



## Certificate of Analysis

<b>Client:</b>	Hawkes Bay Regional Council	<b>Lab No:</b>	2063464	SPV1
<b>Contact:</b>	Ariana Mackay C/- Hawkes Bay Regional Council Private Bag 6006 Napier 4142	<b>Date Received:</b>	11-Oct-2018	
		<b>Date Reported:</b>	18-Oct-2018	
		<b>Quote No:</b>	78490	
		<b>Order No:</b>	RM87	
		<b>Client Reference:</b>	Whangawehi	
		<b>Add. Client Ref:</b>	312-302	
		<b>Submitted By:</b>	Ariana Mackay	

### Sample Type: Aqueous

Sample Name:	70451 - Whangawehi Strm at Pat O'Brians-3304 10-Oct-2018 2:30 pm	70452 - Mangatupae Strm at Pat O'Brians-3303 10-Oct-2018 2:40 pm	70453 - Whangawehi at George Ormonds -3301 10-Oct-2018 3:30 pm	70454 - Coops - Trib of Whangawhi - 3306 10-Oct-2018 1:15 pm	70455 - Reserve Stream - Trib of Whangawehi - 3307 10-Oct-2018 1:00 pm	
<b>Lab Number:</b>	2063464.1	2063464.2	2063464.3	2063464.4	2063464.5	
Individual Tests						
Turbidity	NTU	3.2	3.4	2.8	2.4	3.3
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	90 #1	360	90 #1	180 #1	80 #1
Escherichia coli	cfu / 100mL	90 #1	250	80 #1	160 #1	80 #1
HBRC Standard River						
pH	pH Units	8.1	8.6	8.2	8.4	8.2
Volatile Suspended Solids	g/m <sup>3</sup>	0.7	< 0.5	2.1	< 0.5	< 0.5
Total Suspended Solids	g/m <sup>3</sup>	4.2	1.6	11.6	1.6	1.9
Total Nitrogen	g/m <sup>3</sup>	0.49	0.33	0.28	0.17	0.30
Total Ammoniacal-N	g/m <sup>3</sup>	0.011	< 0.005	0.006	0.007	0.040
Nitrite-N	g/m <sup>3</sup>	0.0018	< 0.0010	0.0019	< 0.0010	0.0018
Nitrate-N	g/m <sup>3</sup>	0.123	0.0018	0.042	0.0116	0.134
Nitrate-N + Nitrite-N	g/m <sup>3</sup>	0.125	0.0026	0.043	0.0121	0.135
Total Kjeldahl Nitrogen (TKN)	g/m <sup>3</sup>	0.36	0.33	0.24	0.16	0.16
Dissolved Reactive Phosphorus	g/m <sup>3</sup>	0.040	0.027	0.033	0.028	0.075
Total Phosphorus	g/m <sup>3</sup>	0.048	0.040	0.048	0.032	0.082

Sample Name:	70456 - Whangawehi US Reserve Confl - 3308 10-Oct-2018 12:30 pm	70457 - Whangawehi DS Cattleyards - 3309 10-Oct-2018 12:00 pm				
<b>Lab Number:</b>	2063464.6	2063464.7				
Individual Tests						
Turbidity	NTU	2.6	1.58	-	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	140 #1	140 #2	-	-	-
Escherichia coli	cfu / 100mL	120 #1	120 #2	-	-	-
HBRC Standard River						
pH	pH Units	8.0	8.0	-	-	-
Volatile Suspended Solids	g/m <sup>3</sup>	< 0.5	< 0.5	-	-	-
Total Suspended Solids	g/m <sup>3</sup>	2.1	1.1	-	-	-
Total Nitrogen	g/m <sup>3</sup>	0.84	0.64	-	-	-
Total Ammoniacal-N	g/m <sup>3</sup>	0.009	0.013	-	-	-
Nitrite-N	g/m <sup>3</sup>	0.0026	0.0021	-	-	-



