

**QUARTER 4 & ANNUAL, 2022– LEACHATE
SAMPLING RESULTS FOR THE CENTRAL WASTE
MANAGEMENT FACILITY (CWMF), BALLYDUFFBEG,
INAGH, CO. CLARE.**

Prepared for:

**CLARE COUNTY COUNCIL
ARAS AN CHONTAE
NEW ROAD
ENNIS
CO. CLARE**

ISSUE/REVISION INDEX

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Prepared by:			John Rea, B.Sc. MEnv.Sc.		

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EXECUTIVE SUMMARY

JRE Ltd. (JRE) was retained by Clare County Council to complete leachate monitoring and sampling at the Central Waste Management Facility (CWMF) located at Ballyduffbeg, Inagh, Co. Clare. The site is a closed landfill site with an operational bring centre. Monthly and quarterly leachate monitoring and sampling was completed at Tank 1 and Tank 2 located on site. Tank 1 is a covered lagoon area that stores collected surface water runoff from the main site yard and green waste processing area. Tank 2 is an above ground storage tank containing a combination of leachate collected from the main landfill body via the leachate collection and pumping system and overflow water from Tank 1. Leachate samples were collected and analysed to assess the quality of leachate being collected, transported and disposed of from the CWMF site.

This report covers the results of the leachate monitoring and sampling completed in the fourth quarter (Q4) of 2022 (i.e., between October and December 2022), and annual sampling completed in November 2022. The results of the sampling events indicated the following:

- All submitted leachate samples from Tank 1 and Tank 2 for monthly analysis of NH₄-N, BOD and COD in Quarter 4, 2022 contained concentrations less than the concentrations included in Table 3 of the EPA Landfill manual, landfill Operational Practices, 1997 for typical leachate.
- All submitted leachate samples from Tank 1 and Tank 2 for quarterly analysis of chloride in Quarter 4, 2022 contained concentrations significantly less than the concentrations included in Table 3 of the EPA Landfill manual, landfill Operational Practices, 1997 for typical leachate.
- All submitted leachate samples from Tank 1 and Tank 2 for annual analysis of inorganics and metals contained concentrations less than the concentrations included in Table 3 of the EPA Landfill manual, landfill Operational Practices, 1997 for typical leachate.

All samples collected from leachate collection Tanks 1 and 2 contained concentrations of parameters less than concentrations included in the typical [Landfill Leachate] Composition of Leachate from Domestic Wastes at Various Stages of Decomposition. All water within Tank 1 is transferred to Tank 2 before being transported off site for treatment at the Clare Co. Co. Wastewater Treatment Plant.

1. INTRODUCTION

JRE Ltd. (JRE) was retained by Clare County Council to complete leachate monitoring and sampling at the Central Waste Management Facility (CWMF) located at Inagh, Co. Clare. The site is a closed landfill site with an operational bring centre. Monthly, quarterly and annual leachate monitoring and sampling was completed at Tank 1 and Tank 2 on site. Tank 1 is a covered lagoon area that stores collected surface water runoff from the main site yard and green waste processing area. Tank 2 is an above ground storage tank containing a combination of leachate collected from the main landfill body via the leachate collection and pumping system and overflow water from Tank 1. Leachate samples were collected and analysed to assess leachate quality being collected, transported and disposed of from site.

The leachate monitoring and sampling completed in October and December 2022 were monthly monitoring and sampling events. The sampling completed in November 2022 was a monthly, quarterly and annual monitoring and sampling event. This report provides the results of the fourth quarter (Q4) sampling programme for 2022.

All sampling was completed under the appropriate health and safety regulations, including; Safety, Health and Welfare at Work Act, 2005 and the Safety, Health and Welfare at Work (General Application) Regulations, 2007 and associated Regulations. All sampling was completed with reference to Schedule E of Environmental Protection Agency (EPA) Waste Licence Ref. W00109-02 (Waste Licence). Sampling frequency was completed with reference to Table E.5.5 of the Waste Licence.

