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**Attention:** Sven Klinkenbergh

## CERTIFICATE OF ANALYSIS

**Date of report Generation:** 04 March 2021  
**Customer:** Minerex Environmental  
**Sample Delivery Group (SDG):** 210301-17  
**Your Reference:** 3188-A1-COC4  
**Location:** Gortyrhilly, Co. Cork  
**Report No:** 589281

We received 6 samples on Monday March 01, 2021 and 6 of these samples were scheduled for analysis which was completed on Thursday March 04, 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

Validated

**SDG:** 210301-17      **Client Reference:** 3188-A1-COC4      **Report Number:** 589281  
**Location:** Gortyrhilly, Co. Cork      **Order Number:**      **Superseded Report:**

## Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23815142	3188-A1-SW1 (Gort. 1)		0.00 - 0.00	24/02/2021
23815157	3188-A1-SW2 (Gort. 2)		0.00 - 0.00	24/02/2021
23815174	3188-A1-SW3 (Gort. 3)		0.00 - 0.00	24/02/2021
23815186	3188-A1-SW4 (Gort. 4)		0.00 - 0.00	24/02/2021
23815204	3188-A1-SW5 (Gort. 5)		0.00 - 0.00	24/02/2021
23815220	3188-A1-SW6 (Gort. 6)		0.00 - 0.00	24/02/2021

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



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<b>SDG:</b> 210301-17	<b>Client Reference:</b> 3188-A1-COC4	<b>Report Number:</b> 589281
<b>Location:</b> Gortyrhillly, Co. Cork	<b>Order Number:</b>	<b>Superseded Report:</b>

Results Legend			Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type												
<p><b>X</b> Test</p> <p><b>N</b> No Determination Possible</p> <p>Sample Types -</p> <p>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</p>			23815142	3188-A1-SW1 (Gort. 1)		0.00 - 0.00	HNO3 Unfiltered (ALE204) H2SO4 (ALE244) H2SO4 (ALE244) 500ml Plastic (ALE208) NaOH (ALE245)	SW												
			23815157	3188-A1-SW2 (Gort. 2)		0.00 - 0.00	HNO3 Unfiltered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) NaOH (ALE245)	SW												
			23815174	3188-A1-SW3 (Gort. 3)		0.00 - 0.00	HNO3 Unfiltered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) NaOH (ALE245)	SW												
			23815186	3188-A1-SW4 (Gort. 4)		0.00 - 0.00	HNO3 Unfiltered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) NaOH (ALE245)	SW												
			23815204	3188-A1-SW5 (Gort. 5)		0.00 - 0.00	HNO3 Unfiltered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) NaOH (ALE245)	SW												
	Alkalinity as CaCO3	All	NDPs: 0 Tests: 6	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				X					
	Colour Test	All	NDPs: 0 Tests: 6	X			X		X		X				X					
	Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 6	X			X		X		X				X					
	Nitrite by Kone (w)	All	NDPs: 0 Tests: 6				X				X				X					
	pH Value	All	NDPs: 0 Tests: 6	X			X		X		X				X					
Phosphate by Kone (w)	All	NDPs: 0 Tests: 6	X			X		X		X				X						
Suspended Solids	All	NDPs: 0 Tests: 6	X			X		X		X				X						
Total Metals by ICP-MS	All	NDPs: 0 Tests: 6				X				X				X					X	
Turbidity in waters	All	NDPs: 0 Tests: 6	X			X		X		X				X					X	

23815204	3188-A1-SW6 (Gort. 5)	0.00 - 0.00	NaOH (ALE245)	SW								X										
			HNO3 Unfiltered (ALE204)	SW																		
			H2SO4 (ALE244)	SW																		
23815204	3188-A1-SW5 (Gort. 5)	0.00 - 0.00	500ml Plastic (ALE208)	SW																		
			NaOH (ALE245)	SW	X																	



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	210301-17	<b>Client Reference:</b>	3188-A1-COC4
<b>Location:</b>	Gortyrähilly, Co. Cork	<b>Order Number:</b>	<b>Report Number:</b> 589281
			<b>Superseded Report:</b>

