



Lawler Quarry, Portersize, Ballitore, Co. Kildare
Monitoring Well Locations and Groundwater Levels 2020 - 2021

Well ID	Irish Grid		ITM		Borehole Diameter (D) mm	Standpipe D (id) mm	Ground Level (GL) m	Top of Casing (TOC) m	Depth to Base (DTB) m	Screened Section m bgl	Sample Depth m bgl	26/06/2020		27/07/2020		19/08/2021	
	Eastings	Northing	Eastings	Northing								DTW	mOD	DTW	mOD	DTW	mOD
	mbTOC		mOD									mbTOC		mOD		mbTOC	
MW1	280888	195314	680820.9	695348.9	120	50	106.031	106.455	24.50	9.50 - 24.50	17	10.15	96.305	10.37	96.085	10.36	96.10
MW2	281059	195467	680991.9	695501.9	120	50	105.816	106.389	21.50	9.50 - 21.50	16	9.16	97.229	9.11	97.279	9.10	97.29
MW3	281546	195313	681478.8	695347.9	120	50	132.56	133.005	30.00	6.00 - 30.00	18	5.67	127.335	6.09	126.915	5.75	127.26
MW4	281124	195064	681056.9	695099.0	120	50	134.662	135.227	39.50	18.50 - 39.50	29	19.58	115.647	19.97	115.257	19.77	115.46

Notes and abbreviations:

- D diameter
- DTB depth to base
- DTW depth to water
- GL Ground Level (surveyed)
- ID Identification
- id internal diameter
- ITM Irish Transverse Mercator
- m metre
- mbgl metres below ground level
- mbTOC metres below top of casing
- mm millimetre
- mOD metres above ordnance datum
- TOC top of casing

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Lawler Quarry, Portersize, Ballitore, Co. Kildare
Groundwater - Laboratory Results Summary Table (August 2021)

Site Name: Lawlers Quarry

Project No.: 191115

Site Location: Portersize, Ballitore, Co. Kildare

Sampling Date: 19/08/2021

Parameter	Units	MW1	MW2	MW3	MW4	Drinking Water Regs (S.I. 122 od 2014)	Groundwater Regs (S.I. 9 of 2010)
		19/08/2021					
BOD	mg/l	<1	<1	<1	<1	-	-
COD	mg/l	<7	<7	<7	<7	-	-
Ammoniacal Nitrogen (as N)	mg/l	<0.03	<0.03	<0.03	<0.03	0.3	0.175
Chloride	mg/l	21.4	15.9	28.5	9.3	250	187.5
Iron (total dissolved)	µg/l	<20.0	<20.0	<20.0	<20.0	200	-
Magnesium (dissolved)	mg/l	15.1	9.8	7.4	14.0	-	-
Manganese (dissolved)	µg/l	<2	<2	<2	<2	50	-
Cadmium (dissolved)	µg/l	<0.5	<0.5	<0.5	<0.5	5	3.75
Chromium (total dissolved)	µg/l	1.6	3.0	<1.5	<1.5	50	50
Copper (dissolved)	µg/l	<7	<7	<7	<7	2000	1500
Lead (dissolved)	µg/l	<5	<5	<5	<5	10	18.75
Nickle (dissolved)	µg/l	<2	<2	<2	<2	20	15
Zinc (dissolved)	µg/l	7.0	<3	7.0	<3	-	-
Mercury (dissolved)	µg/l	<1	<1	<1	<1	1	0.75
Total Nitrogen (N)	mg/l	8.4	5.4	12.1	5.6	-	-
Nitrate (as NO3)	mg/l	33.0	21.1	49.5	21.7	50	37.5
Nitrite (as NO2)	mg/l	<0.02	<0.02	<0.02	<0.02	0.5	0.375
Phosphate (Ortho as P)	mg/l	0.25	<0.03	<0.03	<0.03	-	0.375
Potassium (dissolved)	mg/l	1.7	0.7	0.4	0.9	-	-
Sodium (dissolved)	mg/l	9.5	7.3	10.3	8.6	200	150
Sulphate (as SO4)	mg/l	12.4	11.7	19.3	10.2	250	187.5
Total Suspended Solids	mg/l	45	12	<10	161	-	-
Total Dissolved Solids	mg/l	559	299	511	440	-	-
GRO, C4-C12	µg/l	<10	<10	<10	<10	-	-
EPH, C10-C40	µg/l	<10	<10	<10	<10	-	-

