Lauren Kelly

From: Colin Ryder <cryder@galwaycoco.ie>
Sent: Monday 3 April 2023 15:48
To: historiclandfill applications
Cc: Mike Melody
Subject: H0192-01 - Tuam Historic Landfill - Environmental Monitoring 2022
Attachments: P22-040 Environmental Report 2022_Tuam-B-P22-040 Environmental R.pdf

Ewa,

Please find attached for your information a report outlining Environmental Monitoring, which was carried out in May & August 2022 by Fehily Timoney and Company on behalf of Galway County Council, at the Tuam Historic Landfill (H0192-01).

Do not hesitate to contact me if you have any related queries.

Regards

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GALWAY HISTORIC LANDFILL

ENVIRONMENTAL REPORT 2022 HISTORIC LANDFILL AT TUAM, CO. GALWAY

Prepared for:

Galway County Council

Comhairle Chontae na Gaillimhe
Galway County Council

Date: **March 2023**

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ENVIRONMENTAL REPORT 2022 HISTORIC LANDFILL AT TUAM, CO. GALWAY

REVISION CONTROL TABLE, CLIENT, KEYWORDS AND ABSTRACT

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Abstract: This report represents the findings of additional environmental monitoring carried out at Tuam Historic Landfill, Co. Galway. The monitoring was undertaken to determine the extent of the potential environmental impact of historic landfilling at the site.

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1. INTRODUCTION

1.1 Background

Galway County Council (GCC) appointed Fehily Timoney and Company (FT) to undertake environmental sampling on a historic l landfill in Tuam, Co. Galway. Tuam Historic Landfill covers an area of c.3.4 ha and is located in the townland of Rinkippen to the south of Tuam. The landfill was operated by Galway County Council and closed in 1998. Since then, closure and remediation works were carried out at the site. An active civic amenity site is located immediately adjacent to the site.

In 2020 and 2021, FT conducted three rounds of groundwater, and surface water monitoring at Tuam historic landfill. The monitoring comprised sampling and analysis of groundwater at all existing wells previously established at the site, two new groundwater and surface water sampling at four locations.

In 2022, Galway County Council requested one additional round of monitoring be undertaken. For continuity, GCC requested that the monitoring locations and parameters remain the same as the monitoring carried out at Tuam historic landfill in 2020 and 2021 as part of the Tier 2 Environmental Risk Assessment for the site.

1.2 Scope of Works

FT's scope of work was to undertake one additional round of groundwater, surface water and leachate sampling. FT carried out the following sampling:

Groundwater and Surface water	31st May 2022
Leachate and landfill gas:	9th August 2022

The results of the 2022 monitoring event are presented herein and compared to previous monitoring results from the monitoring event in 2021 and the two monitoring events in 2020. Laboratory analysis of surface water, leachate and groundwater samples was conducted to assess and quantify any potential or ongoing environmental impacts. Laboratory analytical reports for surface water, leachate and groundwater is presented in Appendix 1.

This report presents the findings of the assessment.

2. ENVIRONMENTAL ASSESSMENT

The results of the environmental assessment carried out between 2020 and 2022 at the Tuam Historic Landfill site are presented in the following sections.

The surface water, leachate and groundwater results were compared to relevant environmental quality standards to identify the potential and magnitude of any impacts on receiving surface water and groundwater.

2.1 Chemical Assessment Criteria

In assessing environmental monitoring results, the following relevant documents and regulations were utilised.

- European Communities, Environmental Objectives (Groundwater)(Amendment) Regulations, 2016 (S.I. No. 366 of 2016).
- Interim Guideline Values (IGV) set out in the EPAs Groundwater Towards Setting the Guideline Values for the Protection of Groundwater in Ireland.
- European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009), as amended 2012 (S.I. No. 327 of 2012), 2015 (S.I. No. 386 of 2015), 2019 (S.I. No. 77 of 2019)
- European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989 (S.I. No. 294/1989).

2.2 Groundwater Monitoring

Groundwater monitoring was undertaken on the 31st May 2022 at existing groundwater monitoring wells 5A, 8A, RC2, RC3, 3AP, 4AP, 5AP, 8AP, GW01 and GW02.

The findings from the monitoring and an interpretation of the results are presented in the following sections.

2.2.1 Groundwater Quality Monitoring

The results of groundwater samples analysed from the 12 No. existing wells (BH3, 2AP, 3AP, 4AP, 5A, 5AP, 8A, 8AP, RC2, RC3, GW01 and GW02) at the site have been assessed against the EPAs Interim Guideline Values (IGVs) and S.I No. 9 of the European Communities Environmental Objectives (Groundwater) Regulations 2010 (amended) overall threshold values (OTV).

The specific wells that were sampled in each monitoring event are presented in Table 2-1:

Table 2-1: Groundwater Wells Sampled

Well	Round 1 (01/07/2020)	Round 2 (27/08/2020)	Round 3 (13/07/2021)	Round 4 (31/05/2022)
BH3	Dry	Dry	Dry	Dry
2AP	Dry	Dry	Dry	Dry
3AP	Dry	•	•	•
4AP	Dry	•	Dry	•
5A	•	Dry	•	•
5AP	Dry	•	Dry	•
8A	•	Dry	•	•
8AP	Dry	•	Dry	Dry
RC2	•	•	•	•
RC3	•	•	•	•
GW01	N/A	•	•	•
GW02	N/A	•	•	•

A summary of the results reported for each parameter for the three monitoring rounds since 2020 is outlined in Table 2.2, the complete results and laboratory reports are presented in Appendix 1.

The groundwater sampling locations are presented in Figure 2.1.

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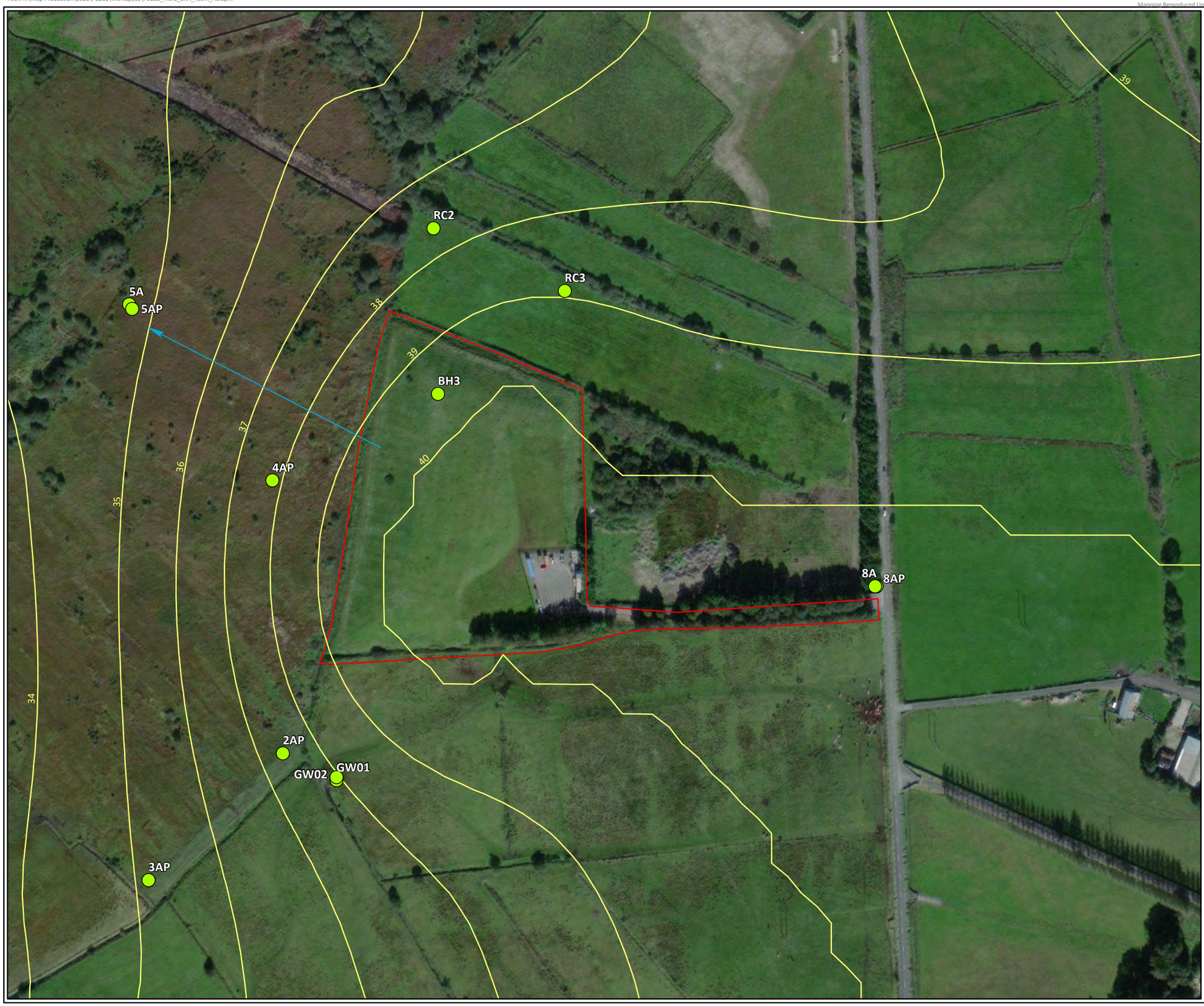

Site Boundary

Borehole Locations

1m Ground Elevation Contours

Indicative Groundwater Flow Direction

N
W E
S

0 50 100 200 Meters

TITLE:	Groundwater Flow Direction		
PROJECT:	Tuam Historic Landfill ERA		
FIGURE NO:	2.1		
CLIENT:	Galway County Council		
SCALE:	1:2,500	**REVISION:**	0
DATE:	18/10/2021	**PAGE SIZE:**	A3

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Table 2-2: Groundwater Sampling Results

Parameter	Units	OTV [1]	EPA IGV [2]	Round 1 (01/07/2020)				Round 2 (27/08/2020)							
				5A	8A	RC2	RC3	3AP	4AP	5AP	8AP	RC2	RC3	GW1-S[4]	GW1-D[4]
				DG	UG	CG	CG	CG	DG	DG	UG	CG	CG	DG	DG
Inorganics															
Conductivity	mS/cm	**0.8**		0.666	0.87	0.769	0.423	0.525	0.966	0.568	0.866	0.762	-	0.765	0.763
Fluoride	mg/l	1	**1**	<0.5	0.693	<0.5	<0.5	<0.5	<0.5	<0.5	0.768	<0.5	<1	0.629	0.664
Oxygen, dissolved	mg/l		**NAC**	7.57	6.76	5.98	8.56	11.2	3.21	6.34	9.13	10.1	-	10	10.4
Sulphate	mg/l	187.5	**200**	<2	18.2	<2	<4	<10	<2	2.1	42.5	<2	<4	<1	<1
Chloride	mg/l	24	**30**	12.5	**57.3**	20.1	17.2	14.7	**48.5**	13.1	**90.2**	21.8	14.8	**45.1**	**33.9**
Ammoniacal Nitrogen as N (low level)	mg/l	0.065 - 0.175	**0.15**	**1.31**	**1.8**	**3.48**	**1.62**	**0.361**	**2.04**	**1.24**	**0.854**	**3.56**	**0.1**	**3.33**	**1.6**
Alkalinity, Total as HCO3	mg/l		**NAC**	967	485	783	641	383	666	994	439	610	16.5	628	523
Filtered (Dissolved) Metals															
Arsenic	µg/l	7.5	**10**	2.84	4.98	2.58	5.08	1.02	4.33	4.35	**31.2**	2.74	2.88	1.93	4.7
Barium	µg/l		**100**	53.1	51.5	59	29.1	9.75	**138**	53.7	63.4	53.5	25.4	91.3	82.8
Boron	µg/l	750	**1000**	<10	11.2	17.1	<10	<10	13.9	10.4	25.6	18	<10	29.7	18.4
Cadmium	µg/l	3.75	**5**	<0.08	<0.08	<0.08	0.103	0.172	<0.08	0.115	0.17	0.519	1.68	<0.08	0.335
Chromium	µg/l	37.5	**30**	<1	<1	2.29	1.17	<1	2.37	3.72	<1	5.33	1.3	1.05	<1
Copper	µg/l	1500	**30**	0.357	<0.3	0.579	6.59	5.2	0.397	1.2	11.7	2.31	11.3	2.99	1.1
Lead	µg/l	7.5	**10**	<0.2	<0.2	0.584	1.52	<0.2	1.58	0.668	2.48	1.52	4.88	<0.2	<0.2
Manganese	µg/l		**50**	**91.9**	**231**	**128**	34.3	**181**	**876**	**146**	**204**	**179**	12.8	89.1	109
Nickel	µg/l	15	**20**	7.98	19.4	11.7	15.3	5.92	7.66	8.89	**22.2**	12	9.3	**17.4**	**44.2**
Zinc	µg/l	75	**100**	2.38	2.81	2.53	8.86	3.36	4.13	6.5	18.4	8.67	37.9	19.7	16.3
Sodium	mg/l	150	**150**	10.4	27.2	13.3	8.34	6.46	88	10.3	47.1	12.7	12.7	32.2	24.5
Magnesium	mg/l		**50**	4.92	9.41	8.65	3.64	4.37	11.9	5.26	9.1	11	3.25	11.6	12.1
Potassium	mg/l		**5**	0.865	1.56	2.99	1.13	0.466	**53.7**	0.916	1.64	3.12	0.237	2.77	2.69
Calcium	mg/l		**200**	160	187	177	97	107	91.4	169	154	**355**	35.9	148	137
Iron	mg/l		**0.2**	**0.33**	**1.32**	**1.87**	**3.04**	**0.657**	**30.2**	**7.79**	**16.9**	**11.1**	**1.9**	0.0349	0.0314
Combined Pesticides / Herbicides															
Dieldrin	µg/l	0.075	**0.01**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-
Simazine	µg/l	0.075	**1**	0.082	<0.01	0.132	0.133	<0.05	<0.1	<0.1	<0.01	<0.01	<0.05	<0.02	<0.02
Microbiological															
Coliforms, Total*	MPN/100ml		**0**	**914**	-	**>2420**	**>2420**	**17300**	**15.5**	**74.9**	**64.2**	**817**	**52000**	**>2419.6**	**>2419.6**
Coliforms, Faecal*	CFU/100ml		**0**	**12**	-	<1	<100	**740**	**1**	**7**	**4**	**9**	**2**	**69**	**>100**
Miscellaneous Organics															
Mecoprop	µg/l	0.075	**10**	<0.04	<0.08	<0.04	<0.04	<0.4	2.64	<0.2	<0.08	<0.4	<0.2	<0.4	<0.4

Notes:

[1] OTV-Overall threshold value, European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) as amended in 2011, 2012, 2016.

[2] IGV-Interim Guideline Values, from EPA, Towards Setting Guideline Values for the Protection of Groundwater in Ireland, 2003.

[3] UG = upgradient, DG=downgradient, IW = in waste, CG=cross-gradient.

[4] GW01-S (shallow) refers to GW01, GW01-D (deep) refers to well GW02.

* Items shaded in **orange** are in exceedance of the Drinking Water Regulations.

* Items shaded in **bold** are in exceedance of the EPA IGV Standards.

Parameter	Units	OTV [1]	EPA IGV [2]	Round 3 (13/07/2021)							Round 4 (31/05/2022)								
				5A	8A	3AP	GW1-D[4]	GW1-S[4]	RC2	RC3	3AP	5A	8A	4AP	5AP	GW1-S[4]	GW1-D[4]	RC2	RC3
				DG	UG	CG	DG	DG	CG	CG	CG	DG	UG	DG	DG	DG	DG	CG	CG
Inorganics																			
Conductivity	mS/cm	**0.8**		0.552	0.773	0.519	0.724	0.738	0.747	0.439	0.608	0.698	0.898	0.953	0.566	0.7	0.805	0.679	0.141
Fluoride	mg/l	1	**1**	<0.5	0.517	<0.5	0.838	0.611	<0.5	<0.5	<0.5	<0.5	0.61	0.701	<0.5	0.922	0.564	0.977	<0.5
Oxygen, dissolved	mg/l		**NAC**	9.81	6.77	10.2	11.5	3.68	8.64	9.59	4.56	7.18	2.98	6.18	5.78	5.36	3.36	2.22	9.11
Sulphate	mg/l	187.5	**200**	<2	47.2	<10	<2	<2	<2	<10	<2	<2	7.3	3.7	<2	<2	<2	<2	<10
Chloride	mg/l	24	**30**	9.1	**56.9**	12	26.3	**38.3**	19.7	17.3	14.9	13	**66**	**45.6**	12.2	**31.2**	**44.4**	18.2	28.2
Ammoniacal Nitrogen as N (low level)	mg/l	0.065 – 0.175	**0.15**	**0.624**	**0.871**	0.14	**2.21**	**2.52**	**2.66**	**0.504**	**0.74**	**1.15**	**11.9**	**0.984**	**0.21**	**2.01**	**1.77**	**2.72**	0.142
Alkalinity, Total as HCO3	mg/l		**NAC**	739	403	382	520	5010	570	332	438	545	528	655	424	683	**28400**	548	30.5
Filtered (Dissolved) Metals																			
Arsenic	µg/l	7.5	**10**	3.38	4.89	0.789	2.67	3.5	1.77	4.56	0.889	3.7	**64.7**	4.48	2.63	3.14	5.96	1.37	1.66
Barium	µg/l		**100**	75.2	47	14.9	95.9	97.6	40.8	23.3	13.7	74.8	41.9	**217**	65.8	83.7	64.9	35.9	4.9
Boron	µg/l	750	**1000**	<10	11.2	<10	16.1	14.3	14.8	<10	<10	<10	34.6	10.9	<10	17.7	<10	16.5	<10
Cadmium	µg/l	3.75	**5**	<0.08	<0.08	0.165	0.311	0.248	<0.08	0.325	0.0915	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.619
Chromium	µg/l	37.5	**30**	1.12	<1	<1	3.13	2.09	2.84	1.5	<1	1.2	1.14	2.99	<1	1.35	<1	3	1.39
Copper	µg/l	1500	**30**	<0.3	<0.3	10.1	1.26	<0.3	<0.3	0.91	0.858	<0.3	<0.3	0.553	0.397	<0.3	<0.3	<0.3	6.41
Lead	µg/l	7.5	**10**	0.234	<0.2	0.368	4.6	3.42	<0.2	0.687	0.359	0.28	<0.2	0.235	<0.2	<0.2	<0.2	0.364	1.79
Manganese	µg/l		**50**	**90.6**	**221**	**120**	**142**	**133**	**121**	41	**327**	**170**	**364**	**926**	**439**	**112**	**90.1**	**119**	8.42
Nickel	µg/l	15	**20**	6.81	12.8	3.4	9.79	10.8	3.6	16.6	3.33	12.9	3.58	4.08	1.56	8.22	13.7	3.25	8.03
Zinc	µg/l	75	**100**	4.76	2.84	3.23	21.4	21	6.43	24.4	4.98	12.9	2.18	5.84	2.76	3.61	5.14	3.7	10.5
Sodium	mg/l	150	**150**	10.5	31.4	9.42	21.2	21.7	13.2	8.14	7.5	9.29	34.4	93.2	7.67	21.5	18.2	11.1	8.36
Magnesium	mg/l		**50**	4.15	8.5	4.42	15.1	15.5	8.52	4.24	4.74	4.93	8.55	14.7	4.64	14.3	16.2	7.73	2.61
Potassium	mg/l		**5**	2.01	1.85	0.329	2.26	2.4	2.61	0.832	0.325	0.733	**6.56**	**54**	0.649	2.26	2.17	2.44	1.9
Calcium	mg/l		**200**	126	169	128	180	162	173	107	139	160	142	107	134	130	106	166	22.8
Iron	mg/l		**0.2**	**4.2**	**0.726**	**1.25**	**8.13**	**7.62**	**9.48**	**3**	**4.22**	**3.53**	**16.4**	**38.8**	**6.05**	**5.86**	**2.71**	**8.49**	**0.941**
Combined Pesticides / Herbicides																			
Dieldrin	µg/l	0.075	**0.01**	<0.01	<0.01	<0.05	<0.02	<0.01	<0.05	<0.1	<0.1	<0.02	<0.02	**0.141**	**0.527**	<0.1	<0.2	<0.02	<0.02
Simazine	µg/l	0.075	**1**	<0.05	<0.01	<0.02	<0.01	<0.1	<0.02	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1
Microbiological																			
Coliforms, Total*	MPN/100ml		**0**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coliforms, Faecal*	CFU/100ml		**0**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Organics																			
Mecoprop	µg/l	0.075	**10**	<0.08	<0.04	<0.08	<0.04	<0.08	<0.08	<0.04	<0.4	<0.2	<0.2	1.01	<0.2	<0.4	<4	<0.04	<0.4

Notes:

[1] OTV-Overall threshold value, European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) as amended in 2011, 2012, 2016.

[2] IGV-Interim Guideline Values, from EPA, Towards Setting Guideline Values for the Protection of Groundwater in Ireland, 2003.

[3] UG = upgradient, DG=downgradient, IW = in waste, CG=cross-gradient.

[4] GW01-S (shallow) refers to GW01, GW01-D (deep) refers to well GW02.

* Items shaded in **orange** are in exceedance of the Drinking Water Regulations.

* Items shaded in **bold** are in exceedance of the EPA IGV Standards.

2.2.2 Groundwater Analysis Discussion

The results of the groundwater monitoring from the 8 No. existing boreholes (3AP, 4AP, 5A, 5AP, 8A, 8AP, RC2 and RC3) and the newly installed monitoring boreholes (GW01 and GW02) include several exceedances of the EPA IGVs and groundwater regulations OTVs in all 4 rounds of monitoring (2020 to 2022).

Samples recovered from monitoring wells reported ammoniacal nitrogen concentrations exceeding threshold values for all boreholes. Ammoniacal nitrogen concentrations at 8A and 8AP, being upgradient of the landfill may represent background levels. The elevated concentrations detected at these wells may be attributed to other anthropogenic sources such as agricultural activities or septic tanks. Additionally, the presence of peat in the area may also be a source of ammonia, and the elevated ammoniacal nitrogen concentrations detected upgradient of the site could be naturally occurring.