Results Legend		Customer Sample Ref.						
#	ISO17025 accredited.		3188-A1-SW1 (Gort. 1)	3188-A1-SW2 (Gort. 2)	3188-A1-SW3 (Gort. 3)	3188-A1-SW4 (Gort. 4)	3188-A1-SW5 (Gort. 5)	3188-A1-SW6 (Gort. 6)
M	mCERTS accredited.							
aq	Aqueous / settled 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
diss.filt	Dissolved / filtered sample.	Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
tot.unfilt	Total / unfiltered sample.	Date Sampled	24/02/2021	24/02/2021	24/02/2021	24/02/2021	24/02/2021	24/02/2021
	Subcontracted - refer to subcontractor report for accreditation status.	Sample Time	00:00	00:00	00:00	00:00	00:00	00:00
	% 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	01/03/2021	01/03/2021	01/03/2021	01/03/2021	01/03/2021	01/03/2021
(F)	Trigger breach confirmed	SDG Ref	210301-17	210301-17	210301-17	210301-17	210301-17	210301-17
1-4*5@	Sample deviation (see appendix)	Lab Sample No.(s)	23815142	23815157	23815174	23815186	23815204	23815220
		AGS Reference						
Component	LOD/Units	Method						
Suspended solids, Total	<2 mg/l	TM022	<2	<2	<2	6.9	<2	<2
			#	#	#	#	#	#
Alkalinity, Total as CaCO3	<2 mg/l	TM043	5	4	6	12.5	5.5	5.5
			#	#	#	#	#	#
Alkalinity, Bicarbonate as CaCO3	<2 mg/l	TM043	5	4	6	12.5	5.5	5.5
			#	#	#	#	#	#
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	0.04	0.049	0.051	0.115	0.044	0.031
			#	#	#	#	#	#
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.036	0.0385	0.0402	0.0602	0.044	0.0396
			#	#	#	#	#	#
Phosphorus (tot.unfilt)	<20 µg/l	TM152	<20	<20	31.5	38.7	<20	<20
			#	#	#	#	#	#
Nitrite as NO2	<0.05 mg/l	TM184	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
			#	#	#	#	#	#
Phosphate (Ortho as P)	<0.02 mg/l	TM184	<0.02	<0.02	0.0215	<0.02	<0.02	<0.02
			#	#	#	#	#	#
Nitrate as NO3	<0.3 mg/l	TM184	0.47	0.389	0.92	0.804	0.722	0.686
			#	#	#	#	#	#
Turbidity	<0.1 ntu	TM195	1.53	0.836	1.28	11.7	0.879	0.91
			@ #	@ #	@ #	@ #	@ #	@ #
pH	<1 pH Units	TM256	6.87	6.81	6.87	6.94	6.9	6.86
			#	#	#	#	#	#
Apparent Colour	<1 mg/l Pt/Co	TM261	49.9	42.8	52.8	109	33.5	39.3
			#	#	#	#	#	#
True Colour	<1 mg/l Pt/Co	TM261	39.5	35.1	45	78.9	28.1	33.2
			#	#	#	#	#	#



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**SDG:** 210301-17      **Client Reference:** 3188-A1-COC4      **Report Number:** 589281  
**Location:** Gortyrahill, Co. Cork      **Order Number:**      **Superseded Report:**

## 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
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM195	Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.	Determination of Turbidity in Waters & Associated Matrices
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
TM261	Colour and Turbidity of Waters, Methods for the Examination of Waters and Associated Materials, HMSO, 1981, ISBN 0 11 7519553.	Determination of True and Apparent Colour by Spectrophotometry

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).



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SDG: 210301-17  
Location: Gortyrally, Co. Cork

Client Reference: 3188-A1-COC4  
Order Number:

Report Number: 589281  
Superseded Report:

## Test Completion Dates

Lab Sample No(s)	23815142	23815157	23815174	23815186	23815204	23815220
Customer Sample Ref.	3188-A1-SW1 (Go rt. 1)	3188-A1-SW2 (Go rt. 2)	3188-A1-SW3 (Go rt. 3)	3188-A1-SW4 (Go rt. 4)	3188-A1-SW5 (Go rt. 5)	3188-A1-SW6 (Go rt. 6)
AGS Ref.						
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Alkalinity as CaCO3	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021
Ammonium Low	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021
Anions by Kone (w)	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021	03-Mar-2021
Colour Test	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021	04-Mar-2021
Conductivity (at 20 deg.C)	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021
Nitrite by Kone (w)	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021
pH Value	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021
Phosphate by Kone (w)	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021
Suspended Solids	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021
Total Metals by ICP-MS	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021	03-Mar-2021
Turbidity in waters	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021	02-Mar-2021



# CERTIFICATE OF ANALYSIS

SDG: 210301-17 Client Reference: 3188-A1-COC4 Report Number: 589281  
 Location: Gortyrahilly, Co. Cork Order Number: Superseded Report:

## Appendix

## General

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

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

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

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

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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

7. Results relate only to the items tested.

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

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. 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.