2. LEACHATE SAMPLING

The purpose of the quarterly leachate sampling programme in Q4 of 2022 was to assess leachate quality in Tank 1 and Tank 2 based on the sampling requirements of the site waste licence for monthly and quarterly monitoring, sampling, and analysis. Tank 1 is a covered lagoon area that stores collected surface water runoff from the main site yard area (i.e., paved civic amenity and green waste areas). Tank 2 is an above ground storage tank containing leachate collected from the main landfill body via the leachate collection and pumping system and the overflow water from Tank 1. Both storage areas are located in the lower yard area close to the green waste composting area.

2.1 Scope of Work

The following tasks were completed as part of the scope of work for the leachate monitoring and sampling assessment:

- Monitor and record field parameters (i.e., pH, electrical conductivity and temperature) on a quarterly basis at both leachate sampling locations.
- Submit monthly leachate samples to an accredited laboratory, in laboratory supplied sample bottles for ammonia, BOD and COD analysis at both leachate sampling locations;
- Submit quarterly leachate samples to an accredited laboratory in laboratory supplied sample bottles for chloride analysis as specified in Table E 5.5 of the Waste Licence at both leachate sampling locations; and
- Prepare a quarterly and annual report of leachate results for Clare Co. Co.

2.2 Methodology

Field personnel completed three (3) leachate sampling events at CWMF between October and December 2022. The sampling events completed in October and December 2022 were monthly monitoring and sampling events. The sampling completed in November 2022 included parameters required to be sampled on a quarterly and annual basis.

All leachate samples were collected in appropriate laboratory supplied sample containers and transported under chain-of custody to an accredited laboratory. Field personnel completed all field work with reference to section 6.5 of the EPA monitoring manual, including the following:

- Transfer all leachate grab samples to appropriate sample containers and seal the container immediately, minimising the exposure of the sample to air.
- Handle leachate samples in a manner that minimises any health risks to monitoring or other personnel, risk of cross-contamination of samples or risk to the environment.
- Transfer all samples to a chilled cooler box immediately following sample collection. All samples were labelled with a unique sample identification number and transported to the contract laboratory under appropriate chain of custody documentation.

3. RESULTS

Samples were collected in Q4 of 2022 from the lagoon located in the main yard area, northwest of the site offices (Tank 1) used to contain surface water runoff from the main CWMF lower yard area and green waste processing area. Leachate samples were also collected from the adjacent leachate storage tank (Tank 2) that contains leachate from the main landfill body, during the same sampling events. Sampling was completed on October 4th, November 2nd and December 1st, 2022. The results of the sampling programme are included in the Tables in Appendix II and the laboratory reports are included in Appendix III. The analysis and monitoring programme indicated the following.

- Electrical conductivity for leachate samples collected from Tank 1 in November 2022 was 899 µS/cm and from Tank 2 was 5,806 µS/cm.
- pH levels for the leachate sample collected from Tank 1 in November 2022 was 7.51 and from Tank 2 was 8.09.
- Temperature for leachate samples collected from Tank 1 in November 2022 was 14.1°C and from Tank 2 was 17.2°C.
- Concentrations of ammonia in Tank 1 ranged between 15.24 mg/l (October 2022) and 45.08 mg/l (November 2022) and concentrations in Tank 2 ranged between 263.18 mg/l (November 2022) and 388.11 mg/l (October 2022). The ammonia concentrations in all leachate samples were less than the mean ammonia concentration of typical landfill leachate of 491 mg/l;
- Concentrations of BOD in Tank 1 ranged between 9 mg/l (October 2022) and 29 mg/l (December 2022) and BOD concentrations in Tank 2 ranged between 14 mg/l (December 2022) and 224 mg/l (November 2022). The concentrations in all leachate samples were significantly less than the mean BOD concentration of typical landfill leachate of >798 mg/l;
- Concentrations of COD in Tank 1 ranged between 64 mg/l (October 2022) and 137 mg/l (November 2022) and COD concentrations in Tank 2 ranged between 289 mg/l (December 2022) and 444 mg/l (October 2022). The concentrations in all samples were significantly less than the mean COD concentration of typical landfill leachate of 3,078 mg/l;
- The concentration of chloride in Tank 1 was 96.68 mg/l and the chloride concentration in Tank 2 was 454.62 mg/l during the Q4 quarterly sampling event in November 2022. All of the submitted leachate samples contained chloride concentrations less than the mean concentration in typical landfill leachate of 1,256 mg/l.
- The concentration of phosphate in Tank 1 (1.71 mg/l) and Tank 2 (2.99 mg/l) were less than the mean typical leachate phosphorus concentration of 3,000 µg/l (i.e., 3 mg/l) for the annual sample collected in November 2022. The submitted leachate samples contained phosphate concentrations less than the mean concentration in typical landfill leachate of 3 mg/l.
- The concentrations of all other inorganics and metal parameters analysed as part of the annual leachate sampling in November 2022 were less than the mean or maximum typical leachate

