



Certificate of Analysis

Client:	4SIGHT Consulting Limited	Lab No:	2239185	SPV1
Contact:	Oliver Bone C/- 4SIGHT Consulting Limited PO Box 402053 Tutukaka 0153	Date Received:	11-Sep-2019	
		Date Reported:	24-Sep-2019	
		Quote No:	66824	
		Order No:	AA1146	
		Client Reference:	AA1146 Eastland Port-Dunstan Rd Surface Water	
		Submitted By:	Oliver Bone	

Sample Type: Aqueous

Sample Name:	MLYSW Site 1 10-Sep-2019 10:01 am	MLWSW Site 2 10-Sep-2019 10:26 am	MLYSW Site 3 10-Sep-2019 10:37 am		
Lab Number:	2239185.1	2239185.2	2239185.3		

Individual Tests

Volatile Suspended Solids	g/m ³	< 3	< 3	< 3	-	-
Total Suspended Solids	g/m ³	7	6	6	-	-
Dissolved Copper	g/m ³	< 0.0005	0.0006	0.0003	-	-
Dissolved Lead	g/m ³	< 0.00010	< 0.0003	< 0.0003	-	-
Dissolved Zinc	g/m ³	< 0.0010	< 0.005	< 0.005	-	-
Dissolved Inorganic Nitrogen*	g/m ³	< 0.011	0.51	0.73	-	-
Total Nitrogen	g/m ³	0.31	1.15	1.24	-	-
Total Ammoniacal-N	g/m ³	< 0.010	0.42	0.63	-	-
Nitrate-N + Nitrite-N	g/m ³	< 0.002	0.087	0.102	-	-
Total Kjeldahl Nitrogen (TKN)	g/m ³	0.31	1.07	1.14	-	-
Dissolved Reactive Phosphorus	g/m ³	0.007	0.33	0.34	-	-
Carbonaceous Biochemical Oxygen Demand (cBOD ₅)	g O ₂ /m ³	< 2	< 2	< 2	-	-
Total Phenols	g/m ³	< 0.02	< 0.02	< 0.02	-	-
Tannin	g/m ³	< 1.0	< 1.0	< 1.0	-	-
Absorbance at 440 nm	AU cm ⁻¹	0.010	0.009	0.010	-	-
Transmittance at 440 nm*	%T, 1 cm cell	97.7	98.0	97.8	-	-
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m ³	< 0.06	< 0.06	< 0.06	-	-
C10 - C14	g/m ³	< 0.2	< 0.2	< 0.2	-	-
C15 - C36	g/m ³	< 0.4	< 0.4	< 0.4	-	-
Total hydrocarbons (C7 - C36)	g/m ³	< 0.7	< 0.7	< 0.7	-	-

Analyst's Comments

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

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.

Test	Method Description	Default Detection Limit	Sample No
Total Petroleum Hydrocarbons in Water	Solvent extraction, GC-FID analysis. Headspace GC-MS analysis for C7-C9 carbon band.	0.06 - 0.7 g/m ³	1-3
Filtration, Glass Fibre	Sample filtration through glass fibre filter.	-	1-3
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-3



Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Volatile Suspended Solids	Filtration (GF/C, 1.2 µm). Ashing 550°C, 30 min. Gravimetric. APHA 2540 E (modified) 23 rd ed. 2017.	3 g/m ³	1-3
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) 23 rd ed. 2017.	3 g/m ³	1-3
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B 23 rd ed. 2017.	-	1-3
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.0005 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, ultratrace level. APHA 3125 B 23 rd ed. 2017.	0.0002 g/m ³	2-3
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.00010 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, ultratrace level. APHA 3125 B 23 rd ed. 2017.	0.00005 g/m ³	2-3
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.0010 g/m ³	1-3
Dissolved Inorganic Nitrogen*	Calculation: NH ₄ -N + NO ₃ -N + NO ₂ -N. In-House.	0.010 g/m ³	1-3
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m ³ 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 ³ , the Default Detection Limit for Total Nitrogen will be 0.11 g/m ³ .	0.05 g/m ³	1-3
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH ₄ -N = NH ₄ ⁺ -N + NH ₃ -N). APHA 4500-NH ₃ H (modified) 23 rd ed. 2017.	0.010 g/m ³	1-3
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO ₃ -I (modified) 23 rd ed. 2017.	0.002 g/m ³	1-3
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-N _{org} D (modified) 4500 NH ₃ F (modified) 23 rd ed. 2017.	0.10 g/m ³	1-3
Dissolved Reactive Phosphorus	Filtered sample. Molybdenum blue colourimetry. Flow injection analyser. APHA 4500-P G (modified) 23 rd ed. 2017.	0.004 g/m ³	1-3
Carbonaceous Biochemical Oxygen Demand (cBOD ₅)	Incubation 5 days, DO meter, nitrification inhibitor added, dilutions, seeded. APHA 5210 B (modified) 23 rd ed. 2017.	2 g O ₂ /m ³	1-3
Total Phenols	In-line distillation, segmented flow colorimetry. NB: Does not detect 4-methylphenol. APHA 5530 B & D (modified) 23 rd ed. 2017 & Skalar Method I497-001 (modified).	0.02 g/m ³	1-3
Tannin	Colorimetric with Folin phenol reagent, tannic acid used for calibration. APHA 5550 B (modified) 23 rd ed. 2017.	0.10 g/m ³	1-3
Absorbance at 440 nm	Filtered sample. Spectrophotometry, 1cm cell. APHA 5910 B 23 rd ed. 2017.	0.002 AU cm ⁻¹	1-3
Transmittance at 440 nm*	Calculation from Absorbance at the specified wavelength.	0.5 %T, 1 cm cell	1-3