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Minerex Environmental  
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Dublin 14

**Attention:** Sven Klinkenbergh

## CERTIFICATE OF ANALYSIS

**Date of report Generation:** 24 March 2021  
**Customer:** Minerex Environmental  
**Sample Delivery Group (SDG):** 210319-116  
**Your Reference:** 3188-A1-COC3  
**Location:** Gortyrally, Co. Cork  
**Report No:** 591988

We received 6 samples on Friday March 19, 2021 and 6 of these samples were scheduled for analysis which was completed on Wednesday March 24, 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

Validated

**SDG:** 210319-116      **Client Reference:** 3188-A1-COC3      **Report Number:** 591988  
**Location:** Gortyrahill, Co. Cork      **Order Number:**      **Superseded Report:**

## Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23935641	3188-A1-SW1		0.00 - 0.00	16/03/2021
23935679	3188-A1-SW2		0.00 - 0.00	16/03/2021
23935698	3188-A1-SW3		0.00 - 0.00	16/03/2021
23935711	3188-A1-SW4		0.00 - 0.00	16/03/2021
23935724	3188-A1-SW5		0.00 - 0.00	16/03/2021
23935738	3188-A1-SW6		0.00 - 0.00	16/03/2021

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



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 210319-116	<b>Client Reference:</b> 3188-A1-COC3	<b>Report Number:</b> 591988
<b>Location:</b> Gortyrahill, Co. Cork	<b>Order Number:</b>	<b>Superseded Report:</b>

**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
23935641	3188-A1-SW1		0.00 - 0.00	500ml Plastic (ALE208)	SW
23935679	3188-A1-SW2		0.00 - 0.00	500ml Plastic (ALE208)	SW
23935698	3188-A1-SW3		0.00 - 0.00	500ml Plastic (ALE208)	SW
23935711	3188-A1-SW4		0.00 - 0.00	500ml Plastic (ALE208)	SW
23935724	3188-A1-SW5		0.00 - 0.00	500ml Plastic (ALE208)	SW

Parameter	All	NDPs: 0 Tests: 6	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)
Alkalinity as CaCO3	All	NDPs: 0 Tests: 6	X	X	X	X	X	X	X	X	X	X	X	X	X
Ammonium Low	All	NDPs: 0 Tests: 6		X	X	X	X	X	X	X	X	X	X	X	X
Anions by Kone (w)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X	X	X	X	X	X	X	X
Colour Test	All	NDPs: 0 Tests: 6	X	X	X	X	X	X	X	X	X	X	X	X	X
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X	X	X	X	X	X	X	X
Nitrite by Kone (w)	All	NDPs: 0 Tests: 6		X	X	X	X	X	X	X	X	X	X	X	X
pH Value	All	NDPs: 0 Tests: 6	X	X	X	X	X	X	X	X	X	X	X	X	X
Phosphate by Kone (w)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X	X	X	X	X	X	X	X
Suspended Solids	All	NDPs: 0 Tests: 6	X	X	X	X	X	X	X	X	X	X	X	X	X
Total Metals by ICP-MS	All	NDPs: 0 Tests: 6		X	X	X	X	X	X	X	X	X	X	X	X
Turbidity in waters	All	NDPs: 0 Tests: 6	X	X	X	X	X	X	X	X	X	X	X	X	X





# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	210319-116	<b>Client Reference:</b>	3188-A1-COC3	<b>Report Number:</b>	591988
<b>Location:</b>	Gortyrally, Co. Cork	<b>Order Number:</b>		<b>Superseded Report:</b>	