Ammoniacal nitrogen is a commonly occurring pollutant associated with landfills, as it is generated through the degradation of organic matter. Levels of ammoniacal nitrogen measured cross-gradient and downgradient of the historic landfill are very similar, ranging from 0.1 mg/l to 3.56 mg/l. Down and cross gradient concentrations are generally higher than upgradient results, which range from 0.8 mg/l to 1.8 mg/l, apart from a single monitoring result in 2022 at location 8A measuring 11.9 mg/l. Leachate migration therefore cannot be considered the sole source of ammoniacal nitrogen downgradient of the historic landfill but it is likely a primary contributor.

Elevated concentrations of chloride above the OTV and EPA IGV are observed in 5 No. boreholes 8A, 4AP, 8AP, GW01-S (GW01) and GW01-D (GW02) in 2020, 3 No boreholes 8A, GW01 and GW02 in 2021 and 4 No boreholes 8A, 4AP, GW01 and GW02 in 2022. The highest Chloride concentrations are located upgradient of the site, at boreholes 8A and 8AP (ranging from 56.9 mg/l to 90.2 mg/l). Although landfill leachate has the potential to contain high concentrations of chloride ions, upgradient concentrations suggests the source of this contaminant is unlikely to be solely attributed to the migration of leachate from the historic landfill.

Arsenic concentrations of 31.2 mg/l borehole 8AP in 2020 and of 64.7 mg/l borehole 8A in 2022 exceed the IGV and groundwater regulation limit values however as both boreholes 8AP and 8A are located upgradient of the landfill is not likely that these arsenic concentrations due to leachate migration from the landfill. No arsenic exceedances were recorded in 2021.

Potassium concentrations exceeding the IGV limit, of 53.7 mg/l and 54 mg/l were detected at monitoring well 4AP immediately downgradient of the landfill in 2020 and 2022 respectively. A single detection of 6.56 mg/l, also exceeding the IGV, was recorded at monitoring well 8A in 2022. No potassium IGV exceedances were recorded in 2021. Downgradient Potassium concentrations at this level are an indication of impact on groundwater quality locally from the landfill. Potassium concentrations are significantly lower at all other wells, cross-gradient and upgradient of the landfill. The concentration of potassium at monitoring location 8A is 8 times lower than downgradient concentrations at 4AP.

Nickel was elevated above the OTV at wells 8A, 8AP, GW01 and GW02. The elevated concentrations at 8A and 8AP, upgradient of the landfill suggest that the concentrations of nickel measured are naturally occurring. Both 8AP and GW02 (GW01-D) yielded the highest concentrations of nickel again indicating that the nickel concentrations may be naturally occurring and attributable to the underlying geology at these monitoring locations.

Iron levels ranging from 2.44 – 5.95 mg/l and manganese levels ranging from 90.1 – 876 µg/l were detected above the IGV limit across most monitoring wells upgradient and downgradient of the site. Results show the highest concentrations of iron and manganese were detected at downgradient wells 4AP and 5AP during the monitoring period.

Faecal coliforms were detected in 9 No. boreholes on both monitoring rounds. However, the presence of faecal coliforms in groundwater is not likely attributed to the historic landfill, but more likely present from agricultural or domestic sources i.e. human/animal waste, slurry, septic tanks etc.

The results of groundwater monitoring are below the laboratory limit of detection for List 1 and List 2 substances (SVOCs, pesticides, herbicides, organics) with the exception of 3 No. offsite boreholes (5A, RC2 and RC3) in 2020 which exceed the threshold values for Simazine and 2 No. off site boreholes (4AP and 5AP) which exceed the threshold values for Dieldrin. Simazine and Dieldrin are commonly used herbicides, and their presence at these locations are not expected to be attributed to leachate migration from the landfill.

Results of historic groundwater monitoring at the site (as included within the Closure and Remediation Plan), upgradient and downgradient also showed evidence of migration of leachate from the site and leachate impacting on groundwater quality at monitoring locations downgradient e.g. at locations 4AP and 10AP. Pollutant concentrations do decrease however further downgradient at the site i.e. at monitoring location 3AP, c.200m west of the site. The results of this assessment suggest that the migration of leachate from the site and contamination of groundwater downgradient of the site is more likely to be a local issue and is not likely to significantly impact on groundwater quality further from the (>200m).

2.3 Leachate monitoring

Three dual leachate/gas boreholes (BH01 – BH03 inc.) were installed replacing the damaged/lost boreholes within waste body.

Leachate monitoring was undertaken on 9th August 2022.

A summary of the results is included in Table 2.2. Only results that were shown to be above the limit of detection were included. Complete results of the leachate monitoring are included in Appendix 1.

Table 2-3: Leachate Sampling Results August 2022

Parameter	Units	BH1	BH2	BH3
Carbon				
Organic Carbon, Total	mg/l	91.8	47.2	233
Inorganics				
Oxygen, dissolved	mg/l	1.87	7.99	<0.3
pH	pH Units	8.06	7.79	7.56
Sulphate	mg/l	176	133	513
Chloride	mg/l	440	70.2	739
COD, unfiltered	mg/l	2380	1420	1860
Ammoniacal Nitrogen as N (low level)	mg/l	68	96.2	255
Conductivity @ 20 deg.C	mS/cm	3.12	1.98	6.33
BOD, unfiltered	mg/l	60.5	42.8	166
Alkalinity, Total as HCO3	mg/l	7130	2340	3310
Filtered (Dissolved) Metals				

Parameter	Units	BH1	BH2	BH3
Mercury	µg/l	<0.01	0.0531	<0.01
Arsenic	µg/l	3.01	2.54	6.35
Barium	µg/l	261	215	233
Boron	µg/l	904	456	1470
Cadmium	µg/l	<0.08	0.163	<0.08
Chromium	µg/l	3.22	3.03	27.1
Copper	µg/l	<0.3	8.49	<0.3
Lead	µg/l	0.644	14.6	0.224
Manganese	µg/l	141	1790	3390
Nickel	µg/l	13.2	10.7	57.5
Phosphorus	µg/l	290	118	320
Selenium	µg/l	8.45	1.88	3.99
Zinc	µg/l	4.25	149	4.47
Sodium	mg/l	1090	87.5	740
Magnesium	mg/l	64.9	55.6	184
Potassium	mg/l	120	59.4	227
Calcium	mg/l	56.7	210	165
Iron	mg/l	3.3	2.01	6.48
Semi-Volatile Organic Compounds (SVOCs)				
bis(2-Ethylhexyl) phthalate	µg/l	541	86.2	31
Butylbenzyl phthalate	µg/l	59.7	<10	<10
Benzo(b)fluoranthene	µg/l	21.6	<10	<10
Chrysene	µg/l	23.1	<10	<10
Volatile Organic Compounds (VOCs)				
Carbon disulphide	µg/l	1.48	<1	1.67
Benzene	µg/l	1.84	<1	3.39
Toluene	µg/l	1.11	<1	1.8
1,1,1,2-Tetrachloroethane	µg/l	<1	5.23	<1
Ethylbenzene	µg/l	<1	5	2.51
m,p-Xylene	µg/l	<1	51	1.77
o-Xylene	µg/l	<1	1.42	1.09
1,3,5-Trimethylbenzene	µg/l	<1	1.52	<1
1,2,4-Trimethylbenzene	µg/l	<1	1.89	<1
4-iso-Propyltoluene	µg/l	<1	<1	1.21

The leachate monitoring results show elevated concentrations of pollutants commonly encountered within MSW landfill leachate i.e., ammoniacal nitrogen, chloride and COD. The results shown are typical of MSW landfill leachate.

2.4 Landfill Gas Monitoring

In 2020, FT carried out two rounds of monitoring of landfill gas (LFG) parameters at each monitoring well locations (BH3, 2AP, 3AP, 4AP, 5A, 5AP, 8A, 8AP, RC2 and RC3) as indicated on Figure 3.1. Methane, carbon dioxide, oxygen and atmospheric pressure were analysed at the 9 No. groundwater monitoring wells located outside the waste body and one well within the waste body (BH3) using a landfill gas analyser.

An additional monitoring round was carried out in 2022, after the reinstallation of the damaged/lost boreholes (BH01 to BH03) within the waste body and the installation of a landfill gas monitoring borehole (BHLFG1) within the civil amenity site.

2.4.1 Monitoring Results

As per the EPA Landfill Manuals – Landfill Monitoring, 2nd Edition, the trigger level for methane outside the waste body is 1% v/v and for carbon dioxide, 1.5% v/v. The monitoring results for methane, carbon dioxide and oxygen levels for the perimeter borehole are summarised in Table 2.3:

Table 2-4: Gas Monitoring Results

Date: 01/07/2020						
Sample Station	CH_4	CO_2	O_2	Atmospheric Pressure	Staff Member	Weather
	(% v/v)	(% v/v)	(% v/v)	(mbar)		
BH3	0	0.6	22.3	1005	Daniel Hayden	Overcast, Warm, 16-18°C
2AP	0	0.9	21.9			
3AP	0	0.3	22.1			
4AP	0	0.6	22.4			
5A	0	1.2	20.8			
5AP	0	1	21.2			
8A	0	**1.8**	20.4			
8AP	0	**1.7**	20.5			
RC2	0	0.9	21.2			
RC3	0	**1.5**	21.5			

Date: 27/8/2020						
Sample Station	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Atmospheric Pressure (mbar)	Staff Member	Weather
BH3	0	0.2	20.8	998	Daniel Hayden	Overcast, Rain, 14-16°C
2AP	0	0.4	20.6			
3AP	0	0.1	21.8			
4AP	0	0.9	22.4			
5A	0	0.8	20.8			
5AP	0	0.6	21.2			
8A	0	1.4	19.8			
8AP	0	0.8	20.5			
RC2	0	0.6	21.2			
RC3	0	0.4	21.5			
Date: 09/08/2022						
Sample Station	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Atmospheric Pressure (mbar)	Staff Member	Weather
BHLFG1	0.2	0.8	19.3	1026	Sean Foley	Sunny, Warm, 22°C
In-Waste Wells						
BH01	**25.6**	**9.8**	1.0			
BH02	**41.2**	**11.5**	1.1			
BH03	**67.7**	**17.2**	0.5			

As can be seen in Table 2.3, no methane was detected in all monitoring wells in both the first and second round of monitoring. Carbon dioxide is only detected at or slightly above the trigger value of 1.5% v/v at wells 8A, 8AP and RC3 in the first round of monitoring. Monitoring wells 8A and 8AP are located c.200m east of the historic landfill, it is not expected that landfill gas would be detected at these distances from the site. These detections may be associated with local peat deposits or other naturally occurring organic degradation.

In the August 2022 monitoring round, methane levels of between 25.6% v/v and 67.7% v/v were detected in the in-waste wells BH01 – BH03. This indicates that waste degradation continues to be active within the waste body.

The slight traces of methane and carbon dioxide detected in the monitoring well located within the civic amenity (BHLFG1) were below the trigger levels set by the EPA.

2.5 Surface Water Monitoring

2.5.1 Monitoring Locations

The surface water monitoring locations were selected upstream and downstream of the landfill footprint, as shown on Figure 2.1. Monitoring locations SW1 to SW4 were selected as the upstream and downstream locations on River Killeelaun to the north of the landfill and River Clare to the south of the landfill.

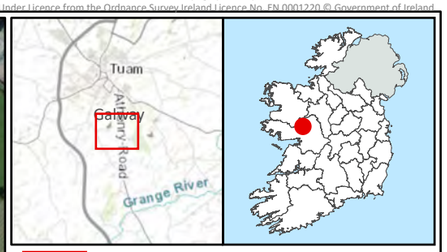
Two rounds of surface water monitoring were carried out in 2020, on the 1st July and 26th August and one round was carried out in 2021, on the 13th July. An additional round was carried out in 2022, on the 31st May.

2.5.2 Monitoring Parameters

The results of surface water sampling analysed from the 4 No. sampling locations (SW1 to SW4) at the site have been assessed against the Maximum Admissible Concentration (MAC) and the Environmental Quality Standard (EQS) as per S.I. No. 77/2019 – European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019.

A summary of the results from the monitoring round is outlined in Table 2.4, while the laboratory reports are presented in Appendix 1.

Path: R:\Map Production\2020\P2282\Workspace\P2282_Tier2_ERA_Tuam_A3.aprx



Site Boundary

Surface Water Monitoring Locations

N
W E
S

0 50 100 200 Meters

TITLE: Surface Water Sampling Locations			
PROJECT: Tuam Historic Landfill ERA			
FIGURE NO:	2.2		
CLIENT:	Galway County Council		
SCALE:	1:5,000	**REVISION:**	0
DATE:	18/10/2021	**PAGE SIZE:**	A3

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Table 2-5: Surface Water Sampling Results

Parameter	Units	EQS[1]	MAC[2]	Round 1 (01/07/2020)				Round 2 (26/08/2020)			
				SW1 (US)	SW2 (DS)	SW3 (DS)	SW4 (DS)	SW1 (US)	SW2 (DS)	SW3 (DS)	SW4
Inorganics											
Fluoride	mg/l	0.5		<0.5	<0.5	<0.5	<0.5	0.562	<0.5	<0.5	<0.5
pH	-	6.0<pH<9.0		7.59	7.99	8.08	7.85	6.94	7.37	7.12	7.23
Ammoniacal Nitrogen as N (low level)	mg/l	≤0.065 (good status mean)		1.86	0.174	0.123	0.16	3.42	4.79	-	0.0791
Cyanide, Total	mg/l	0.01		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Biochemical Oxygen Demand (BOD)	mg/l	2.6		2.25	6.27	5.94	9.4	13.5	18.3	-	5.85
Filtered (Dissolved) Metals											
Mercury	µg/l		0.07	<0.01	0.0131	<0.01	<0.01	<0.01	**0.114**	<0.01	0.0178
Arsenic	µg/l	25		1.4	1.35	1.28	2.14	2.63	2.75	1.32	2.07
Cadmium	µg/l	0.15	0.9	<0.08	<0.08	<0.08	<0.08	0.448	<0.08	0.136	0.476
Chromium	µg/l	4.7	32	1.94	6.63	6.74	7.33	1.39	1.27	1.18	2.13
Copper	µg/l	30		1.96	3.9	3.7	3.71	3.32	5.26	2.47	4.8
Lead	µg/l	1.2	14	<0.2	<0.2	<0.2	<0.2	0.223	0.681	0.231	0.65
Nickel	µg/l	4	34	3.64	4.33	3.88	6.18	7.04	3.4	4.36	9.3
Zinc	µg/l	100		1.88	5.54	6.44	8.16	9.81	16.6	10.8	20.9
Semi-Volatile Organic Compounds (SVOCs)											
1,2,4-Trichlorobenzene	µg/l	0.4	not applicable	<1	<1	<1	<1	<4	<8	<10	<4
Anthracene	µg/l	0.1	0.1	<1	<1	<1	<1	<4	<8	<10	<4
bis(2-Ethylhexyl) phthalate	µg/l	1.3	not applicable	<2	<2	<2	<2	<8	<16	<20	<8
Benzo(b)fluoranthene	µg/l		0.017	<1	<1	<1	<1	<4	<8	<10	<4
Benzo(k)fluoranthene	µg/l		0.017	<1	<1	<1	<1	<4	<8	<10	<4
Benzo(a)pyrene	µg/l	0.00017	0.27	<1	<1	<1	<1	<4	<8	<10	<4
Benzo(g,h,i)perylene	µg/l		0.0082	<1	<1	<1	<1	<4	<8	<10	<4
Diethyl phthalate	µg/l	1.3	not applicable	<1	<1	<1	<1	<4	<8	<10	<4
Fluoranthene	µg/l	0.0063	0.12	<1	<1	<1	<1	<4	<8	<10	<4
Hexachlorobenzene	µg/l		0.05	<1	<1	<1	<1	<4	<8	<10	<4
Hexachlorobutadiene	µg/l		0.6	<1	<1	<1	<1	<4	<8	<10	<4
Pentachlorophenol	µg/l	0.4	1	<1	<1	<1	<1	<4	<8	<10	<4
Phenol	µg/l	8	46	<1	<1	<1	<1	<4	<8	<10	<4
Naphthalene	µg/l	2	130	<1	<1	<1	<1	<4	<8	<10	<4
Indeno(1,2,3-cd)pyrene	µg/l		not applicable	<1	<1	<1	<1	<4	<8	<10	<4
Combined Pesticides / Herbicides											
Dieldrin	µg/l	0.01	not applicable	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:

1. Environmental Quality Standard (EQS) as per European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I No. 272 of 2009). Refers to Annual-Average (AA) EQS for relevant parameters.
2. Maximum Admissible Concentration (MAC), as classified by European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I No. 272 of 2009).

** Items shaded in **orange** are in exceedance of the 2009 EQS Regulations

*** NAC – no abnormal change

Parameter	Units	EQS[1]	MAC[2]	Round 3 (13/07/2021)				Round 4 (31/05/2022)			
				SW1 (US)	SW2 (DS)	SW3 (DS)	SW4 (DS)	SW1 (US)	SW2 (DS)	SW3 (DS)	SW4 (DS)
Inorganics											
Fluoride	mg/l	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
pH	-	6.0<pH<9.0		7.77	7.75	7.7	8.03	7.79	7.84	7.88	8.07
Ammoniacal Nitrogen as N (low level)	mg/l	≤0.065 (good status mean)		0.335	0.07	0.026	0.04	0.0537	0.139	0.0285	0.0297
Cyanide, Total	mg/l	0.01		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Biochemical Oxygen Demand (BOD)	mg/l	2.6		<1	1.89	<1	<1	<1	<1	<1	<1
Filtered (Dissolved) Metals											
Mercury	µg/l		0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	µg/l	25		1.46	1.54	1.49	1.34	0.863	1.12	1.04	1.15
Cadmium	µg/l	0.15	0.9	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chromium	µg/l	4.7	32	<1	<1	<1	<1	<1	<1	<1	<1
Copper	µg/l	30		0.416	<0.3	<0.3	1.31	6.16	0.4	0.442	0.731
Lead	µg/l	1.2	14	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	µg/l	4	34	3.15	2.93	2.91	3.22	3.95	2.71	2.89	2.78
Zinc	µg/l	100		3.29	7.51	10.7	3.22	3.55	2.1	4.06	2.72
Semi-Volatile Organic Compounds (SVOCs)											
1,2,4-Trichlorobenzene	µg/l	0.4	not applicable	<1	<1	<1	<1	<1	<1	<1	<1
Anthracene	µg/l	0.1	0.1	<1	<1	<1	<1	<1	<1	<1	<1
bis(2-Ethylhexyl) phthalate	µg/l	1.3	not applicable	<2	<2	<2	<2	<2	<2	<2	<2
Benzo(b)fluoranthene	µg/l		0.017	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	µg/l		0.017	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	µg/l	0.00017	0.27	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/l		0.0082	<1	<1	<1	<1	<1	<1	<1	<1
Diethyl phthalate	µg/l	1.3	not applicable	<1	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	µg/l	0.0063	0.12	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorobenzene	µg/l		0.05	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/l		0.6	<1	<1	<1	<1	<1	<1	<1	<1
Pentachlorophenol	µg/l	0.4	1	<1	<1	<1	<1	<1	<1	<1	<1
Phenol	µg/l	8	46	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	µg/l	2	130	<1	<1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3-cd)pyrene	µg/l		not applicable	<1	<1	<1	<1	<1	<1	<1	<1
Combined Pesticides / Herbicides											
Dieldrin	µg/l	0.01	not applicable	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0386	<0.015

Notes:

1. Environmental Quality Standard (EQS) as per European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I No. 272 of 2009). Refers to Annual-Average (AA) EQS for relevant parameters.
2. Maximum Admissible Concentration (MAC), as classified by European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I No. 272 of 2009).

** Items shaded in **orange** are in exceedance of the 2009 EQS Regulations

*** NAC – no abnormal change

2.5.3 Surface Water Analysis Discussion

The results of the surface water laboratory analysis as presented in Table 2.4, when assessed against the MAC and EQS quality standards reported several exceedances of threshold values in 2020 and 2022.

Results from the additional monitoring round undertaken in 2022 at SW1 to SW4 show only 2 no. exceedances for the EQS threshold values. Samples from SW2 exceeded the 'Good Status' EQS for ammoniacal nitrogen (0.139 mg/l), which could be an indicator of leachate migration from the landfill to surface water; and SW3 exceeds the threshold value for Dieldrin. The results of groundwater monitoring also showed Dieldrin exceedances for 2 No. off site boreholes (4AP and 5AP). Dieldrin is a commonly used herbicides, and its presence at these locations is not expected to be attributed to leachate migration from the landfill.

In 2020, exceedances of the EQS limit values for ammoniacal nitrogen (as N) was recorded in all sampling locations on both rounds except for SW3 during the August 2020 sampling event. The presence of ammoniacal nitrogen at these levels may have been an indication of agricultural runoff from the surrounding fields or due to the presence of peat and bog in the area rather than direct impact from the landfill.

In 2021, ammoniacal nitrogen (as N) was the only parameter exceeding the EQS threshold value for both SW1 and SW2.

Fluoride slightly exceeds the EQS threshold value on one occasion at upstream monitoring location SW1 in August 2020.

Biochemical oxygen demand (BOD) concentrations were elevated above the EQS value at almost all sampling locations during the two monitoring events in 2020. BOD results from the July 2021 and May 2022 events showed levels were below the laboratory LOD at all four locations. BOD is a broad indicator of water quality and provides a measurement of the organic matter that is biologically available for bacteria present in a sample or waterbody to consume. Organic matter present in the waterbody is likely to be naturally occurring.

In 2020, the presence of elevated dissolved heavy metal concentrations such as lead, cadmium, chromium and nickel in downstream samples which weren't recorded in upstream samples indicates potential leaching of metals from landfill and migration to the receiving drainage network and stream.

3. CONCLUSION

In 2022, Galway County Council requested FT to undertake one additional round of environmental monitoring at Tuam Historic Landfill. The results of this sampling served as a continuation of the monitoring assessments carried out in 2020 and 2021 as part of the Tier 2 environmental risk assessment for the site.