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



Certificate of Analysis

Client:	4SIGHT Consulting Limited	Lab No:	2239193	SUPV1
Contact:	Oliver Bone C/- 4SIGHT Consulting Limited PO Box 402053 Tutukaka 0153	Date Received:	11-Sep-2019	
		Date Reported:	18-Sep-2019	
		Quote No:	83367	
		Order No:	AA1146	
		Client Reference:	AA1146 - Matawhero Logyard [Dunstan Rd]	
		Submitted By:	Shanna Hickling	

Sample Type: Aqueous

Sample Name:	MLYGW01 10-Sep-2019 10:53 am	MLYGW02 10-Sep-2019 11:10 am	MLY STD01 10-Sep-2019 10:06 am	
Lab Number:	2239193.1	2239193.2	2239193.3	
Individual Tests				
pH	pH Units	-	-	7.3 ± 0.2
Electrical Conductivity (EC)	mS/m	-	-	99.6 ± 2.0
Total Nitrogen	g/m ³	0.341 ± 0.069	0.259 ± 0.068	1.057 ± 0.085
Nitrate-N + Nitrite-N	g/m ³	0.0557 ± 0.0069	0.0515 ± 0.0064	0.251 ± 0.031
Total Kjeldahl Nitrogen (TKN)	g/m ³	0.286 ± 0.069	0.208 ± 0.068	0.806 ± 0.079
Total Petroleum Hydrocarbons in Water				
C7 - C9	g/m ³	< 0.06 ± 0.041	< 0.06 ± 0.041	< 0.06 ± 0.041
C10 - C14	g/m ³	< 0.2 ± 0.095	< 0.2 ± 0.095	< 0.2 ± 0.095
C15 - C36	g/m ³	< 0.4 ± 0.12	< 0.4 ± 0.12	< 0.4 ± 0.12
Total hydrocarbons (C7 - C36)	g/m ³	< 0.7 ± 0.16	< 0.7 ± 0.16	< 0.7 ± 0.16

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.

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
Total Petroleum Hydrocarbons in Water	Solvent extraction, GC-FID analysis. Headspace GC-MS analysis for C7-C9 carbon band.	0.06 - 0.7 g/m ³	1-3
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-3
pH	pH meter. APHA 4500-H+ B 23 rd 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	3
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23 rd ed. 2017.	0.1 mS/m	3
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m ³ 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 ³ , the Default Detection Limit for Total Nitrogen will be 0.11 g/m ³ .	0.05 g/m ³	1-3



Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO ₃ ⁻ I (modified) 23 rd ed. 2017.	0.002 g/m ³	1-3
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-N _{org} D (modified) 4500 NH ₃ F (modified) 23 rd ed. 2017.	0.10 g/m ³	1-3

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Wednesday, 9 October 2019

4Sight Consulting (on behalf of Eastland Port).
Auckland Office.

Attn: Oliver Bone

TRACE RESIN ACID ANALYSIS – MLY GW01, GW02, STD01, SW Site1-3 – 10Sept 2019.

CLIENT'S ORDER NUMBER: AA1146 EPL Compliance Programme.

WORK PERFORMED BY: Murray Robinson & Michael Robertson

WORK CHECKED BY: Kim McGrouther

APPROVED BY:  **(SIGN)**

DATE OF ISSUE: 9 October 2019

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DATE SAMPLES RECEIVED 11/09/2019

SAMPLE DESCRIPTION Six water samples in 1L glass bottles (450°C muffled bottles supplied by Scion) – sent to Scion by Tom Needham 10/09/2019.