Results Legend		Customer Sample Ref.	3188-A1-SW1	3188-A1-SW2	3188-A1-SW3	3188-A1-SW4	3188-A1-SW5	3188-A1-SW6
#	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)							
		<b>Depth (m)</b>	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
		<b>Sample Type</b>	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
		<b>Date Sampled</b>	16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021
		<b>Sample Time</b>	00:00	00:00	00:00	00:00	00:00	00:00
		<b>Date Received</b>	19/03/2021	19/03/2021	19/03/2021	19/03/2021	19/03/2021	19/03/2021
		<b>SDG Ref</b>	210319-116	210319-116	210319-116	210319-116	210319-116	210319-116
		<b>Lab Sample No.(s)</b>	23935641	23935679	23935698	23935711	23935724	23935738
		<b>AGS Reference</b>						
Component	LOD/Units	Method						
Suspended solids, Total	<2 mg/l	TM022	<2	<2	<2	<2	<2	<2
			#	#	#	#	#	#
Alkalinity, Total as CaCO3	<2 mg/l	TM043	13.7	8	12	16.5	11.5	12.7
			#	#	#	#	#	#
Alkalinity, Bicarbonate as CaCO3	<2 mg/l	TM043	13.7	8	12	16.5	11.5	12.7
			#	#	#	#	#	#
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	0.034	0.031	0.052	0.068	0.031	0.031
			#	#	#	#	#	#
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.0754	0.0627	0.0682	0.0885	0.0674	0.072
			#	#	#	#	#	#
Phosphorus (tot.unfilt)	<20 µg/l	TM152	<20	<20	<20	28.2	<20	<20
			#	#	#	#	#	#
Nitrite as NO2	<0.05 mg/l	TM184	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
			#	#	#	#	#	#
Phosphate (Ortho as P)	<0.02 mg/l	TM184	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			#	#	#	#	#	#
Nitrate as NO3	<0.3 mg/l	TM184	0.787	0.428	1.8	0.891	0.69	1.19
			#	#	#	#	#	#
Turbidity	<0.1 ntu	TM195	0.691	0.675	0.451	2.15	0.959	0.343
			@ #	@ #	@ #	@ #	@ #	@ #
pH	<1 pH Units	TM256	7.52	7.26	7.5	7.65	7.49	7.23
			#	#	#	#	#	#
Apparent Colour	<1 mg/l Pt/Co	TM261	23.7	24.8	12.7	62.7	20	11.2
			#	#	#	#	#	#
True Colour	<1 mg/l Pt/Co	TM261	15.6	13.2	8.33	45.7	12.9	7.33
			#	#	#	#	#	#



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 210319-116      **Client Reference:** 3188-A1-COC3      **Report Number:** 591988  
**Location:** Gortyrahill, Co. Cork      **Order Number:**      **Superseded Report:**

## 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
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM195	Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.	Determination of Turbidity in Waters & Associated Matrices
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
TM261	Colour and Turbidity of Waters, Methods for the Examination of Waters and Associated Materials, HMSO, 1981, ISBN 0 11 7519553.	Determination of True and Apparent Colour by Spectrophotometry

NA = not applicable.

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



# CERTIFICATE OF ANALYSIS

Validated

SDG: 210319-116  
Location: Gortyrally, Co. Cork

Client Reference: 3188-A1-COC3  
Order Number:

Report Number: 591988  
Superseded Report:

## Test Completion Dates

Lab Sample No(s)	23935641	23935679	23935698	23935711	23935724	23935738
Customer Sample Ref.	3188-A1-SW1	3188-A1-SW2	3188-A1-SW3	3188-A1-SW4	3188-A1-SW5	3188-A1-SW6
AGS Ref.						
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water

Alkalinity as CaCO3	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021
Ammonium Low	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021
Anions by Kone (w)	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021
Colour Test	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021
Conductivity (at 20 deg.C)	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021
Nitrite by Kone (w)	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021
pH Value	22-Mar-2021	23-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	23-Mar-2021
Phosphate by Kone (w)	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021
Suspended Solids	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021
Total Metals by ICP-MS	23-Mar-2021	23-Mar-2021	23-Mar-2021	24-Mar-2021	24-Mar-2021	24-Mar-2021
Turbidity in waters	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021	22-Mar-2021



# CERTIFICATE OF ANALYSIS

SDG: 210319-116 Client Reference: 3188-A1-COC3 Report Number: 591988  
 Location: Gortyrahilly, Co. Cork Order Number: Superseded Report:

## Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH<sub>4</sub> 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.