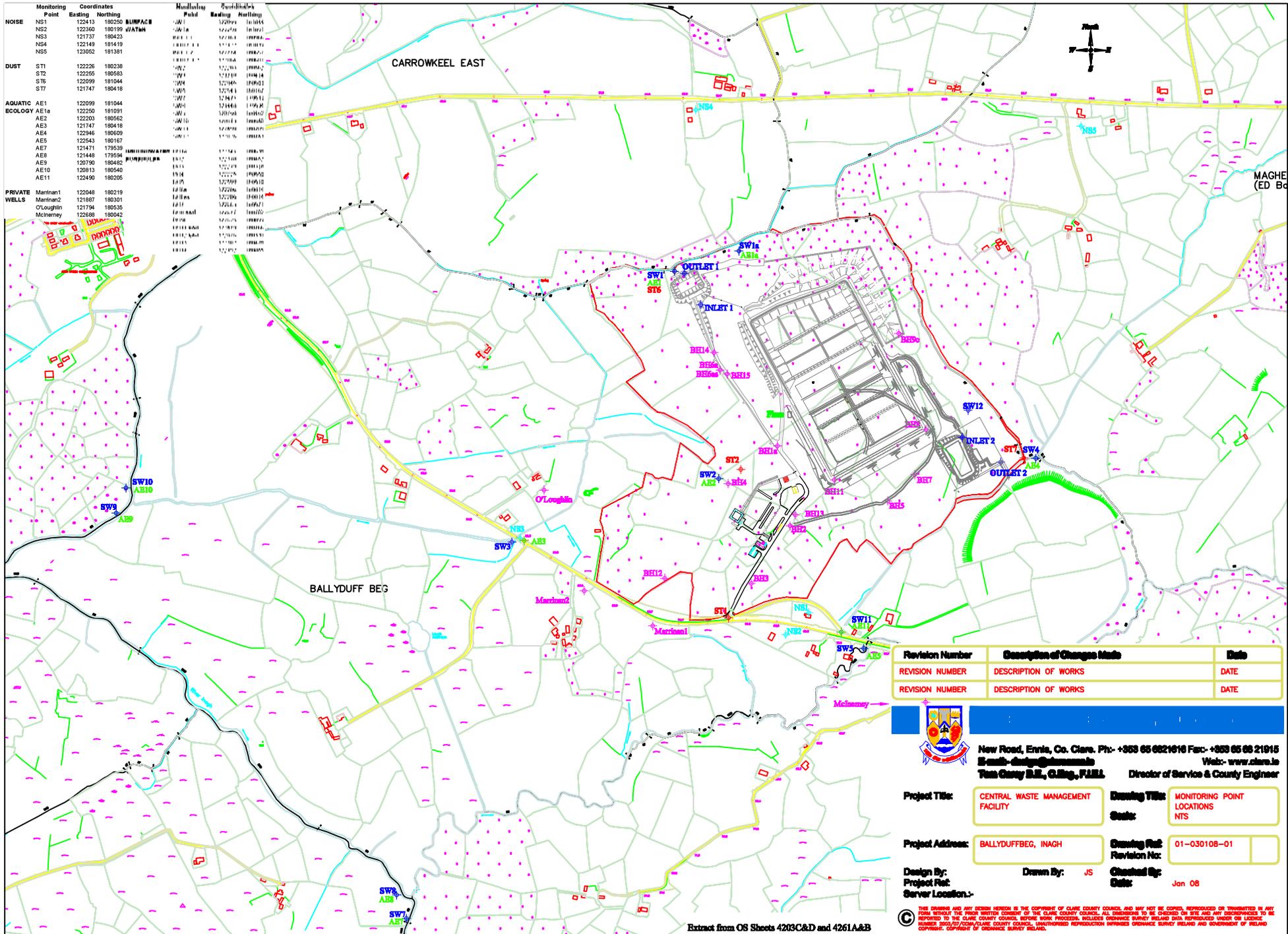
- concentrations outlined in the EPA typical leachate composition for landfills accepting mainly domestic waste (EPA, 1997) in both Tank 1 and Tank 2.

