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Certificate of Analysis

Client:	Pigeon Rock Water Supply Company Limited	**Lab No:**	3858214	DWAPv1
Contact:	John Carr	**Date Received:**	15-Apr-2025	
	C/- Pigeon Rock Water Supply Company Limited	**Date Reported:**	22-Apr-2025	
	1 Pigeon Rock Road	**Quote No:**		
	Cornish Point	**Order No:**		
	Cromwell 9384	**Client Reference:**	Jason	
		Submitted By:	Jason Oliphant	

Sample Type: Drinking Water for DWSNZ Compliance

		Sample Name:	Pigeon Rock Water Supply 14-Apr-2025 3:30 pm	Aesthetic Values	Maximum Acceptable Values (MAV)
		Lab Number:	3858214.1		
Routine Water + E.coli profile Kit					
Escherichia coli	MPN / 100mL		< 1	-	< 1
Routine Water Profile					
Turbidity	NTU		0.37	≤ 5	-
pH	pH Units		7.8	7.0 - 8.5	-
Total Alkalinity	g/m³ as $CaCO_3$		280	-	-
Free Carbon Dioxide	g/m³ at 25°C		9.6	-	-
Total Hardness	g/m³ as $CaCO_3$		310	≤ 200	-
Electrical Conductivity (EC)	mS/m		61.7	-	-
Electrical Conductivity (EC)	µS/cm		617	-	-
Approx Total Dissolved Salts	g/m³		410	≤ 1000	-
Total Arsenic	g/m³		< 0.0011	-	0.01
Total Boron	g/m³		0.028	-	2.4
Total Calcium	g/m³		80	-	-
Total Copper	g/m³		0.0027	≤ 1	2
Total Iron	g/m³		< 0.021	≤ 0.3	-
Total Lead	g/m³		0.00054	-	0.01
Total Magnesium	g/m³		28	-	-
Total Manganese	g/m³		< 0.00053	≤ 0.04 (Staining) ≤ 0.10 (Taste)	0.4
Total Potassium	g/m³		2.2	-	-
Total Sodium	g/m³		19.7	≤ 200	-
Total Zinc	g/m³		0.0128	≤ 1.5	-
Chloride	g/m³		14.4	≤ 250	-
Nitrate-N	g/m³		0.78	-	11.3
Sulphate	g/m³		30	≤ 250	-

Note: The Maximum Acceptable Values (MAV) are taken from the 'Water Services (Drinking Water Standards for New Zealand) Regulations 2022', published under the authority of the New Zealand Government-2022. Copies of this publication are available from: https://www.legislation.govt.nz/regulation/public/2022/0168/latest/whole.html

The standards set limits for the concentration of determinands in drinking water. The Maximum Acceptable Values (MAVs) for any determinand must not be exceeded at any time.

The Aesthetic Values are taken the publication, 'Aesthetic Values for Drinking Water Notice 2022' issued by the Water Services Regulator ("Taumata Arowai"). Aesthetic values specify or provide minimum or maximum values for substances and other characteristics that relate to the acceptability of drinking water to consumers (such as appearance, taste or odour).

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

Routine Water Assessment for Sample No 3858214.1 - Pigeon Rock Water Supply

pH/Alkalinity and Corrosiveness Assessment
The pH of a water sample is a measure of its acidity or basicity. Waters with a low pH can be corrosive and those with a high pH can promote scale formation in pipes and hot water cylinders.
The guideline level for pH in drinking water is 7.0-8.5. Below this range the water will be corrosive and may cause problems with disinfection if such treatment is used.

The alkalinity of a water is a measure of its acid neutralising capacity and is usually related to the concentration of carbonate, bicarbonate and hydroxide. Low alkalinities (25 g/m^3) promote corrosion and high alkalinities can cause problems with scale formation in metal pipes and tanks.

The pH of this water is within the NZ Drinking Water Guidelines, the ideal range being 7.0 to 8.0.
With the pH and alkalinity levels found, it is unlikely this water will be corrosive towards metal piping and fixtures.
The high alkalinity of this water may cause an increase in the pH in the root zones of plants which are irrigated using this water.

Hardness/Total Dissolved Salts Assessment
The water contains a moderate amount of dissolved solids and would be regarded as being very hard.
There will be difficulty in forming a lather with soap, and a 'scum' will form in baths, showers, etc.
The high value for hardness (200 is considered excessive) indicates that this water may promote scale build-up in pipes and cylinders, and that irrigation systems using this water may be prone to scale build-up and blockage of narrow irrigation capillaries and jets.

