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R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

T 0508 HILL LAB (44 555 22)
T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2135019 DWUPv1
Contact:	Lisa Shaw	**Date Received:**	04-Mar-2019
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	12-Mar-2019
	PO Box 7469	**Quote No:**	64980
	Christchurch 8240	**Order No:**	
		Client Reference:	
		Submitted By:	Catherine McGoldrick

Sample Type: Aqueous

Sample Name:		Lincoln Source - Eastfield Drive G02129 04-Mar-2019 9:59 am	Lincoln Source - Millstream Drive G00164 04-Mar-2019 9:49 am	Guideline Value	Maximum Acceptable Values (MAV)
Lab Number:		2135019.1	2135019.2		
Individual Tests					
Total Arsenic	g/m³	< 0.0011 ± 0.00074	< 0.0011 ± 0.00074	-	0.01
Total Cadmium	g/m³	< 0.000053 ± 0.000036	< 0.000053 ± 0.000036	-	0.004
Total Chromium	g/m³	0.00110 ± 0.00037	0.00100 ± 0.00036	-	0.05
Total Lead	g/m³	< 0.00011 ± 0.000074	< 0.00011 ± 0.000074	-	0.01
Total Nickel	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	-	0.08
Routine Water Profile					
pH	pH Units	7.8 ± 0.2	7.8 ± 0.2	7.0 - 8.5	-
Total Alkalinity	g/m³ as $CaCO_3$	53.0 ± 2.3	50.8 ± 2.2	-	-
Free Carbon Dioxide	g/m³ at 25°C	1.57 ± 0.73	1.61 ± 0.75	-	-
Total Hardness	g/m³ as $CaCO_3$	50.1 ± 1.9	52.1 ± 1.9	< 200	-
Electrical Conductivity (EC)	mS/m	14.3 ± 0.3	14.6 ± 0.3	-	-
Electrical Conductivity (EC)	µS/cm	143 ± 3	146 ± 3	-	-
Approx Total Dissolved Salts	g/m³	95.6 ± 2.0	97.7 ± 2.1	< 1000	-
Total Boron	g/m³	0.0190 ± 0.0044	0.0205 ± 0.0045	-	1.4
Total Calcium	g/m³	16.83 ± 0.68	17.77 ± 0.72	-	-
Total Copper	g/m³	0.00084 ± 0.00036	< 0.00053 ± 0.00036	< 1	2
Total Iron	g/m³	< 0.021 ± 0.014	< 0.021 ± 0.014	< 0.2	-
Total Magnesium	g/m³	1.95 ± 0.16	1.87 ± 0.16	-	-
Total Manganese	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	< 0.04 (Staining) < 0.10 (Taste)	0.4
Total Potassium	g/m³	0.875 ± 0.064	0.910 ± 0.065	-	-
Total Sodium	g/m³	8.31 ± 0.50	8.09 ± 0.49	< 200	-
Total Zinc	g/m³	0.00591 ± 0.00087	0.0107 ± 0.0012	< 1.5	-
Chloride	g/m³	7.80 ± 0.50	8.45 ± 0.53	< 250	-
Nitrate-N	g/m³	1.154 ± 0.094	1.77 ± 0.14	-	11.3
Sulphate	g/m³	2.14 ± 0.37	1.97 ± 0.36	< 250	-