4. QUALITY ASSURANCE / QUALITY CONTROL

Leachate sampling was completed according to JRE's preferred operating procedures (POPs). Upon collection, leachate samples were immediately transferred to appropriate laboratory prepared jars and stored in ice-chilled coolers for shipment with chain-of-custody documentation.

DRAWING

01-030108-01 – Monitoring Point Locations



Monitoring Point	Coordinates	Monitoring Point	Coordinates
	Easting Northing		Easting Northing
NOISE			
NS1	122413 180250	NS1	122499 180445
NS2	122360 180199	NS2	122420 180401
NS3	121737 180425	NS3	122411 180401
NS4	122149 181419	NS4	122411 180401
NS5	123002 181381	NS5	122278 180401
DUST			
ST1	122226 180238	ST1	122204 180401
ST2	122255 180583	ST2	122204 180401
ST6	122099 181044	ST6	122099 180401
ST7	121747 180410	ST7	122099 180401
AQUATIC ECOLOGY			
AE1	122099 181044	AE1	121444 180401
AE1a	122250 181091	AE1a	120700 180401
AE2	122203 180562	AE2	120700 180401
AE3	121747 180418	AE3	120700 180401
AE4	122946 180609	AE4	120700 180401
AE5	122543 180167	AE5	120700 180401
AE7	121471 179539	AE7	120700 180401
AE8	121448 179594	AE8	120700 180401
AE9	120700 180401	AE9	120700 180401
AE10	120813 180540	AE10	120700 180401
AE11	122490 180205	AE11	120700 180401
PRIVATE WELLS			
Mannan1	122048 180219	Mannan1	122099 180401
Mannan2	121887 180301	Mannan2	122099 180401
O'Loughlin	121794 180535	O'Loughlin	122099 180401
McInerney	122608 180402	McInerney	122099 180401

Revision Number	Description of Changes Made	Date
REVISION NUMBER	DESCRIPTION OF WORKS	DATE
REVISION NUMBER	DESCRIPTION OF WORKS	DATE



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 Tom Casey B.E., C.Eng., F.I.E.E. Director of Service & County Engineer

Project Title:	CENTRAL WASTE MANAGEMENT FACILITY	Drawing Title:	MONITORING POINT LOCATIONS NTS
Project Address:	BALLYDUFFBEG, INAGH	Drawing Ref:	01-030108-01
Design By:		Checked By:	Jan 08
Project Ref:		Server Location:	

Extract from OS Sheets 4203C&D and 4261A&B

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APPENDIX I

Analysis Results Tables

CWMF LEACHATE SAMPLING RESULTS - OCTOBER 2022

LOCATIONS	Date	NH ₃ -N (mg/l)	BOD (mg/l)	COD (mg/l)	pH	Conductivity (µS/cm)	Visual /odour
TANK 1	04/10/2022	15.24	9	64	7.65	588	Brown/black with organic odour
TANK 2		388.11	26	444	8.12	5,704.00	Dark Brown with organic odour
Unit		mg/l	mg/l O ₂	mg/l	mg/l	mg/l	
Typical Leachate Composition* (mean)		491	>798	3,078	7.2	7,789	N/A