Analysis of groundwater samples recovered from 8 No. monitoring wells between 2020 and 2022 shows ammoniacal nitrogen concentrations continue to exceed threshold values. Measured ammoniacal nitrogen concentration at upgradient boreholes could be considered representative of background levels possibly due to agricultural activities, or the presence of peat in the area. However, apart from one single result upgradient in 2022 (8A, 2022 – 11.9 mg/l), the general trend is for higher concentration measured downgradient of the landfill. Results generally indicate the historic landfill may be a source for ammoniacal nitrogen.

Similar to 2020 and 2021, elevated concentrations of chloride above the OTV and IGV are observed in 4 No boreholes 8A, 4AP, GW01 and GW02 in 2022. Although landfill leachate has the potential to contain high concentrations of chloride ions, upgradient concentrations suggest the source of this contaminant is unlikely to be attributed solely to the migration of leachate from the historic landfill.

Iron and manganese levels above the IGV limit appear to be a localised characteristic of groundwater quality, as evidenced at monitoring wells surrounding the site. Results of 2020 to 2022 monitoring show the highest concentrations of iron and manganese were detected at downgradient wells during the monitoring period. Potassium levels above the IGV at downgradient wells during the monitoring period are another indication of impact from the landfill. The source of these higher concentrations may be caused by leachate migration from the landfill.

Groundwater monitoring from 2020 to 2022 indicates that leachate migration is potentially impacting groundwater quality immediately downgradient of the site. The results of monitoring upgradient do however point to potential other contributing sources of contamination in addition to the historic landfill. Significant impacts on groundwater quality have not been observed further downgradient of the site (>200m). Impacts are therefore likely to be localised.

Landfill gas monitoring from 2020 and 2022 at 11 No. perimeter monitoring wells at the site indicates gas concentrations detected are broadly below the threshold levels set by the EPA CoP. Methane concentrations detected in the in-waste wells (BH1 – BH3) indicates that waste degradation continues to be active within the waste body and the site remains biologically active.

Analysis of surface water samples from the River Killeelaun and River Clare found very few exceedances of the MAC and EQS guideline limit values in 2021 and 2022 compared to 2020 results. In 2020, the presence of elevated dissolved heavy metal concentrations such as chromium, cadmium, lead and nickel in downstream samples which weren't recorded in upstream samples indicated potential leaching of metals from landfill and migration to the receiving drainage network and stream. Sampling in 2021 and 2022 showed dissolved metal concentrations were lower than 2020 results and below the respective MAC and EQS limit. Overall, results from 2020 to 2022 generally showed little variation in parameter levels observed between upstream and downstream sampling locations.

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CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
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APPENDIX 1

Groundwater, Leachate and Surface Water Sampling Analysis Results

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

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.

Validated

CERTIFICATE OF ANALYSIS

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

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
			22408325	5A		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
							NaOH (ALE245)	GW
							Vial (ALE297)	GW
			22408337	8A		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
							NaOH (ALE245)	GW
							STL 19 (ALS)	GW
							Vial (ALE297)	GW
			22408350	RC2		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
							NaOH (ALE245)	GW
							Vial (ALE297)	GW
			22408370	RC3		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 4	X				X	
Alkalinity as CaCO3	All	NDPs: 0 Tests: 4	X				X	
Ammonium Low	All	NDPs: 0 Tests: 4		X				X
Anions by Kone (w)	All	NDPs: 0 Tests: 4	X				X	
BOD True Total	All	NDPs: 0 Tests: 4		X				X
COD Unfiltered	All	NDPs: 0 Tests: 4	X				X	
Coliforms (W)	All	NDPs: 0 Tests: 3		X				X
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 4		X				X
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 4			X			
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4		X				X
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 4		X				X
Faecal Coliforms (W)*	All	NDPs: 0 Tests: 1				X		
Fluoride	All	NDPs: 0 Tests: 4		X				X
Mercury Dissolved	All	NDPs: 0 Tests: 4		X				X
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 4		X				X

22408370	RC3		0.00 - 0.00	Vial (ALE297)	GW																														
				NaOH (ALE245)	GW																	X													

Validated

CERTIFICATE OF ANALYSIS

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

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)						22408325						22408337						22408350					22408370
Customer Sample Reference						5A						8A						RC2					RC3
AGS Reference																							
Depth (m)						0.00 - 0.00						0.00 - 0.00						0.00 - 0.00					0.00 - 0.00
Container						0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	STL 19 (ALS)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)
Sample Type						GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 4				X					X						X					X		
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 4				X					X						X					X		
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 4				X					X						X					X		
pH Value	All	NDPs: 0 Tests: 4		X								X						X					X	
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 4				X					X						X					X		
Total Coliforms(W)*	All	NDPs: 0 Tests: 1													X									
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 4			X								X						X					X
VOC MS (W)	All	NDPs: 0 Tests: 4								X						X					X			

22408370	RC3		0.00 - 0.00	Vial (ALE297)	GW																X
				NaOH (ALE245)	GW																

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	5A	8A	RC2	RC3		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	.	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-48	200702-48	200702-48	200702-48		
			Lab Sample No.(s)	22408325	22408337	22408350	22408370		
			AGS Reference						
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 2 #	4.98 2 #	2.58 2 #	5.08 2 #		
Barium (diss.filt)	<0.2 µg/l	TM152		53.1 2 #	51.5 2 #	59 2 #	29.1 2 #		
Boron (diss.filt)	<10 µg/l	TM152		<10 2 #	11.2 2 #	17.1 2 #	<10 2 #		
Cadmium (diss.filt)	<0.08 µg/l	TM152		<0.08 2 #	<0.08 2 #	<0.08 2 #	0.103 2 #		
Chromium (diss.filt)	<1 µg/l	TM152		<1 2 #	<1 2 #	2.29 2 #	1.17 2 #		
Copper (diss.filt)	<0.3 µg/l	TM152		0.357 2 #	<0.3 2 #	0.579 2 #	6.59 2 #		
Lead (diss.filt)	<0.2 µg/l	TM152		<0.2 2 #	<0.2 2 #	0.584 2 #	1.52 2 #		
Manganese (diss.filt)	<3 µg/l	TM152		91.9 2 #	231 2 #	128 2 #	34.3 2 #		
Nickel (diss.filt)	<0.4 µg/l	TM152		7.98 2 #	19.4 2 #	11.7 2 #	15.3 2 #		
Phosphorus (diss.filt)	<10 µg/l	TM152		<10 2 #	<10 2 #	12.1 2 #	37.2 2 #		
Selenium (diss.filt)	<1 µg/l	TM152		<1 2 #	<1 2 #	<1 2 #	<1 2 #		
Thallium (diss.filt)	<2 µg/l	TM152		<2 2 #	<2 2 #	<2 2 #	<2 2 #		
Zinc (diss.filt)	<1 µg/l	TM152		2.38 2 #	2.81 2 #	2.53 2 #	8.86 2 #		
Sodium (Dis.Filt)	<0.076 mg/l	TM152		10.4 2 #	27.2 2 #	13.3 2 #	8.34 2 #		
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		4.92 2 #	9.41 2 #	8.65 2 #	3.64 2 #		
Potassium (Dis.Filt)	<0.2 mg/l	TM152		0.865 2 #	1.56 2 #	2.99 2 #	1.13 2 #		
Calcium (Dis.Filt)	<0.2 mg/l	TM152		160 2 #	187 2 #	177 2 #	97 2 #		
Iron (Dis.Filt)	<0.019 mg/l	TM152		0.33 2 #	1.32 2 #	1.87 2 #	3.04 2 #		
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 2 #	<0.01 2 #	<0.01 2 #	<0.01 2 #		
Sulphate	<2 mg/l	TM184		<2 #	18.2 #	<2 #	<4 #		

CERTIFICATE OF ANALYSIS

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

Results Legend	
#	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	Customer Sample Ref.	5A	8A	RC2	RC3		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	.	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-48	200702-48	200702-48	200702-48		
			Lab Sample No.(s)	22408325	22408337	22408350	22408370		
			AGS Reference						
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

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

Results Legend

#	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	Customer Sample Ref.	5A	8A	RC2	RC3		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	.	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-48	200702-48	200702-48	200702-48		
			Lab Sample No.(s)	22408325	22408337	22408350	22408370		
			AGS Reference						
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		
Chlorpyriphos-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		
Chlorpyriphos	<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

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

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
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**	% 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	Customer Sample Ref.	5A	8A	RC2	RC3		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	.	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-48	200702-48	200702-48	200702-48		
			Lab Sample No.(s)	22408325	22408337	22408350	22408370		
			AGS Reference						
Chlorfenvinphos	<0.01 µg/l	TM344		<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		

Validated

CERTIFICATE OF ANALYSIS

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

Results Legend	
#	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	Customer Sample Ref.	5A	8A	RC2	RC3		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	.	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-48	200702-48	200702-48	200702-48		
			Lab Sample No.(s)	22408325	22408337	22408350	22408370		
			AGS Reference						
MCPB	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
2,4-DB	<0.1 µg/l	TM411		<0.1	<0.2	<0.1	<0.1		
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
Dichlorprop	<0.1 µg/l	TM411		<0.1	<0.2	<0.1	<0.1		
Triclopyr	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
Fenoprop (Silvex)	<0.1 µg/l	TM411		<0.1	<0.2	<0.1	<0.1		
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
Bromoxynil	<0.04 µg/l	TM411		<0.04	<0.08	<0.04	<0.04		
Benazolin	<0.04 µg/l	TM411		<0.04	<0.08	<0.04	<0.04		
Ioxynil	<0.05 µg/l	TM411		<0.1	<0.1	<0.1	<0.1		
Pentachlorophenol	<0.04 µg/l	TM411		<0.04	<0.08	<0.04	<0.04		
Fluoroxypyr	<0.1 µg/l	TM411		<0.1	<0.2	<0.1	<0.1		

CERTIFICATE OF ANALYSIS

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

#	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	Customer Sample Ref.	5A	8A	RC2	RC3		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	.	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-48	200702-48	200702-48	200702-48		
			Lab Sample No.(s)	22408325	22408337	22408350	22408370		
			AGS Reference						
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 #		

Validated

CERTIFICATE OF ANALYSIS

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

#	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	Customer Sample Ref.	5A	8A	RC2	RC3		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	.	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-48	200702-48	200702-48	200702-48		
			Lab Sample No.(s)	22408325	22408337	22408350	22408370		
			AGS Reference						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Carbazole (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Chrysene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Dibenzofuran (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Diethyl phthalate (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Dimethyl phthalate (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<250 #	<10 #	<50 #	<500 #		
Fluoranthene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Fluorene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Hexachlorobenzene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Pentachlorophenol (aq)	<1 µg/l	TM176		<50	<2	<10	<100		
Phenol (aq)	<1 µg/l	TM176		<50	<2	<10	<100		
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Hexachloroethane (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Nitrobenzene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Naphthalene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Isophorone (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<50	<2	<10	<100		
Phenanthrene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		
Pyrene (aq)	<1 µg/l	TM176		<50 #	<2 #	<10 #	<100 #		

CERTIFICATE OF ANALYSIS

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

VOC MS (W)

Results Legend

#	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	Customer Sample Ref.	5A	8A	RC2	RC3		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	.	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-48	200702-48	200702-48	200702-48		
			Lab Sample No.(s)	22408325	22408337	22408350	22408370		
			AGS Reference						
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

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

VOC MS (W)

Results Legend

#	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	Customer Sample Ref.	5A	8A	RC2	RC3		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	.	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-48	200702-48	200702-48	200702-48		
			Lab Sample No.(s)	22408325	22408337	22408350	22408370		
			AGS Reference						
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<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		

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

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
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

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www.cityanalysts.ie

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.

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Ringsend,
Dublin 4.

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Fax: (01) 613 6008

Email:
reports@cityanalysts.ie

www.cityanalysts.ie

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

Sample Type: Ground

Lab Reference Number: 517821

Date of Sampling: 01/07/2020

Date Sample Received: 01/07/2020

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

City Analysts Limited,
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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

Sample Type: Ground

Lab Reference Number: 517822

Date of Sampling: 01/07/2020

Date Sample Received: 01/07/2020

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.
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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

Sample Type: Ground

Lab Reference Number: 517823

Date of Sampling: 01/07/2020

Date Sample Received: 01/07/2020

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.
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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

Sample Type: Ground

Lab Reference Number: 517824

Date of Sampling: 01/07/2020

Date Sample Received: 01/07/2020

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
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Coventry
CV4 9GU

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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

UKAS TESTING 1314

bsi ISO 14001 Environmental Management CERTIFIED ISO 45001 Occupational Health and Safety Management CERTIFIED
EMS 675527 OHS 542058

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report Summary

ANALYSED BY

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

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**

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

Job Received: **04 July 2020**

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.

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

ALS

Report Number: **COV/1891189/2020** Issue **1**

Laboratory Number: **19450519** Sample **1** of **2**

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**

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

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/1891189/2020**	Issue	**1**
Laboratory Number:	**19450520**	Sample	**2** of **2**

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**

Test Description	Result	Units	Analysis Date	Accreditation		Method
Total Coliform presump	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 presump 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**

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 presump 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: Elizabeth Parker.

Name: **E. Parker** Date: **07 July 2020**

Title: **Potable Micro Team Leader**

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

Approved By:

Sonia McWhan

Operations Manager

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

Version: 2.5 Version Issued: 10/09/2020

CERTIFICATE OF ANALYSIS

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.

Validated

CERTIFICATE OF ANALYSIS

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

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)							22736761					22736754					22736713			
Customer Sample Reference							3AP					4AP					5AP			
AGS Reference																				
Depth (m)							0.00 - 0.00					0.00 - 0.00					0.00 - 0.00			
Container							0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE204)	HNO3 Filtered (ALE244)	NaOH (ALE245)
Sample Type							GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 6					X					X					X				
Alkalinity as CaCO3	All	NDPs: 0 Tests: 6		X					X					X					X		
Ammonium Low	All	NDPs: 0 Tests: 6			X					X					X						X
Anions by Kone (w)	All	NDPs: 0 Tests: 6		X					X					X					X		
BOD True Total	All	NDPs: 0 Tests: 6		X					X					X					X		
COD Unfiltered	All	NDPs: 0 Tests: 6		X					X					X					X		
Coliforms (W)	All	NDPs: 0 Tests: 6		X					X					X					X		
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 5		X					X					X					X		
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 6				X					X					X					
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6		X					X											X	
Dissolved Oxygen by Probe	All	NDPs: 1 Tests: 5		X					X					X					X		
Fluoride	All	NDPs: 0 Tests: 6		X					X					X					X		
Mercury Dissolved	All	NDPs: 0 Tests: 6		X					X											X	
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 6	X					X				X					X				
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 6	X					X				X					X				

22736745	RC3		0.00 - 0.00	Vial (ALE297)	GW																	
				NaOH (ALE245)	GW											X						
				HNO3 Filtered (ALE204)	GW												X				X		
				H2SO4 (ALE244)	GW			X															
				500ml Plastic (ALE208)	GW		X		X		X		X					N		X			
				0.5l glass bottle (ALE227)	GW	X																X		X
22736738	RC2		0.00 - 0.00	Vial (ALE297)	GW																	
				NaOH (ALE245)	GW											X						
				HNO3 Filtered (ALE204)	GW												X				X		
				H2SO4 (ALE244)	GW			X															
				500ml Plastic (ALE208)	GW		X		X		X		X		X				X		X		
				0.5l glass bottle (ALE227)	GW	X																X		X
22736728	8AP		0.00 - 0.00	Vial (ALE297)	GW																	
				NaOH (ALE245)	GW											X						
				HNO3 Filtered (ALE204)	GW												X				X		

Validated

CERTIFICATE OF ANALYSIS

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

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)						22736761					22736754					22736713				22736728
Customer Sample Reference						3AP					4AP					5AP				8AP
AGS Reference																				
Depth (m)						0.00 - 0.00					0.00 - 0.00					0.00 - 0.00				0.00 - 0.00
Container						Vial (ALE297)	NaOH (ALE245)	H2SO4 (ALE244)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	H2SO4 (ALE244)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	HNO3 Filtered (ALE204)	H2SO4 (ALE244)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)	H2SO4 (ALE244)
Sample Type						GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 6								X					X						X	
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 6								X					X						X	
pH Value	All	NDPs: 0 Tests: 6							X					X						X		
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 6							X					X						X		
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 6						X					X					X				X
VOC MS (W)	All	NDPs: 0 Tests: 6				X					X					X						

22736745	RC3		0.00 - 0.00	Vial (ALE297)	GW												X
				NaOH (ALE245)	GW												
				HNO3 Filtered (ALE204)	GW												
				H2SO4 (ALE244)	GW										X		
				500ml Plastic (ALE208)	GW						X		X				
				0.5l glass bottle (ALE227)	GW		X		X								
22736738	RC2		0.00 - 0.00	Vial (ALE297)	GW												X
				NaOH (ALE245)	GW												
				HNO3 Filtered (ALE204)	GW												
				H2SO4 (ALE244)	GW										X		
				500ml Plastic (ALE208)	GW						X		X				
				0.5l glass bottle (ALE227)	GW		X		X								
22736728	8AP		0.00 - 0.00	Vial (ALE297)	GW												X
				NaOH (ALE245)	GW												
				HNO3 Filtered (ALE204)	GW												

Validated

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
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 2 #	4.33 2 #	4.35 #	31.2 #	2.74 #	2.88 #
Barium (diss.filt)	<0.2 µg/l	TM152		9.75 2 #	138 2 #	53.7 #	63.4 #	53.5 #	25.4 #
Boron (diss.filt)	<10 µg/l	TM152		<10 2 #	13.9 2 #	10.4 #	25.6 #	18 #	<10 #
Cadmium (diss.filt)	<0.08 µg/l	TM152		0.172 2 #	<0.08 2 #	0.115 #	0.17 #	0.519 #	1.68 #
Chromium (diss.filt)	<1 µg/l	TM152		<1 2 #	2.37 2 #	3.72 #	<1 #	5.33 #	1.3 #
Copper (diss.filt)	<0.3 µg/l	TM152		5.2 2 #	0.397 2 #	1.2 #	11.7 #	2.31 #	11.3 #
Lead (diss.filt)	<0.2 µg/l	TM152		<0.2 2 #	1.58 2 #	0.668 #	2.48 #	1.52 #	4.88 #
Manganese (diss.filt)	<3 µg/l	TM152		181 2 #	876 2 #	146 #	204 #	179 #	12.8 #
Nickel (diss.filt)	<0.4 µg/l	TM152		5.92 2 #	7.66 2 #	8.89 #	22.2 #	12 #	9.3 #
Phosphorus (diss.filt)	<10 µg/l	TM152		31.8 2 #	682 2 #	262 #	89 #	171 #	94.9 #
Selenium (diss.filt)	<1 µg/l	TM152		<1 2 #	<1 2 #	<1 #	<1 #	<1 #	<1 #
Thallium (diss.filt)	<2 µg/l	TM152		<2 2 #	<2 2 #	<2 #	<2 #	<2 #	<2 #
Zinc (diss.filt)	<1 µg/l	TM152		3.36 2 #	4.13 2 #	6.5 #	18.4 #	8.67 #	37.9 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152		6.46 2 #	88 2 #	10.3 #	47.1 #	12.7 #	12.7 #
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		4.37 2 #	11.9 2 #	5.26 #	9.1 #	11 #	3.25 #
Potassium (Dis.Filt)	<0.2 mg/l	TM152		0.466 2 #	53.7 2 #	0.916 #	1.64 #	3.12 #	0.237 #
Calcium (Dis.Filt)	<0.2 mg/l	TM152		107 2 #	91.4 2 #	169 #	154 #	355 #	35.9 #
Iron (Dis.Filt)	<0.019 mg/l	TM152		0.657 2 #	30.2 2 #	7.79 #	16.9 #	11.1 #	1.9 #
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 2 #	<0.01 2 #	<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

CERTIFICATE OF ANALYSIS

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

Results Legend

#	ISO17025 accredited.
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**	% 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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
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
PCB congener 138	<0.015 µg/l	TM197		<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
PCB congener 180	<0.015 µg/l	TM197		<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
Cyanide, Total	<0.05 mg/l	TM227		<0.05 #	<0.05 #	<0.05 #	<0.05 #	<0.05 #	<0.05 #
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
alpha-HCH	<0.01 µg/l	TM343		<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
Heptachlor	<0.01 µg/l	TM343		<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
beta-HCH	<0.01 µg/l	TM343		<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
delta-HCH	<0.01 µg/l	TM343		<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
o,p'-DDE	<0.01 µg/l	TM343		<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
trans-Chlordane	<0.01 µg/l	TM343		<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
p,p'-DDE	<0.01 µg/l	TM343		<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
o,p'-DDD (TDE)	<0.01 µg/l	TM343		<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
o,p'-DDT	<0.01 µg/l	TM343		<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
Endosulphan II	<0.02 µg/l	TM343		<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
o,p'-Methoxychlor	<0.01 µg/l	TM343		<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
Endosulphan Sulphate	<0.02 µg/l	TM343		<0.04	<0.02	<0.02	<0.02	<0.04	<0.04

CERTIFICATE OF ANALYSIS

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

Results Legend

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			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Permethrin I	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Permethrin II	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Hexachlorobutadiene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	0.113	<0.1	<0.01	<0.01	<0.05
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Dichlorvos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Dichlobenil	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Mevinphos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Tecnazene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Hexachlorobenzene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Demeton-S-methyl	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Phorate	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Diazinon	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Triallate	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Atrazine	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Simazine	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Disulfoton	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Propetamphos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Chlorpyriphos-methyl	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Dimethoate	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Chlorpyriphos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Methyl Parathion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Malathion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Fenthion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Fenitrothion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Triadimefon	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Pendimethalin	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Parathion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Chlorfenvinphos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
trans-Chlordane	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
cis-Chlordane	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05

CERTIFICATE OF ANALYSIS

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

Results Legend

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Component	LOD/Units	Method	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Ethion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Carbophenothion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Triazophos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Phosalone	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Azinphos methyl	<0.02 µg/l	TM344		<0.1	<0.2	<0.2	<0.02	<0.04	<0.1
Azinphos ethyl	<0.02 µg/l	TM344		<0.1	<0.2	<0.2	<0.02	<0.02	<0.1
Etridiazole	<0.01 µg/l	TM345		<0.05	<0.04	<0.1	<0.01	<0.02	<0.1
Pentachlorobenzene	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Propachlor	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Quintozene (PCNB)	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Omethoate	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Propazine	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Propyzamide	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Alachlor	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Prometryn	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Telodrin	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Terbutryn	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Chlorothalonil	<0.01 µg/l	TM345		<0.1	<0.02	<0.2	<0.02	<0.04	<0.2
Etrimphos	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Metazachlor	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Cyanazine	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Trietazine	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Coumaphos	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Phosphamidon I	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Phosphamidon II	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
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

Validated

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Dichlorprop	<0.1 µg/l	TM411		<1	<0.5	<0.5	<0.2	<1	<0.5
Triclopyr	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.1	<0.5	<0.25
Fenoprop (Silvex)	<0.1 µg/l	TM411		<1	<0.5	<0.5	<0.2	<1	<0.5
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.1	<0.5	<0.25
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.1	<0.5	<0.25
Bromoxynil	<0.04 µg/l	TM411		<0.4	<0.2	<0.2	<0.08	<0.4	<0.2
Benazolin	<0.04 µg/l	TM411		<0.4	<0.2	<0.2	<0.08	<0.4	<0.2
Ioxynil	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.1	<0.5	<0.25
Pentachlorophenol	<0.04 µg/l	TM411		<0.4	<0.2	<0.2	<0.08	<0.4	<0.2
Fluoroxypyr	<0.1 µg/l	TM411		<1	<0.5	<0.5	<0.2	<1	<0.5

Validated

CERTIFICATE OF ANALYSIS

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

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Chloronaphthalene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Chlorophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Methylnaphthalene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Methylphenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Nitroaniline (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Nitrophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
3-Nitroaniline (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Bromophenylphenylether (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Chloroaniline (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Methylphenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Nitroaniline (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Nitrophenol (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
Azobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Acenaphthylene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Acenaphthene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Anthracene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176		<40 #	<100 #	<20 #	<8 #	<8 #	<40 #
Butylbenzyl phthalate (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(a)anthracene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #

CERTIFICATE OF ANALYSIS

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	
#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Carbazole (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Chrysene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Dibenzofuran (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Diethyl phthalate (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Dimethyl phthalate (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<100 #	<250 #	<50 #	<20 #	<20 #	<100 #
Fluoranthene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Fluorene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Pentachlorophenol (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
Phenol (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachloroethane (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Nitrobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Naphthalene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Isophorone (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
Phenanthrene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Pyrene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #

CERTIFICATE OF ANALYSIS

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

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Dibromofluoromethane**	%	TM208		113	110	106	115	112	111
Toluene-d8**	%	TM208		102	102	104	99.7	100	101
4-Bromofluorobenzene**	%	TM208		101	96.8	98.8	95.6	94.9	94.6
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		<3 #	<3 #	<3 #	<3 #	<3 #	<3 #
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

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

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			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

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

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

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

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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: 20-82837
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

Louise Morrow

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.