Notes and abbreviations:

Bold - exceeds GW Regs (S.I. 9 of 2010)

BOD - biochemical oxygen demand

COD - chemical oxygen demand

EPH - extractable petroleum hydrocarbons

GRO - gasoline range organics

µg/l - micrograms per liter

mg/l - milligrams per liter

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Map Legend

- Dust Monitoring
- Surface Water
- ⊗ Monitoring Well
- Red Line Boundary
- River

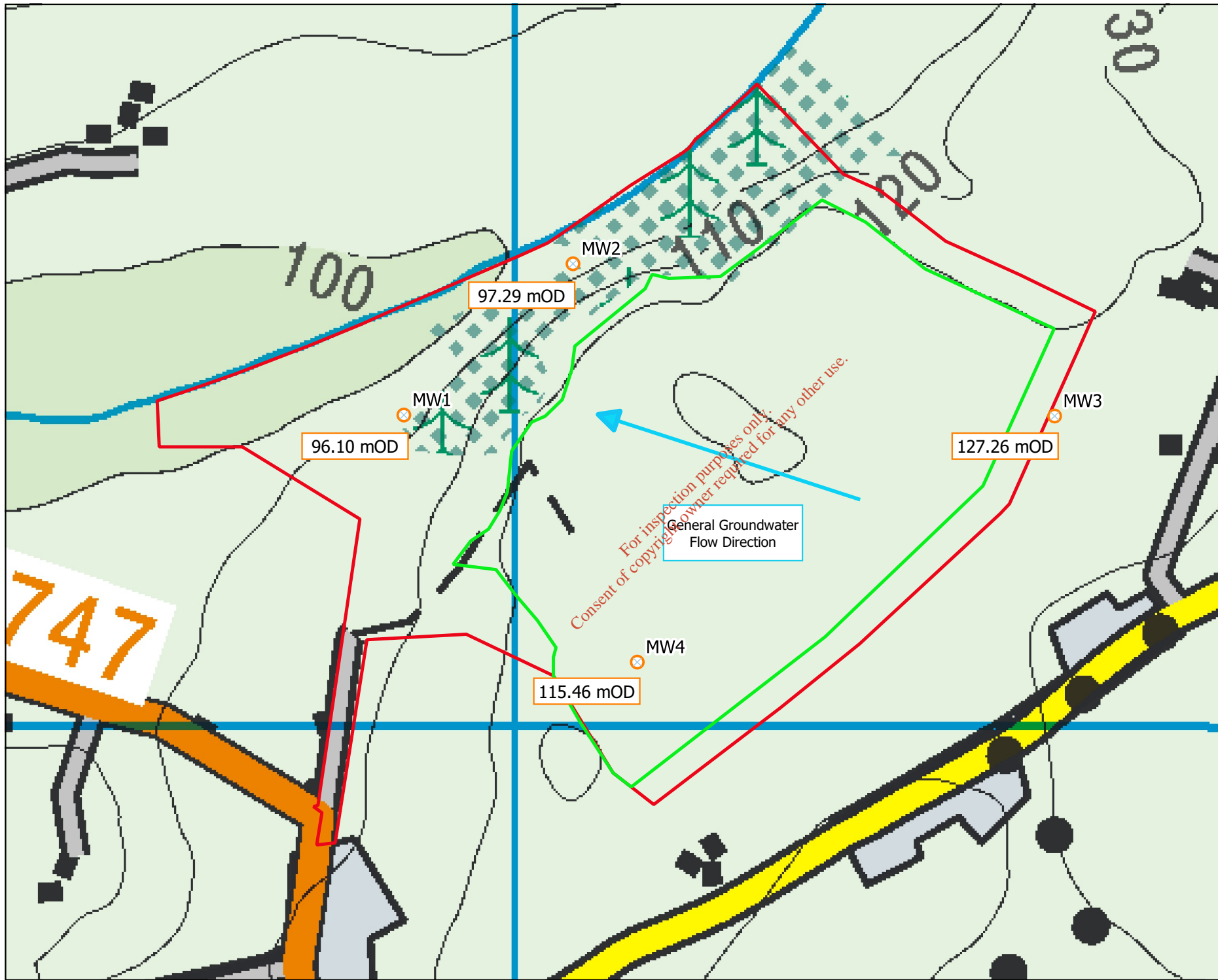


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Site Monitoring Points

Project Title	
Lawler Quarry Restoration	
Drawn By	Checked By
Eoin Hurst	Eoin O'Sullivan
Project No.	Drawing No.
191115	Fig 4-1
Scale	Date
1:5000	03.08.2021

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Map Legend

- Red Line Boundary
- Quarry Void Boundary
- ⊗ MW Location

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Drawing Title	
Groundwater Levels and Flow Direction, Aug-2021	
Project Title	
Lawler Quarry Restoration	
Drawn By	Checked By
Eoin Hurst	Eoin O'Sullivan
Project No.	Drawing No.
191115	Fig 4-2
Scale	Date
1:5000	26.08.2021

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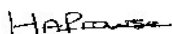
Attention : Eoin Hurst
Date : 3rd September, 2021
Your reference : 191115
Our reference : Test Report 21/12793 Batch 1
Location : Lawler Quarry, Portersize, Co Kildare
Date samples received : 20th August, 2021
Status : Final Report
Issue : 1

Seven samples were received for analysis on 20th August, 2021 of which seven 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.

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Authorised By:



Hayley Prowse

Project Manager

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Element Materials Technology

Client Name: McCarthy Keville & O'Sullivan Ltd
Reference: 191115
Location: Lawler Quarry, Portersize, Co Kildare
Contact: Eoin Hurst
EMT Job No: 21/12793

