µg/l	TM411	<5	<5	<5			
Mecoprop	<0.04 µg/l	TM411	<4	<4	<4			
Dicamba	<0.04 µg/l	TM411	<4	<4	<4			
MCPB	<0.05 µg/l	TM411	<5	<5	<5			
2,4-DB	<0.1 µg/l	TM411	<10	<10	<10			
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<5	<5	<5			
Dichlorprop	<0.1 µg/l	TM411	<10	<10	<10			
Triclopyr	<0.05 µg/l	TM411	<5	<5	<5			



CERTIFICATE OF ANALYSIS

Validated

SDG: 220811-71
Client Ref.: Galway Historic Landfills P22-040

Report Number: 659148
Location: Tuam Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	BH1	BH2	BH3		
#	ISO17025 accredited.						
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
dis.s.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted - refer to subcontractor report for accreditation status.						
**	% 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						
1-4*§@	Sample deviation (see appendix)						
		Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
		Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)		
		Date Sampled	10/08/2022	10/08/2022	10/08/2022		
		Sample Time					
		Date Received	11/08/2022	11/08/2022	11/08/2022		
		SDG Ref	220811-71	220811-71	220811-71		
		Lab Sample No.(s)	26714539	26714550	26714561		
		AGS Reference					
Component	LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<20	<10	<10		
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<20	<10	<10		
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<20	<10	<10		
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<20	<10	<10		
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<20	<10	<10		
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<20	<10	<10		
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<20	<10	<10		
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<20	<10	<10		
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<20	<10	<10		
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<20	<10	<10		
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<20	<10	<10		
2-Chlorophenol (aq)	<1 µg/l	TM176	<20	<10	<10		
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<20	<10	<10		
2-Methylphenol (aq)	<1 µg/l	TM176	<20	<10	<10		
2-Nitroaniline (aq)	<1 µg/l	TM176	<20	<10	<10		
2-Nitrophenol (aq)	<1 µg/l	TM176	<20	<10	<10		
3-Nitroaniline (aq)	<1 µg/l	TM176	<20	<10	<10		
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<20	<10	<10		
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<20	<10	<10		
4-Chloroaniline (aq)	<1 µg/l	TM176	<20	<10	<10		
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<20	<10	<10		
4-Methylphenol (aq)	<1 µg/l	TM176	<20	<10	<10		
4-Nitroaniline (aq)	<1 µg/l	TM176	<20	<10	<10		
4-Nitrophenol (aq)	<1 µg/l	TM176	<20	<10	<10		
Azobenzene (aq)	<1 µg/l	TM176	<20	<10	<10		
Acenaphthylene (aq)	<1 µg/l	TM176	<20	<10	<10		
Acenaphthene (aq)	<1 µg/l	TM176	<20	<10	<10		
Anthracene (aq)	<1 µg/l	TM176	<20	<10	<10		
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<20	<10	<10		
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<20	<10	<10		
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	541	86.2	31		
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	59.7	<10	<10		
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<20	<10	<10		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220811-71
Client Ref.: Galway Historic Landfills P22-040

Report Number: 659148
Location: Tuam Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Table with columns: Results Legend, Customer Sample Ref., BH1, BH2, BH3, Component, LOD/Units, Method. Rows list various SVOCs like Benzo(b)fluoranthene, Benzo(k)fluoranthene, etc., with their respective concentrations and methods.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220811-71

Report Number: 659148

Superseded Report:

Client Ref.: Galway Historic Landfills P22-040

Location: Tuam Landfill

VOC MS (W)

Results Legend		Customer Sample Ref.	BH1	BH2	BH3		
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-4*§@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Land Leachate (LE) 10/08/2022	0.00 - 0.00 Land Leachate (LE) 10/08/2022	0.00 - 0.00 Land Leachate (LE) 10/08/2022		
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM208	107	108	103		
Toluene-d8**	%	TM208	95.8	95.2	97.4		
4-Bromofluorobenzene**	%	TM208	85.3	89.5	95.6		
Dichlorodifluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Chloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Vinyl chloride	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Bromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Chloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Carbon disulphide	<1 µg/l	TM208	1.48 #	<1 #	1.67 #		
Dichloromethane	<3 µg/l	TM208	<7 #	<7.5 #	<7 #		
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #	<1 #	<1 #		
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
2,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Bromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Chloroform	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Carbontetrachloride	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,2-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Benzene	<1 µg/l	TM208	1.84 #	<1 #	3.39 #		
Trichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Dibromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Bromodichloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
Toluene	<1 µg/l	TM208	1.11 #	<1 #	1.8 #		
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #		
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #		