CWMF LEACHATE SAMPLING RESULTS - NOVEMBER 2022

Parameter	Units	Tank 1 Results	Tank 2 Results	Typical Leachate Composition* (mean concentration)	Typical Leachate Composition* (max concentration)
BOD	mg/l	18	224	>798	>4,800
COD	mg/l	137	373	3,078	33,700
Chloride	mg/l	96.68	454.62	1,256	3,410
pH	pH Units	7.51	8.09	7.2	8
Temp	°C	14.1	17.2	N/A	N/A
Conductivity	µS/cm	899	5,806	7,789	19,200
Boron	µg/l	318	2,080	7,000	116,000
Calcium	mg/l	62.3	162	250	1,440
Cadmium	µg/l	<0.6	<0.6	<0.10	3
Cyanide	mg/l	<0.009	0.011	<0.05	0.16
Chromium	µg/l	<2	30.7	70	560
Copper	µg/l	<9	<9	40	160
Iron	µg/l	2,300	4,300	54,500	664,000
Fluoride	mg/l	0.46	0.47	N/A	N/A
Mercury	µg/l	0.14	6.27	0.10	1.00
Potassium	mg/l	31.4	185	491	1,480
Magnesium	mg/l	8.1	39.3	151	470
Manganese	µg/l	573	3,010	1,990	23,200
Sodium	mg/l	63.1	429	904	3,000
Ammonia	mg/l	45.08	263.18	491	1,700
Nickel	µg/l	3.38	25.5	100	330
Ortho-P	mg/l	1.71	2.99	3	16
Lead	µg/l	<6	<6	100	280
Sulphate	mg/l	35.21	196.73	136	739
TON	mg/l	<0.5	2.49	2.40	32.80
Zinc	µg/l	58.4	<18	580	6,700

CWMF LEACHATE SAMPLING RESULTS - DECEMBER 2022

LOCATIONS	Date	NH ₃ -N	BOD	COD
TANK 1	01/12/2022	25.708	29	100
TANK 2		270.409	14	289
Unit		mg/l	mg/l O ₂	mg/l
Typical Leachate Composition* (mean)		491	>798	3,078

APPENDIX II
Laboratory Reports

John Rea Environmental Ltd
Purcellsinch Business Park
Carlow Road
Kilkenny
Ireland



Attention : John Rea
Date : 18th October, 2022
Your reference : 3156
Our reference : Test Report 22/16373 Batch 1
Location : CWMF
Date samples received : 7th October, 2022
Status : Final Report
Issue : 1

Six samples were received for analysis on 7th October, 2022 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Liza Klebe

Project Co-ordinator

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/16373

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 22/16373

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM37	Modified methods: TSS: USEPA 160.2 (1985), EN672:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometrically.	PM0	No preparation is required.				
TM58	APHA SMEWW 5210B:1999 22nd Edition. Comparable with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as am	PM0	No preparation is required.				
TM58	APHA SMEWW 5210B:1999 22nd Edition. Comparable with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as am	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.				



Independent Analytical Supplies

Test Report

Lab Report Number: 13514S001

Customer ID:	SNC-LAVA	Analysis Type:	99A (99A)
Contact Name:	JOHN REA	Delivery By:	CUSTOMER
Company Name:	JRE Ltd	Sample Card Number:	78360
Address:	PURCELSINCH BUS. PARK CARLOW RD. KILKENNY CITY CO.KILKENNY	Condition on Receipt:	Acceptable
Sample Type:	LEACHATE	Date Sample Received:	03/11/2022
Sample Reference:	LEACHATE SAMPLES 02.11.22	Date Analysis Commenced:	03/11/2022
Sample Description:	L22-TANK 1-11	Date Certificate Issued:	28/11/2022