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

EMT Sample No.	1-7	8-14	15-21	22-28	29-32	33-36	37-43	Please see attached notes for all abbreviations and acronyms					
	Sample ID	MW-1	MW-2	MW-2-DUP	MW-4	SW-1	SW-2				MW-3		
Depth													
COC No / misc													
Containers	V H HN P BOD G	V H HN P BOD G	V H HN P BOD G	V H HN P BOD G	H HN P BOD	H HN P BOD	V H HN P BOD G						
Sample Date	19/08/2021 13:30	19/08/2021 14:15	19/08/2021 14:20	19/08/2021 12:30	19/08/2021 15:00	19/08/2021 15:30	19/08/2021						
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Ground Water						
Batch Number	1	1	1	1	1	1	1						
Date of Receipt	20/08/2021	20/08/2021	20/08/2021	20/08/2021	20/08/2021	20/08/2021	20/08/2021				LOD/LOR	Units	Method No.
Dissolved Cadmium #	<0.5	<0.5	<0.5	<0.5	-	-	<0.5				<0.5	ug/l	TM30/PM14
Total Dissolved Chromium #	1.6	3.0	2.4	<1.5	-	-	<1.5	<1.5	ug/l	TM30/PM14			
Dissolved Copper #	<7	<7	<7	<7	-	-	<7	<7	ug/l	TM30/PM14			
Total Dissolved Iron #	<20	<20	<20	<20	-	-	<20	<20	ug/l	TM30/PM14			
Dissolved Lead #	<5	<5	<5	<5	-	-	<5	<5	ug/l	TM30/PM14			
Dissolved Magnesium #	15.1	9.8	9.7	14.0	-	-	7.4	<0.1	mg/l	TM30/PM14			
Dissolved Manganese #	<2	<2	<2	<2	-	-	<2	<2	ug/l	TM30/PM14			
Dissolved Mercury #	<1	<1	<1	<1	-	-	<1	<1	ug/l	TM30/PM14			
Dissolved Nickel #	<2	<2	<2	<2	-	-	<2	<2	ug/l	TM30/PM14			
Dissolved Phosphorus #	-	-	-	-	14	15	-	<5	ug/l	TM30/PM14			
Dissolved Potassium #	1.7	0.7	0.7	0.9	-	-	0.4	<0.1	mg/l	TM30/PM14			
Dissolved Sodium #	9.5	7.3	7.2	8.6	-	-	10.3	<0.1	mg/l	TM30/PM14			
Dissolved Zinc #	7	<3	<3	<3	-	-	7	<3	ug/l	TM30/PM14			
GRO (>C4-C8) #	<10	<10	<10	<10	-	-	<10	<10	ug/l	TM36/PM12			
GRO (>C8-C12) #	<10	<10	<10	18	-	-	<10	<10	ug/l	TM36/PM12			
GRO (>C4-C12) #	<10	<10	<10	18	-	-	<10	<10	ug/l	TM36/PM12			
EPH >C10-C21 #	<10	<10	<10	<10	-	-	<10	<10	ug/l	TM5/PM30			
EPH >C21-C40 #	<10	<10	<10	<10	-	-	<10	<10	ug/l	TM5/PM30			
EPH >C10-C40 #	<10	<10	<10	<10	-	-	<10	<10	ug/l	TM5/PM30			
Sulphate as SO ₄ #	12.4	11.7	11.8	10.2	-	-	19.3	<0.5	mg/l	TM38/PM0			
Chloride #	21.4	15.9	15.8	9.3	18.2	17.8	28.5	<0.3	mg/l	TM38/PM0			
Nitrate as NO ₃ #	33.0	21.1	20.0	21.7	27.4	28.6	49.5	<0.2	mg/l	TM38/PM0			