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Website: www.alsenvironmental.co.uk

Minerex Environmental  
Taney hall  
Eglinton Terrace  
Dundrum  
Dublin  
Dublin 14

**Attention:** Sven Klinkenbergh

## CERTIFICATE OF ANALYSIS

**Date of report Generation:** 05 September 2020  
**Customer:** Minerex Environmental  
**Sample Delivery Group (SDG):** 200828-99  
**Your Reference:** 3188-A1-COC2  
**Location:** Gortyrhilly, Co. Cork  
**Report No:** 566074

We received 7 samples on Friday August 28, 2020 and 6 of these samples were scheduled for analysis which was completed on Saturday September 05, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

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

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

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

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

Approved By:

**Sonia McWhan**

Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 200828-99      **Client Reference:** 3188-A1-COC2      **Report Number:** 566074  
**Location:** Gortyrahilly, Co. Cork      **Order Number:**      **Superseded Report:**

## Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22737481	3188-A1-SW1		0.00 - 0.00	26/08/2020
22737495	3188-A1-SW2		0.00 - 0.00	26/08/2020
22737506	3188-A1-SW3		0.00 - 0.00	26/08/2020
22737523	3188-A1-SW4		0.00 - 0.00	26/08/2020
22737543	3188-A1-SW5		0.00 - 0.00	26/08/2020
22737556	3188-A1-SW6		0.00 - 0.00	26/08/2020
22737479	3188-A2-SW4			26/08/2020

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



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 200828-99	<b>Client Reference:</b> 3188-A1-COC2	<b>Report Number:</b> 566074
<b>Location:</b> Gortyrahill, Co. Cork	<b>Order Number:</b>	<b>Superseded Report:</b>

**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		
					1 plastic (ALE221)	NaOH (ALE245)	HNO3 Unfiltered (ALE204)	H2SO4 (ALE244)	HNO3 Unfiltered (ALE204)	H2SO4 (ALE244)	500ml Plastic (ALE208)	NaOH (ALE245)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Unfiltered (ALE204)	NaOH (ALE245)		500ml Plastic (ALE208)	
	22737481	3188-A1-SW1		0.00 - 0.00															
	22737495	3188-A1-SW2		0.00 - 0.00															
	22737506	3188-A1-SW3		0.00 - 0.00															
	22737523	3188-A1-SW4		0.00 - 0.00															
	22737543	3188-A1-SW5		0.00 - 0.00															
Alkalinity as CaCO3	All	NDPs: 0 Tests: 6			X			X			X			X				X	
Ammonium Low	All	NDPs: 0 Tests: 6				X			X			X			X				X
Anions by Kone (w)	All	NDPs: 0 Tests: 6			X			X			X			X				X	
Colour Test	All	NDPs: 0 Tests: 6			X			X			X			X				X	
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 6			X			X			X			X				X	
Nitrite by Kone (w)	All	NDPs: 0 Tests: 6						X			X			X				X	
pH Value	All	NDPs: 0 Tests: 6			X			X			X			X				X	
Phosphate by Kone (w)	All	NDPs: 0 Tests: 6			X			X			X			X				X	
Suspended Solids	All	NDPs: 0 Tests: 6			X			X			X			X				X	
Total Metals by ICP-MS	All	NDPs: 0 Tests: 6					X			X			X			X			X
Turbidity in waters	All	NDPs: 0 Tests: 6			X			X			X			X				X	





# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	200828-99	<b>Client Reference:</b>	3188-A1-COC2	<b>Report Number:</b>	566074
<b>Location:</b>	Gortyrhillly, Co. Cork	<b>Order Number:</b>		<b>Superseded Report:</b>	