Sample Type: Aqueous					
Sample Name:		Lincoln Source - West Belt G01341 04-Mar-2019 9:41 am	Prebbleton Source - Well 1 G00165 04-Mar-2019 9:12 am	**Guideline Value**	**Maximum Acceptable Values (MAV)**
Lab Number:		2135019.3	2135019.4		
Individual Tests					
Total Arsenic	g/m^3	< 0.0011 ± 0.00074	< 0.0011 ± 0.00074	-	0.01
Total Cadmium	g/m^3	< 0.000053 ± 0.000036	< 0.000053 ± 0.000036	-	0.004
Total Chromium	g/m^3	0.00101 ± 0.00036	0.00095 ± 0.00036	-	0.05
Total Lead	g/m^3	< 0.00011 ± 0.000074	0.000624 ± 0.000083	-	0.01
Total Nickel	g/m^3	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	-	0.08
Routine Water Profile					
pH	pH Units	7.8 ± 0.2	7.8 ± 0.2	7.0 - 8.5	-
Total Alkalinity	g/m^3 as $CaCO_3$	56.2 ± 2.4	44.0 ± 1.9	-	-
Free Carbon Dioxide	g/m^3 at 25°C	1.67 ± 0.78	1.52 ± 0.71	-	-
Total Hardness	g/m^3 as $CaCO_3$	61.2 ± 2.2	41.4 ± 1.5	< 200	-
Electrical Conductivity (EC)	mS/m	17.6 ± 0.4	11.7 ± 0.3	-	-
Electrical Conductivity (EC)	µS/cm	176 ± 4	117 ± 3	-	-
Approx Total Dissolved Salts	g/m^3	117.9 ± 2.5	78.3 ± 1.7	< 1000	-
Total Boron	g/m^3	0.0200 ± 0.0045	0.0186 ± 0.0044	-	1.4
Total Calcium	g/m^3	19.83 ± 0.80	14.07 ± 0.57	-	-
Total Copper	g/m^3	< 0.00053 ± 0.00036	0.00059 ± 0.00036	< 1	2
Total Iron	g/m^3	< 0.021 ± 0.014	< 0.021 ± 0.014	< 0.2	-
Total Magnesium	g/m^3	2.83 ± 0.23	1.52 ± 0.13	-	-
Total Manganese	g/m^3	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	< 0.04 (Staining) < 0.10 (Taste)	0.4
Total Potassium	g/m^3	1.004 ± 0.070	0.780 ± 0.059	-	-
Total Sodium	g/m^3	10.32 ± 0.62	6.61 ± 0.40	< 200	-
Total Zinc	g/m^3	0.00342 ± 0.00078	0.184 ± 0.015	< 1.5	-
Chloride	g/m^3	12.28 ± 0.68	4.72 ± 0.41	< 250	-
Nitrate-N	g/m^3	1.96 ± 0.16	0.706 ± 0.064	-	11.3
Sulphate	g/m^3	2.52 ± 0.38	2.93 ± 0.39	< 250	-

Sample Type: Aqueous					
Sample Name:		Prebbleton Source - Well 3 G02128 04-Mar-2019 9:19 am	Tai Tapu Source - Perymans Road G00675 04-Mar-2019 10:10 am	**Guideline Value**	**Maximum Acceptable Values (MAV)**
Lab Number:		2135019.5	2135019.6		
Individual Tests					
Total Arsenic	g/m³	< 0.0011 ± 0.00074	< 0.0011 ± 0.00074	-	0.01
Total Cadmium	g/m³	< 0.000053 ± 0.000036	< 0.000053 ± 0.000036	-	0.004
Total Chromium	g/m³	0.00105 ± 0.00037	0.00093 ± 0.00036	-	0.05
Total Lead	g/m³	< 0.00011 ± 0.000074	< 0.00011 ± 0.000074	-	0.01
Total Nickel	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	-	0.08
Routine Water Profile					
pH	pH Units	7.8 ± 0.2	7.8 ± 0.2	7.0 - 8.5	-
Total Alkalinity	g/m³ as $CaCO_3$	50.0 ± 2.2	61.2 ± 2.6	-	-
Free Carbon Dioxide	g/m³ at 25°C	1.49 ± 0.70	1.83 ± 0.85	-	-
Total Hardness	g/m³ as $CaCO_3$	46.0 ± 1.7	52.1 ± 1.9	< 200	-
Electrical Conductivity (EC)	mS/m	12.6 ± 0.3	14.6 ± 0.4	-	-
Electrical Conductivity (EC)	µS/cm	126 ± 3	146 ± 4	-	-
Approx Total Dissolved Salts	g/m³	84.7 ± 1.8	98.2 ± 2.1	< 1000	-
Total Boron	g/m³	0.0192 ± 0.0044	0.0200 ± 0.0045	-	1.4
Total Calcium	g/m³	15.82 ± 0.64	16.33 ± 0.66	-	-
Total Copper	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	< 1	2
Total Iron	g/m³	< 0.021 ± 0.014	< 0.021 ± 0.014	< 0.2	-
Total Magnesium	g/m³	1.58 ± 0.13	2.76 ± 0.23	-	-
Total Manganese	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	< 0.04 (Staining) < 0.10 (Taste)	0.4
Total Potassium	g/m³	0.838 ± 0.062	0.872 ± 0.064	-	-
Total Sodium	g/m³	7.08 ± 0.43	9.36 ± 0.57	< 200	-
Total Zinc	g/m³	0.00317 ± 0.00078	0.0274 ± 0.0024	< 1.5	-
Chloride	g/m³	5.25 ± 0.42	6.46 ± 0.46	< 250	-
Nitrate-N	g/m³	0.581 ± 0.056	0.247 ± 0.039	-	11.3
Sulphate	g/m³	2.49 ± 0.38	2.47 ± 0.38	< 250	-