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VOC MS (W)

Results Legend			Customer Sample Ref.	BH1	BH2	BH3			
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% 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								
1-4*§@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
Tetrachloroethene	<1 µg/l	TM208	0.00 - 0.00 Land Leachate (LE) 10/08/2022	<1 #	<1 #	<1 #			
Dibromochloromethane	<1 µg/l	TM208	0.00 - 0.00 Land Leachate (LE) 10/08/2022	<1 #	<1 #	<1 #			
1,2-Dibromoethane	<1 µg/l	TM208	0.00 - 0.00 Land Leachate (LE) 10/08/2022	<1 #	<1 #	<1 #			
Chlorobenzene	<1 µg/l	TM208	0.00 - 0.00 Land Leachate (LE) 10/08/2022	<1 #	<1 #	<1 #			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	11/08/2022 220811-71 26714539	<1 #	5.23 #	<1 #			
Ethylbenzene	<1 µg/l	TM208	11/08/2022 220811-71 26714550	<1 #	5 #	2.51 #			
m,p-Xylene	<1 µg/l	TM208	11/08/2022 220811-71 26714561	<1 #	51 #	1.77 #			
o-Xylene	<1 µg/l	TM208		<1 #	1.42 #	1.09 #			
Styrene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Bromoform	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Isopropylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,2,3-Trichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Bromobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Propylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
2-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1 #	1.52 #	<1 #			
4-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
tert-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1 #	1.89 #	<1 #			
sec-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
4-iso-Propyltoluene	<1 µg/l	TM208		<1 #	<1 #	1.21 #			
1,3-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,4-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
n-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,2-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Hexachlorobutadiene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Naphthalene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			



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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
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
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
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, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
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
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

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



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Superseded Report:

Test Completion Dates

Lab Sample No(s)	26714539	26714550	26714561
Customer Sample Ref.	BH1	BH2	BH3
AGS Ref.			
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Land Leachate	Land Leachate	Land Leachate

	26714539	26714550	26714561
Acid Herbicides by GCMS	26-Aug-2022	26-Aug-2022	26-Aug-2022
Alkalinity as CaCO3	16-Aug-2022	16-Aug-2022	16-Aug-2022
Ammonium Low	12-Aug-2022	16-Aug-2022	12-Aug-2022
Anions by Kone (w)	12-Aug-2022	12-Aug-2022	12-Aug-2022
BOD True Total	19-Aug-2022	19-Aug-2022	19-Aug-2022
COD Unfiltered	18-Aug-2022	18-Aug-2022	18-Aug-2022
Cyanide Comp/Free/Total/Thiocyanate	15-Aug-2022	15-Aug-2022	15-Aug-2022
Dissolved Metals by ICP-MS	15-Aug-2022	15-Aug-2022	15-Aug-2022
Dissolved Oxygen by Probe	16-Aug-2022	16-Aug-2022	16-Aug-2022
Fluoride	13-Aug-2022	13-Aug-2022	13-Aug-2022
Mercury Dissolved	16-Aug-2022	16-Aug-2022	16-Aug-2022
PCB Congeners - Aqueous (W)	16-Aug-2022	16-Aug-2022	16-Aug-2022
Pesticides (Suite I) by GCMS	19-Aug-2022	20-Aug-2022	19-Aug-2022
Pesticides (Suite II) by GCMS	22-Aug-2022	22-Aug-2022	22-Aug-2022
Pesticides (Suite III) by GCMS	22-Aug-2022	22-Aug-2022	22-Aug-2022
pH Value	15-Aug-2022	15-Aug-2022	15-Aug-2022
SVOC MS (W) - Aqueous	17-Aug-2022	17-Aug-2022	17-Aug-2022
Total Organic and Inorganic Carbon	13-Aug-2022	13-Aug-2022	17-Aug-2022
VOC MS (W)	12-Aug-2022	12-Aug-2022	12-Aug-2022



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Report Number: 659148
Location: Tuam Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. 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.