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ALS Life Sciences
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CH5 3US

Report Reference: 20-82837

Report Version: 1

Site: Fehily Timoney

Sample Description: 5AP

Sample Type: Ground

Lab Reference Number: 529056

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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

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CH5 3US

Report Reference: 20-82837

Report Version: 1

Site: Fehily Timoney

Sample Description: 8AP

Sample Type: Ground

Lab Reference Number: 529057

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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	-

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Note:
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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

Louise Morrow

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.

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Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: RC2 - TUAM

Sample Type: Ground

Lab Reference Number: 529048

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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.
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Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: RC3- TUAM

Sample Type: Ground

Lab Reference Number: 529049

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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.
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Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: 3AP-TUAM

Sample Type: Ground

Lab Reference Number: 529050

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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.
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Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: 4AP- TUAM

Sample Type: Ground

Lab Reference Number: 529051

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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.
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Appendix General

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

2. 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.

Appendix

General

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

2. 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.

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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 Offices
North Park Business Park
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Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date of report Generation:	26 July 2021
Customer:	Fehily Timoney
Sample Delivery Group (SDG):	210715-101
Your Reference:	P2282
Location:	Tuam Landfill
Report No:	607021

We received 7 samples on Thursday July 15, 2021 and 7 of these samples were scheduled for analysis which was completed on Monday July 26, 2021. 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

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
24638127	5A		0.00 - 0.00	13/07/2021
24638137	8A		0.00 - 0.00	13/07/2021
24638117	3AP		0.00 - 0.00	13/07/2021
24638157	GW01(D)		0.00 - 0.00	13/07/2021
24638149	GW01(S)		0.00 - 0.00	13/07/2021
24638099	RC2		0.00 - 0.00	13/07/2021
24638106	RC3		0.00 - 0.00	13/07/2021

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

Validated

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**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)								24638127						24638137						24638117		24638157
Customer Sample Reference								5A						8A						3AP		GW01(D)
AGS Reference																						
Depth (m)								0.00 - 0.00						0.00 - 0.00						0.00 - 0.00		0.00 - 0.00
Container								0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)
Sample Type								GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 7						X						X						X						X
Alkalinity as CaCO3	All	NDPs: 0 Tests: 7		X						X						X						X				
Ammonium Low	All	NDPs: 0 Tests: 7			X						X						X						X			
Anions by Kone (w)	All	NDPs: 0 Tests: 7		X						X						X						X				
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 7		X						X						X						X				
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 7					X						X						X						X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 7				X						X						X						X		
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 7		X						X						X						X				
Fluoride	All	NDPs: 0 Tests: 7		X						X						X						X				
Mercury Dissolved	All	NDPs: 0 Tests: 7				X						X						X						X		
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 7	X						X						X						X					X
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 7	X						X						X						X					X
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 7	X						X						X						X					X
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 7	X						X						X						X					X
pH Value	All	NDPs: 0 Tests: 7		X						X						X						X				

24638106	RC3		0.00 - 0.00	HNO3 Filtered (ALE204)	GW								X			X						
				H2SO4 (ALE244)	GW				X													
				500ml Plastic (ALE208)	GW			X			X		X			X		X					X
				0.5l glass bottle (ALE227)	GW		X													X		X		X		
24638099	RC2		0.00 - 0.00	Vial (ALE297)	GW																			
				NaOH (ALE245)	GW								X											
				HNO3 Filtered (ALE204)	GW										X									
				H2SO4 (ALE244)	GW				X															
				500ml Plastic (ALE208)	GW			X			X		X			X		X					X
				0.5l glass bottle (ALE227)	GW		X													X		X		X		
24638149	GW01(S)		0.00 - 0.00	Vial (ALE297)	GW																			
				NaOH (ALE245)	GW								X											
				HNO3 Filtered (ALE204)	GW										X									
				H2SO4 (ALE244)	GW				X															
				500ml Plastic (ALE208)	GW			X			X		X			X		X					X
				0.5l glass bottle (ALE227)	GW		X													X		X		X		
24638157	GW01(D)		0.00 - 0.00	Vial (ALE297)	GW																			
				NaOH (ALE245)	GW								X											
				HNO3 Filtered (ALE204)	GW										X									
				H2SO4 (ALE244)	GW				X															
				500ml Plastic (ALE208)	GW			X			X		X			X		X					X

Validated

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**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)			24638127						24638137						24638117						24638157			
Customer Sample Reference			5A						8A						3AP						GW01(D)			
AGS Reference																								
Depth (m)			0.00 - 0.00						0.00 - 0.00						0.00 - 0.00						0.00 - 0.00			
Container			0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)			
Sample Type			GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW		
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 7		X						X						X								
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 7			X						X						X							
VOC MS (W)	All	NDPs: 0 Tests: 7						X						X						X				

24638106	RC3		0.00 - 0.00	HNO3 Filtered (ALE204)	GW		
				H2SO4 (ALE244)	GW	X	
				500ml Plastic (ALE208)	GW		X
				0.5l glass bottle (ALE227)	GW		
24638099	RC2		0.00 - 0.00	Vial (ALE297)	GW	X	
				NaOH (ALE245)	GW		
				HNO3 Filtered (ALE204)	GW		
				H2SO4 (ALE244)	GW	X	
				500ml Plastic (ALE208)	GW		X
				0.5l glass bottle (ALE227)	GW		
24638149	GW01(S)		0.00 - 0.00	Vial (ALE297)	GW	X	
				NaOH (ALE245)	GW		
				HNO3 Filtered (ALE204)	GW		
				H2SO4 (ALE244)	GW	X	
				500ml Plastic (ALE208)	GW		X
				0.5l glass bottle (ALE227)	GW		
24638157	GW01(D)		0.00 - 0.00	Vial (ALE297)	GW	X	
				NaOH (ALE245)	GW		
				HNO3 Filtered (ALE204)	GW		
				H2SO4 (ALE244)	GW	X	
				500ml Plastic (ALE208)	GW		X

Validated

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**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)			24638106	
Customer Sample Reference			RC3	
AGS Reference				
Depth (m)			0.00 - 0.00	
Container			NaOH (ALE245)	Vial (ALE297)
Sample Type			GW	GW
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 7	X	
VOC MS (W)	All	NDPs: 0 Tests: 7		X

Validated

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	5A	8A	3AP	GW01(D)	GW01(S)	RC2
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
			Sample Time	.	.	.	.	.	.
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021
			SDG Ref	210715-101	210715-101	210715-101	210715-101	210715-101	210715-101
			Lab Sample No.(s)	24638127	24638137	24638117	24638157	24638149	24638099
			AGS Reference						
Alkalinity, Total as HCO3	<2 mg/l	TM043		739	403	382	520	5010	570
Oxygen, dissolved	<0.3 mg/l	TM046		9.81	6.77	10.2	11.5	3.68	8.64
Organic Carbon, Total	<3 mg/l	TM090		19.7 #	11.5 #	26.4 #	16.8 #	13.6 ♦ #	32.4 #
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099		0.624 #	0.871 #	0.14 #	2.21 #	2.52 #	2.66 #
Fluoride	<0.5 mg/l	TM104		<0.5 #	0.517 #	<0.5 #	0.838 #	0.611 #	<0.5 #
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120		0.552 #	0.773 #	0.519 #	0.724 #	0.738 #	0.747 #
Arsenic (diss.filt)	<0.5 µg/l	TM152		3.38 #	4.89 2 #	0.789 #	2.67 2 #	3.5 2 #	1.77 #
Barium (diss.filt)	<0.2 µg/l	TM152		75.2 #	47 2 #	14.9 #	95.9 2 #	97.6 2 #	40.8 #
Boron (diss.filt)	<10 µg/l	TM152		<10 #	11.2 2 #	<10 #	16.1 2 #	14.3 2 #	14.8 #
Cadmium (diss.filt)	<0.08 µg/l	TM152		<0.08 #	<0.08 2 #	0.165 #	0.311 2 #	0.248 2 #	<0.08 #
Chromium (diss.filt)	<1 µg/l	TM152		1.12 #	<1 2 #	<1 #	3.13 2 #	2.09 2 #	2.84 #
Copper (diss.filt)	<0.3 µg/l	TM152		<0.3 #	<0.3 2 #	10.1 #	1.26 2 #	<0.3 2 #	<0.3 #
Lead (diss.filt)	<0.2 µg/l	TM152		0.234 #	<0.2 2 #	0.368 #	4.6 2 #	3.42 2 #	<0.2 #
Manganese (diss.filt)	<3 µg/l	TM152		90.6 #	221 2 #	120 #	142 2 #	133 2 #	121 #
Nickel (diss.filt)	<0.4 µg/l	TM152		6.81 #	12.8 2 #	3.4 #	9.79 2 #	10.8 2 #	3.6 #
Phosphorus (diss.filt)	<10 µg/l	TM152		35.5 #	<10 2 #	<10 #	195 2 #	193 2 #	65.1 #
Selenium (diss.filt)	<1 µg/l	TM152		<1 #	<1 2 #	<1 #	<1 2 #	<1 2 #	<1 #
Thallium (diss.filt)	<2 µg/l	TM152		<2 #	<2 2 #	<2 #	<2 2 #	<2 2 #	<2 #
Zinc (diss.filt)	<1 µg/l	TM152		4.76 #	2.84 2 #	3.23 #	21.4 2 #	21 2 #	6.43 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152		10.5 #	31.4 2 #	9.42 #	21.2 2 #	21.7 2 #	13.2 #
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		4.15 #	8.5 2 #	4.42 #	15.1 2 #	15.5 2 #	8.52 #
Potassium (Dis.Filt)	<0.2 mg/l	TM152		2.01 #	1.85 2 #	0.329 #	2.26 2 #	2.4 2 #	2.61 #
Calcium (Dis.Filt)	<0.2 mg/l	TM152		126 #	169 2 #	128 #	180 2 #	162 2 #	173 #
Iron (Dis.Filt)	<0.019 mg/l	TM152		4.2 #	0.726 2 #	1.25 #	8.13 2 #	7.62 2 #	9.48 #
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172		<100	<100	<100	<100	<100	<100
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 #	<0.01 2 #	<0.01 #	<0.01 2 #	<0.01 2 #	<0.01 #
Sulphate	<2 mg/l	TM184		<2 #	47.2 #	<10 #	<2 #	<2 #	<2 #
Chloride	<2 mg/l	TM184		9.1 #	56.9 #	12 #	26.3 #	38.3 #	19.7 #
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184		<0.1 #	<0.1 #	0.994 #	<0.1 #	<0.1 #	<0.1 #
Cyanide, Total	<0.05 mg/l	TM227		<0.05 #	<0.05 #	<0.05 #	<0.05 #	<0.05 #	<0.05 #
pH	<1 pH Units	TM256		7.12 #	7.28 #	7.3 #	7.18 #	7.07 #	7.1 #
Trifluralin	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
alpha-HCH	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	5A	8A	3AP	GW01(D)	GW01(S)	RC2
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
			Sample Time	.	.	.	.	.	.
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021
			SDG Ref	210715-101	210715-101	210715-101	210715-101	210715-101	210715-101
			Lab Sample No.(s)	24638127	24638137	24638117	24638157	24638149	24638099
			AGS Reference						
gamma-HCH (Lindane)	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
Heptachlor	<0.01 µg/l	TM343		<0.02	<0.02	<0.1	<0.04	<0.02	<0.1
Aldrin	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
beta-HCH	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
Isodrin	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
delta-HCH	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
Heptachlor epoxide	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
o,p'-DDE	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
Endosulphan I	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
trans-Chlordane	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
cis-Chlordane	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
p,p'-DDE	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
Dieldrin	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
o,p'-DDD (TDE)	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
Endrin	<0.01 µg/l	TM343		<0.02	<0.02	<0.1	<0.04	<0.02	<0.1
o,p'-DDT	<0.01 µg/l	TM343		<0.05	<0.05	<0.25	<0.1	<0.05	<0.1
p,p'-DDD (TDE)	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.16	<0.01	<0.05
Endosulphan II	<0.02 µg/l	TM343		<0.02	<0.02	<0.1	<0.04	<0.02	<0.1
p,p'-DDT	<0.01 µg/l	TM343		<0.08	<0.08	<0.4	<0.02	<0.08	<0.4
o,p'-Methoxychlor	<0.01 µg/l	TM343		<0.04	<0.04	<0.2	<0.08	<0.04	<0.2
p,p'-Methoxychlor	<0.01 µg/l	TM343		<0.08	<0.08	<0.4	<0.16	<0.08	<0.4
Endosulphan Sulphate	<0.02 µg/l	TM343		<0.04	<0.04	<0.2	<0.08	<0.04	<0.2
Permethrin I	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
Permethrin II	<0.01 µg/l	TM343		<0.01	<0.01	<0.05	<0.02	<0.01	<0.05
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Hexachlorobutadiene	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Dichlorvos	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Dichlobenil	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Mevinphos	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Tecnazene	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Hexachlorobenzene	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	5A	8A	3AP	GW01(D)	GW01(S)	RC2
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
			Sample Time	.	.	.	.	.	.
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021
			SDG Ref	210715-101	210715-101	210715-101	210715-101	210715-101	210715-101
			Lab Sample No.(s)	24638127	24638137	24638117	24638157	24638149	24638099
			AGS Reference						
Demeton-S-methyl	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Phorate	<0.01 µg/l	TM344		<0.05	<0.03	<0.06	<0.03	<0.1	<0.06
Diazinon	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Triallate	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Atrazine	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Simazine	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Disulfoton	<0.01 µg/l	TM344		<0.1	<0.07	<0.14	<0.07	<0.2	<0.14
Propetamphos	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Chlorpyriphos-methyl	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Dimethoate	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Chlorpyriphos	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Methyl Parathion	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Malathion	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Fenthion	<0.01 µg/l	TM344		<0.05	<0.02	<0.04	<0.02	<0.1	<0.04
Fenitrothion	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Triadimefon	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Pendimethalin	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Parathion	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Chlorfenvinphos	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
trans-Chlordane	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
cis-Chlordane	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Ethion	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Carbophenothion	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Triazophos	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Phosalone	<0.01 µg/l	TM344		<0.05	<0.01	<0.02	<0.01	<0.1	<0.02
Azinphos methyl	<0.02 µg/l	TM344		<0.1	<0.02	<0.04	<0.02	<0.2	<0.04
Azinphos ethyl	<0.02 µg/l	TM344		<0.1	<0.02	<0.04	<0.02	<0.2	<0.04
Etridiazole	<0.01 µg/l	TM345		<0.2	<0.01	<0.02	<0.01	<0.2	<0.02
Pentachlorobenzene	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Propachlor	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Quintozene (PCNB)	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Omethoate	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	5A	8A	3AP	GW01(D)	GW01(S)	RC2
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
			Sample Time	.	.	.	.	.	.
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021
			SDG Ref	210715-101	210715-101	210715-101	210715-101	210715-101	210715-101
			Lab Sample No.(s)	24638127	24638137	24638117	24638157	24638149	24638099
			AGS Reference						
Propazine	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Propyzamide	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Alachlor	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Prometryn	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Telodrin	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Terbutryn	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Chlorothalonil	<0.01 µg/l	TM345		<0.3	<0.02	<0.04	<0.02	<0.3	<0.04
Etrimphos	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Metazachlor	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Cyanazine	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Trietazine	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Coumaphos	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Phosphamidon I	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Phosphamidon II	<0.01 µg/l	TM345		<0.1	<0.01	<0.02	<0.01	<0.1	<0.02
Dinitro-o-cresol	<0.1 µg/l	TM411		<0.2	<0.1	<0.2	<0.1	<0.2	<0.2
Clopyralid	<0.04 µg/l	TM411		<0.08	<0.04	<0.08	<0.04	<0.08	<0.08
MCPA	<0.05 µg/l	TM411		<0.1	<0.05	<0.1	<0.05	<0.1	<0.1
Mecoprop	<0.04 µg/l	TM411		<0.08	<0.04	<0.08	<0.04	<0.08	<0.08
Dicamba	<0.04 µg/l	TM411		<0.08	<0.04	<0.08	<0.04	<0.08	<0.08
MCPB	<0.05 µg/l	TM411		<0.1	<0.05	<0.1	<0.05	<0.1	<0.1
2,4-DB	<0.1 µg/l	TM411		<0.2	<0.1	<0.2	<0.1	<0.2	<0.2
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411		<0.1	<0.05	<0.1	<0.05	<0.1	<0.1
Dichlorprop	<0.1 µg/l	TM411		<0.2	<0.1	<0.2	<0.1	<0.2	<0.2
Triclopyr	<0.05 µg/l	TM411		<0.1	<0.05	<0.1	<0.05	<0.1	<0.1
Fenoprop (Silvex)	<0.1 µg/l	TM411		<0.2	<0.1	<0.2	<0.1	<0.2	<0.2
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.1	<0.05	<0.1	<0.05	<0.1	<0.1
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.1	<0.05	<0.1	<0.05	<0.1	<0.1
Bromoxynil	<0.04 µg/l	TM411		<0.08	<0.04	<0.08	<0.04	<0.08	<0.08
Benazolin	<0.04 µg/l	TM411		<0.08	<0.04	<0.08	<0.04	<0.08	<0.08
Ioxynil	<0.05 µg/l	TM411		<0.1	<0.05	<0.1	<0.05	<0.1	<0.1
Pentachlorophenol	<0.04 µg/l	TM411		<0.08	<0.04	<0.08	<0.04	<0.08	<0.08
Fluoroxypyr	<0.1 µg/l	TM411		<0.2	<0.1	<0.2	<0.1	<0.2	<0.2

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend

#	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)

Customer Sample Ref.	RC3							
Depth (m)	0.00 - 0.00							
Sample Type	Ground Water (GW)							
Date Sampled	13/07/2021							
Sample Time	.							
Date Received	15/07/2021							
SDG Ref	210715-101							
Lab Sample No.(s)	24638106							
AGS Reference								
Component	**LOD/Units**	**Method**						
Alkalinity, Total as HCO3	<2 mg/l	TM043	332					
Oxygen, dissolved	<0.3 mg/l	TM046	9.59					
Organic Carbon, Total	<3 mg/l	TM090	52.5 #					
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	0.504 #					
Fluoride	<0.5 mg/l	TM104	<0.5 #					
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.439 #					
Arsenic (diss.filt)	<0.5 µg/l	TM152	4.56 #					
Barium (diss.filt)	<0.2 µg/l	TM152	23.3 #					
Boron (diss.filt)	<10 µg/l	TM152	<10 #					
Cadmium (diss.filt)	<0.08 µg/l	TM152	0.325 #					
Chromium (diss.filt)	<1 µg/l	TM152	1.5 #					
Copper (diss.filt)	<0.3 µg/l	TM152	0.91 #					
Lead (diss.filt)	<0.2 µg/l	TM152	0.687 #					
Manganese (diss.filt)	<3 µg/l	TM152	41 #					
Nickel (diss.filt)	<0.4 µg/l	TM152	16.6 #					
Phosphorus (diss.filt)	<10 µg/l	TM152	35.9 #					
Selenium (diss.filt)	<1 µg/l	TM152	<1 #					
Thallium (diss.filt)	<2 µg/l	TM152	<2 #					
Zinc (diss.filt)	<1 µg/l	TM152	24.4 #					
Sodium (Dis.Filt)	<0.076 mg/l	TM152	8.14 #					
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	4.24 #					
Potassium (Dis.Filt)	<0.2 mg/l	TM152	0.832 #					
Calcium (Dis.Filt)	<0.2 mg/l	TM152	107 #					
Iron (Dis.Filt)	<0.019 mg/l	TM152	3 #					
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172	435					
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01 #					
Sulphate	<2 mg/l	TM184	<10 #					
Chloride	<2 mg/l	TM184	17.3 #					
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.1 #					
Cyanide, Total	<0.05 mg/l	TM227	<0.05 #					
pH	<1 pH Units	TM256	7.14 #					
Trifluralin	<0.01 µg/l	TM343	<0.1					
alpha-HCH	<0.01 µg/l	TM343	<0.1					

