Hill Laboratories
TRIED, TESTED AND TRUSTED

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:	Oravida Waters Limited	**Lab No:**	2597024	SPv1
Contact:	Sunel Davies	**Date Received:**	28-Apr-2021	
	C/- Oravida Waters Limited	**Date Reported:**	05-May-2021	
	PO Box 106123	**Quote No:**	107348	
	Auckland 1010	**Order No:**		
		Client Reference:	OWL Typical analysis	
		Submitted By:	Sunel Davies	

Sample Type: Aqueous

Sample Name:		Typical Analysis: Orando Waters Ltd				
Lab Number:		2597024.1				
Individual Tests						
pH	pH Units	7.1	-	-	-	-
Total Alkalinity	g/m³ as $CaCO_3$	30	-	-	-	-
Carbonate	g/m³ at 25°C	< 1.0	-	-	-	-
Bicarbonate	g/m³ at 25°C	36	-	-	-	-
Total Hardness	g/m³ as $CaCO_3$	13.0	-	-	-	-
Total Dissolved Solids (TDS)	g/m³	111	-	-	-	-
Calcium	g/m³	2.8	-	-	-	-
Magnesium	g/m³	1.44	-	-	-	-
Potassium	g/m³	2.7	-	-	-	-
Sodium	g/m³	11.5	-	-	-	-
Chloride	g/m³	9.4	-	-	-	-
Silicon	g/m³	46	-	-	-	-
Nitrite-N	g/m³	< 0.002	-	-	-	-
Nitrate-N	g/m³	< 0.002	-	-	-	-
Nitrate-N + Nitrite-N	g/m³	< 0.002	-	-	-	-
Reactive Silica	g/m³ as SiO_2	92	-	-	-	-
Sulphate	g/m³	< 0.5	-	-	-	-
Heterotrophic Plate Count 22°C (72 hrs)	cfu / mL	< 1 #2	-	-	-	-
Total Coliforms and E.coli						
Escherichia coli	MPN / 100mL	< 1 #1	-	-	-	-
Total Coliforms	MPN / 100mL	< 1 #1	-	-	-	-

Analyst's Comments

#1 Please interpret this result with caution as it is not known what the sample age was on receipt at the lab. Please ensure that both sampling date and time are recorded on the submission form and sample bottle. The sample is required to be less than 24 hours old at the time of testing in the lab.
Please interpret this result with caution as the sample was > 10 °C on receipt at the lab. The sample temperature is recommended by the laboratory's reference methods to be less than 10 °C on receipt at the laboratory (but not frozen). However, it is acknowledged that samples that are transported quickly to the laboratory after sampling, may not have been cooled to this temperature.

#2 Statistically estimated count based on the theoretical countable range for the stated method.
Please interpret this result with caution as it is not known what the sample age was on receipt at the lab. Please ensure that both sampling date and time are recorded on the submission form and sample bottle. The sample is required to be less than 24 hours at the time of testing in the lab.
Please interpret this result with caution as the sample was > 10 °C on receipt at the lab. The sample temperature is recommended by the laboratory's reference methods to be less than 10 °C on receipt at the laboratory (but not frozen). However, it is acknowledged that samples that are transported quickly to the laboratory after sampling, may not have been cooled to this temperature.

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 Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
pH	pH meter. 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
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (modified for Alkalinity <20) 23rd ed. 2017.	1.0 g/m^3 as $CaCO_3$	1
Carbonate	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/m^3 at 25°C	1
Bicarbonate	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/m^3 at 25°C	1
Total Hardness	Calculation: from Ca and Mg. APHA 2340 B 23rd ed. 2017.	1.0 g/m^3 as $CaCO_3$	1
Total Dissolved Solids (TDS)	Filtration through GF/C (1.2 µm), gravimetric. APHA 2540 C (modified; drying temperature of 103 - 105°C used rather than 180 ± 2°C) 23rd ed. 2017.	10 g/m^3	1
Calcium	Analysed as received (after acid preservation, if required), ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.05 g/m^3	1
Magnesium	Analysed as received (after acid preservation, if required), ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.02 g/m^3	1
Potassium	Analysed as received (after acid preservation, if required), ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.05 g/m^3	1
Sodium	Analysed as received (after acid preservation, if required), ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.02 g/m^3	1
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.5 g/m^3	1
Silicon	Analysed as received (filtration, if required), ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.005 g/m^3	1
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m^3	1
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m^3	1
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m^3	1
Reactive Silica	Filtered sample. Heteropoly blue colorimetry. Flow Injection Analyser. APHA 4500-SiO2 F (modified) 23rd ed. 2017.	0.10 g/m^3 as SiO_2	1
Sulphate	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.5 g/m^3	1
Heterotrophic Plate Count 22°C (72 hrs)	Count on Plate count agar, Incubated at 22°C for 72 hours. APHA 9215 B 23rd ed. 2017.	1 cfu / mL	1
Total Coliforms and E.coli			
Escherichia coli	MPN count using Colilert 18 (Incubated at 35°C for 18 hours) and 51 wells. APHA 9223 B 23rd ed. 2017.	1 MPN / 100mL	1
Total Coliforms	MPN count using Colilert 18 (Incubated at 35°C for 18 hours) and 51 wells. APHA 9223 B 23rd ed. 2017.	1 MPN / 100mL	1

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

Testing was completed between 29-Apr-2021 and 05-May-2021. 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.