Results Legend		Customer Sample Ref.	3188-A1-SW1	3188-A1-SW2	3188-A1-SW3	3188-A1-SW4	3188-A1-SW5	3188-A1-SW6
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
-	Subcontracted - refer to subcontractor report for accreditation status.							
--	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-3*5@	Sample deviation (see appendix)							
		<b>Depth (m)</b>	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
		<b>Sample Type</b>	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
		<b>Date Sampled</b>	26/08/2020	26/08/2020	26/08/2020	26/08/2020	26/08/2020	26/08/2020
		<b>Sample Time</b>	00:00	00:00	00:00	00:00	00:00	00:00
		<b>Date Received</b>	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
		<b>SDG Ref</b>	200828-99	200828-99	200828-99	200828-99	200828-99	200828-99
		<b>Lab Sample No.(s)</b>	22737481	22737495	22737506	22737523	22737543	22737556
		<b>AGS Reference</b>						
Component	LOD/Units	Method						
Suspended solids, Total	<2 mg/l	TM022	<2	<2	<2	<2	<2	<2
			#	#	#	#	#	#
Alkalinity, Total as CaCO3	<2 mg/l	TM043	14.2	21.9	24.1	10.3	12.7	7.5
			#	#	#	#	#	#
Alkalinity, Bicarbonate as CaCO3	<2 mg/l	TM043	14.2	21.9	24.1	10.3	12.7	7.5
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099	0.0207	0.0372	0.0179	0.0168	0.0183	0.021
			#	#	#	#	#	#
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.0529	0.0763	0.0669	0.0516	0.0543	0.0499
			#	#	#	#	#	#
Phosphorus (tot.unfilt)	<20 µg/l	TM152	<20	35.1	<20	<20	<20	<20
			#	#	#	#	#	#
Nitrite as NO2	<0.05 mg/l	TM184	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
			#	#	#	#	#	#
Phosphate (Ortho as P)	<0.02 mg/l	TM184	<0.02	0.0202	<0.02	<0.02	<0.02	<0.02
			#	#	#	#	#	#
Nitrate as NO3	<0.3 mg/l	TM184	0.66	0.495	1.69	<0.3	0.84	0.369
Turbidity	<0.1 ntu	TM195	0.538	1.87	0.536	1.69	1.8	0.995
			◆ #	◆ #	◆ #	◆ #	◆ #	◆ #
pH	<1 pH Units	TM256	6.69	6.63	6.69	6.25	6.8	6.64
			#	#	#	#	#	#
Apparent Colour	<1 mg/l Pt/Co	TM261	44.8	151	31.4	88.5	45.1	65.9
True Colour	<1 mg/l Pt/Co	TM261	34.7	125	28.7	72.5	36.6	49.6



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 200828-99  
**Location:** Gortyrähilly, Co. Cork

**Client Reference:** 3188-A1-COC2  
**Order Number:**

**Report Number:** 566074  
**Superseded Report:**

## 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
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM195	Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.	Determination of Turbidity in Waters & Associated Matrices
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
TM261	Colour and Turbidity of Waters, Methods for the Examination of Waters and Associated Materials, HMSO, 1981, ISBN 0 11 7519553.	Determination of True and Apparent Colour by Spectrophotometry

NA = not applicable.

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



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 200828-99	<b>Client Reference:</b> 3188-A1-COC2	<b>Report Number:</b> 566074
<b>Location:</b> Gortyrally, Co. Cork	<b>Order Number:</b>	<b>Superseded Report:</b>

## Test Completion Dates

Lab Sample No(s)	22737481	22737495	22737506	22737523	22737543	22737556
Customer Sample Ref.	3188-A1-SW1	3188-A1-SW2	3188-A1-SW3	3188-A1-SW4	3188-A1-SW5	3188-A1-SW6
AGS Ref.						
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water

Alkalinity as CaCO3	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	04-Sep-2020
Ammonium Low	03-Sep-2020	03-Sep-2020	03-Sep-2020	05-Sep-2020	05-Sep-2020	05-Sep-2020
Anions by Kone (w)	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Colour Test	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Conductivity (at 20 deg.C)	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020
Nitrite by Kone (w)	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
pH Value	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020	02-Sep-2020
Phosphate by Kone (w)	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Suspended Solids	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020
Total Metals by ICP-MS	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020	04-Sep-2020
Turbidity in waters	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020	03-Sep-2020



# CERTIFICATE OF ANALYSIS

SDG: 200828-99 Client Reference: 3188-A1-COC2 Report Number: 566074  
 Location: Gortyrahilly, Co. Cork Order Number: Superseded Report:

## Appendix

## General

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

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

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

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

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

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

7. Results relate only to the items tested.

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

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. 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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Taney hall  
Eglinton Terrace  
Dundrum  
Dublin  
Dublin 14