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend

#	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)

		Customer Sample Ref.	RC3
		Depth (m)	0.00 - 0.00
		Sample Type	Ground Water (GW)
		Date Sampled	13/07/2021
		Sample Time	.
		Date Received	15/07/2021
		SDG Ref	210715-101
		Lab Sample No.(s)	24638106
		AGS Reference	
Component	**LOD/Units**	**Method**	
gamma-HCH (Lindane)	<0.01 µg/l	TM343	<0.1
Heptachlor	<0.01 µg/l	TM343	<0.2
Aldrin	<0.01 µg/l	TM343	<0.1
beta-HCH	<0.01 µg/l	TM343	<0.1
Isodrin	<0.01 µg/l	TM343	<0.1
delta-HCH	<0.01 µg/l	TM343	<0.1
Heptachlor epoxide	<0.01 µg/l	TM343	<0.1
o,p'-DDE	<0.01 µg/l	TM343	<0.1
Endosulphan I	<0.01 µg/l	TM343	<0.1
trans-Chlordane	<0.01 µg/l	TM343	<0.1
cis-Chlordane	<0.01 µg/l	TM343	<0.1
p,p'-DDE	<0.01 µg/l	TM343	<0.1
Dieldrin	<0.01 µg/l	TM343	<0.1
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.1
Endrin	<0.01 µg/l	TM343	<0.2
o,p'-DDT	<0.01 µg/l	TM343	<0.5
p,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.1
Endosulphan II	<0.02 µg/l	TM343	<0.2
p,p'-DDT	<0.01 µg/l	TM343	<0.8
o,p'-Methoxychlor	<0.01 µg/l	TM343	<0.4
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.8
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.4
Permethrin I	<0.01 µg/l	TM343	<0.1
Permethrin II	<0.01 µg/l	TM343	<0.1
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344	<0.05
Hexachlorobutadiene	<0.01 µg/l	TM344	<0.05
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344	<0.05
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344	<0.05
Dichlorvos	<0.01 µg/l	TM344	<0.05
Dichlobenil	<0.01 µg/l	TM344	<0.05
Mevinphos	<0.01 µg/l	TM344	<0.05
Tecnazene	<0.01 µg/l	TM344	<0.05
Hexachlorobenzene	<0.01 µg/l	TM344	<0.05

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend	
#	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)

Customer Sample Ref.	RC3
Depth (m)	0.00 - 0.00
Sample Type	Ground Water (GW)
Date Sampled	13/07/2021
Sample Time	.
Date Received	15/07/2021
SDG Ref	210715-101
Lab Sample No.(s)	24638106
AGS Reference	

Component	LOD/Units	Method	
Demeton-S-methyl	<0.01 µg/l	TM344	<0.05
Phorate	<0.01 µg/l	TM344	<0.05
Diazinon	<0.01 µg/l	TM344	<0.05
Triallate	<0.01 µg/l	TM344	<0.05
Atrazine	<0.01 µg/l	TM344	<0.05
Simazine	<0.01 µg/l	TM344	<0.05
Disulfoton	<0.01 µg/l	TM344	<0.1
Propetamphos	<0.01 µg/l	TM344	<0.05
Chlorpyriphos-methyl	<0.01 µg/l	TM344	<0.05
Dimethoate	<0.01 µg/l	TM344	<0.05
Pirimiphos-methyl	<0.01 µg/l	TM344	<0.05
Chlorpyriphos	<0.01 µg/l	TM344	<0.05
Methyl Parathion	<0.01 µg/l	TM344	<0.05
Malathion	<0.01 µg/l	TM344	<0.05
Fenthion	<0.01 µg/l	TM344	<0.05
Fenitrothion	<0.01 µg/l	TM344	<0.05
Triadimefon	<0.01 µg/l	TM344	<0.05
Pendimethalin	<0.01 µg/l	TM344	<0.05
Parathion	<0.01 µg/l	TM344	<0.05
Chlorfenvinphos	<0.01 µg/l	TM344	<0.05
trans-Chlordane	<0.01 µg/l	TM344	<0.05
cis-Chlordane	<0.01 µg/l	TM344	<0.05
Ethion	<0.01 µg/l	TM344	<0.05
Carbophenothion	<0.01 µg/l	TM344	<0.05
Triazophos	<0.01 µg/l	TM344	<0.05
Phosalone	<0.01 µg/l	TM344	<0.05
Azinphos methyl	<0.02 µg/l	TM344	<0.1
Azinphos ethyl	<0.02 µg/l	TM344	<0.1
Etridiazole	<0.01 µg/l	TM345	<0.01
Pentachlorobenzene	<0.01 µg/l	TM345	<0.01
Propachlor	<0.01 µg/l	TM345	<0.01
Quintozene (PCNB)	<0.01 µg/l	TM345	<0.01
Omethoate	<0.01 µg/l	TM345	<0.01

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend

#	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)

		Customer Sample Ref.	RC3
		Depth (m)	0.00 - 0.00
		Sample Type	Ground Water (GW)
		Date Sampled	13/07/2021
		Sample Time	.
		Date Received	15/07/2021
		SDG Ref	210715-101
		Lab Sample No.(s)	24638106
		AGS Reference	
Component	**LOD/Units**	**Method**	
Propazine	<0.01 µg/l	TM345	<0.01
Propyzamide	<0.01 µg/l	TM345	<0.01
Alachlor	<0.01 µg/l	TM345	<0.01
Prometryn	<0.01 µg/l	TM345	<0.01
Telodrin	<0.01 µg/l	TM345	<0.01
Terbutryn	<0.01 µg/l	TM345	<0.01
Chlorothalonil	<0.01 µg/l	TM345	<0.02
Etrimphos	<0.01 µg/l	TM345	<0.01
Metazachlor	<0.01 µg/l	TM345	<0.01
Cyanazine	<0.01 µg/l	TM345	<0.01
Trietazine	<0.01 µg/l	TM345	<0.01
Coumaphos	<0.01 µg/l	TM345	<0.01
Phosphamidon I	<0.01 µg/l	TM345	<0.01
Phosphamidon II	<0.01 µg/l	TM345	<0.01
Dinitro-o-cresol	<0.1 µg/l	TM411	<0.1
Clopyralid	<0.04 µg/l	TM411	<0.04
MCPA	<0.05 µg/l	TM411	<0.05
Mecoprop	<0.04 µg/l	TM411	<0.04
Dicamba	<0.04 µg/l	TM411	<0.04
MCPB	<0.05 µg/l	TM411	<0.05
2,4-DB	<0.1 µg/l	TM411	<0.1
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.05
Dichlorprop	<0.1 µg/l	TM411	<0.1
Triclopyr	<0.05 µg/l	TM411	<0.05
Fenoprop (Silvex)	<0.1 µg/l	TM411	<0.1
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05
Bromoxynil	<0.04 µg/l	TM411	<0.04
Benazolin	<0.04 µg/l	TM411	<0.04
Ioxynil	<0.05 µg/l	TM411	<0.05
Pentachlorophenol	<0.04 µg/l	TM411	<0.04
Fluoroxypyr	<0.1 µg/l	TM411	<0.1

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	5A	8A	3AP	GW01(D)	GW01(S)	RC2
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
			Sample Time	.	.	.	.	.	.
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021
			SDG Ref	210715-101	210715-101	210715-101	210715-101	210715-101	210715-101
			Lab Sample No.(s)	24638127	24638137	24638117	24638157	24638149	24638099
			AGS Reference						
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2-Chloronaphthalene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2-Chlorophenol (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2-Methylnaphthalene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2-Methylphenol (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2-Nitroaniline (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
2-Nitrophenol (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
3-Nitroaniline (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
4-Bromophenylphenylether (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
4-Chloroaniline (aq)	<1 µg/l	TM176		<4	<1	<1	<1	<10	<1
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
4-Methylphenol (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
4-Nitroaniline (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
4-Nitrophenol (aq)	<1 µg/l	TM176		<4	<1	<1	<1	<10	<1
Azobenzene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Acenaphthylene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Acenaphthene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Anthracene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176		<8 #	<2 #	<2 #	<2 #	<20 #	<2 #
Butylbenzyl phthalate (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Benzo(a)anthracene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	5A	8A	3AP	GW01(D)	GW01(S)	RC2
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
			Sample Time	.	.	.	.	.	.
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021
			SDG Ref	210715-101	210715-101	210715-101	210715-101	210715-101	210715-101
			Lab Sample No.(s)	24638127	24638137	24638117	24638157	24638149	24638099
			AGS Reference						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Carbazole (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Chrysene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Dibenzofuran (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Diethyl phthalate (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Dimethyl phthalate (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<20 #	<5 #	<5 #	<5 #	<50 #	<5 #
Fluoranthene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Fluorene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Hexachlorobenzene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Pentachlorophenol (aq)	<1 µg/l	TM176		<4	<1	<1	<1	<10	<1
Phenol (aq)	<1 µg/l	TM176		<4	<1	<1	<1	<10	<1
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Hexachloroethane (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Nitrobenzene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Naphthalene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Isophorone (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<4	<1	<1	<1	<10	<1
Phenanthrene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #
Pyrene (aq)	<1 µg/l	TM176		<4 #	<1 #	<1 #	<1 #	<10 #	<1 #

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend

#	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)

Customer Sample Ref.	RC3
Depth (m)	0.00 - 0.00
Sample Type	Ground Water (GW)
Date Sampled	13/07/2021
Sample Time	.
Date Received	15/07/2021
SDG Ref	210715-101
Lab Sample No.(s)	24638106
AGS Reference	

Component	LOD/Units	Method	
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<8 #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<8 #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<8 #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<8 #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<8 #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<8 #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<8 #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<8 #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<8 #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<8 #
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<8 #
2-Chlorophenol (aq)	<1 µg/l	TM176	<8 #
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<8 #
2-Methylphenol (aq)	<1 µg/l	TM176	<8 #
2-Nitroaniline (aq)	<1 µg/l	TM176	<8 #
2-Nitrophenol (aq)	<1 µg/l	TM176	<8 #
3-Nitroaniline (aq)	<1 µg/l	TM176	<8 #
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<8 #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<8 #
4-Chloroaniline (aq)	<1 µg/l	TM176	<8
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<8 #
4-Methylphenol (aq)	<1 µg/l	TM176	<8 #
4-Nitroaniline (aq)	<1 µg/l	TM176	<8 #
4-Nitrophenol (aq)	<1 µg/l	TM176	<8
Azobenzene (aq)	<1 µg/l	TM176	<8 #
Acenaphthylene (aq)	<1 µg/l	TM176	<8 #
Acenaphthene (aq)	<1 µg/l	TM176	<8 #
Anthracene (aq)	<1 µg/l	TM176	<8 #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<8 #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<8 #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<16 #
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<8 #
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<8 #

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	RC3
			Depth (m)	0.00 - 0.00
			Sample Type	Ground Water (GW)
			Date Sampled	13/07/2021
			Sample Time	.
			Date Received	15/07/2021
			SDG Ref	210715-101
			Lab Sample No.(s)	24638106
			AGS Reference	
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<8 #	
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<8 #	
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<8 #	
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<8 #	
Carbazole (aq)	<1 µg/l	TM176	<8 #	
Chrysene (aq)	<1 µg/l	TM176	<8 #	
Dibenzofuran (aq)	<1 µg/l	TM176	<8 #	
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<8 #	
Diethyl phthalate (aq)	<1 µg/l	TM176	<8 #	
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<8 #	
Dimethyl phthalate (aq)	<1 µg/l	TM176	<8 #	
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<40 #	
Fluoranthene (aq)	<1 µg/l	TM176	<8 #	
Fluorene (aq)	<1 µg/l	TM176	<8 #	
Hexachlorobenzene (aq)	<1 µg/l	TM176	<8 #	
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<8 #	
Pentachlorophenol (aq)	<1 µg/l	TM176	<8	
Phenol (aq)	<1 µg/l	TM176	<8	
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<8 #	
Hexachloroethane (aq)	<1 µg/l	TM176	<8 #	
Nitrobenzene (aq)	<1 µg/l	TM176	<8 #	
Naphthalene (aq)	<1 µg/l	TM176	<8 #	
Isophorone (aq)	<1 µg/l	TM176	<8 #	
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<8	
Phenanthrene (aq)	<1 µg/l	TM176	<8 #	
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<8 #	
Pyrene (aq)	<1 µg/l	TM176	<8 #	

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

VOC MS (W)

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	5A	8A	3AP	GW01(D)	GW01(S)	RC2
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
			Sample Time	.	.	.	.	.	.
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021
			SDG Ref	210715-101	210715-101	210715-101	210715-101	210715-101	210715-101
			Lab Sample No.(s)	24638127	24638137	24638117	24638157	24638149	24638099
			AGS Reference						
Dibromofluoromethane**	%	TM208		111	110	112	116	110	115
Toluene-d8**	%	TM208		99.1	101	99.3	98.8	99.8	99
4-Bromofluorobenzene**	%	TM208		96.2	101	96.8	96.9	96.3	96.9
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		<3 #	<3 #	<3 #	<3 #	<3 #	<3 #
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

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

VOC MS (W)

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	5A	8A	3AP	GW01(D)	GW01(S)	RC2
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021	13/07/2021
			Sample Time	.	.	.	.	.	.
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021
			SDG Ref	210715-101	210715-101	210715-101	210715-101	210715-101	210715-101
			Lab Sample No.(s)	24638127	24638137	24638117	24638157	24638149	24638099
			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

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

VOC MS (W)

Results Legend

#	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)

Customer Sample Ref.	RC3							
Depth (m)	0.00 - 0.00							
Sample Type	Ground Water (GW)							
Date Sampled	13/07/2021							
Sample Time	.							
Date Received	15/07/2021							
SDG Ref	210715-101							
Lab Sample No.(s)	24638106							
AGS Reference								
Component	**LOD/Units**	**Method**						
Dibromofluoromethane**	%	TM208	113					
Toluene-d8**	%	TM208	99.4					
4-Bromofluorobenzene**	%	TM208	96.5					
Dichlorodifluoromethane	<1 µg/l	TM208	<1 #					
Chloromethane	<1 µg/l	TM208	<1 #					
Vinyl chloride	<1 µg/l	TM208	<1 #					
Bromomethane	<1 µg/l	TM208	<1 #					
Chloroethane	<1 µg/l	TM208	<1 #					
Trichlorofluoromethane	<1 µg/l	TM208	<1 #					
1,1-Dichloroethene	<1 µg/l	TM208	<1 #					
Carbon disulphide	<1 µg/l	TM208	<1 #					
Dichloromethane	<3 µg/l	TM208	<3 #					
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #					
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #					
1,1-Dichloroethane	<1 µg/l	TM208	<1 #					
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #					
2,2-Dichloropropane	<1 µg/l	TM208	<1					
Bromochloromethane	<1 µg/l	TM208	<1 #					
Chloroform	<1 µg/l	TM208	<1 #					
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #					
1,1-Dichloropropene	<1 µg/l	TM208	<1 #					
Carbontetrachloride	<1 µg/l	TM208	<1 #					
1,2-Dichloroethane	<1 µg/l	TM208	<1 #					
Benzene	<1 µg/l	TM208	<1 #					
Trichloroethene	<1 µg/l	TM208	<1 #					
1,2-Dichloropropane	<1 µg/l	TM208	<1 #					
Dibromomethane	<1 µg/l	TM208	<1 #					
Bromodichloromethane	<1 µg/l	TM208	<1 #					
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #					
Toluene	<1 µg/l	TM208	<1 #					
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #					
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #					
1,3-Dichloropropane	<1 µg/l	TM208	<1 #					

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

VOC MS (W)

Results Legend	
#	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)

Customer Sample Ref.	RC3
Depth (m)	0.00 - 0.00
Sample Type	Ground Water (GW)
Date Sampled	13/07/2021
Sample Time	.
Date Received	15/07/2021
SDG Ref	210715-101
Lab Sample No.(s)	24638106
AGS Reference	

Component	LOD/Units	Method	RC3
Tetrachloroethene	<1 µg/l	TM208	<1 #
Dibromochloromethane	<1 µg/l	TM208	<1 #
1,2-Dibromoethane	<1 µg/l	TM208	<1 #
Chlorobenzene	<1 µg/l	TM208	<1 #
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1 #
Ethylbenzene	<1 µg/l	TM208	<1 #
m,p-Xylene	<1 µg/l	TM208	<1 #
o-Xylene	<1 µg/l	TM208	<1 #
Styrene	<1 µg/l	TM208	<1 #
Bromoform	<1 µg/l	TM208	<1 #
Isopropylbenzene	<1 µg/l	TM208	<1 #
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1 #
1,2,3-Trichloropropane	<1 µg/l	TM208	<1 #
Bromobenzene	<1 µg/l	TM208	<1 #
Propylbenzene	<1 µg/l	TM208	<1 #
2-Chlorotoluene	<1 µg/l	TM208	<1 #
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1 #
4-Chlorotoluene	<1 µg/l	TM208	<1 #
tert-Butylbenzene	<1 µg/l	TM208	<1 #
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1 #
sec-Butylbenzene	<1 µg/l	TM208	<1 #
4-iso-Propyltoluene	<1 µg/l	TM208	<1 #
1,3-Dichlorobenzene	<1 µg/l	TM208	<1 #
1,4-Dichlorobenzene	<1 µg/l	TM208	<1 #
n-Butylbenzene	<1 µg/l	TM208	<1 #
1,2-Dichlorobenzene	<1 µg/l	TM208	<1 #
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1 #
Hexachlorobutadiene	<1 µg/l	TM208	<1 #
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1 #
Naphthalene	<1 µg/l	TM208	<1 #
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1 #
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1

CERTIFICATE OF ANALYSIS

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**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
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
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter
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

SDG:	210715-101	**Client Reference:**	P2282	**Report Number:**	607021
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	24638127	24638137	24638117	24638157	24638149	24638099	24638106
Customer Sample Ref.	5A	8A	3AP	GW01(D)	GW01(S)	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
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021
Alkalinity as CaCO3	21-Jul-2021	20-Jul-2021	20-Jul-2021	21-Jul-2021	19-Jul-2021	20-Jul-2021	20-Jul-2021
Ammonium Low	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021
Anions by Kone (w)	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021
Conductivity (at 20 deg.C)	21-Jul-2021	20-Jul-2021	21-Jul-2021	20-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021
Cyanide Comp/Free/Total/Thiocyanate	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021
Dissolved Metals by ICP-MS	21-Jul-2021	20-Jul-2021	20-Jul-2021	21-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021
Dissolved Oxygen by Probe	16-Jul-2021	16-Jul-2021	16-Jul-2021	16-Jul-2021	16-Jul-2021	16-Jul-2021	16-Jul-2021
Fluoride	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	16-Jul-2021	16-Jul-2021
Mercury Dissolved	20-Jul-2021	22-Jul-2021	19-Jul-2021	19-Jul-2021	22-Jul-2021	19-Jul-2021	19-Jul-2021
Mineral Oil C10-40 Aqueous (W)	20-Jul-2021	21-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021
Pesticides (Suite I) by GCMS	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021
Pesticides (Suite II) by GCMS	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021
Pesticides (Suite III) by GCMS	26-Jul-2021	26-Jul-2021	26-Jul-2021	26-Jul-2021	26-Jul-2021	26-Jul-2021	26-Jul-2021
pH Value	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
SVOC MS (W) - Aqueous	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
Total Organic and Inorganic Carbon	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021	22-Jul-2021	20-Jul-2021	20-Jul-2021
VOC MS (W)	16-Jul-2021	18-Jul-2021	16-Jul-2021	16-Jul-2021	16-Jul-2021	16-Jul-2021	16-Jul-2021

Appendix General

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

2. 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**
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**

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 asbestos present is not determined unless specifically requested.

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
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

1291

CERTIFICATE OF ANALYSIS

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.