Nitrite as NO ₂ #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/l	TM38/PM0			
Nitrate as N #	7.46	4.76	4.52	4.89	-	-	11.18	<0.05	mg/l	TM38/PM0			
Nitrite as N #	<0.006	<0.006	<0.006	<0.006	-	-	<0.006	<0.006	mg/l	TM38/PM0			
Ortho Phosphate as P #	0.25	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/l	TM38/PM0			
Total Oxidised Nitrogen as N #	7.5	4.8	4.5	4.9	-	-	11.2	<0.2	mg/l	TM38/PM0			
Ammoniacal Nitrogen as N #	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	mg/l	TM38/PM0			
Ammoniacal Nitrogen as NH ₃ #	<0.03	<0.03	<0.03	<0.03	-	-	<0.03	<0.03	mg/l	TM38/PM0			
BOD (Settled) #	<1	<1	<1	<1	<1	<1	<1	<1	mg/l	TM58/PM0			
COD (Settled) #	<7	<7	<7	<7	7	<7	<7	<7	mg/l	TM57/PM0			
Kjeldahl Nitrogen	0.9	0.6	0.7	0.7	-	-	0.9	<0.5	mg/l	TM125/PM0			
Total Dissolved Solids #	559	299	275	440	-	-	511	<35	mg/l	TM20/PM0			
Total Nitrogen	8.4	5.4	5.2	5.6	7.1	7.2	12.1	<0.5	mg/l	TM38/TM125/PM0			
Total Suspended Solids #	45	12	<10	161	<10	<10	<10	<10	mg/l	TM37/PM0			

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/12793

SOILS

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.

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.

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.

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.

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.

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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.

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: 21/12793

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
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods TSS: USEPA 100.2 (1993), EN672:2003 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: 2013	PM0	No preparation is required.	Yes			
TM38/TM125	Total Nitrogen/Organic Nitrogen by calculation	PM0	No preparation is required.				
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.	Yes			
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			
TM125	Modified AOAC EPA 973.48 (2011). Kjeldahl Nitrogen by application of a strong acid digestion, distillation and titration.	PM0	No preparation is required.				

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