**Attention:** Sven Klinkenbergh

## CERTIFICATE OF ANALYSIS

**Date of report Generation:** 05 March 2021  
**Customer:** Minerex Environmental  
**Sample Delivery Group (SDG):** 200814-70  
**Your Reference:** 3188-A1-COC1  
**Location:** Gortyrhilly  
**Report No:** 589418

**This report has been revised and directly supersedes 564068 in its entirety.**

We received 6 samples on Friday August 14, 2020 and 6 of these samples were scheduled for analysis which was completed on Friday August 21, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

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

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

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

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

Approved By:

**Sonia McWhan**

Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

SDG: 200814-70 Client Reference: 3188-A1-COC1 Report Number: 589418  
Location: Gortyrahilly Order Number: Superseded Report: 564068

## Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22656514	3188-SW1		0.00 - 0.00	12/08/2020
22656531	3188-SW2		0.00 - 0.00	12/08/2020
22656549	3188-SW3		0.00 - 0.00	12/08/2020
22656562	3188-SW4		0.00 - 0.00	12/08/2020
22656577	3188-SW5		0.00 - 0.00	12/08/2020
22656590	3188-SW6		0.00 - 0.00	12/08/2020

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



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 200814-70	<b>Client Reference:</b> 3188-A1-COC1	<b>Report Number:</b> 589418
<b>Location:</b> Gortyrhillly	<b>Order Number:</b>	<b>Superseded Report:</b> 564068

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type		
	<b>X</b> Test	<b>N</b> No Determination Possible											
<b>Sample Types -</b> 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			22656514	3188-SW1		0.00 - 0.00	500ml Plastic (ALE208)	SW					
			22656531	3188-SW2		0.00 - 0.00	HNO3 Unfiltered (ALE204)	SW					
			22656549	3188-SW3		0.00 - 0.00	H2SO4 (ALE244)	SW					
			22656562	3188-SW4		0.00 - 0.00	500ml Plastic (ALE208)	SW					
			22656577	3188-SW5		0.00 - 0.00	HNO3 Unfiltered (ALE204)	SW					
							H2SO4 (ALE244)	SW					
							500ml Plastic (ALE208)	SW					
							HNO3 Unfiltered (ALE204)	SW					
							H2SO4 (ALE244)	SW					
							500ml Plastic (ALE208)	SW					
							HNO3 Unfiltered (ALE204)	SW					
	Alkalinity as CaCO3	All	NDPs: 0 Tests: 6	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		
Colour Test	All	NDPs: 0 Tests: 6	X			X			X		X		
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 6	X			X			X		X		
Nitrite by Kone (w)	All	NDPs: 0 Tests: 6			X			X		X			
pH Value	All	NDPs: 0 Tests: 6	X			X			X		X		
Phosphate by Kone (w)	All	NDPs: 0 Tests: 6	X			X			X		X		
Suspended Solids	All	NDPs: 0 Tests: 6	X			X			X		X		
Total Metals by ICP-MS	All	NDPs: 0 Tests: 6		X		X			X		X	X	
Turbidity in waters	All	NDPs: 0 Tests: 6	X			X			X		X		





# CERTIFICATE OF ANALYSIS

Validated

SDG: 200814-70  
Location: Gortyrachilly

Client Reference: 3188-A1-COC1  
Order Number:

