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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:	Hawkes Bay Regional Council	**Lab No:**	2605979 SPv1
Contact:	Ariana Mackay	**Date Received:**	07-May-2021
	C/- Hawkes Bay Regional Council	**Date Reported:**	12-May-2021
	Private Bag 6006	**Quote No:**	105684
	Napier 4142	**Order No:**	RM1422
		Client Reference:	Whangawehi (May)
		Add. Client Ref:	312-200
		Submitted By:	Ariana Mackay

Sample Type: Aqueous

Sample Name:		82171 - Whangawehi Strm at Pat O'Brians-3304 06-May-2021 2:00 pm	82172 - Mangatupae Strm at Pat O'Brians-3303 06-May-2021 2:00 pm	82173 - Whangawehi at George Ormonds -3301 06-May-2021 1:30 pm	82174 - Coops - Trib of Whangawhi - 3306 06-May-2021 9:30 am	82175 - Reserve Stream - Trib of Whangawehi - 3307 06-May-2021 9:20 am
Lab Number:		2605979.1	2605979.2	2605979.3	2605979.4	2605979.5
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	50 #2	10 #2	10 #2	190 #2	270
Escherichia coli	cfu / 100mL	20 #2	10 #2	10 #2	150 #2	210
HBRC Standard River						
Turbidity ISO	FNU	1.28	0.98	0.46	0.47	3.8
pH	pH Units	8.0	7.8	8.0	8.2	8.0
Electrical Conductivity (EC)	µS/cm	616	773	611	591	626
Volatile Suspended Solids	g/m³	< 1.0	3.2	< 0.5	< 0.5	2.8
Total Suspended Solids	g/m³	1.2	16.8	< 0.5	0.9	26
Total Nitrogen	g/m³	0.20	0.23	0.28	0.18	0.40
Total Ammoniacal-N	g/m³	< 0.010 #1	< 0.010 #1	< 0.010 #1	< 0.010 #1	0.043
Nitrite-N	g/m³	0.0017	< 0.0010	< 0.0010	< 0.0010	0.0036
Nitrate-N	g/m³	0.031	< 0.0010	0.0011	0.0088	0.22
Nitrate-N + Nitrite-N	g/m³	0.032	< 0.0010	0.0016	0.0094	0.23
Total Kjeldahl Nitrogen (TKN)	g/m³	0.17	0.23	0.28	0.17	0.17
Dissolved Reactive Phosphorus	g/m³	0.063	0.022	0.054	0.054	0.080
Total Phosphorus	g/m³	0.076	0.025	0.060	0.053	0.123

Sample Name:		82176 - Whangawehi US Reserve Confl - 3308 06-May-2021 9:00 am	82177 - Whangawehi DS Cattleyards - 3309 06-May-2021 10:30 am			
Lab Number:		2605979.6	2605979.7			
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	170 #2	< 10 #2	-	-	-
Escherichia coli	cfu / 100mL	110 #2	< 10 #2	-	-	-
HBRC Standard River						
Turbidity ISO	FNU	2.0	0.47	-	-	-
pH	pH Units	8.0	7.9	-	-	-
Electrical Conductivity (EC)	µS/cm	594	573	-	-	-
Volatile Suspended Solids	g/m³	< 0.7 #3	< 0.5	-	-	-
Total Suspended Solids	g/m³	1.4	0.6	-	-	-
Total Nitrogen	g/m³	0.69	0.43	-	-	-
Total Ammoniacal-N	g/m³	0.009	< 0.005	-	-	-

Sample Type: Aqueous						
Sample Name:		82176 - Whangawehi US Reserve Confl - 3308 06-May-2021 9:00 am	82177 - Whangawehi DS Cattleyards - 3309 06-May-2021 10:30 am			
Lab Number:		2605979.6	2605979.7			
HBRC Standard River						
Nitrite-N	g/m³	0.0029	0.0011	-	-	-
Nitrate-N	g/m³	0.45	0.025	-	-	-
Nitrate-N + Nitrite-N	g/m³	0.45	0.027	-	-	-
Total Kjeldahl Nitrogen (TKN)	g/m³	0.23	0.40	-	-	-
Dissolved Reactive Phosphorus	g/m³	0.099	0.040	-	-	-
Total Phosphorus	g/m³	0.114	0.048	-	-	-

Analyst's Comments

#1 Severe matrix interferences required that a dilution be performed prior to analysis, resulting in a detection limit higher than that normally achieved for the NH4Nt analysis.

#2 Statistically estimated count based on the theoretical countable range for the stated method.

#3 Due to the nature of the sample, it was not possible to filter the usual volume for the Volatile Suspended Solids analysis. As the volume filtered was less than usual, the detection limit achieved for this sample is greater than normal.

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			
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-7
Turbidity - ISO 7027 Method	Analysis using a Hach 2100N IS, Turbidity meter. ISO 7027:1999(E) (modified).	0.05 FNU	1-7
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	1-7
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23rd ed. 2017.	1 µS/cm	1-7
Volatile Suspended Solids	Filtration (GF/C, 1.2 µm). Ashing 550°C, 30 min. Gravimetric. APHA 2540 E (modified) 23rd ed. 2017.	0.5 g/m³	1-7
Total Suspended Solids	Filtration of a 2L sample using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) 23rd ed. 2017.	0.5 g/m³	1-7
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m³ is only attainable when the TKN has been determined using a trace method utilising duplicate analyses. In cases where the Detection Limit for TKN is 0.10 g/m³, the Default Detection Limit for Total Nitrogen will be 0.11 g/m³. In-house calculation.	0.05 g/m³	1-7
Total Ammoniacal-N Trace	Phenol/hypochlorite colorimetry. Flow injection analyser. (NH4-N = NH4+-N + NH3-N). APHA 4500-NH_3 H 23rd ed. 2017.	0.005 g/m³	1-7
Nitrite-N Trace	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.0010 g/m³	1-7
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-7
Nitrate-N + Nitrite-N Trace	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.0010 g/m³	1-7
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-N_{org} D (modified) 4500 NH_3 F (modified) 23rd ed. 2017.	0.10 g/m³	1-7
Dissolved Reactive Phosphorus (trace)	Filtered sample. Molybdenum blue colorimetry. Flow injection analyser. APHA 4500-P G 23rd ed. 2017.	0.0010 g/m³	1-7

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H 23rd ed. 2017.	0.002 g/m^3	1-7
HBRC Standard River		-	1-7
Faecal Coliforms and E. coli profile			
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation. APHA 9222 D 23rd ed. 2017.	1 cfu / 100mL	1-7
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, MUG Confirmation. APHA 9222 I 23rd ed. 2017.	1 cfu / 100mL	1-7

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

Testing was completed between 07-May-2021 and 12-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