Validated

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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
			26388593	3A		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
							HNO3 Filtered (ALE204)	GW
							NaOH (ALE245)	GW
							Vial (ALE297)	GW
			26388531	5A		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
							HNO3 Filtered (ALE204)	GW
							NaOH (ALE245)	GW
							Vial (ALE297)	GW
			26388541	8A		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
							HNO3 Filtered (ALE204)	GW
							NaOH (ALE245)	GW
							Vial (ALE297)	GW
			26388633	4AP		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 9						
			X				X	
							X	
Alkalinity as CaCO3	All	NDPs: 0 Tests: 9						
				X				
							X	
				X				
Ammonium Low	All	NDPs: 0 Tests: 9						
							X	
							X	
Anions by Kone (w)	All	NDPs: 0 Tests: 9						
			X				X	
							X	
BOD True Total	All	NDPs: 0 Tests: 9						
				X				
							X	
				X				
COD Unfiltered	All	NDPs: 0 Tests: 9						
			X				X	
							X	
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 9						
					X			
							X	
							X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 9						
					X			
							X	
							X	
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 9						
				X				
							X	
				X				
Fluoride	All	NDPs: 0 Tests: 9						
				X				
							X	
				X				
Mercury Dissolved	All	NDPs: 0 Tests: 9						
					X			
							X	
					X			
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 9						
				X				
							X	
				X				
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 9						
			X				X	
							X	
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 9						
			X				X	
							X	
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 9						
			X				X	
							X	

26388583	GW02		0.00 - 0.00	HNO3 Filtered (ALE204)	GW									x			x						
				H2SO4 (ALE244)	GW			x															
				500ml Plastic (ALE208)	GW		x			x					x	x			x				
				0.5l glass bottle (ALE227)	GW	x			x		x									x	x	x	
26388574	GW01		0.00 - 0.00	Vial (ALE297)	GW																		
				NaOH (ALE245)	GW							x											
				HNO3 Filtered (ALE204)	GW									x			x						
				H2SO4 (ALE244)	GW			x															
				500ml Plastic (ALE208)	GW		x			x					x	x			x				
				0.5l glass bottle (ALE227)	GW	x			x		x									x	x	x	
26388616	5AP		0.00 - 0.00	Vial (ALE297)	GW																		
				NaOH (ALE245)	GW							x											
				HNO3 Filtered (ALE204)	GW									x			x						
				H2SO4 (ALE244)	GW			x															
				500ml Plastic (ALE208)	GW		x			x					x	x			x				
				0.5l glass bottle (ALE227)	GW	x			x		x									x	x	x	
26388633	4AP		0.00 - 0.00	Vial (ALE297)	GW																		
				NaOH (ALE245)	GW							x											
				HNO3 Filtered (ALE204)	GW									x			x						
				H2SO4 (ALE244)	GW			x															
				500ml Plastic (ALE208)	GW		x			x					x	x			x				

Validated

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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
			26388593	3A		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
							HNO3 Filtered (ALE204)	GW
							NaOH (ALE245)	GW
							Vial (ALE297)	GW
			26388531	5A		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
							HNO3 Filtered (ALE204)	GW
							NaOH (ALE245)	GW
							Vial (ALE297)	GW
			26388541	8A		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
							500ml Plastic (ALE208)	GW
							H2SO4 (ALE244)	GW
							HNO3 Filtered (ALE204)	GW
							NaOH (ALE245)	GW
							Vial (ALE297)	GW
			26388633	4AP		0.00 - 0.00	0.5l glass bottle (ALE227)	GW
pH Value	All	NDPs: 0 Tests: 9						
			X				X	
			X				X	
			X				X	
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 9						
			X				X	
			X				X	
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 9						
				X				
				X				
VOC MS (W)	All	NDPs: 0 Tests: 9						
					X			
					X			

26388583	GW02		0.00 - 0.00	HNO3 Filtered (ALE204)	GW								
				H2SO4 (ALE244)	GW						X		
				500ml Plastic (ALE208)	GW								
				0.5l glass bottle (ALE227)	GW		X		X				
26388574	GW01		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		X		X				
26388616	5AP		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		X		X				
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								

Validated

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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	GW02	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)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)
			Sample Type	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 9			X						X						
Alkalinity as CaCO3	All	NDPs: 0 Tests: 9				X						X					
Ammonium Low	All	NDPs: 0 Tests: 9					X						X				
Anions by Kone (w)	All	NDPs: 0 Tests: 9			X						X						
BOD True Total	All	NDPs: 0 Tests: 9				X						X					
COD Unfiltered	All	NDPs: 0 Tests: 9			X						X						
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 9	X						X							X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 9						X							X		
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 9				X						X					
Fluoride	All	NDPs: 0 Tests: 9				X						X					
Mercury Dissolved	All	NDPs: 0 Tests: 9						X							X		
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 9				X						X					
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 9			X						X						
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 9			X						X						
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 9			X						X						

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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				GW02						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)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)
Sample Type			GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
pH Value	All	NDPs: 0 Tests: 9			X						X					
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 9			X						X					
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 9					X						X			
VOC MS (W)	All	NDPs: 0 Tests: 9		X						X						X

Validated

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
			Sample Time	-	-	-	-	-	-
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
			SDG Ref	220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
			Lab Sample No.(s)	26388593	26388531	26388541	26388633	26388616	26388574
			AGS Reference						
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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
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- 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)

Component	LOD/Units	Method	Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
			Sample Time	.	.	.	.	.	.
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
			SDG Ref	220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
			Lab Sample No.(s)	26388593	26388531	26388541	26388633	26388616	26388574
			AGS Reference						
PCB congener 138	<0.015 µg/l	TM197		<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
PCB congener 180	<0.015 µg/l	TM197		<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
Cyanide, Total	<0.05 mg/l	TM227		<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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
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Component	LOD/Units	Method	Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
			Sample Time	.	.	.	.	.	.
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
			SDG Ref	220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
			Lab Sample No.(s)	26388593	26388531	26388541	26388633	26388616	26388574
			AGS Reference						
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344		<0.4	<0.2	<0.2	<0.2	<0.2	<0.1
Hexachlorobutadiene	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
Dichlorvos	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlobenil	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Mevinphos	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Tecnazene	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Demeton-S-methyl	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Phorate	<0.01 µg/l	TM344		<0.4	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Triallate	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Atrazine	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Simazine	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Disulfoton	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Propetamphos	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Methyl Parathion	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Fenthion	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Triadimefon	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Pendimethalin	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorfenvinphos	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Chlordane	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
cis-Chlordane	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	<0.01 µg/l	TM344		<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Carbophenothion	<0.01 µg/l	TM344		<0.4	<0.1	<0.1	<0.2	<0.1	<0.1

CERTIFICATE OF ANALYSIS

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Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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Component	LOD/Units	Method	Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
			Sample Time	.	.	.	.	.	.
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
			SDG Ref	220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
			Lab Sample No.(s)	26388593	26388531	26388541	26388633	26388616	26388574
			AGS Reference						
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

Validated

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**

Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
			Sample Time	.	.	.	.	.	.
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
			SDG Ref	220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
			Lab Sample No.(s)	26388593	26388531	26388541	26388633	26388616	26388574
			AGS Reference						
Fenoprop (Silvex)	<0.1 µg/l	TM411		<1	<0.5	<0.5	<1	<0.5	<1
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.5	<0.25	<0.5
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.5	<0.25	<0.5
Bromoxynil	<0.04 µg/l	TM411		<0.4	<0.2	<0.2	<0.4	<0.2	<0.4
Benazolin	<0.04 µg/l	TM411		<0.4	<0.2	<0.2	<0.4	<0.2	<0.4
Ioxynil	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.5	<0.25	<0.5
Pentachlorophenol	<0.04 µg/l	TM411		<0.4	<0.2	<0.2	<0.4	<0.2	<0.4
Fluoroxypyr	<0.1 µg/l	TM411		<1	<0.5	<0.5	<1	<0.5	<1

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
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- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	GW02	RC2	RC3			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	31/05/2022	31/05/2022	31/05/2022			
			Sample Time	-	-	-			
			Date Received	06/06/2022	06/06/2022	06/06/2022			
			SDG Ref	220606-21	220606-21	220606-21			
			Lab Sample No.(s)	26388583	26388558	26388566			
			AGS Reference						
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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
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- aq Aqueous / settled sample.
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- tot.unfilt Total / unfiltered sample.
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- ** % 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	Customer Sample Ref.	GW02	RC2	RC3			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	31/05/2022	31/05/2022	31/05/2022			
			Sample Time	.	.	.			
			Date Received	06/06/2022	06/06/2022	06/06/2022			
			SDG Ref	220606-21	220606-21	220606-21			
			Lab Sample No.(s)	26388583	26388558	26388566			
			AGS Reference						
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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
- # ISO17025 accredited.
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- aq Aqueous / settled sample.
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- * 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
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- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	GW02	RC2	RC3			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	31/05/2022	31/05/2022	31/05/2022			
			Sample Time	.	.	.			
			Date Received	06/06/2022	06/06/2022	06/06/2022			
			SDG Ref	220606-21	220606-21	220606-21			
			Lab Sample No.(s)	26388583	26388558	26388566			
			AGS Reference						
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			
Chlorpyriphos-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			
Chlorpyriphos	<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			

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Component	LOD/Units	Method	Customer Sample Ref.	GW02	RC2	RC3			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	31/05/2022	31/05/2022	31/05/2022			
			Sample Time	.	.	.			
			Date Received	06/06/2022	06/06/2022	06/06/2022			
			SDG Ref	220606-21	220606-21	220606-21			
			Lab Sample No.(s)	26388583	26388558	26388566			
			AGS Reference						
Triazophos	<0.01 µg/l	TM344		<0.4	<0.05	<0.1			
Phosalone	<0.01 µg/l	TM344		<0.4	<0.05	<0.1			
Azinphos methyl	<0.02 µg/l	TM344		<0.4	<0.2	<0.4			
Azinphos ethyl	<0.02 µg/l	TM344		<0.4	<0.1	<0.2			
Etridiazole	<0.01 µg/l	TM345		<0.2	<0.04	<0.2			
Pentachlorobenzene	<0.01 µg/l	TM345		<0.4	<0.02	<0.1			
Propachlor	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Quintozene (PCNB)	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Omethoate	<0.01 µg/l	TM345		<0.4	<0.04	<0.2			
Propazine	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Propyzamide	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Alachlor	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Prometryn	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Telodrin	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Terbutryn	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Chlorothalonil	<0.01 µg/l	TM345		<0.2	<0.04	<0.1			
Etrimphos	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Metazachlor	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Cyanazine	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Trietazine	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Coumaphos	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Phosphamidon I	<0.01 µg/l	TM345		<0.4	<0.04	<0.2			
Phosphamidon II	<0.01 µg/l	TM345		<0.2	<0.02	<0.1			
Dinitro-o-cresol	<0.1 µg/l	TM411		<10	<0.1	<1			
Clopyralid	<0.04 µg/l	TM411		<4	<0.04	<0.4			
MCPA	<0.05 µg/l	TM411		<5	<0.05	<0.5			
Mecoprop	<0.04 µg/l	TM411		<4	<0.04	<0.4			
Dicamba	<0.04 µg/l	TM411		<4	<0.04	<0.4			
MCPB	<0.05 µg/l	TM411		<5	<0.05	<0.5			
2,4-DB	<0.1 µg/l	TM411		<10	<0.1	<1			
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411		<5	<0.05	<0.5			
Dichlorprop	<0.1 µg/l	TM411		<10	<0.1	<1			
Triclopyr	<0.05 µg/l	TM411		<5	<0.05	<0.5			

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Results Legend

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Component	LOD/Units	Method	Customer Sample Ref.	GW02	RC2	RC3			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	31/05/2022	31/05/2022	31/05/2022			
			Sample Time	.	.	.			
			Date Received	06/06/2022	06/06/2022	06/06/2022			
			SDG Ref	220606-21	220606-21	220606-21			
			Lab Sample No.(s)	26388583	26388558	26388566			
			AGS Reference						
Fenoprop (Silvex)	<0.1 µg/l	TM411		<10	<0.1	<1			
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<5	<0.05	<0.5			
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<5	<0.05	<0.5			
Bromoxynil	<0.04 µg/l	TM411		<4	<0.04	<0.4			
Benazolin	<0.04 µg/l	TM411		<4	<0.04	<0.4			
Ioxynil	<0.05 µg/l	TM411		<5	<0.05	<0.5			
Pentachlorophenol	<0.04 µg/l	TM411		<4	<0.04	<0.4			
Fluoroxypyr	<0.1 µg/l	TM411		<10	<0.1	<1			

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

SVOC MS (W) - Aqueous

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
			Sample Time	-	-	-	-	-	-
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
			SDG Ref	220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
			Lab Sample No.(s)	26388593	26388531	26388541	26388633	26388616	26388574
			AGS Reference						
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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

SVOC MS (W) - Aqueous

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.		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
tot.unfilt	Total / unfiltered sample.		Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
*	Subcontracted - refer to subcontractor report for accreditation status.		Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
**	% 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		Sample Time	.	.	.	.	.	.
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
(F)	Trigger breach confirmed		SDG Ref	220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
1-4+§@	Sample deviation (see appendix)		Lab Sample No.(s)	26388593	26388531	26388541	26388633	26388616	26388574
			AGS Reference						

Component	LOD/Units	Method						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Carbazole (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Chrysene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Dibenzofuran (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Diethyl phthalate (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Dimethyl phthalate (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<40 #	<10 #	<20 #	<20 #	<20 #	<20 #
Fluoranthene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Fluorene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Hexachlorobenzene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Pentachlorophenol (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4
Phenol (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Hexachloroethane (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Nitrobenzene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Naphthalene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Isophorone (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<8	<2	<4	<4	<4	<4
Phenanthrene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #
Pyrene (aq)	<1 µg/l	TM176	<8 #	<2 #	<4 #	<4 #	<4 #	<4 #

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

SVOC MS (W) - Aqueous

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	GW02	RC2	RC3			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	31/05/2022	31/05/2022	31/05/2022			
			Sample Time	-	-	-			
			Date Received	06/06/2022	06/06/2022	06/06/2022			
			SDG Ref	220606-21	220606-21	220606-21			
			Lab Sample No.(s)	26388583	26388558	26388566			
			AGS Reference						
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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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.	Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
tot.unfilt	Total / unfiltered sample.	Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
*	Subcontracted - refer to subcontractor report for accreditation status.	Date Sampled	31/05/2022	31/05/2022	31/05/2022			
**	% 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	Sample Time	.	.	.			
		Date Received	06/06/2022	06/06/2022	06/06/2022			
		SDG Ref	220606-21	220606-21	220606-21			
(F)	Trigger breach confirmed	Lab Sample No.(s)	26388583	26388558	26388566			
1-4+§@	Sample deviation (see appendix)	AGS Reference						

Component	LOD/Units	Method						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Carbazole (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Chrysene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Dibenzofuran (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Diethyl phthalate (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Dimethyl phthalate (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<100 #	<5 #	<20 #			
Fluoranthene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Fluorene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Hexachlorobenzene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Pentachlorophenol (aq)	<1 µg/l	TM176	<20	<1	<4			
Phenol (aq)	<1 µg/l	TM176	<20	<1	<4			
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Hexachloroethane (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Nitrobenzene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Naphthalene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Isophorone (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<20	<1	<4			
Phenanthrene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			
Pyrene (aq)	<1 µg/l	TM176	<20 #	<1 #	<4 #			

CERTIFICATE OF ANALYSIS

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

VOC MS (W)

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
			Sample Time	-	-	-	-	-	-
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
			SDG Ref	220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
			Lab Sample No.(s)	26388593	26388531	26388541	26388633	26388616	26388574
			AGS Reference						
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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

VOC MS (W)

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	3A	5A	8A	4AP	5AP	GW01
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
			Sample Time	.	.	.	.	.	.
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
			SDG Ref	220606-21	220606-21	220606-21	220606-21	220606-21	220606-21
			Lab Sample No.(s)	26388593	26388531	26388541	26388633	26388616	26388574
			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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

VOC MS (W)

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	GW02	RC2	RC3			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	31/05/2022	31/05/2022	31/05/2022			
			Sample Time	-	-	-			
			Date Received	06/06/2022	06/06/2022	06/06/2022			
			SDG Ref	220606-21	220606-21	220606-21			
			Lab Sample No.(s)	26388583	26388558	26388566			
			AGS Reference						
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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

VOC MS (W)

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	GW02	RC2	RC3			
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	31/05/2022	31/05/2022	31/05/2022			
			Sample Time	.	.	.			
			Date Received	06/06/2022	06/06/2022	06/06/2022			
			SDG Ref	220606-21	220606-21	220606-21			
			Lab Sample No.(s)	26388583	26388558	26388566			
			AGS Reference						
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			

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

SDG: 220606-21 **Report Number:** 650615 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Test Completion Dates

Lab Sample No(s)	26388593	26388531	26388541	26388633	26388616	26388574	26388583	26388558	26388566
Customer Sample Ref.	3A	5A	8A	4AP	5AP	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

Appendix

General

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

2. 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 fror supplied bulk materials andd soils which have been examined to determine th presence of asbestos fibres using ALS (Hawarden) in-house method transmitted/polarised light microscopy and central stop dispersion staining, based o HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised su 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 othe 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 product can be found in HSG 264.

The identification of asbestos containing materials and soils falls within ou schedule of tests for which we hold UKAS accreditation, however opinion interpretations and all other information contained in the report are outside th scope of UKAS accreditation.

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

1291

CERTIFICATE OF ANALYSIS

SDG: 220811-71 **Report Number:** 659148 **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
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.

Validated

CERTIFICATE OF ANALYSIS

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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)	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)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)
			Sample Type	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE	LE
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 3		X						X							X					
Alkalinity as CaCO3	All	NDPs: 0 Tests: 3		X						X							X					
Ammonium Low	All	NDPs: 0 Tests: 3				X							X								X	
Anions by Kone (w)	All	NDPs: 0 Tests: 3		X								X							X			
BOD True Total	All	NDPs: 0 Tests: 3			X						X							X				
COD Unfiltered	All	NDPs: 0 Tests: 3			X						X							X				
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 3						X							X							X
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 3					X							X							X	
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 3		X								X							X			
Fluoride	All	NDPs: 0 Tests: 3		X								X							X			
Mercury Dissolved	All	NDPs: 0 Tests: 3					X							X							X	
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 3		X								X							X			
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 3							X	X							X					
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 3		X						X							X					
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 3		X						X							X					

26714561
BH3
0.00 - 0.00
Vial (ALE297)
LE

Validated

CERTIFICATE OF ANALYSIS

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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)			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)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)				
Sample Type			LE	LE	LE	LE	LE	LE	LE	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										

26714561	BH3		0.00 - 0.00	Vial (ALE297)	LE						
X											

Validated

CERTIFICATE OF ANALYSIS

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2	BH3			
			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						
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

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2	BH3			
			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						
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

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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 . 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**							
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			
Chlorpyriphos-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			
Chlorpyriphos	<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

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend								
# ISO17025 accredited.	Customer Sample Ref.	BH1	BH2	BH3			
M mCERTS accredited.								
aq Aqueous / settled sample.	Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
diss.filt Dissolved / filtered sample.	Sample Type	Land Leachate (LE)	Land Leachate (LE)	Land Leachate (LE)			
tot.unfilt Total / unfiltered sample.	Date Sampled	10/08/2022	10/08/2022	10/08/2022			
* Subcontracted - refer to subcontractor report for accreditation status.	Sample Time	.	.	.			
** % 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	Date Received	11/08/2022	11/08/2022	11/08/2022			
	SDG Ref	220811-71	220811-71	220811-71			
(F) Trigger breach confirmed	Lab Sample No.(s)	26714539	26714550	26714561			
1-4+§@ Sample deviation (see appendix)	AGS Reference						

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			
Etrimphos	<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

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend	
#	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)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2	BH3			
			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						
Fenoprop (Silvex)	<0.1 µg/l	TM411		<10	<10	<10			
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<5	<5	<5			
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<5	<5	<5			
Bromoxynil	<0.04 µg/l	TM411		<4	<4	<4			
Benazolin	<0.04 µg/l	TM411		<4	<4	<4			
Ioxynil	<0.05 µg/l	TM411		<5	<5	<5			
Pentachlorophenol	<0.04 µg/l	TM411		<4	<4	<4			
Fluoroxypyr	<0.1 µg/l	TM411		<10	<10	<10			

CERTIFICATE OF ANALYSIS

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

SVOC MS (W) - Aqueous

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2	BH3			
			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						
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

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

SVOC MS (W) - Aqueous

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2	BH3			
			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						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		21.6	<10	<10			
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<20	<10	<10			
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<20	<10	<10			
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<20	<10	<10			
Carbazole (aq)	<1 µg/l	TM176		<20	<10	<10			
Chrysene (aq)	<1 µg/l	TM176		23.1	<10	<10			
Dibenzofuran (aq)	<1 µg/l	TM176		<20	<10	<10			
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<20	<10	<10			
Diethyl phthalate (aq)	<1 µg/l	TM176		<20	<10	<10			
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<20	<10	<10			
Dimethyl phthalate (aq)	<1 µg/l	TM176		<20	<10	<10			
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<100	<50	<50			
Fluoranthene (aq)	<1 µg/l	TM176		<20	<10	<10			
Fluorene (aq)	<1 µg/l	TM176		<20	<10	<10			
Hexachlorobenzene (aq)	<1 µg/l	TM176		<20	<10	<10			
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<20	<10	<10			
Pentachlorophenol (aq)	<1 µg/l	TM176		<20	<10	<10			
Phenol (aq)	<1 µg/l	TM176		<20	<10	<10			
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<20	<10	<10			
Hexachloroethane (aq)	<1 µg/l	TM176		<20	<10	<10			
Nitrobenzene (aq)	<1 µg/l	TM176		<20	<10	<10			
Naphthalene (aq)	<1 µg/l	TM176		<20	<10	<10			
Isophorone (aq)	<1 µg/l	TM176		<20	<10	<10			
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<20	<10	<10			
Phenanthrene (aq)	<1 µg/l	TM176		<20	<10	<10			
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<20	<10	<10			
Pyrene (aq)	<1 µg/l	TM176		<20	<10	<10			

CERTIFICATE OF ANALYSIS

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

VOC MS (W)

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2	BH3			
			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						
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 #			

CERTIFICATE OF ANALYSIS

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

VOC MS (W)

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2	BH3			
			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						
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 #	5.23 #	<1 #			
Ethylbenzene	<1 µg/l	TM208		<1 #	5 #	2.51 #			
m,p-Xylene	<1 µg/l	TM208		<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			

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).

CERTIFICATE OF ANALYSIS

SDG: 220811-71 **Report Number:** 659148 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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
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

SDG:	220811-71	**Report Number:**	659148	**Superseded Report:**	
Client Ref:	Galway Historic Landfills P22-(	**Location:**	Tuam Landfill		

Appendix

General

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

2. 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.

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 andd 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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Tel: (01244) 528700
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Website: www.alsenvironmental.co.uk

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

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date 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.

Approved By:

Sonia McWhan

Operations Manager

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

Version: 2.4 Version Issued: 10/07/2020

CERTIFICATE OF ANALYSIS

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.