Report Number: 589418  
Superseded Report: 564068

Results Legend		Customer Sample Ref.	3188-SW1	3188-SW2	3188-SW3	3188-SW4	3188-SW5	3188-SW6
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.		Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
aq	Aqueous / settled sample.		12/08/2020	12/08/2020	12/08/2020	12/08/2020	12/08/2020	12/08/2020
diss.filt	Dissolved / filtered sample.		00:00	00:00	00:00	00:00	00:00	00:00
tot.unfilt	Total / unfiltered sample.		14/08/2020	14/08/2020	14/08/2020	14/08/2020	14/08/2020	14/08/2020
*	Subcontracted - refer to subcontractor report for accreditation status.		200814-70	200814-70	200814-70	200814-70	200814-70	200814-70
**	% 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		22656514	22656531	22656549	22656562	22656577	22656590
(F)	Trigger breach confirmed							
1-4*\$@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
Suspended solids, Total	<2 mg/l	TM022	<2	<2	<4	7.02	<2	2.95
			#	#	#	#	#	#
Alkalinity, Total as CaCO3	<2 mg/l	TM043	19.3	21	16.5	22.5	19.5	22.9
			#	#	#	#	#	#
Alkalinity, Bicarbonate as CaCO3	<2 mg/l	TM043	19.3	21	16.5	22.5	19.5	22.9
			#	#	#	#	#	#
Ammoniacal Nitrogen Low as NH3	<0.01 mg/l	TM099	0.0431	0.0459	0.0173	0.0434	0.0616	0.029
			#	#	#	#	#	#
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.0736	0.128	0.0737	0.0869	0.0828	0.0678
			#	#	#	#	#	#
Phosphorus (tot.unfilt)	<20 µg/l	TM152	<20	32	<20	<20	<20	<20
			#	#	#	#	#	#
Nitrite as NO2	<0.05 mg/l	TM184	<0.05	<0.05	<0.05	<0.05	0.139	<0.05
			#	#	#	#	#	#
Phosphate (Ortho as P)	<0.02 mg/l	TM184	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			#	#	#	#	#	#
Nitrate as NO3	<0.3 mg/l	TM184	0.387	46.1	1.25	0.887	0.844	<0.3
			#	#	#	#	#	#
Turbidity	<0.1 ntu	TM195	1.25	1.46	0.653	1.59	0.75	6.16
			◆#	◆#	◆#	◆#	◆#	◆#
pH	<1 pH Units	TM256	7.15	4.87	7.05	7.69	7.17	7.12
			#	#	#	#	#	#
Apparent Colour	<1 mg/l Pt/Co	TM261	36	96.4	24.1	48.5	24.4	74.3
			#	#	#	#	#	#
True Colour	<1 mg/l Pt/Co	TM261	24	75.5	12.4	30.8	17.4	40.6
			#	#	#	#	#	#



# CERTIFICATE OF ANALYSIS

Validated

SDG: 200814-70 Client Reference: 3188-A1-COC1 Report Number: 589418  
Location: Gortyrally Order Number: Superseded Report: 564068

## 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
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
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TM195	Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.	Determination of Turbidity in Waters & Associated Matrices
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
TM261	Colour and Turbidity of Waters, Methods for the Examination of Waters and Associated Materials, HMSO, 1981, ISBN 0 11 7519553.	Determination of True and Apparent Colour by Spectrophotometry

NA = not applicable.

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



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	200814-70	<b>Client Reference:</b>	3188-A1-COC1
<b>Location:</b>	Gortyrachilly	<b>Order Number:</b>	
		<b>Report Number:</b>	589418
		<b>Superseded Report:</b>	564068

## Test Completion Dates

Lab Sample No(s)	22656514	22656531	22656549	22656562	22656577	22656590
Customer Sample Ref.	3188-SW1	3188-SW2	3188-SW3	3188-SW4	3188-SW5	3188-SW6
AGS Ref.						
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Alkalinity as CaCO3	19-Aug-2020	19-Aug-2020	21-Aug-2020	21-Aug-2020	21-Aug-2020	19-Aug-2020
Ammonium Low	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020
Anions by Kone (w)	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Colour Test	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020
Conductivity (at 20 deg.C)	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Nitrite by Kone (w)	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
pH Value	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Phosphate by Kone (w)	20-Aug-2020	20-Aug-2020	20-Aug-2020	20-Aug-2020	20-Aug-2020	20-Aug-2020
Suspended Solids	19-Aug-2020	19-Aug-2020	20-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Total Metals by ICP-MS	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020	19-Aug-2020
Turbidity in waters	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020	18-Aug-2020

<b>ALS Environmental, Land</b>	<b>QF.7.5.1 Data Amendments Form (Issue No. 4)</b>
	<b>Date: 03/03/2020</b>
	<b>Issued and Authorised by Quality Manager</b>

SDG	Sample Event	Sample ID	Date Amended	Amendment Reason	Previous Reference	New Reference	Supersedes Report
200814-70	All samples	All samples	05/03/2021	Site Reference Change	Inchamore, Co. Cork	Gortyrhilly	564068





# CERTIFICATE OF ANALYSIS

<b>SDG:</b> 200814-70	<b>Client Reference:</b> 3188-A1-COC1	<b>Report Number:</b> 589418
<b>Location:</b> Gortyrally	<b>Order Number:</b>	<b>Superseded Report:</b> 564068

## Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH<sub>4</sub> 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.**