Sample Type: Aqueous						
<b>Sample Name:</b>	70456 - Whangawehi US Reserve Confl - 3308 10-Oct-2018 12:30 pm	70457 - Whangawehi DS Cattleyards - 3309 10-Oct-2018 12:00 pm				
<b>Lab Number:</b>	2063464.6	2063464.7				
HBRC Standard River						
Nitrate-N	g/m <sup>3</sup>	0.61	0.29	-	-	-
Nitrate-N + Nitrite-N	g/m <sup>3</sup>	0.61	0.30	-	-	-
Total Kjeldahl Nitrogen (TKN)	g/m <sup>3</sup>	0.23	0.35	-	-	-
Dissolved Reactive Phosphorus	g/m <sup>3</sup>	0.066	0.046	-	-	-
Total Phosphorus	g/m <sup>3</sup>	0.072	0.054	-	-	-

**Analyst's Comments**

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

#2 Statistically estimated count based on the theoretical countable range for the stated method. Please interpret this microbiological result with caution as the sample was > 24 (24-26 hours) hours old at the time of testing in the laboratory. The sample is required to reach the laboratory with sufficient time to allow testing to commence within 24 hours of sampling.

## 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
Individual Tests			
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-7
Turbidity	Analysis using a Hach 2100N, Turbidity meter. APHA 2130 B 22 <sup>nd</sup> ed. 2012.	0.05 NTU	1-7
pH	pH meter. APHA 4500-H+ B 22 <sup>nd</sup> ed. 2012. 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
Volatile Suspended Solids	Filtration (GF/C, 1.2 µm). Ashing 550°C, 30 min. Gravimetric. APHA 2540 E (modified) 22 <sup>nd</sup> ed. 2012.	0.5 g/m <sup>3</sup>	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) 22 <sup>nd</sup> ed. 2012.	0.5 g/m <sup>3</sup>	1-7
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m <sup>3</sup> 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/m <sup>3</sup> , the Default Detection Limit for Total Nitrogen will be 0.11 g/m <sup>3</sup> .	0.05 g/m <sup>3</sup>	1-7
Total Ammoniacal-N Trace	Phenol/hypochlorite colorimetry. Flow injection analyser. (NH <sub>4</sub> -N = NH <sub>4</sub> <sup>+</sup> -N + NH <sub>3</sub> -N). APHA 4500-NH <sub>3</sub> H 22 <sup>nd</sup> ed. 2012.	0.005 g/m <sup>3</sup>	1-7
Nitrite-N Trace	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO <sub>3</sub> -I 22 <sup>nd</sup> ed. 2012 (modified).	0.0010 g/m <sup>3</sup>	1-7
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO <sub>2</sub> N. In-House.	0.0010 g/m <sup>3</sup>	1-7
Nitrate-N + Nitrite-N Trace	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO <sub>3</sub> -I 22 <sup>nd</sup> ed. 2012 (modified).	0.0010 g/m <sup>3</sup>	1-7
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-Norg D. (modified) 4500 NH <sub>3</sub> F (modified) 22 <sup>nd</sup> ed. 2012.	0.10 g/m <sup>3</sup>	1-7
Dissolved Reactive Phosphorus (trace)	Filtered sample. Molybdenum blue colorimetry. Flow injection analyser. APHA 4500-P G 22 <sup>nd</sup> ed. 2012.	0.0010 g/m <sup>3</sup>	1-7
Total Phosphorus	Total phosphorus digestion, ascorbic acid colorimetry. Discrete Analyser. APHA 4500-P B & E (modified from manual analysis) 22 <sup>nd</sup> ed. 2012. Also modified to include the use of a reductant to eliminate interference from arsenic present in the sample. NAWASCO, Water & soil Miscellaneous Publication No. 38, 1982.	0.004 g/m <sup>3</sup>	1-7
HBRC Standard River		-	1-7

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
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, 22 <sup>nd</sup> ed. 2012.	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 G, 22 <sup>nd</sup> ed. 2012.	1 cfu / 100mL	1-7

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.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Ara Heron BSc (Tech)  
Client Services Manager - Environmental