Nitrate Assessment
Nitrate-nitrogen at elevated levels is considered undesirable in natural waters as this element can cause a health disorder called methaemaglobinaemia. Very young infants (less than six months old) are especially vulnerable. The 'Water Services (Drinking Water Standards for New Zealand) Regulations 2022' sets a maximum permissible level of 11.3 g/m^3 as Nitrate-nitrogen (50 g/m^3 as Nitrate).

Nitrate-nitrogen was detected in this water but at such a low level to not be of concern.

Boron Assessment
Boron may be present in natural waters and if present at high concentrations can be toxic to plants.
Boron was found at a low level in this water but would not give any cause for concern.

Metals Assessment
Iron and manganese are two problem elements that commonly occur in natural waters. These elements may cause unsightly stains and produce a brown/black precipitate. Iron is not toxic but manganese, at concentrations above 0.5 g/m^3, may adversely affect health. At concentrations below this it may cause stains on clothing and sanitary ware.

Neither element was detected in this water, which is a pleasing feature.
Treatment to remove iron and/or manganese should not be necessary.

Bacteriological Tests
The Drinking Water Standards for NZ state that there should be no Escherichia coli (E coli) in water used for human consumption. The presence of these organisms would indicate that other pathogens of faecal origin may be present. Results obtained for Total Coliforms are only significant if the sample has not also been tested for E coli.

Escherichia coli was not detected in this sample.

Final Assessment
The parameter Total Hardness did NOT meet the guidelines laid down in the 'Water Services (Drinking Water Standards for New Zealand) Regulations 2022' and the 'Aesthetic Values for Drinking Water Notice 2022' issued by the Water Services Regulator ("Taumata Arowai") for water which is suitable for drinking purposes.

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 simple 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. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Drinking Water for DWSNZ Compliance

Test	Method Description	Default Detection Limit	Sample No
Routine Water Profile		-	1
Filtration, Unpreserved	Sample filtration through 0.45 µm membrane filter. Analysed at Hill Laboratories - Chemistry; Unit 1, 17 Print Place, Middleton, Christchurch.	-	1
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	1
Turbidity	Analysis by Turbidity meter. Analysed at Hill Laboratories - Chemistry; Unit 1, 17 Print Place, Middleton, Christchurch. APHA 2130 B (modified) : Online Edition.	0.05 NTU	1
pH	pH meter. Analysed at Hill Laboratories - Chemistry; Unit 1, 17 Print Place, Middleton, Christchurch. APHA 4500-H^+ B (modified) : Online Edition. 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
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. Analysed at Hill Laboratories - Chemistry; Unit 1, 17 Print Place, Middleton, Christchurch. APHA 2320 B (modified for Alkalinity <20) : Online Edition.	1.0 g/m^3 as $CaCO_3$	1
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 : Online Edition.	1.0 g/m^3 at 25°C	1
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B : Online Edition.	1.0 g/m^3 as $CaCO_3$	1
Electrical Conductivity (EC)	Conductivity meter, 25°C. Analysed at Hill Laboratories - Chemistry; Unit 1, 17 Print Place, Middleton, Christchurch. APHA 2510 B : Online Edition.	0.1 mS/m	1
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B : Online Edition.	1 µS/cm	1
Approx Total Dissolved Salts	Calculation: from Electrical Conductivity.	2 g/m^3	1
Total Arsenic	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.0011 g/m^3	1
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.0053 g/m^3	1
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.053 g/m^3	1
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00053 g/m^3	1
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.021 g/m^3	1
Total Lead	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00011 g/m^3	1
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.021 g/m^3	1
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00053 g/m^3	1
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.053 g/m^3	1
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.021 g/m^3	1
Total Zinc	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.0011 g/m^3	1
Chloride	Filtered sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) : Online Edition.	0.5 g/m^3	1
Nitrate-N	Filtered (if required) sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) : Online Edition.	0.05 g/m^3	1
Sulphate	Filtered sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) : Online Edition.	0.5 g/m^3	1
Escherichia coli	MPN count using Colilert 18 (Incubated at 35°C for 18 hours) and 97 wells. Analysed at Hill Laboratories - Microbiology; Unit 1, 17 Print Place, Middleton, Christchurch. APHA 9223 B : Online Edition.	1 MPN / 100mL	1

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

Testing was completed between 15-Apr-2025 and 22-Apr-2025. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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Graham Corban MSc Tech (Hons)
Client Services Manager - Environmental