Validated

CERTIFICATE OF ANALYSIS

SDG:	200702-49	**Client Reference:**	P2282	**Report Number:**	558533
Location:	Tuam Landfill	**Order Number:**		**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)	22408403	22408424	22408437	22408448
			Customer Sample Reference	SW1	SW2	SW3	SW4
			AGS Reference				
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Container	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)
			Sample Type	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 4		X						X						X							X
Ammonium Low	All	NDPs: 0 Tests: 4					X						X						X				
Anions by Kone (w)	All	NDPs: 0 Tests: 4		X						X						X							X
BOD True Total	All	NDPs: 0 Tests: 4			X						X						X						
COD Unfiltered	All	NDPs: 0 Tests: 4			X						X						X						
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 4				X						X						X					
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 4					X							X						X			
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4				X						X				X							
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 4				X						X						X					
Fluoride	All	NDPs: 0 Tests: 4				X						X						X					
Mercury Dissolved	All	NDPs: 0 Tests: 4				X						X				X							
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 4				X						X						X					
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 4				X						X						X					
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 4		X						X						X							X
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 4		X						X						X							X

					22408448
				SW4	
			0.00 - 0.00		
250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	
SW	SW	SW	SW	SW	
		X			
X					
X					
	X				
			X		
	X				
	X				
	X				
	X				
	X				

Validated

CERTIFICATE OF ANALYSIS

SDG: 200702-49 **Client Reference:** P2282 **Report Number:** 558533
Location: Tuam Landfill **Order Number:** **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)								22408403							22408424							22408437							22408448
Customer Sample Reference								SW1							SW2							SW3							SW4
AGS Reference																													
Depth (m)								0.00 - 0.00							0.00 - 0.00							0.00 - 0.00							0.00 - 0.00
Container								0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)		0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)		0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)		0.5l glass bottle (ALE227)
Sample Type								SW	SW	SW	SW	SW	SW		SW	SW	SW	SW	SW	SW		SW	SW	SW	SW	SW	SW		SW
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 4						X							X							X							X
pH Value	All	NDPs: 0 Tests: 4								X							X							X					
Phosphate by Kone (w)	All	NDPs: 0 Tests: 4						X							X							X							X
Suspended Solids	All	NDPs: 0 Tests: 4								X							X							X					
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 4						X							X							X							X
VOC MS (W)	All	NDPs: 0 Tests: 4											X							X							X		

22408448	SW4		0.00 - 0.00	Vial (ALE297)	SW												X
				NaOH (ALE245)	SW												
				H2SO4 (ALE244)	SW												
				500ml Plastic (ALE208)	SW				X				X				
				250ml BOD (ALE212)	SW												

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	00:00:00	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-49	200702-49	200702-49	200702-49		
			Lab Sample No.(s)	22408403	22408424	22408437	22408448		
			AGS Reference						
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 2 #	1.35 2 #	1.28 2 #	2.14 2 #		
Barium (diss.filt)	<0.2 µg/l	TM152		26 2 #	75.4 2 #	64.8 2 #	35.8 2 #		
Cadmium (diss.filt)	<0.08 µg/l	TM152		<0.08 2 #	<0.08 2 #	<0.08 2 #	<0.08 2 #		
Chromium (diss.filt)	<1 µg/l	TM152		1.94 2 #	6.63 2 #	6.74 2 #	7.33 2 #		
Copper (diss.filt)	<0.3 µg/l	TM152		1.96 2 #	3.9 2 #	3.7 2 #	3.71 2 #		
Lead (diss.filt)	<0.2 µg/l	TM152		<0.2 2 #	<0.2 2 #	<0.2 2 #	<0.2 2 #		
Manganese (diss.filt)	<3 µg/l	TM152		132 2 #	122 2 #	132 2 #	11.2 2 #		
Nickel (diss.filt)	<0.4 µg/l	TM152		3.64 2 #	4.33 2 #	3.88 2 #	6.18 2 #		
Phosphorus (diss.filt)	<10 µg/l	TM152		371 2 #	34.4 2 #	27.7 2 #	30.9 2 #		
Selenium (diss.filt)	<1 µg/l	TM152		<1 2 #	<1 2 #	<1 2 #	<1 2 #		
Thallium (diss.filt)	<2 µg/l	TM152		<2 2 #	<2 2 #	<2 2 #	<2 2 #		
Zinc (diss.filt)	<1 µg/l	TM152		1.88 2 #	5.54 2 #	6.44 2 #	8.16 2 #		
Sodium (Dis.Filt)	<0.076 mg/l	TM152		12.6 2 #	44.5 2 #	38.3 2 #	22.3 2 #		
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		8.03 2 #	18.5 2 #	16.5 2 #	9.37 2 #		
Potassium (Dis.Filt)	<0.2 mg/l	TM152		8.94 2 #	18.8 2 #	15.5 2 #	6.99 2 #		
Calcium (Dis.Filt)	<0.2 mg/l	TM152		157 2 #	135 2 #	132 2 #	128 2 #		
Iron (Dis.Filt)	<0.019 mg/l	TM152		0.186 2 #	0.149 2 #	0.143 2 #	0.287 2 #		
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172		<100	<100	<100	<100		
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 2	0.0131 2	<0.01 2	<0.01 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		

Validated

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	00:00:00	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-49	200702-49	200702-49	200702-49		
			Lab Sample No.(s)	22408403	22408424	22408437	22408448		
			AGS Reference						
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		

Validated

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	00:00:00	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-49	200702-49	200702-49	200702-49		
			Lab Sample No.(s)	22408403	22408424	22408437	22408448		
			AGS Reference						
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		
Chlorpyriphos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Dimethoate	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Chlorpyriphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Methyl Parathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Malathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Fenthion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Fenitrothion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Triadimefon	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Pendimethalin	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Parathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Chlorfenvinphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<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		

Validated

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	00:00:00	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-49	200702-49	200702-49	200702-49		
			Lab Sample No.(s)	22408403	22408424	22408437	22408448		
			AGS Reference						
Phosalone	<0.01 µg/l	TM344		<0.02	<0.02	<0.02	<0.02		
Azinphos methyl	<0.02 µg/l	TM344		<0.04	<0.04	<0.04	<0.04		
Azinphos ethyl	<0.02 µg/l	TM344		<0.02	<0.02	<0.02	<0.02		
Etridiazole	<0.01 µg/l	TM345		<0.02	<0.02	<0.02	<0.02		
Pentachlorobenzene	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Propachlor	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Quintozene (PCNB)	<0.01 µg/l	TM345		<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		

Validated

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	00:00:00	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-49	200702-49	200702-49	200702-49		
			Lab Sample No.(s)	22408403	22408424	22408437	22408448		
			AGS Reference						
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.1	<0.05	<0.05	<0.05		
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.1	<0.05	<0.05	<0.05		
Bromoxynil	<0.04 µg/l	TM411		<0.08	<0.04	<0.04	<0.08		
Benazolin	<0.04 µg/l	TM411		<0.08	<0.04	<0.04	<0.08		
Ioxynil	<0.05 µg/l	TM411		<0.1	<0.1	<0.1	<0.1		
Pentachlorophenol	<0.04 µg/l	TM411		<0.08	<0.04	<0.04	<0.08		
Fluoroxypyr	<0.1 µg/l	TM411		<0.2	<0.1	<0.1	<0.2		

CERTIFICATE OF ANALYSIS

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

SVOC MS (W) - Aqueous

Results Legend

#	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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	00:00:00	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-49	200702-49	200702-49	200702-49		
			Lab Sample No.(s)	22408403	22408424	22408437	22408448		
			AGS Reference						
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 #		

Validated

CERTIFICATE OF ANALYSIS

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

SVOC MS (W) - Aqueous

Results Legend

#	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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	00:00:00	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-49	200702-49	200702-49	200702-49		
			Lab Sample No.(s)	22408403	22408424	22408437	22408448		
			AGS Reference						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Carbazole (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Chrysene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Dibenzofuran (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Diethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5 #	<5 #	<5 #	<5 #		
Fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Fluorene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Phenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Hexachloroethane (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Nitrobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Naphthalene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Isophorone (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Phenanthrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		

CERTIFICATE OF ANALYSIS

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

VOC MS (W)

Results Legend

#	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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	00:00:00	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-49	200702-49	200702-49	200702-49		
			Lab Sample No.(s)	22408403	22408424	22408437	22408448		
			AGS Reference						
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

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

VOC MS (W)

Results Legend

#	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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	01/07/2020	01/07/2020	01/07/2020	01/07/2020		
			Sample Time	.	00:00:00	.	.		
			Date Received	02/07/2020	02/07/2020	02/07/2020	02/07/2020		
			SDG Ref	200702-49	200702-49	200702-49	200702-49		
			Lab Sample No.(s)	22408403	22408424	22408437	22408448		
			AGS Reference						
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<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		

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

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

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

Appendix

General

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

2. 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.

Approved By:

Sonia McWhan

Operations Manager

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

Version: 2.5 Version Issued: 10/09/2020

CERTIFICATE OF ANALYSIS

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.

Validated

CERTIFICATE OF ANALYSIS

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

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)							22736761					22736754					22736713			
Customer Sample Reference							3AP					4AP					5AP			
AGS Reference																				
Depth (m)							0.00 - 0.00					0.00 - 0.00					0.00 - 0.00			
Container							0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE204)	HNO3 Filtered (ALE244)	NaOH (ALE245)
Sample Type							GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 6					X					X					X				
Alkalinity as CaCO3	All	NDPs: 0 Tests: 6		X					X					X					X		
Ammonium Low	All	NDPs: 0 Tests: 6			X					X					X						X
Anions by Kone (w)	All	NDPs: 0 Tests: 6		X					X					X					X		
BOD True Total	All	NDPs: 0 Tests: 6		X					X					X					X		
COD Unfiltered	All	NDPs: 0 Tests: 6		X					X					X					X		
Coliforms (W)	All	NDPs: 0 Tests: 6		X					X					X					X		
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 5		X					X					X					X		
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 6				X					X					X					
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6		X					X											X	
Dissolved Oxygen by Probe	All	NDPs: 1 Tests: 5		X					X					X					X		
Fluoride	All	NDPs: 0 Tests: 6		X					X					X					X		
Mercury Dissolved	All	NDPs: 0 Tests: 6		X					X											X	
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 6	X					X				X					X				
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 6	X					X				X					X				

22736745	RC3		0.00 - 0.00	Vial (ALE297)	GW																	
				NaOH (ALE245)	GW											X						
				HNO3 Filtered (ALE204)	GW												X				X		
				H2SO4 (ALE244)	GW			X															
				500ml Plastic (ALE208)	GW		X		X		X		X					N		X			
				0.5l glass bottle (ALE227)	GW	X																X		X
22736738	RC2		0.00 - 0.00	Vial (ALE297)	GW																	
				NaOH (ALE245)	GW											X						
				HNO3 Filtered (ALE204)	GW												X				X		
				H2SO4 (ALE244)	GW			X															
				500ml Plastic (ALE208)	GW		X		X		X		X		X				X		X		
				0.5l glass bottle (ALE227)	GW	X																X		X
22736728	8AP		0.00 - 0.00	Vial (ALE297)	GW																	
				NaOH (ALE245)	GW											X						
				HNO3 Filtered (ALE204)	GW												X				X		

Validated

CERTIFICATE OF ANALYSIS

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

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)						22736761					22736754					22736713				22736728
Customer Sample Reference						3AP					4AP					5AP				8AP
AGS Reference																				
Depth (m)						0.00 - 0.00					0.00 - 0.00					0.00 - 0.00				0.00 - 0.00
Container						Vial (ALE297)	NaOH (ALE245)	H2SO4 (ALE244)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	H2SO4 (ALE244)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	HNO3 Filtered (ALE204)	H2SO4 (ALE244)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)	H2SO4 (ALE244)
Sample Type						GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 6								X					X						X	
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 6								X					X						X	
pH Value	All	NDPs: 0 Tests: 6							X					X						X		
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 6							X					X						X		
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 6						X					X					X				X
VOC MS (W)	All	NDPs: 0 Tests: 6				X					X					X						

22736745	RC3		0.00 - 0.00	Vial (ALE297)	GW												X
				NaOH (ALE245)	GW												
				HNO3 Filtered (ALE204)	GW												
				H2SO4 (ALE244)	GW										X		
				500ml Plastic (ALE208)	GW						X		X				
				0.5l glass bottle (ALE227)	GW		X		X								
22736738	RC2		0.00 - 0.00	Vial (ALE297)	GW												X
				NaOH (ALE245)	GW												
				HNO3 Filtered (ALE204)	GW												
				H2SO4 (ALE244)	GW										X		
				500ml Plastic (ALE208)	GW						X		X				
				0.5l glass bottle (ALE227)	GW		X		X								
22736728	8AP		0.00 - 0.00	Vial (ALE297)	GW												X
				NaOH (ALE245)	GW												
				HNO3 Filtered (ALE204)	GW												

Validated

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
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 2 #	4.33 2 #	4.35 #	31.2 #	2.74 #	2.88 #
Barium (diss.filt)	<0.2 µg/l	TM152		9.75 2 #	138 2 #	53.7 #	63.4 #	53.5 #	25.4 #
Boron (diss.filt)	<10 µg/l	TM152		<10 2 #	13.9 2 #	10.4 #	25.6 #	18 #	<10 #
Cadmium (diss.filt)	<0.08 µg/l	TM152		0.172 2 #	<0.08 2 #	0.115 #	0.17 #	0.519 #	1.68 #
Chromium (diss.filt)	<1 µg/l	TM152		<1 2 #	2.37 2 #	3.72 #	<1 #	5.33 #	1.3 #
Copper (diss.filt)	<0.3 µg/l	TM152		5.2 2 #	0.397 2 #	1.2 #	11.7 #	2.31 #	11.3 #
Lead (diss.filt)	<0.2 µg/l	TM152		<0.2 2 #	1.58 2 #	0.668 #	2.48 #	1.52 #	4.88 #
Manganese (diss.filt)	<3 µg/l	TM152		181 2 #	876 2 #	146 #	204 #	179 #	12.8 #
Nickel (diss.filt)	<0.4 µg/l	TM152		5.92 2 #	7.66 2 #	8.89 #	22.2 #	12 #	9.3 #
Phosphorus (diss.filt)	<10 µg/l	TM152		31.8 2 #	682 2 #	262 #	89 #	171 #	94.9 #
Selenium (diss.filt)	<1 µg/l	TM152		<1 2 #	<1 2 #	<1 #	<1 #	<1 #	<1 #
Thallium (diss.filt)	<2 µg/l	TM152		<2 2 #	<2 2 #	<2 #	<2 #	<2 #	<2 #
Zinc (diss.filt)	<1 µg/l	TM152		3.36 2 #	4.13 2 #	6.5 #	18.4 #	8.67 #	37.9 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152		6.46 2 #	88 2 #	10.3 #	47.1 #	12.7 #	12.7 #
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		4.37 2 #	11.9 2 #	5.26 #	9.1 #	11 #	3.25 #
Potassium (Dis.Filt)	<0.2 mg/l	TM152		0.466 2 #	53.7 2 #	0.916 #	1.64 #	3.12 #	0.237 #
Calcium (Dis.Filt)	<0.2 mg/l	TM152		107 2 #	91.4 2 #	169 #	154 #	355 #	35.9 #
Iron (Dis.Filt)	<0.019 mg/l	TM152		0.657 2 #	30.2 2 #	7.79 #	16.9 #	11.1 #	1.9 #
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 2 #	<0.01 2 #	<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

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
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
PCB congener 138	<0.015 µg/l	TM197		<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
PCB congener 180	<0.015 µg/l	TM197		<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
Cyanide, Total	<0.05 mg/l	TM227		<0.05 #	<0.05 #	<0.05 #	<0.05 #	<0.05 #	<0.05 #
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
alpha-HCH	<0.01 µg/l	TM343		<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
Heptachlor	<0.01 µg/l	TM343		<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
beta-HCH	<0.01 µg/l	TM343		<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
delta-HCH	<0.01 µg/l	TM343		<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
o,p'-DDE	<0.01 µg/l	TM343		<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
trans-Chlordane	<0.01 µg/l	TM343		<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
p,p'-DDE	<0.01 µg/l	TM343		<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
o,p'-DDD (TDE)	<0.01 µg/l	TM343		<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
o,p'-DDT	<0.01 µg/l	TM343		<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
Endosulphan II	<0.02 µg/l	TM343		<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
o,p'-Methoxychlor	<0.01 µg/l	TM343		<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
Endosulphan Sulphate	<0.02 µg/l	TM343		<0.04	<0.02	<0.02	<0.02	<0.04	<0.04

CERTIFICATE OF ANALYSIS

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

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
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(F)	Trigger breach confirmed
1-3+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Permethrin I	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Permethrin II	<0.01 µg/l	TM343		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Hexachlorobutadiene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	0.113	<0.1	<0.01	<0.01	<0.05
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Dichlorvos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Dichlobenil	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Mevinphos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Tecnazene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Hexachlorobenzene	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Demeton-S-methyl	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Phorate	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Diazinon	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Triallate	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Atrazine	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Simazine	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Disulfoton	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Propetamphos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Chlorpyriphos-methyl	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Dimethoate	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Chlorpyriphos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Methyl Parathion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Malathion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Fenthion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Fenitrothion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Triadimefon	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Pendimethalin	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Parathion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Chlorfenvinphos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
trans-Chlordane	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
cis-Chlordane	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Ethion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Carbophenothion	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Triazophos	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Phosalone	<0.01 µg/l	TM344		<0.05	<0.1	<0.1	<0.01	<0.01	<0.05
Azinphos methyl	<0.02 µg/l	TM344		<0.1	<0.2	<0.2	<0.02	<0.04	<0.1
Azinphos ethyl	<0.02 µg/l	TM344		<0.1	<0.2	<0.2	<0.02	<0.02	<0.1
Etridiazole	<0.01 µg/l	TM345		<0.05	<0.04	<0.1	<0.01	<0.02	<0.1
Pentachlorobenzene	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Propachlor	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Quintozene (PCNB)	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Omethoate	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Propazine	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Propyzamide	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Alachlor	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Prometryn	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Telodrin	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Terbutryn	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Chlorothalonil	<0.01 µg/l	TM345		<0.1	<0.02	<0.2	<0.02	<0.04	<0.2
Etrimphos	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Metazachlor	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Cyanazine	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Trietazine	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Coumaphos	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Phosphamidon I	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
Phosphamidon II	<0.01 µg/l	TM345		<0.05	<0.02	<0.1	<0.01	<0.02	<0.1
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

Validated

CERTIFICATE OF ANALYSIS

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

Results Legend

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Dichlorprop	<0.1 µg/l	TM411		<1	<0.5	<0.5	<0.2	<1	<0.5
Triclopyr	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.1	<0.5	<0.25
Fenoprop (Silvex)	<0.1 µg/l	TM411		<1	<0.5	<0.5	<0.2	<1	<0.5
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.1	<0.5	<0.25
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.1	<0.5	<0.25
Bromoxynil	<0.04 µg/l	TM411		<0.4	<0.2	<0.2	<0.08	<0.4	<0.2
Benazolin	<0.04 µg/l	TM411		<0.4	<0.2	<0.2	<0.08	<0.4	<0.2
Ioxynil	<0.05 µg/l	TM411		<0.5	<0.25	<0.25	<0.1	<0.5	<0.25
Pentachlorophenol	<0.04 µg/l	TM411		<0.4	<0.2	<0.2	<0.08	<0.4	<0.2
Fluoroxypyr	<0.1 µg/l	TM411		<1	<0.5	<0.5	<0.2	<1	<0.5

Validated

CERTIFICATE OF ANALYSIS

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

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Chloronaphthalene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Chlorophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Methylnaphthalene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Methylphenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Nitroaniline (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
2-Nitrophenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
3-Nitroaniline (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Bromophenylphenylether (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Chloroaniline (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Methylphenol (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Nitroaniline (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
4-Nitrophenol (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
Azobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Acenaphthylene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Acenaphthene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Anthracene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176		<40 #	<100 #	<20 #	<8 #	<8 #	<40 #
Butylbenzyl phthalate (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(a)anthracene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #

CERTIFICATE OF ANALYSIS

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	
#	ISO17025 accredited.
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1-3+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Carbazole (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Chrysene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Dibenzofuran (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Diethyl phthalate (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Dimethyl phthalate (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<100 #	<250 #	<50 #	<20 #	<20 #	<100 #
Fluoranthene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Fluorene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachlorobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Pentachlorophenol (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
Phenol (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachloroethane (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Nitrobenzene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Naphthalene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Isophorone (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<20	<50	<10	<4	<4	<20
Phenanthrene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #
Pyrene (aq)	<1 µg/l	TM176		<20 #	<50 #	<10 #	<4 #	<4 #	<20 #

CERTIFICATE OF ANALYSIS

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

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			AGS Reference						
Dibromofluoromethane**	%	TM208		113	110	106	115	112	111
Toluene-d8**	%	TM208		102	102	104	99.7	100	101
4-Bromofluorobenzene**	%	TM208		101	96.8	98.8	95.6	94.9	94.6
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		<3 #	<3 #	<3 #	<3 #	<3 #	<3 #
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

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

#	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	Customer Sample Ref.	3AP	4AP	5AP	8AP	RC2	RC3
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
			Sample Time	.	.	.	.	.	.
			Date Received	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
			SDG Ref	200828-74	200828-74	200828-74	200828-74	200828-74	200828-74
			Lab Sample No.(s)	22736761	22736754	22736713	22736728	22736738	22736745
			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

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

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

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

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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: 20-82837
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

Louise Morrow

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.

City Analysts Limited,
Pigeon House Road,
Ringsend,
Dublin 4.

Tel: (01) 613 6003
Fax: (01) 613 6008

Email:
reports@cityanalysts.ie

www.cityanalysts.ie

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

Sample Type: Ground

Lab Reference Number: 529056

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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

City Analysts Limited,
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Dublin 4.

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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

Sample Type: Ground

Lab Reference Number: 529057

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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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City Analysts Limited,
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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

Louise Morrow

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.

City Analysts Limited,
Pigeon House Road,
Ringsend,
Dublin 4.