SAMPLE IDENTIFICATION MLY GW01 10/09 10:53 1L
Light brown water, reddish-brown layer of sediment.

MLY GW02 10/09 11:10 1L
Clear water, small amount of brown sediment.

MLY STD01 10/09 10:06 1L
Light brown water, brown sediment.

MLY SW Site 1 10/09 10:01 1L
Clear water, brown sediment.

MLY SW Site 2 10/09 10:26 1L
Clear water, very little sediment.

MLY SW Site 3 10/09 10:37 1L
Clear water, very little sediment.

SAMPLING PROCEDURE

This report relates only to the items tested as received and therefore does not necessarily represent the sample from which it was taken.

DATE OF TESTING 17/09/2019

METHODS

In-house method using unfiltered, pH 9-buffered liquid/liquid extraction with dichloromethane (DCM), followed by gas chromatography - mass spectrometry (GC/MS) analysis.

RESULTS:**RESIN ACIDS (µg/L)**

Sample name	MLY GW01 10/9/19	MLY GW02 10/9/19	MLY STD01 10/9/19	MLY SWSite1 10/9/19	MLY SWSite2 10/9/19	MLY SWSite3 10/9/19
Pimaric acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Sandaracopimaric acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Isopimaric acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Palustric acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Levopimaric Acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Dehydroabietic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Abietic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Neoabietic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Pimarenic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Sandaracopimarenic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Isopimarenic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
13-Abietenic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Pimaranic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Isopimaranic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Abietanic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Seco-1-dehydroabietic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Seco-2-dehydroabietic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
12-Chlorodehydroabietic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
14-Chlorodehydroabietic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
12,14-Dichlorodehydroabietic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
7-Oxodehydroabietic acid	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Total Resin Acids	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

n.d. = not detected, method detection limit is 0.1µg/L

All results presented are from duplicate sample analysis and concentrations are in µg/L. Compounds are quantified if they have a response 2.5 times higher than the average blank.



Surface Water (Fresh) Sampling Form

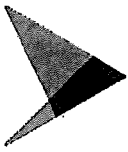
Job Information				Equipment			
Date: 10.9.19		Time: Arrive: 0930 Depart: 1130		Water quality equipment description: -		Calibration Records Filed? Y N NA	
Project Name: EPL Outsourced Compliance Programme		Project Number: AA1146		Interface Probe Number: -		Calibration Records Filed? Y N NA	
Site Location: MLY		Operator: Dion + Tom + Libby		Sampling Equipment Type: Grab samples only			
Weather: Patchy showers		Rainfall event start time/date: 6am 9.9.19		Event Rainfall Depth: 22mL (consistent)		Number of dry days before sampling: NA	
Reason for sampling: Standard Compliance Programme (Circle frequency: Monthly/2 Monthly/Quarterly/6 Monthly) or Additional Monitoring (describe):							

Sample Details					Water Quality Parameters					Observations				
EPL Site Number	Lab Sample ID	Sample Time	Approx Depth (m)	Approx Stream Flow Rate	Temp (°C)	DO (%)	DO (mg/L)	EC (µS/cm)	pH	Debris Present (Y/N: type)	Foams/Scums (Y/N)	Clarity (Clear/Lightly Turbid/Turbid/Very Turbid)	Photos Reference	Secchi Disk
MLYSW Ste 1		10:01	NA		10.3	24.5	2.62	890	7.3	N	N	Clear		71
MLYSW Ste 2		10:26	0.6		10.9	76.0	8.40	6620	8.1	N	N	Clear no debris		35
MLYSW Ste 3		10:37	0.6		10.9	77.8	8.60	6160	8.2	N	N	Clear no debris		52
MLYSW 01		10:06	0.6		10.9	42.8	4.72	1000	7.2	N	N	Lightly Turbid		
GW01		10:53	X		15.0		3.71	874	7.3	NA	NA	NA		
GW02		11:10	X		13.9		4.65	964	7.1	NA	NA	NA		

Downstream
Upstream
Normal Awapuni Stream flow.

