

Interim Report MFI0068

Client Details

Client	Natural Aqua Solutions Pty Ltd
Contact	Olaf Lyche
Address	33 Allenby Avenue, MALVERN EAST, VIC, 3145

Sample Details

Your Reference	Mt Beauty 126m Bore
Number of Samples	1 Water
Date Samples Received	04/09/2024
Date Instructions Received	04/09/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

PLEASE NOTE THAT THIS IS A PRELIMINARY REPORT AND THEREFORE DATA & INFORMATION THEREIN MAY BE ALTERED IN THE COMPLETE FINAL REPORT

Report Details

Date Results Requested by	11/09/2024
Date of Issue	11/09/2024

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Authorisation Details

Results Approved By	Chris De Luca, Assistant Lab Manager Tara White, Metals Supervisor
Laboratory Manager	Pamela Adams

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Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MFI0068-01	Sample 1	Water	04/09/2024	04/09/2024

Sample Comments

General Comment No attempt to cool was made. Envirolab strongly recommends cooling to <6° C (or an attempt to cool) when samples are transported to the laboratory.

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Acid Extractable Low Level Metals (Water)

Envirolab ID Your Reference Date Sampled	Units	PQL	MFI0068-01 Sample 1 04/09/2024
Aluminium	µg/L	10	<10
Arsenic	µg/L	1.0	<1.0
Cadmium	µg/L	0.10	<0.10
Chromium	µg/L	1.0	<1.0
Copper	µg/L	1.0	<1.0
Iron	µg/L	10	98
Mercury	µg/L	0.050	<0.050
Manganese	µg/L	1.0	10
Nickel	µg/L	1.0	<1.0
Lead	µg/L	1.0	<1.0
Selenium	µg/L	1.0	<1.0
Zinc	µg/L	1.0	2.1

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MFI0068-01
Your Reference			Sample 1
Date Sampled			04/09/2024
Total Dissolved Solids	mg/L	5.0	420

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Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID Your Reference Date Sampled	Units	PQL	MFI0068-01 Sample 1 04/09/2024
Bicarbonate Alkalinity as CaCO ₃	mg/L as CaCO ₃	5.0	310
Carbonate Alkalinity as CaCO ₃	mg/L as CaCO ₃	5.0	<5.0
Hydroxide OH ⁻ as CaCO ₃	mg/L as CaCO ₃	5.0	<5.0
Total Alkalinity as CaCO ₃	mg/L as CaCO ₃	5.0	310
Chloride	mg/L	1.0	9.1
Sulfate	mg/L	1.0	<1.0
Calcium	mg/L	0.50	19
Magnesium	mg/L	0.50	5.0
Potassium	mg/L	0.50	1.1
Sodium	mg/L	0.50	110
Hardness (calc) equivalent CaCO ₃	mg/L	3.0	68
Ionic Balance	%		-0.91
Total Anions	mg/L	7.0	320
Anions as meq	meq/L	0.59	5.3
Total Cations	mg/L	2.0	140
Cations as meq	meq/L	0.10	6.3

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Method Summary

Method ID	Methodology Summary
Calc - ION	Calculation
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition, 4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at $180 \pm 10^{\circ}\text{C}$. NOTE: Where the EC of the sample is $<100\mu\text{S}/\text{cm}$, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: $\text{TDS} = \text{EC} \times 0.6$
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within $\pm 15\%$ i.e. total anions = total cations $\pm 15\%$.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
METALS-020	Determination of various metals by ICP-OES.
METALS-021	Determination of Mercury by Cold Vapour AAS.
METALS-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Salt forms and/or anion/cation forms (e.g. FeO, PbO, ZnO, BO3) are determined stoichiometrically from the base metal concentration.

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Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

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Client Details

Client	Natural Aqua Solutions Pty Ltd
Your Reference	Mt Beauty 126m Bore
Date Issued	11/09/2024

Recommended Holding Time Compliance

No recommended holding time exceedances

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	Yes	No Outliers

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

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Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
Total Metals (LL) Water	1	04/09/2024	05/09/2024	06/09/2024	Yes
Total Metals (LL)-Hg Water	1	04/09/2024	06/09/2024	09/09/2024	Yes
TDS Water	1	04/09/2024	10/09/2024	11/09/2024	Yes
Alkalinity Suite Water	1	04/09/2024	05/09/2024	05/09/2024	Yes
Chloride Water	1	04/09/2024	05/09/2024	05/09/2024	Yes
Dissolved Cations Water	1	04/09/2024	06/09/2024	06/09/2024	Yes
Ion Balance Water	1	04/09/2024	05/09/2024	11/09/2024	Yes
	1	04/09/2024	06/09/2024	06/09/2024	Yes
Sulfate Water	1	04/09/2024	05/09/2024	05/09/2024	Yes