Martin Cowell - BSc
Client Services Manager - Environmental

The Mineral Profile of Water in a Box

The quality of mineral water is determined by the mineral profile of the source water. The water is sourced from the Otakiri Aquifer in the Bay of Plenty in New Zealand. This aquifer is located 1000 feet deep under the surface of the earth and was formed 1800 years ago by volcanic activity.

It takes 50 years for the water, which falls as rain, to seep down through the earth to reach this ancient aquifer. During this time, the water is filtered through thousands of layers of porous volcanic igneous rock where every precious drop is both purified and infused with the perfect concentration of life giving minerals.

The important minerals that are found in this premium quality artesian mineral water are :

Silica

Silica is the common name given to silicone dioxide (SiO2) which is naturally occurring as quartz and is a major component in sand in most parts of the world.

Silica helps support bone health in humans and as well as being important for the creation and maintenance of connective tissue. Regular consumption of silica supplements have shown positive effects on the strength and condition of skin, hair, and nails by preventing brittleness.

Medical research has identified that consumption of 10 mg/ day of silica enhances the excretion of aluminium from the body. Aluminium toxicity has been linked with Alzheimers, Parkinsons, Multiple Sclerosis and chronic fatigue. It has become standard practice in parts of Europe to administer high silica mineral water to patients suffering from these degenerative diseases to help improve their cognitive function.

The water from the Otakiri Spring, in Bay of Plenty, New Zealand contains natural silica levels of 89mg / litre which means that consuming a couple of glasses of this water every day may help to protect your long term cognitive performance.

Calcium

The function of Calcium (Ca) in the human body is well understood. It is the most plentiful mineral found in the human body and is one of the most important minerals for good health. Calcium helps form and maintain strong healthy teeth and bones and deficiency in the diet may lead to osteoporosis. In addition to helping build bone and teeth strength, Calcium plays an important role in blood clotting, effective nerve function, muscle contraction and maintaining a regular heartbeat.

Researchers have confirmed that the human body can just as effectively absorb calcium from mineral water as it does from milk or other dairy products and so drinking mineral water is a good way of boosting dietary calcium, without the calories that are associated with dairy products.

Magnesium

Like Calcium, Magnesium (Mg) is also an essential mineral for the human body, playing a key role in many biological processes through its function in enzyme activities.

Recent studies have confirmed the essential role magnesium plays in the prevention of cardiovascular diseases. Having an adequate intake of magnesium in the diet is important for preventing atherogenesis and inappropriate blood clotting, as well as for maintaining electrolyte balance and a host of other cellular, biochemical and physiological processes which are crucial to cardiovascular function and health.

Sodium

Sodium (Na) is most commonly known as salt and is well understood by most consumers to be a mineral that they should be seeking to reduce their intake of. A small amount of sodium is required for healthy functioning of the human body as it plays an essential role in fluid and electrolytes balancing. However too much salt in our diet is associated with an increased risk of raised blood pressure, which is a risk factor for heart disease, stroke and kidney disease. High sodium intakes have also been shown to increase calcium losses in urine, potentially increasing the risk of osteoporosis.

Some bottled waters contain sodium which has been added as part of water treatment processes. The sodium in this artesian mineral water is naturally occurring and has been dissolved into the water from the volcanic rock of the ancient storage aquifer, it is not added to the water as part of any water treatment processes.

World Health Organisation guidelines are that water should contain less than 20 mg / litre of sodium, particularly if the water is going to be used for drinking by children or for mixing up with infant formula. The water water contains 12 mg / litre of sodium and so is well below this guideline and can be consumed daily without any concerns about it contributing to a high sodium diet.

Potassium

Potassium (P) is very closely chemically related to Sodium, and so these minerals are commonly found together in many types of rock and find their way into mineral water during the natural filtration process.

Potassium is a very important mineral for the proper function of all cells, tissues, and organs in the human body. It is also an electrolyte, along with sodium, chloride, calcium, and magnesium. Potassium is crucial to heart function and plays a key role in skeletal and smooth muscle contraction, making it important for normal digestive and muscular function.

Chloride & Sulphate

All naturally occurring mineral waters contain some quantity of Chloride (Cl) and Sulphate (SO4) depending on the mineral profile of the rock in the local region surrounding the aquifer.

High chloride and sulphate levels in water can indicate the use of water treatment chemicals in bottled water. This artesian mineral water contains very low levels of both chloride and sulphate which are well below the World Heath Guidelines for drinking water for children and for mixing infant formula and which indicates the purity of the water source.