3. 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.

4. 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.

5. 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.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **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.

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

11. 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.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

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

14. 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.

15. 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.

16. 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.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **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.

19. 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	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

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 (2021), 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.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils 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 (2021).

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.

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.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

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.

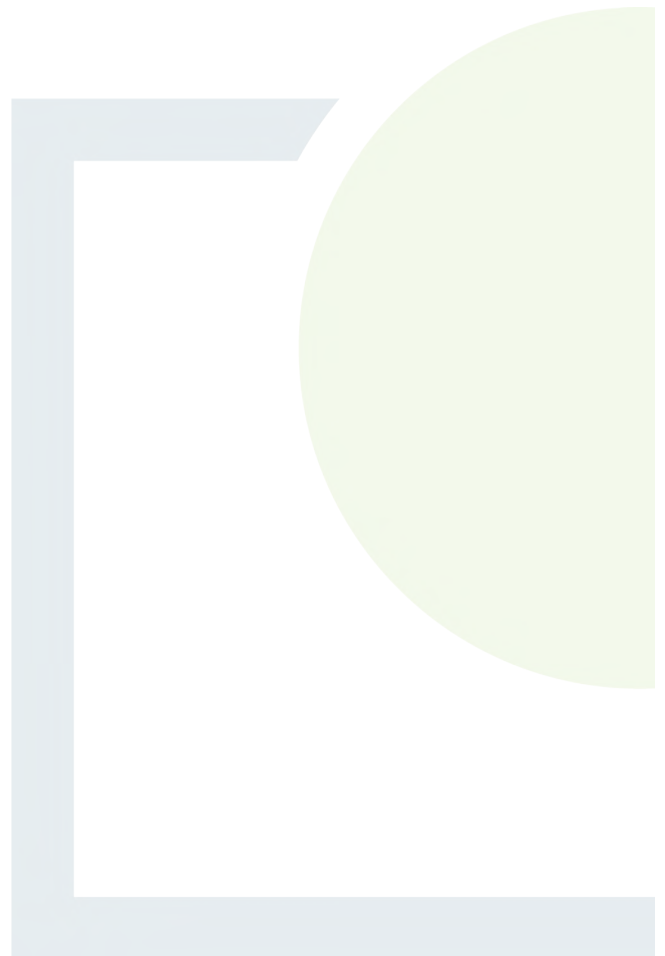


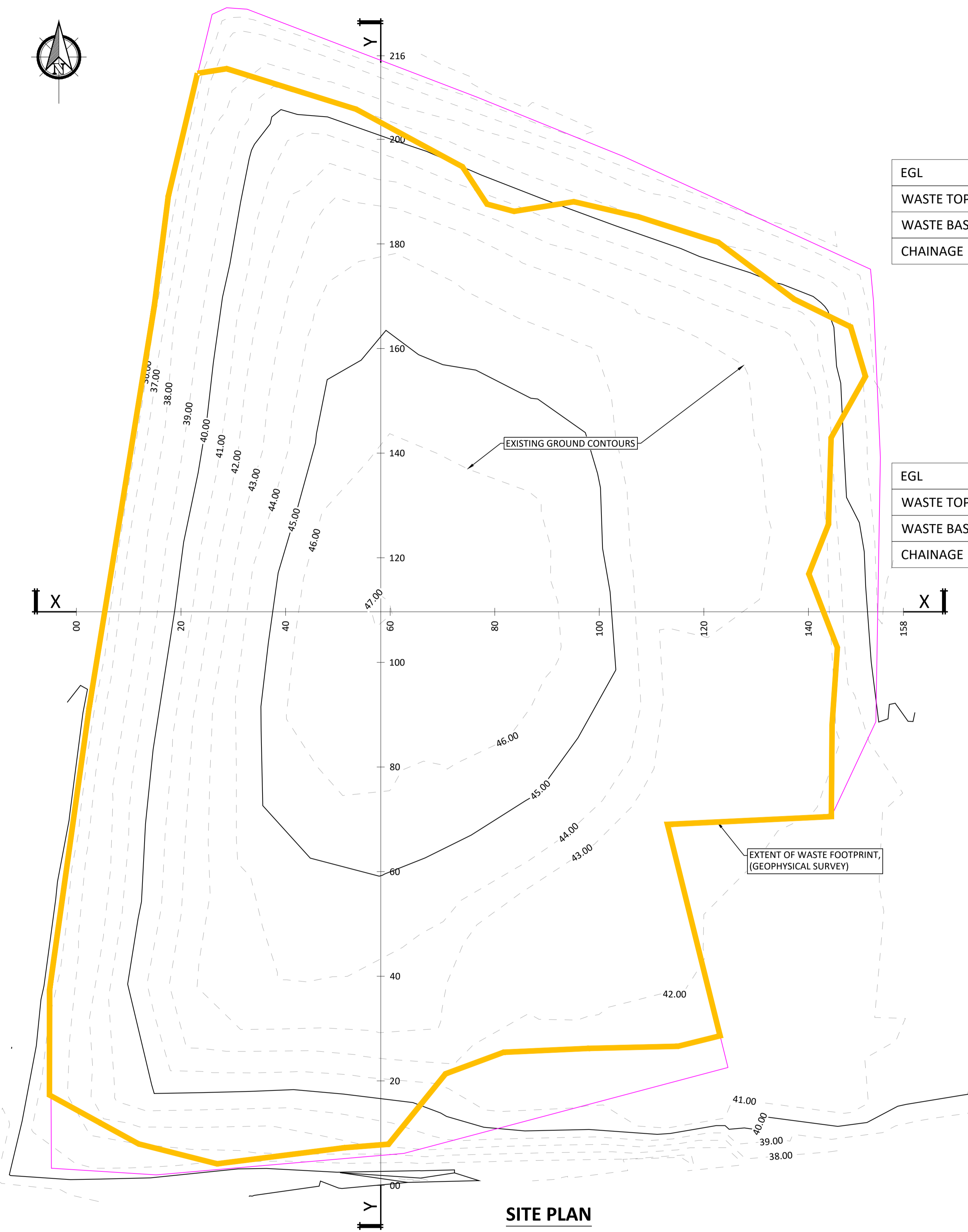
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ENVIRONMENTAL SCIENCE & PLANNING

APPENDIX 8

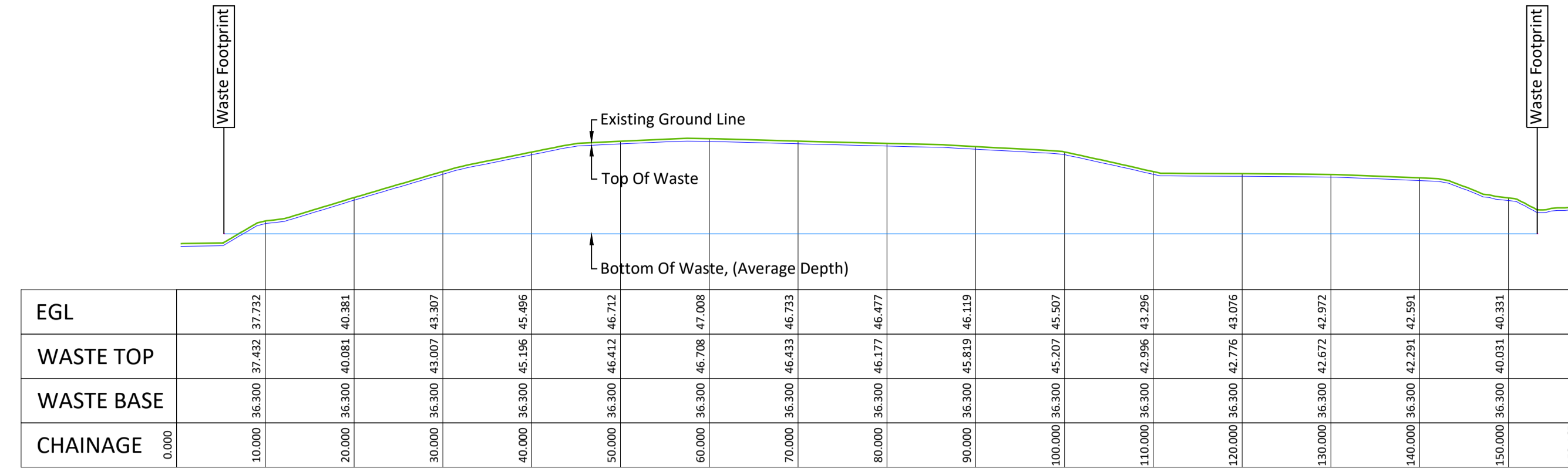
Waste Volume Report and
Site Cross Sections



