



CERTIFICATE OF ANALYSIS 254726

Client Details

Client	Walker Quarries Pty Ltd
Attention	Johnn van der Merwe
Address	PO Box 115, Wallerawang, NSW, 2845

Sample Details

Your Reference	<u>Walker Quarries</u>
Number of Samples	2 Water
Date samples received	02/11/2020
Date completed instructions received	02/11/2020

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 solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	09/11/2020
Date of Issue	06/11/2020

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Results Approved By

Jaimie Loa-Kum-Cheung, Metals Supervisor
Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Client Reference: Walker Quarries

Miscellaneous Inorganics			
Our Reference		254726-1	254726-2
Your Reference	UNITS	SD1 - Upstream	SD2 - Downstream
Date Sampled		29/10/2020	29/10/2020
Type of sample		Water	Water
Date prepared	-	02/11/2020	02/11/2020
Date analysed	-	02/11/2020	02/11/2020
pH	pH Units	7.9	8.2
Electrical Conductivity	µS/cm	630	490
Sulphate, SO4	mg/L	140	110
Total Suspended Solids	mg/L	<10	<10
Turbidity	NTU	1.2	2.2
Oil & Grease (LLE)	mg/L	<5	<5

Client Reference: Walker Quarries

Metals in Water - Dissolved			
Our Reference		254726-1	254726-2
Your Reference	UNITS	SD1 - Upstream	SD2 - Downstream
Date Sampled		29/10/2020	29/10/2020
Type of sample		Water	Water
Date digested	-	03/11/2020	03/11/2020
Date analysed	-	03/11/2020	03/11/2020
Arsenic - Dissolved	mg/L	<0.05	<0.05
Cadmium - Dissolved	mg/L	<0.01	<0.01
Chromium - Dissolved	mg/L	<0.01	<0.01
Copper - Dissolved	mg/L	<0.01	<0.01
Lead - Dissolved	mg/L	<0.03	<0.03
Mercury - Dissolved	mg/L	<0.0005	<0.0005
Nickel - Dissolved	mg/L	<0.02	<0.02
Zinc - Dissolved	mg/L	<0.02	<0.02

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Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-003	Oil & Grease - determine gravimetrically following extraction with Hexane, in accordance with APHA latest edition, 5520-B.
Inorg-019	Suspended Solids - determined gravimetrically by filtration of the sample. The samples are dried at 104+/-5°C.
Inorg-022	Turbidity - measured nephelometrically using a turbidimeter, in accordance with APHA latest edition, 2130-B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.

Client Reference: Walker Quarries

QUALITY CONTROL: Miscellaneous Inorganics				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	254726-2
Date prepared	-			02/11/2020	1	02/11/2020	02/11/2020		02/11/2020	02/11/2020
Date analysed	-			02/11/2020	1	02/11/2020	02/11/2020		02/11/2020	02/11/2020
pH	pH Units		Inorg-001	[NT]	1	7.9	[NT]		100	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	630	[NT]		104	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	140	140	0	100	91
Total Suspended Solids	mg/L	5	Inorg-019	<5	1	<10	[NT]		99	[NT]
Turbidity	NTU	0.1	Inorg-022	<0.1	1	1.2	[NT]		93	[NT]
Oil & Grease (LLE)	mg/L	5	Inorg-003	<5	1	<5	[NT]		91	[NT]

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QUALITY CONTROL: Metals in Water - Dissolved					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			03/11/2020	1	03/11/2020	03/11/2020		03/11/2020	[NT]
Date analysed	-			03/11/2020	1	03/11/2020	03/11/2020		03/11/2020	[NT]
Arsenic - Dissolved	mg/L	0.05	Metals-020	<0.05	1	<0.05	<0.05	0	111	[NT]
Cadmium - Dissolved	mg/L	0.01	Metals-020	<0.01	1	<0.01	<0.01	0	108	[NT]
Chromium - Dissolved	mg/L	0.01	Metals-020	<0.01	1	<0.01	<0.01	0	106	[NT]
Copper - Dissolved	mg/L	0.01	Metals-020	<0.01	1	<0.01	<0.01	0	105	[NT]
Lead - Dissolved	mg/L	0.03	Metals-020	<0.03	1	<0.03	<0.03	0	101	[NT]
Mercury - Dissolved	mg/L	0.0005	Metals-021	<0.0005	1	<0.0005	[NT]		102	[NT]
Nickel - Dissolved	mg/L	0.02	Metals-020	<0.02	1	<0.02	<0.02	0	105	[NT]
Zinc - Dissolved	mg/L	0.02	Metals-020	<0.02	1	<0.02	<0.02	0	108	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
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.
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.
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.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

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.

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 QA/QC tables for details; <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 (not SPOCAS); 60-140% for organics/SPOCAS (+/-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 insufficient in order to satisfy laboratory QA/QC protocols.

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.

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 and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

pH/Turbidity

Outside of recommended holding time.

TOTAL SUSPENDED SOLIDS:

The PQL has been raised due to the limited amount of sample/s available for testing.

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab. Note: there is a possibility some elements may be underestimated.

samples received were SD1 and SD2, not SD3 and SD4 listed on the COC