Parameter	Method	Result	Unit
Boron*^	Subcontracted	318	µg/l
Biochemical Oxygen Demand	SOP 2006	18	mg/l
Calcium^	Subcontracted	62.3	mg/l
Cadmium^	Subcontracted	<0.600	µg/l
Chloride	SOP 2065	96.68	mg/l
Cyanide*^	Subcontracted	<0.009	mg/l
Chemical Oxygen Demand	SOP 2005	137	mg/l
Chromium^	Subcontracted	<2.00	µg/l
Copper^	Subcontracted	<9.00	µg/l
Iron*^	Subcontracted	2300	µg/l
Fluoride*	SOP 2069	0.46	mg/l
Mercury*^	Subcontracted	0.14	µg/l
Potassium^	Subcontracted	31.4	mg/l
Magnesium^	Subcontracted	8.1	mg/l
Manganese*^	Subcontracted	573	µg/l
Sodium^	Subcontracted	63.1	mg/l
Ammonia*	SOP 2057	45.08	mg/l NH ₃
Nickel^	Subcontracted	3.38	µg/l
Orthophosphate	SOP 2061	1.71	mg/l PO ₄
Lead^	Subcontracted	<6.00	µg/l
Sulphate	SOP 2062	35.21	mg/l
Total Oxidised Nitrogen	SOP 2058	<0.50	mg/l N
Zinc*^	Subcontracted	58.4	µg/l

Signed: Laura Kavanagh
Laura Kavanagh - Deputy Lab Manager

Date: 28/11/2022

* = not INAB Accredited ^ = Subcontracted

This report must not be reproduced, except in full, without the prior written approval of IAS Laboratories. This report relates only to the sample submitted and tested.
Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
Uncertainty of Measurement is not taken into account for any test results reported.



IAS Laboratories, Unit 4 Bagenalstown Bus. Park, Bagenalstown, Co Carlow, R21 YX99

Test Report

Lab Report Number: 13514S002

Customer ID:	SNC-LAVA	Analysis Type:	99A (99A)
Contact Name:	JOHN REA	Delivery By:	CUSTOMER
Company Name:	JRE Ltd	Sample Card Number:	78360
Address:	PURCELSINCH BUS. PARK CARLOW RD. KILKENNY CITY CO.KILKENNY	Condition on Receipt:	Acceptable
Sample Type:	LEACHATE	Date Sample Received:	03/11/2022
Sample Reference:	LEACHATE SAMPLES 02.11.22	Date Analysis Commenced:	03/11/2022
Sample Description:	L22-TANK 2-11	Date Certificate Issued:	28/11/2022

Parameter	Method	Result	Unit
Boron ^{*^}	Subcontracted	2080	µg/l
Biochemical Oxygen Demand	SOP 2006	224	mg/l
Calcium [^]	Subcontracted	162	mg/l
Cadmium [^]	Subcontracted	<0.600	µg/l
Chloride	SOP 2065	464.62	mg/l
Cyanide ^{*^}	Subcontracted	0.011	mg/l
Chemical Oxygen Demand	SOP 2005	373	mg/l
Chromium [^]	Subcontracted	30.7	µg/l
Copper [^]	Subcontracted	<9.00	µg/l
Iron ^{*^}	Subcontracted	4300	µg/l
Fluoride [*]	SOP 2069	0.47	mg/l
Mercury ^{*^}	Subcontracted	6.27	µg/l
Potassium [^]	Subcontracted	185	mg/l
Magnesium [^]	Subcontracted	39.3	mg/l
Manganese ^{*^}	Subcontracted	3010	µg/l
Sodium ^{*^}	Subcontracted	429	mg/l
Ammonia [*]	SOP 2057	263.18	mg/l NH ₃
Nickel [^]	Subcontracted	25.5	µg/l
Orthophosphate	SOP 2061	2.99	mg/l PO ₄
Lead [^]	Subcontracted	<6.00	µg/l
Sulphate	SOP 2062	196.73	mg/l
Total Oxidised Nitrogen	SOP 2058	2.49	mg/l N
Zinc ^{*^}	Subcontracted	<18.0	µg/l

Signed: Laura Kavanagh
Laura Kavanagh - Deputy Lab Manager

Date: 28/11/2022

* = not INAB Accredited ^ = Subcontracted

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John Rea Environmental Ltd
Purcellsinch Business Park
Carlow Road
Kilkenny
Ireland

Attention : John Rea
Date : 8th December, 2022
Your reference : 3156
Our reference : Test Report 22/19888 Batch 1
Location : CWMF
Date samples received : 2nd December, 2022
Status : Final Report
Issue : 1

Two samples were received for analysis on 2nd December, 2022 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Liza Klebe

Project Co-ordinator

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/19888

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