Outliers: Matrix Spike

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFI1192

Sample ID	Analyte	% Limits	% Recovery
BFI1192-MS1#	Sodium	70 - 130	##[1]

METALS-022 | Acid Extractable Low Level Metals (Water) | Batch BFI0789

Sample ID	Analyte	% Limits	% Recovery
BFI0789-MS1#	Aluminium	70 - 130	##[2]
BFI0789-MS1#	Iron	70 - 130	##[1]
BFI0789-MS1#	Manganese	70 - 130	##[2]

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METALS-022 | Acid Extractable Low Level Metals (Water) | Batch BFI0789

Analyte	Units	PQL	Blank	DUP1	LCS %	Spike %
				BFI0789-DUP1#		
				Samp QC RPD %		
Aluminium	µg/L	10	<10	989 942 4.84	100	##[2]
Arsenic	µg/L	1.0	<1.0	3.38 3.50 [NA]	103	115
Cadmium	µg/L	0.10	<0.10	<0.20 <0.20 [NA]	105	115
Chromium	µg/L	1.0	<1.0	2.26 2.12 [NA]	103	115
Copper	µg/L	1.0	<1.0	2.98 2.66 [NA]	106	116
Iron	µg/L	10	<10	3040 2880 5.55	102	##[1]
Lead	µg/L	1.0	<1.0	2.68 2.48 [NA]	94.5	108
Manganese	µg/L	1.0	<1.0	501 476 5.24	102	##[2]
Nickel	µg/L	1.0	<1.0	6.42 6.54 [NA]	104	116
Selenium	µg/L	1.0	<1.0	<2.0 <2.0 [NA]	102	105
Zinc	µg/L	1.0	<1.0	10.2 10.3 0.972	104	113

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-021 | Acid Extractable Low Level Metals (Water) | Batch BFI1191

Analyte	Units	PQL	Blank	DUP1	LCS %	Spike %
				BFI1191-DUP1#		
				Samp QC RPD %		
Mercury	µg/L	0.050	<0.050	<0.050 <0.050 [NA]	109	108

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BFI1585

Analyte	Units	PQL	Blank	DUP1	LCS %
				MFI0068-01	
				Samp QC RPD %	
Total Dissolved Solids	mg/L	5.0	<5.0	420 390 7.41	109

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFI0794

Analyte	Units	PQL	Blank	DUP1	DUP2	LCS %
				BFI0794-DUP1#	BFI0794-DUP2#	
				Samp QC RPD %	Samp QC RPD %	
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	78.2 79.4 1.52	<5.0 <5.0 [NA]	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 <5.0 [NA]	<5.0 <5.0 [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 <5.0 [NA]	<5.0 <5.0 [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	78.2 79.4 1.52	<5.0 <5.0 [NA]	94.4

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFI0807

Analyte	Units	PQL	Blank	DUP1	DUP2	LCS %	Spike %
				BFI0807-DUP1#	BFI0807-DUP2#		
				Samp QC RPD %	Samp QC RPD %		
Chloride	mg/L	1.0	<1.0	164 156 4.78	218 206 5.89	102	79.9
Sulfate	mg/L	1.0	<1.0	12.4 12.5 0.297	14.6 13.2 [NA]	108	97.2

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFI1192

Analyte	Units	PQL	Blank	DUP1	LCS %	Spike %
				BFI1192-DUP1#		
				Samp QC RPD %		
Calcium	mg/L	0.50	<0.50	26.4 27.4 [NA]	96.4	75.8
Magnesium	mg/L	0.50	<0.50	24.1 24.4 [NA]	95.4	83.2
Potassium	mg/L	0.50	<0.50	9.02 8.95 0.834	112	94.2
Sodium	mg/L	0.50	<0.50	242 245 1.49	108	##[1]
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	165 169 [NA]	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

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QC Comments

Identifier	Description
[1]	Spike recovery is not applicable due to the relatively high analyte background in the sample (>3* spike level). However, the LCS recovery is within acceptance criteria.
[2]	Spike recovery is outside routine acceptance criteria (70-130%), this may be due to suspected non-homogeneity and/or matrix interference effects. However, an acceptable recovery was achieved for the LCS.