Tel: (01) 613 6003
Fax: (01) 613 6008

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reports@cityanalysts.ie

www.cityanalysts.ie

Certificate Of Analysis

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Hawarden, Deeside
UK
CH5 3US

Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: RC2 - TUAM

Sample Type: Ground

Lab Reference Number: 529048

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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

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Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: RC3- TUAM

Sample Type: Ground

Lab Reference Number: 529049

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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.
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Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: 3AP-TUAM

Sample Type: Ground

Lab Reference Number: 529050

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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.
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Report Reference: 20-82835

Report Version: 2

Site: Fehily Timoney

Sample Description: 4AP- TUAM

Sample Type: Ground

Lab Reference Number: 529051

Date of Sampling: 27/08/2020

Date Sample Received: 27/08/2020

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

Appendix General

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

2. 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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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 July 2021
Customer:	Fehily Timoney
Sample Delivery Group (SDG):	210715-103
Your Reference:	P2282
Location:	Tuam Landfill
Report No:	607014

We received 4 samples on Thursday July 15, 2021 and 4 of these samples were scheduled for analysis which was completed on Monday July 26, 2021. 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

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
24638178	SW1		0.00 - 0.00	13/07/2021
24638192	SW2		0.00 - 0.00	13/07/2021
24638206	SW3		0.00 - 0.00	13/07/2021
24638217	SW4		0.00 - 0.00	13/07/2021

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

Validated

CERTIFICATE OF ANALYSIS

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**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)									24638178							24638192					24638206
Customer Sample Reference									SW1							SW2					SW3
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)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)
Sample Type									SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 4							X							X					X				
Alkalinity as CaCO3	All	NDPs: 0 Tests: 4									X							X					X		
Ammonium Low	All	NDPs: 0 Tests: 4										X							X						X	
Anions by Kone (w)	All	NDPs: 0 Tests: 4									X							X					X		
BOD True Total	All	NDPs: 0 Tests: 4								X							X					X			
COD Unfiltered	All	NDPs: 0 Tests: 4								X							X					X			
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 4									X							X					X		
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 4												X						X						
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4											X						X							X
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 4									X							X					X		
Fluoride	All	NDPs: 0 Tests: 4									X							X					X		
Mercury Dissolved	All	NDPs: 0 Tests: 4											X						X							X
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 4							X							X					X				
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 4							X							X					X				
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 4							X							X					X				

									24638217
								SW4	
							0.00 - 0.00		
SW	SW	SW	SW	SW	SW	SW	SW		
Vial (ALE297)	NaOH (ALE245)	HNO3 Filtered (ALE204)	H2SO4 (ALE244)	500ml Plastic (ALE208)	250ml BOD (ALE212)	0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	
						X			
				X					
			X						
				X					
					X				
					X				
				X					
								X	
		X							
				X					
				X					
		X							
	X								
						X			
						X			
						X			
									24638206
								SW3	
							0.00 - 0.00		
SW	SW	SW	SW	SW	SW	SW	SW		
Vial (ALE297)	NaOH (ALE245)	HNO3 Filtered (ALE204)	H2SO4 (ALE244)	500ml Plastic (ALE208)	250ml BOD (ALE212)	0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	

Validated

CERTIFICATE OF ANALYSIS

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**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)									24638178							24638192							24638206		
Customer Sample Reference									SW1							SW2							SW3		
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)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)
Sample Type									SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 4																									
			X							X						X							X				
pH Value	All	NDPs: 0 Tests: 4																									
					X						X							X							X		
Suspended Solids	All	NDPs: 0 Tests: 4																									
					X						X							X							X		
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 4																									
					X						X							X							X		
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 4																									
						X						X							X							X	
VOC MS (W)	All	NDPs: 0 Tests: 4																									
									X													X					

24638217	SW4		0.00 - 0.00	Vial (ALE297)	SW												X
				NaOH (ALE245)	SW												
				HNO3 Filtered (ALE204)	SW												
				H2SO4 (ALE244)	SW										X		
				500ml Plastic (ALE208)	SW				X		X		X				
				250ml BOD (ALE212)	SW												
				0.5l glass bottle (ALE227)	SW		X										
24638206	SW3		0.00 - 0.00	Vial (ALE297)	SW												X
				NaOH (ALE245)	SW												

CERTIFICATE OF ANALYSIS

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021		
			Sample Time	.	.	.	.		
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021		
			SDG Ref	210715-103	210715-103	210715-103	210715-103		
			Lab Sample No.(s)	24638178	24638192	24638206	24638217		
			AGS Reference						
Suspended solids, Total	<2 mg/l	TM022		5 #	13.5 #	<2 #	32 #		
Alkalinity, Total as HCO3	<2 mg/l	TM043		496	445	404	406		
BOD, unfiltered	<1 mg/l	TM045		<1 #	1.89 #	<1 #	<1 #		
Oxygen, dissolved	<0.3 mg/l	TM046		8.07	10.2	10.7	11.4		
Organic Carbon, Total	<3 mg/l	TM090		11.2 #	14.4 #	12.1 #	13 #		
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099		0.335 #	0.07 #	0.026 #	0.04 #		
Fluoride	<0.5 mg/l	TM104		<0.5	<0.5	<0.5	<0.5		
COD, unfiltered	<7 mg/l	TM107		30.9 #	43.8 #	36 #	48.4 #		
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120		0.71 #	0.677 #	0.617 #	0.592 #		
Arsenic (diss.filt)	<0.5 µg/l	TM152		1.46 #	1.54 #	1.49 #	1.34 #		
Barium (diss.filt)	<0.2 µg/l	TM152		24.8 #	43.7 #	30.6 #	27.5 #		
Boron (diss.filt)	<10 µg/l	TM152		<10 #	58.7 #	19.6 #	17.6 #		
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		0.416 #	<0.3 #	<0.3 #	1.31 #		
Lead (diss.filt)	<0.2 µg/l	TM152		<0.2 #	<0.2 #	<0.2 #	<0.2 #		
Manganese (diss.filt)	<3 µg/l	TM152		121 #	166 #	166 #	9.26 #		
Nickel (diss.filt)	<0.4 µg/l	TM152		3.15 #	2.93 #	2.91 #	3.22 #		
Phosphorus (diss.filt)	<10 µg/l	TM152		404 #	<10 #	<10 #	13.3 #		
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		3.29 #	7.51 #	10.7 #	3.22 #		
Sodium (Dis.Filt)	<0.076 mg/l	TM152		10.9 #	25.7 #	17.2 #	14.3 #		
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		8.2 #	11.3 #	8.58 #	8.04 #		
Potassium (Dis.Filt)	<0.2 mg/l	TM152		4.84 #	8.47 #	3.34 #	2.88 #		
Calcium (Dis.Filt)	<0.2 mg/l	TM152		155 #	119 #	125 #	124 #		
Iron (Dis.Filt)	<0.019 mg/l	TM152		0.851 #	0.273 #	0.281 #	0.15 #		
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172		<100	<100	<100	<100		
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01	<0.01	<0.01	<0.01		
Sulphate	<2 mg/l	TM184		<2 #	<2 #	<2 #	<2 #		
Chloride	<2 mg/l	TM184		23.6 #	36.1 #	28.1 #	21.5 #		
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184		<0.1 #	0.549 #	<0.1 #	<0.1 #		
Cyanide, Total	<0.05 mg/l	TM227		<0.05	<0.05	<0.05	<0.05		

CERTIFICATE OF ANALYSIS

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend	
#	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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021		
			Sample Time	.	.	.	.		
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021		
			SDG Ref	210715-103	210715-103	210715-103	210715-103		
			Lab Sample No.(s)	24638178	24638192	24638206	24638217		
			AGS Reference						
pH	<1 pH Units	TM256		7.77 #	7.75 #	7.7 #	8.03 #		
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		<0.02	<0.02	<0.02	<0.02		
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		<0.05	<0.05	<0.05	<0.05		
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		<0.08	<0.08	<0.08	<0.08		
o,p'-Methoxychlor	<0.01 µg/l	TM343		<0.04	<0.04	<0.04	<0.04		
p,p'-Methoxychlor	<0.01 µg/l	TM343		<0.08	<0.08	<0.08	<0.08		
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		
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		

CERTIFICATE OF ANALYSIS

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
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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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021		
			Sample Time	.	.	.	.		
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021		
			SDG Ref	210715-103	210715-103	210715-103	210715-103		
			Lab Sample No.(s)	24638178	24638192	24638206	24638217		
			AGS Reference						
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		<0.03	<0.03	<0.03	<0.03		
Diazinon	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Triallate	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Atrazine	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Simazine	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Disulfoton	<0.01 µg/l	TM344		<0.07	<0.07	<0.07	<0.07		
Propetamphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Chlorpyriphos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Dimethoate	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Chlorpyriphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Methyl Parathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Malathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Fenthion	<0.01 µg/l	TM344		<0.02	<0.03	<0.02	<0.02		
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		
Phosalone	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Azinphos methyl	<0.02 µg/l	TM344		<0.02	<0.02	<0.02	<0.02		
Azinphos ethyl	<0.02 µg/l	TM344		<0.02	<0.02	<0.02	<0.02		
Etridiazole	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Pentachlorobenzene	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		

CERTIFICATE OF ANALYSIS

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021		
			Sample Time	.	.	.	.		
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021		
			SDG Ref	210715-103	210715-103	210715-103	210715-103		
			Lab Sample No.(s)	24638178	24638192	24638206	24638217		
			AGS Reference						
Propachlor	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Quintozene (PCNB)	<0.01 µg/l	TM345		<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		<0.01	<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		<0.02	<0.01	<0.02	<0.01		
Etrimphos	<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		<0.01	<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		<0.1	<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		
MCPB	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
2,4-DB	<0.1 µg/l	TM411		<0.1	<0.2	<0.1	<0.1		
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
Dichlorprop	<0.1 µg/l	TM411		<0.1	<0.2	<0.1	<0.1		
Triclopyr	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
Fenoprop (Silvex)	<0.1 µg/l	TM411		<0.1	<0.2	<0.1	<0.1		
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		
Bromoxynil	<0.04 µg/l	TM411		<0.04	<0.08	<0.04	<0.04		
Benazolin	<0.04 µg/l	TM411		<0.04	<0.08	<0.04	<0.04		
Ioxynil	<0.05 µg/l	TM411		<0.05	<0.1	<0.05	<0.05		

Validated

CERTIFICATE OF ANALYSIS

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Results Legend	
#	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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021		
			Sample Time	.	.	.	.		
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021		
			SDG Ref	210715-103	210715-103	210715-103	210715-103		
			Lab Sample No.(s)	24638178	24638192	24638206	24638217		
			AGS Reference						
Pentachlorophenol	<0.04 µg/l	TM411		<0.04	<0.08	<0.04	<0.04		
Fluoroxypyr	<0.1 µg/l	TM411		<0.1	<0.2	<0.1	<0.1		

CERTIFICATE OF ANALYSIS

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021		
			Sample Time	.	.	.	.		
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021		
			SDG Ref	210715-103	210715-103	210715-103	210715-103		
			Lab Sample No.(s)	24638178	24638192	24638206	24638217		
			AGS Reference						
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

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

SVOC MS (W) - Aqueous

Results Legend

#	ISO17025 accredited.
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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	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021		
			Sample Time	.	.	.	.		
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021		
			SDG Ref	210715-103	210715-103	210715-103	210715-103		
			Lab Sample No.(s)	24638178	24638192	24638206	24638217		
			AGS Reference						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Carbazole (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Chrysene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Dibenzofuran (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Diethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5 #	<5 #	<5 #	<5 #		
Fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Fluorene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Phenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Hexachloroethane (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Nitrobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Naphthalene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Isophorone (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1		
Phenanthrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		
Pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #		

CERTIFICATE OF ANALYSIS

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

VOC MS (W)

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021		
			Sample Time	.	.	.	.		
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021		
			SDG Ref	210715-103	210715-103	210715-103	210715-103		
			Lab Sample No.(s)	24638178	24638192	24638206	24638217		
			AGS Reference						
Dibromofluoromethane**	%	TM208		113	112	113	112		
Toluene-d8**	%	TM208		99.6	99.6	99.3	99.6		
4-Bromofluorobenzene**	%	TM208		96.9	95.9	96.3	96.2		
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

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

VOC MS (W)

Results Legend	
#	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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	13/07/2021	13/07/2021	13/07/2021	13/07/2021		
			Sample Time	.	.	.	.		
			Date Received	15/07/2021	15/07/2021	15/07/2021	15/07/2021		
			SDG Ref	210715-103	210715-103	210715-103	210715-103		
			Lab Sample No.(s)	24638178	24638192	24638206	24638217		
			AGS Reference						
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<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		

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
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
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter
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

SDG:	210715-103	**Client Reference:**	P2282	**Report Number:**	607014
Location:	Tuam Landfill	**Order Number:**	Z2798	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	24638178	24638192	24638206	24638217
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	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021
Alkalinity as CaCO3	21-Jul-2021	16-Jul-2021	19-Jul-2021	21-Jul-2021
Ammonium Low	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021
Anions by Kone (w)	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021
BOD True Total	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021
COD Unfiltered	17-Jul-2021	17-Jul-2021	17-Jul-2021	17-Jul-2021
Conductivity (at 20 deg.C)	21-Jul-2021	20-Jul-2021	21-Jul-2021	21-Jul-2021
Cyanide Comp/Free/Total/Thiocyanate	21-Jul-2021	21-Jul-2021	21-Jul-2021	21-Jul-2021
Dissolved Metals by ICP-MS	21-Jul-2021	20-Jul-2021	20-Jul-2021	21-Jul-2021
Dissolved Oxygen by Probe	16-Jul-2021	16-Jul-2021	16-Jul-2021	16-Jul-2021
Fluoride	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
Mercury Dissolved	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
Mineral Oil C10-40 Aqueous (W)	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021
Pesticides (Suite I) by GCMS	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021
Pesticides (Suite II) by GCMS	22-Jul-2021	22-Jul-2021	22-Jul-2021	22-Jul-2021
Pesticides (Suite III) by GCMS	26-Jul-2021	26-Jul-2021	26-Jul-2021	26-Jul-2021
pH Value	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
Suspended Solids	19-Jul-2021	19-Jul-2021	19-Jul-2021	18-Jul-2021
SVOC MS (W) - Aqueous	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
Total Organic and Inorganic Carbon	20-Jul-2021	20-Jul-2021	20-Jul-2021	20-Jul-2021
VOC MS (W)	16-Jul-2021	16-Jul-2021	16-Jul-2021	16-Jul-2021

Appendix General

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

2. 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**
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**

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 asbestos present is not determined unless specifically requested.

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
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:	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

1291

CERTIFICATE OF ANALYSIS

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

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)			26388595							26388621							26388645				
Customer Sample Reference			SW1							SW2							SW3				
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)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)
Sample Type			SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 4	X							X							X				
Alkalinity as CaCO3	All	NDPs: 0 Tests: 4	X							X							X				
Ammonium Low	All	NDPs: 0 Tests: 4				X							X							X	
Anions by Kone (w)	All	NDPs: 0 Tests: 4			X							X							X		
BOD True Total	All	NDPs: 0 Tests: 4		X							X							X			
COD Unfiltered	All	NDPs: 0 Tests: 4		X							X							X			
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 4						X							X						
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4					X							X							X
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 4			X							X							X		
Fluoride	All	NDPs: 0 Tests: 4			X							X							X		
Mercury Dissolved	All	NDPs: 0 Tests: 4					X							X							X
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 4			X							X							X		
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 4	X							X							X				
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 4	X							X							X				
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 4	X							X							X				

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									26388663
								SW4	
							0.00 - 0.00		
SW	SW	SW	SW	SW	SW	SW	SW	SW	26388645
								SW3	
							0.00 - 0.00		
Vial (ALE297)	NaOH (ALE245)	HNO3 Filtered (ALE204)	H2SO4 (ALE244)	500ml Plastic (ALE208)	250ml BOD (ALE212)	0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	
SW	SW	SW	SW	SW	SW	SW	SW	SW	
						X			
						X			
			X						
				X					
					X				
					X				
								X	
	X								
		X							
				X					
				X					
		X							
				X					
								X	
								X	
								X	

	Validated

CERTIFICATE OF ANALYSIS

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**

Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend

- X Test
- N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
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PL - Prepared Leachate
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SA - Saline Water
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TS - Treated Sewage
US - Untreated Sewage
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DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			26388595							26388621							26388645				
Customer Sample Reference			SW1							SW2							SW3				
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)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	250ml BOD (ALE212)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)
Sample Type			SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
pH Value	All	NDPs: 0 Tests: 4			X							X							X		
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 4	X							X							X				
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 4				X							X							X	
VOC MS (W)	All	NDPs: 0 Tests: 4							X							X					

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26388663	SW4		0.00 - 0.00	Vial (ALE297)	SW								X
				NaOH (ALE245)	SW								
				HNO3 Filtered (ALE204)	SW								
				H2SO4 (ALE244)	SW						X		
				500ml Plastic (ALE208)	SW		X						
				250ml BOD (ALE212)	SW								
				0.5l glass bottle (ALE227)	SW				X				
26388645	SW3		0.00 - 0.00	Vial (ALE297)	SW								X
				NaOH (ALE245)	SW								

CERTIFICATE OF ANALYSIS

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022		
			Sample Time	-	-	-	-		
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022		
			SDG Ref	220606-22	220606-22	220606-22	220606-22		
			Lab Sample No.(s)	26388595	26388621	26388645	26388663		
			AGS Reference						
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

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
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- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022		
			Sample Time	.	.	.	.		
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022		
			SDG Ref	220606-22	220606-22	220606-22	220606-22		
			Lab Sample No.(s)	26388595	26388621	26388645	26388663		
			AGS Reference						
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		

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SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
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Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022		
			Sample Time	.	.	.	.		
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022		
			SDG Ref	220606-22	220606-22	220606-22	220606-22		
			Lab Sample No.(s)	26388595	26388621	26388645	26388663		
			AGS Reference						
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344		<0.02	<0.02	<0.02	<0.02		
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	<0.02	<0.02	<0.01		
Diazinon	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Triallate	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Atrazine	<0.01 µg/l	TM344		<0.01	0.0133	0.013	<0.01		
Simazine	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<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		
Chlorpyriphos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Dimethoate	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Pirimiphos-methyl	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Chlorpyriphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Methyl Parathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Malathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Fenthion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Fenitrothion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Triadimefon	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Pendimethalin	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Parathion	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<0.01		
Chlorfenvinphos	<0.01 µg/l	TM344		<0.01	<0.01	<0.01	<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	<0.02	<0.02	<0.01		

CERTIFICATE OF ANALYSIS

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022		
			Sample Time	.	.	.	.		
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022		
			SDG Ref	220606-22	220606-22	220606-22	220606-22		
			Lab Sample No.(s)	26388595	26388621	26388645	26388663		
			AGS Reference						
Triazophos	<0.01 µg/l	TM344		<0.01	<0.02	<1.53	<0.01		
Phosalone	<0.01 µg/l	TM344		<0.01	<0.02	<0.02	<0.01		
Azinphos methyl	<0.02 µg/l	TM344		<0.04	<0.02	<0.02	<0.04		
Azinphos ethyl	<0.02 µg/l	TM344		<0.02	<0.02	<0.02	<0.02		
Etridiazole	<0.01 µg/l	TM345		<0.02	<0.02	<0.02	<0.02		
Pentachlorobenzene	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Propachlor	<0.01 µg/l	TM345		<0.01	<0.01	<0.01	<0.01		
Quintozene (PCNB)	<0.01 µg/l	TM345		<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		
Etrimphos	<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

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

Results Legend

#	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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022		
			Sample Time	.	.	.	.		
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022		
			SDG Ref	220606-22	220606-22	220606-22	220606-22		
			Lab Sample No.(s)	26388595	26388621	26388645	26388663		
			AGS Reference						
Fenoprop (Silvex)	<0.1 µg/l	TM411		<0.1	<0.1	<0.1	<0.1		
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.05	<0.05	<0.05	<0.05		
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411		<0.05	<0.05	<0.05	<0.05		
Bromoxynil	<0.04 µg/l	TM411		<0.04	<0.04	<0.04	<0.04		
Benazolin	<0.04 µg/l	TM411		<0.04	<0.04	<0.04	<0.04		
Ioxynil	<0.05 µg/l	TM411		<0.05	<0.05	<0.05	<0.05		
Pentachlorophenol	<0.04 µg/l	TM411		<0.04	<0.04	<0.04	<0.04		
Fluoroxypyr	<0.1 µg/l	TM411		<0.1	<0.1	<0.1	<0.1		

CERTIFICATE OF ANALYSIS

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

SVOC MS (W) - Aqueous

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022		
			Sample Time	-	-	-	-		
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022		
			SDG Ref	220606-22	220606-22	220606-22	220606-22		
			Lab Sample No.(s)	26388595	26388621	26388645	26388663		
			AGS Reference						
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 #		

Validated

CERTIFICATE OF ANALYSIS

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

SVOC MS (W) - Aqueous

Results Legend

#	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)

Customer Sample Ref.	SW1	SW2	SW3	SW4		
Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022		
Sample Time	.	.	.	.		
Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022		
SDG Ref	220606-22	220606-22	220606-22	220606-22		
Lab Sample No.(s)	26388595	26388621	26388645	26388663		
AGS Reference						

Component	LOD/Units	Method	SW1	SW2	SW3	SW4		
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Carbazole (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Chrysene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Dibenzofuran (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Diethyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Dimethyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<5 #	<5 #	<5 #	<5 #		
Fluoranthene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Fluorene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Hexachlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Pentachlorophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
Phenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Hexachloroethane (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Nitrobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Naphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Isophorone (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<1	<1	<1	<1		
Phenanthrene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		
Pyrene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #		

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CERTIFICATE OF ANALYSIS

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

VOC MS (W)

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022		
			Sample Time	-	-	-	-		
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022		
			SDG Ref	220606-22	220606-22	220606-22	220606-22		
			Lab Sample No.(s)	26388595	26388621	26388645	26388663		
			AGS Reference						
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

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

VOC MS (W)

Results Legend
- # 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)

Component	LOD/Units	Method	Customer Sample Ref.	SW1	SW2	SW3	SW4		
			Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00		
			Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)		
			Date Sampled	31/05/2022	31/05/2022	31/05/2022	31/05/2022		
			Sample Time	.	.	.	.		
			Date Received	06/06/2022	06/06/2022	06/06/2022	06/06/2022		
			SDG Ref	220606-22	220606-22	220606-22	220606-22		
			Lab Sample No.(s)	26388595	26388621	26388645	26388663		
			AGS Reference						
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #		
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<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		

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

SDG: 220606-22 **Report Number:** 651143 **Superseded Report:**
Client Ref.: Galway Historic Landfills P22-040 **Location:** Tuam Landfill

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
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

Appendix

General

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

2. 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.

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 andd 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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