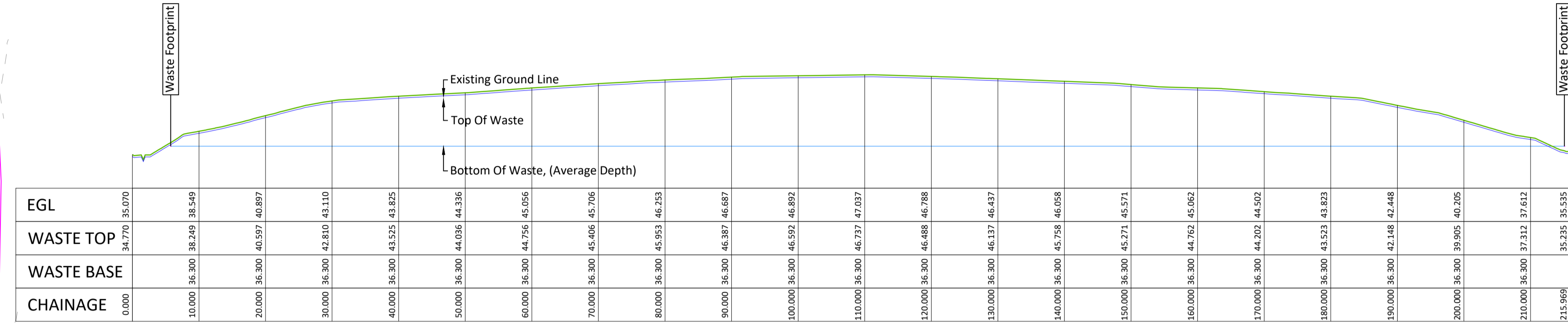


SITE PLAN
Scale 1:500

If Applicable : Ordnance Survey Ireland Licence No. CYAL50221678 © Ordnance Survey Ireland and Government of Ireland

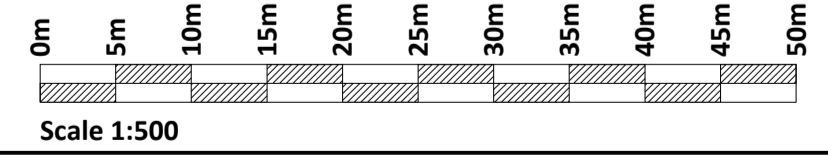


SECTION X-X



SECTION Y-Y

Volume Summary		
Name	2d Area	Waste
Waste Volume	23296.390sq.m	145407.752 Cu. M.



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Rev.	Description	App By	Date
A	REQUEST FOR FURTHER INFORMATION	BG	17.10.22

PROJECT	TUAM HISTORIC LANDFILL: CoA REGULATION 7 RFI			CLIENT	GALWAY COUNTY COUNCIL		
SHEET	WASTE VOLUME REPORT AND SITE CROSS SECTIONS			Date	SEPT. '22	Project number	P22-065
				Scale (@ A1-)	1:500	Drawing Number	P22-065-0600-0001
				Drawn by	SK	Rev	A
				Checked by	JON		

O:\ACAD\2022\P22-065\P22-065-0600-0001

Monday 17 October 2022



FEHILY TIMONEY

CONSULTANTS IN ENGINEERING,
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