Additional Comments: - Rainfall event started 6am 9.9.19 and finished 5am 10.9.19.
- DO probe was MER 108139

Field Quality Control Checks				
Was pre-cleaning sampling equipment used for these samples?	(Y)	N	Consistent with COC form?	(Y) N
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	COC Filled out?	(Y) N
Sampling has been undertaken in accordance with the Site Specific Sampling Protocol and SOPs?	(Y)	N	Signed:	<i>J. Neill</i>



Groundwater Well Sampling Form

Job Information	
Date: 10.9.19	Time: Arrive: 0930 Depart: 1130
Project Name: EPL Outsourced Compliance Programme	Project Number: AA1146
Site Location: mcy	Operator: Dion + Tom + Ebby
Well ID: GWC1	Weather: Patchy showers

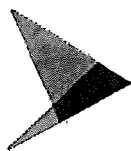
Equipment	
Water quality equipment description:	Calibration records filed? <input type="checkbox"/> Y <input type="checkbox"/> N
Interface Probe Number:	Calibration records filed? <input type="checkbox"/> Y <input type="checkbox"/> N
Purging Equipment Type? (Please circle)	Bailer Type: Plastic Teflon Pump Type: Peristaltic <u>Submersible</u> Micro-purge Other:

Well Gauging and Purge Volume Calculations									
Casing Diameter	25mm	50mm	50mm	50mm	50mm	100mm	100mm	100mm	Volume of water in a well: $V = \pi \times r^2 \times h$ $V =$ Volume in litres $\pi = 3.142$ $r =$ radius in m $h =$ Height of water column in m
Bore Diameter	50mm	100mm	125mm	150mm	200mm	125mm	200mm	250mm	
Conversion Factor (L/m)	0.93	3.73	5.06	6.68	10.8	10.8	14.2	20.2	
Total Well depth (-) Water Level (=) Water Column $9.5 - 1.7 = 7.8 \text{ m}$ Water Column (x) Conversion Factor (=) Litres per 1 Well Volume $\text{m} \times \text{L} = \text{L}$									

Water Quality Parameters										
Beginning Purging Time: 10:53			Ending Purging Time:				Fill Time:	Discharge Time:		
Litres	Time	DO (mg/L)	Cond. ($\mu\text{S}/\text{cm}$)	pH	Redox (mV)	Temp ($^{\circ}\text{C}$)	DTW (mbTTC)	Comments		
	1053	3.71	874	7.3		15.0		Great recovery		
	10L	in 90 seconds								
Stabilisation Criteria		$\pm 10\%^{\dagger}$	$\pm 3\%$ or $\pm 5\%$ if $< 100^*$	$\pm 0.1^*$	$\pm 10\text{mV}^{\dagger}$	$\pm 0.1^*$	Example Comments: clear / slightly cloudy / turbid / very turbid / colour / no odour / slight odour / strong odour / describe odour (hydrocarbon/solvent/organic)			
<small>*Based on MfE National Protocol for SOE Groundwater Sampling in NZ, 2006, \daggerBased on Vic EPA (Australia) 669. Low Flow: Max flow rate = 0.5 L/min Max drawdown = 0.2 cm -- Well stable when 3 consecutive readings (either 3 min or 0.5L apart)</small>										
Total Well Volume							Did field parameters stabilise?		<input checked="" type="radio"/> Y	<input type="radio"/> N
Actual amount of water removed prior to sampling							Was the well dry purged?		<input type="radio"/> Y	<input checked="" type="radio"/> N

Field Quality Control Checks				
Was pre-cleaning sampling equipment used for these samples?	<input checked="" type="radio"/> Y	<input type="radio"/> N	Consistent with COC form?	<input checked="" type="radio"/> Y <input type="radio"/> N
Was pre-cleaning sampling equipment properly protected from contamination?	<input checked="" type="radio"/> Y	<input type="radio"/> N	COC Filled out?	<input checked="" type="radio"/> Y <input type="radio"/> N

J. Heed



Groundwater Well Sampling Form

Job Information	
Date: 10/9/19	Time: Arrive: 0930 Depart: 1130
Project Name: EPL Outsourced Compliance Programme	Project Number: AA1146
Site Location: m-4	Operator: Dion + Tom + Libby
Well ID: GW02	Weather: Patchy Showers

Equipment	
Water quality equipment description:	Calibration records filed? Y N
Interface Probe Number:	Calibration records filed? Y N
Purging Equipment Type? (Please circle)	Bailer Type: Plastic Teflon Pump Type: Peristaltic (Submersible) Micro-purge Other:

Well Gauging and Purge Volume Calculations									
Casing Diameter	25mm	50mm	50mm	50mm	50mm	100mm	100mm	100mm	Volume of water in a well: $V = \pi \times r^2 \times h$ $V = \text{Volume in litres}$ $\pi = 3.142$ $r = \text{radius in m}$ $h = \text{Height of water column in m}$
<i>No casing</i>									
Bore Diameter	50mm	100mm	125mm	150mm	200mm	125mm	200mm	250mm	
Conversion Factor (L/m)	0.93	3.73	5.06	6.68	10.8	10.8	14.2	20.2	
Total Well depth (-) Water Level (=) Water Column 4.24 - 1.58 = 2.66m Water Column (x) Conversion Factor (=) Litres per 1 Well Volume _____ m x _____ = _____ L									

Water Quality Parameters										
Beginning Purging Time: 11:10			Ending Purging Time:				Fill Time:	Discharge Time:		
Litres	Time	DO (mg/L)	Cond. (µS/cm)	pH	Redox (mV)	Temp (°C)	DTW (mbTPC)	Comments		
	11:10	4.65	964	7.1		13.9		Sampled as soon as pumping started, no bore was dry at the end of sampling.		
Stabilisation Criteria		±10% ¹	±3% or ±5% if <100*	±0.1*	±10mV ¹	±0.1*	Example Comments: clear / slightly cloudy / turbid / very turbid / colour / no odour / slight odour / strong odour / describe odour (hydrocarbon/solvent/organic)			
*Based on MfE National Protocol for SOE Groundwater Sampling in NZ, 2006, ¹ Based on Vic EPA (Australia) 669. Low Flow: Max flow rate = 0.5 L/min Max drawdown = 0.2 cm -- Well stable when 3 consecutive readings (either 3 min or 0.5L apart)										
Total Well Volume							Did field parameters stabilise?		(Y)	N
Actual amount of water removed prior to sampling							Was the well dry purged?		Y	(N)

Field Quality Control Checks				
Was pre-cleaning sampling equipment used for these samples?	(Y)	N	Consistent with COC form?	(Y) N
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	COC Filled out?	(Y) N

[Signature]



Time	Comments
0850	Dion checked MLY to see if there was discharge.
09 30 ⁴⁵	Entered on site to start sampling
1001	MLY SW site 1 : Clear water discharging, no foams or scums.
1006	MLY STD 01 : Light flow of lightly turbid water, no foams and scums.
1026	MLY SW site 2 : Clear with no debris
1037	MLY SW site 3 : Clear with no debris
	NOTE : Stream was flowing <u>INTO</u> the Waipaea River
1053	GW01 : Water pumped 10L at over 1.30 minutes, good recovery. Water was turbid.
11:10	GW02 : Sampling started as soon as pumping began, just finished pumping when last bottle was filled.
1120	Left MLY

Field D.O. Probe Calibration

Date	Probe	Water - Saturated Air (100%)				Air - Saturated Water (100%)				Analytical DO (g/m ³)	Accept Initials
		Check 100%	Meter (°C)	Cal OK?	Temp (°C)	DO (%)	DO (g/m ³)	Temp (°C)	DO (g/m ³)		
3/7/19	139	101.9	18.6	✓	17.1	99.7	✓	9.61	9.62	✓	✓
"	138	99.1	17.8	✓	17.2	98.6	✓	9.49	9.50	✓	✓
10/7/19	139	100.4	20.0	✓	17.6	100.0	✓	9.55	9.55	✓	✓
17/7/19	139	99.8	18.9	✓	18.5	98.9	✓	9.36	9.37	✓	✓
24/7/19	141	100.4	20.2	✓	20.2	100.7	✓	9.09	9.06	✓	✓
25/7/19	139	100.9	21.6	✓	19.6	100.7	✓	9.23	9.23	✓	✓
30/7/19	139	98.3	18.6	✓	19.7	98.9	✓	9.04	9.25 9.04	✓	✓
"	138	98.3	18.5	✓	19.4	101.3	✓	9.30	9.32	✓	✓
2/8/19	138	98.7	20.8	✓	17.7	99.6	✓	9.49	9.49	✓	✓
5/8/19	138 141	99.1	19.0	✓	18.0	100.4	✓	9.51	9.51	✓	✓
12/8/19	138	98.4	22.2	✓	20.2	97.7	✓	8.85	8.85	✓	✓
20/8/19	138	95.6	21.1	✓	17.9	100.8	✓	9.56	9.57	✓	✓
"	139	104.6	21.1	✓	18.0	106.4	✓	9.51	9.51	✓	✓
28.8.19	138	97.3	24.8		20.5	98.4		8.84	9.00 8.86	0.02 ✓	✓ TN
	137	Not turning		on							
4.9.19	138	94.7	19.3	✓	19.8	97.6	✓	8.90	8.91	✓	✓ TN
	139	94.9	18.4	✓	19.5	99.1	✓	9.10	9.10	✓	✓ TN
11.9.19	138	100.6	27.4	✓	20.4	99.0	✓	8.93	8.92	✓	✓ TN
	139	100.6	23.1	✓	20.9	98.6	✓	8.81	8.80	✓	✓ TN

Accept if ±0.1 of Meter D.O.