Note: The Guideline Values and Maximum Acceptable Values (MAV) are taken from the publication 'Drinking-water Standards for New Zealand 2005 (Revised 2018)', Ministry of Health. Copies of this publication are available from https://www.health.govt.nz/publication/drinking-water-standards-new-zealand-2005-revised-2018

The Maximum Acceptable Values (MAVs) have been defined by the Ministry of Health for parameters of health significance and should not be exceeded. The Guideline Values are the limits for aesthetic determinands that, if exceeded, may render the water unattractive to consumers.

The reported uncertainty is an expanded uncertainty with a level of confidence of approximately 95 percent (i.e. two standard deviations, calculated using a coverage factor of 2). Reported uncertainties are calculated from the performance of typical matrices, and do not include variation due to sampling.
For further information on uncertainty of measurement at Hill Laboratories, refer to the technical note on our website: www.hill-laboratories.com/files/Intro_To_UOM.pdf, or contact the laboratory.

Note that the units g/m³ are the same as mg/L and ppm.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Routine Water Profile		-	1-6
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter. Performed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch.	-	1-6
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-6

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
pH	pH meter. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 4500-H^+ B 23rd ed. 2017. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units	1-6
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 2320 B (modified for Alkalinity <20) 23rd ed. 2017.	1.0 g/m³ as $CaCO_3$	1-6
Free Carbon Dioxide	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO_2 D 23rd ed. 2017.	1.0 g/m³ at 25°C	1-6
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23rd ed. 2017.	1.0 g/m³ as $CaCO_3$	1-6
Electrical Conductivity (EC)	Conductivity meter, 25°C. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 2510 B 23rd ed. 2017.	0.1 mS/m	1-6
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23rd ed. 2017.	1 µS/cm	1-6
Approx Total Dissolved Salts	Calculation: from Electrical Conductivity.	2 g/m³	1-6
Total Arsenic	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.0011 g/m³	1-6
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.0053 g/m³	1-6
Total Cadmium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000053 g/m³	1-6
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.053 g/m³	1-6
Total Chromium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00053 g/m³	1-6
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00053 g/m³	1-6
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.021 g/m³	1-6
Total Lead	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00011 g/m³	1-6
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.021 g/m³	1-6
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00053 g/m³	1-6
Total Nickel	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00053 g/m³	1-6
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.053 g/m³	1-6
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.021 g/m³	1-6
Total Zinc	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.0011 g/m³	1-6
Chloride	Filtered sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.5 g/m³	1-6
Nitrate-N	Filtered sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.05 g/m³	1-6
Sulphate	Filtered sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.5 g/m³	1-6

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental