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April 27, 2018 File: 2016-8113.010.003

Brady Nelless Regional Director BC Ministry of Environment Northern Regional Operations Bag 5000 3726 Alfred Avenue Smithers, BC V0J 2N0

Re: GRACE-MAR FARMS FALL 2017 WATER SAMPLING RESULTS MINISTRY OF ENVIRONMENT FILE NO. 350101 - ACTION PLAN ITEM #14

Dear Mr. Nelless:

1 BACKGROUND

Grace-Mar Farms Ltd. (Grace-Mar) operated a feeding operation for heifers on a 121 ha property located at 5904 Salmon River Road, Armstrong, BC ("study area") from February 28, 2017 to March 2018. Grace-Mar also operated a dairy at the same location from September 2009 until February 28, 2017, when all the milking cows were moved to their Fraser Valley operation.

On May 12, 2016, the BC Ministry of Environment (MOE) issued a Pollution Abatement Order ("the Order") to Grace-Mar (File AMS#350101, MOE 2016). The Order required that Grace-Mar carry out a comprehensive monitoring program, complete an environmental impact assessment (EIA), prepare an Action Plan to detail measures to be taken to abate any environmental impacts identified in the EIA, and submit formal written summaries for three years identifying what actions from the Action Plan were undertaken.

The EIA and Action Plan were submitted to MOE on February 27, 2017 and April 6, 2017, respectively (Associated 2017a, 2017b). To meet one of the specified actions in the approved Action Plan, Action 14, Grace-Mar retained Associated Environmental Consultants Inc. (Associated) to complete groundwater and surface water sampling, and report on the findings. The sampling was conducted in May 2017 and on June 29, 2017 Associated submitted the first annual report summarising this work (Associated 2017c).

2 SCOPE OF WORK AND OBJECTIVES

To ensure continued compliance of the approved Action Plan, Grace-Mar retained Associated to complete a second round of water quality sampling followed by the 2017 annual report (this report). The objective is to meet Action #14 of the Action Plan and the related recommendations from the first annual report. The scope included sampling and testing groundwater from eight wells and from one surface water location for





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nutrients and routine water quality parameters (Section 3). We understand that others are addressing the objectives of the other actions in the Action Plan.

As described in the Order, annual reports must be submitted to MOE annually for three years to confirm that certain Actions have been completed and include the following;

- i) summarize in reasonable detail what actions from the Action Plan were undertaken;
- ii) identify of all agriculture operational changes that occurred;
- iii) summarize in reasonable detail monitoring results;
- iv) summarize environmental impact assessment (first year only)¹; and
- v) recommend additional mitigation and restoration measures, if appropriate.

The scope of this report includes addressing these objectives. The report includes methods, results and discussion, quality assurance/quality control, and any additional measures and recommendations. The objectives are identified in the section headings below.

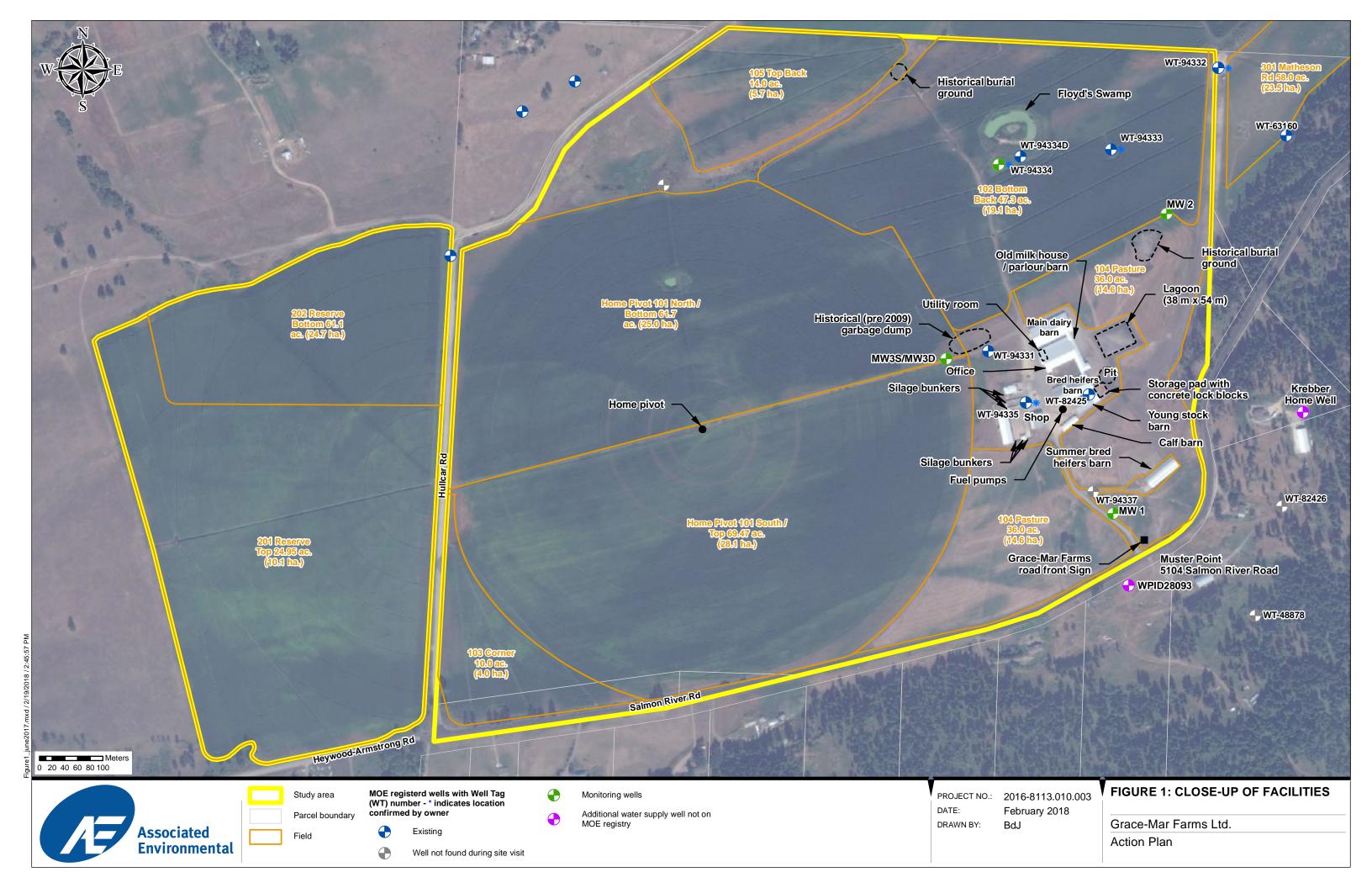
3 METHODS (OBJECTIVE I)

An Associated Engineering Company

Water quality samples were collected by Associated, following standard BC methods (MWLAP 2013), from the locations listed in Table 1 and shown on Figure 1. Samples were collected on November 14 and 15, 2017. Field sheets from the sampling events are attached.

¹ In objective iv, our interpretation of "first year only" is the year 2016; however, because the groundwater and surface water monitoring (Action 14) only started in May 2017, we have included a section related to this objective in this report. This section of the Order will be met after the submission of this report and will not be needed in future years.







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Sample Location ¹	Sample Description
MW1	Monitoring well (installed in 2016)
MW2	Monitoring well (installed in 2016)
MW3S	Monitoring well (installed in 2016)
MW3D	Monitoring well (installed in 2016)
WTN 94334	Well for industrial use owned by Grace-Mar Farms. Used for livestock watering and barn washing.
WTN 94335	Well for industrial use owned by Grace-Mar Farms. Used for livestock watering and barn washing.
WPID 28093 ²	Domestic, Irrigation and Industrial Use well owned by James Krebber. Used for domestic purposes (rental home) and livestock watering.
James Krebber's Well (no well tag number or well plate identifier) ²	Domestic well owned by James Krebber. Used for domestic purposes.
Floyd's Swamp	Surface water

able 1: Spring 2017 Sampling Locations

Note:

¹ WTN refers to well tag number, which is a number assigned to a well log that is voluntarily submitted to MOE. WPID refers to well plate identifier, which is a steel plate affixed to the top of the casing on some wells by the well driller. ² WPID 28093 and James Krebber's Well are included in the program in place of WTN 48878 and WTN 42426, which were originally listed in the Action Plan. However, during the spring 2017 sampling event, Associated confirmed that they either do not exist or are in a different location than shown on the BC Water Resource Atlas. Therefore, Associated recommended replacing these wells with WPID 28093 and James Krebber's Well (Associated 2017c).

Water samples were shipped under chain-of-custody protocol to CARO Analytical Services (CARO) in Kelowna, BC for analysis of the parameters specified in the Action Plan: nitrate-N, nitrite-N, ammonia-N, total Kjeldahl nitrogen (TKN), total nitrogen, chloride, and total phosphorous (Associated 2017b). A field duplicate sample² was also collected during the November 2017 sampling event.

The groundwater results were compared with the BC Approved and Working Water Quality Guidelines (BCAWQG/BCWWQG) for irrigation (I), livestock (L) (MOE 2018, 2017a), the BC Source Drinking Water Guidelines (BC DW) (MOE 2017b), and the Guidelines for Canadian Drinking Water Quality (GCDWQ) Maximum Acceptable Concentrations (MAC) and Aesthetic Objectives (AO) (Health Canada 2017). The



² Collection and analysis of duplicate samples provides information on the combined (field and analytical) precision of the sampling and the analytical program. Data are assessed by calculating the relative percent difference between the primary and duplicate sample and comparing the data to acceptable thresholds (MWLAP 2013).



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results from Floyd's Swamp were compared with the same guidelines plus the BCAWQG/BCWWQG for aquatic life (AL) protection (MOE 2018, 2017a).

4 RESULTS AND DISCUSSION (OBJECTIVES III AND IV)

4.1 GROUNDWATER ELEVATION AND FLOW DIRECTION

The groundwater elevations at the monitoring well locations were measured during the May and November 2017 sampling events to assess seasonal fluctuations in groundwater levels and determine groundwater flow direction (Table 2). Spring water levels were, on average, 1.435 m higher then in the fall. The general groundwater flow direction in the May 2017 was north-northwest with a low average gradient of 0.002, indicated that some of the aquifer recharge during the spring melt is coming from the hillside to the south of the Grace-Mar Farms road front sign (Figure 1). In November 2017, when aquifer water levels are lower, the flow direction is due north with a very shallow gradient of 0.0001, suggesting that there is minimal recharge from the south during this time of year. Based on past reports, the overall flow direction for the underlying aquifer (Aquifer 103) is generally east to west with a flow divide from Parkinson's Lake to the east (Monahan 2006, Golder and Summit 2009). The reason for the difference in direction between the regional flow and the localized flow at the site is most likely a result of local aquifer recharge coming from the hillside to the south of the Grace-Mar Farms road front sign.

	Elevation	Octo	ber 2016	Ма	iy 2017	Noven	nber 2017	
Sample Locatio n	of Top of Well Casing (masl)	Depth to Water (mbtoc)	Ground- water Elevation (masl)	Depth to Water (mbtoc)	Ground- water Elevation (masl)	Depth to Water (mbtoc)	Ground- water Elevation (masl)	Seasonal Change (m)
MW1	513.48	6.62	506.86	3.58	509.90	5.79	507.69	2.21
MW2	510.01	3.38	506.63	1.34	508.67	2.38	507.63	1.04
MW3S	514.66	7.89	506.77	5.76	508.91	7.00	507.66	1.25
MW3D	514.71	7.95	506.76	5.81	508.91	7.05	507.67	1.25

Table 2: Groundwater Elevations

mbtoc = metres below top of casing

masl = metres above sea level





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4.2 WATER QUALITY DATA

The groundwater results, tabulated and compared with applicable guidelines, are presented in Table A1. Included in the tables are the results for nitrate-N, nitrite-N, ammonia-N, TKN, total nitrogen, chloride and total phosphorus from the October 2016, May 2017, and November 2017 sampling events.³ It should be noted that October was the first round of sampling which just included sampling MW1, MW2, MW3S, MW3D and WTN 94334. Based on the results of the October sampling event James Krebber's well, WPID 28093, and WTN 94335 were also tested in May and November 2017. Table A2 presents the results from Floyd's Swamp, which includes data from the May and November 2017 sampling events. The original laboratory reports are attached.

The November 2017 groundwater quality data (Table A1) met applicable guidelines with the exception of the nitrate-N concentration in MW3S (13.3 mg/L), which exceeded the GCDWQ MAC and BC DW guideline of 10 mg/L. Field-measured conductivity in all wells also exceeded the BCWWQG I, which ranges from 700 μ S/cm to 5,000 μ S/cm, depending on the crop type.

Generally, results indicate the water quality varies both spatially and temporally. Seasonal variation, with higher nitrate-N concentrations in fall/early winter, are apparent in MW1, MW2, and MW3S. Nitrate-N concentrations in MW1 and MW3S exceeded the GCDWQ MAC and BCAWQG DW guidelines in October 2016 (with concentrations of 21.0 and 16.6 mg/L nitrate-N, respectively) were below detection levels in both wells in May 2017, and elevated again in the November sampling event (8.70 and 13.3 mg/L nitrate-N, respectively). In MW2, nitrate-N has remained within guidelines during all sampling events, but was also notably higher in fall/early winter sampling events (7.82 mg/L in October 2016 and 1.51 mg/L in November 2017) than in the spring (<0.010 in May 2017). Conversely, nitrate-N concentrations in James Krebber's well exceeded the DW guideline in May 2017, then dropped to 0.021 mg/L in November 2017. Wells MW3D, WPID 28093, WTN 94334, WTN 94335 all have had consistently low nitrate concentrations for all sampling events.

The water quality data from Floyd's Swamp (Table A2) met the all applicable guidelines during the November 2017 sampling event with the exception of conductivity, which exceeded the BCWWQG I. This is a change the May 2017 results, when nitrite-N exceeded the BCAWQG/BCWWQG for aquatic life guidelines.

Overall, nitrate concentrations increased from May to November, but were still within guidelines with the exception of MW3S. Due to the variability and limited available data, it is still premature to determine



³ Wells MW1, MW2, MW3S, MW3D, and WTN 94334 were tested in October 2016, May 2017, and November 2017. James Krebber's well, WPID 28093, and WTN 94335 were tested in May and November 2017.



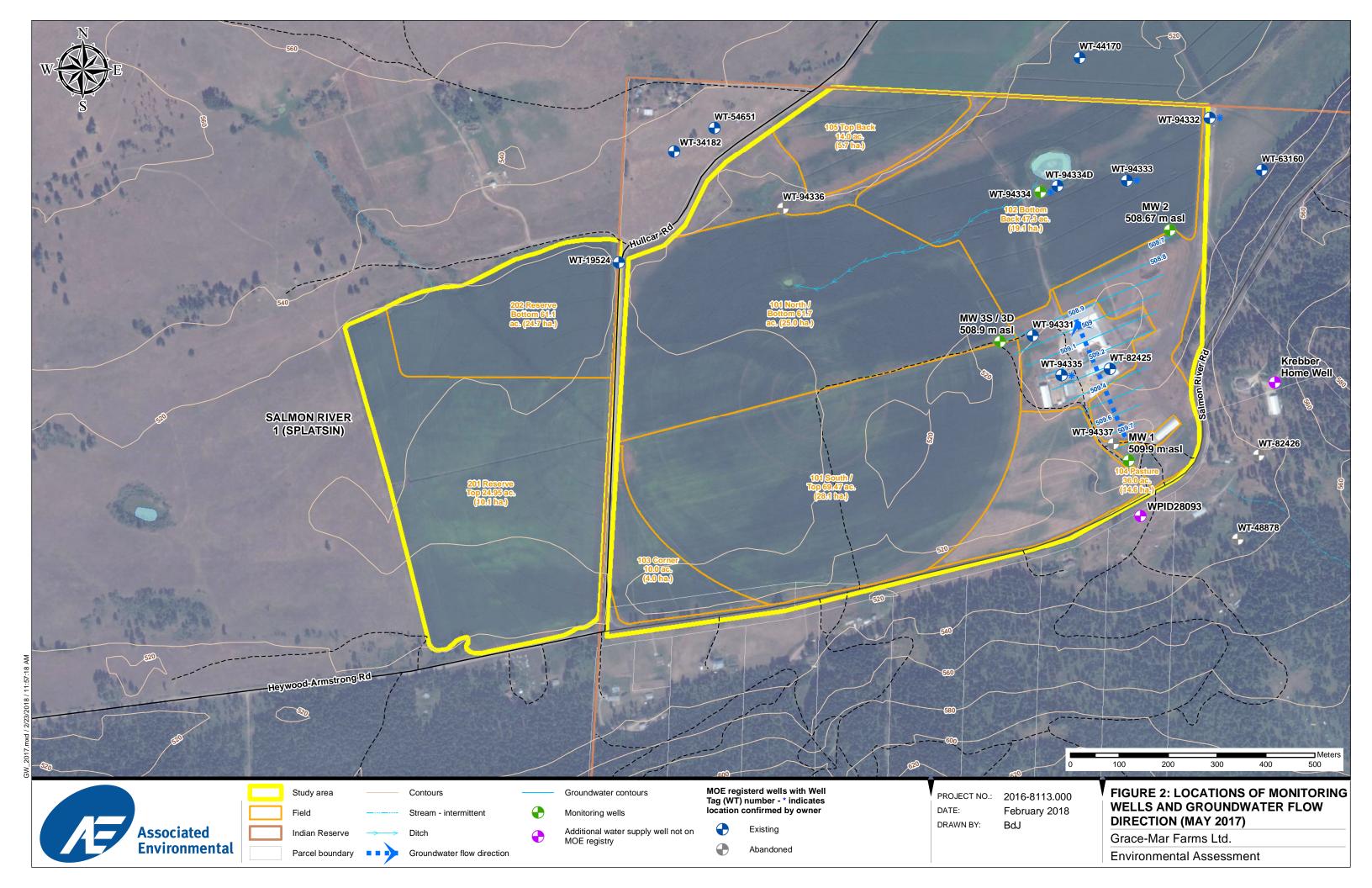
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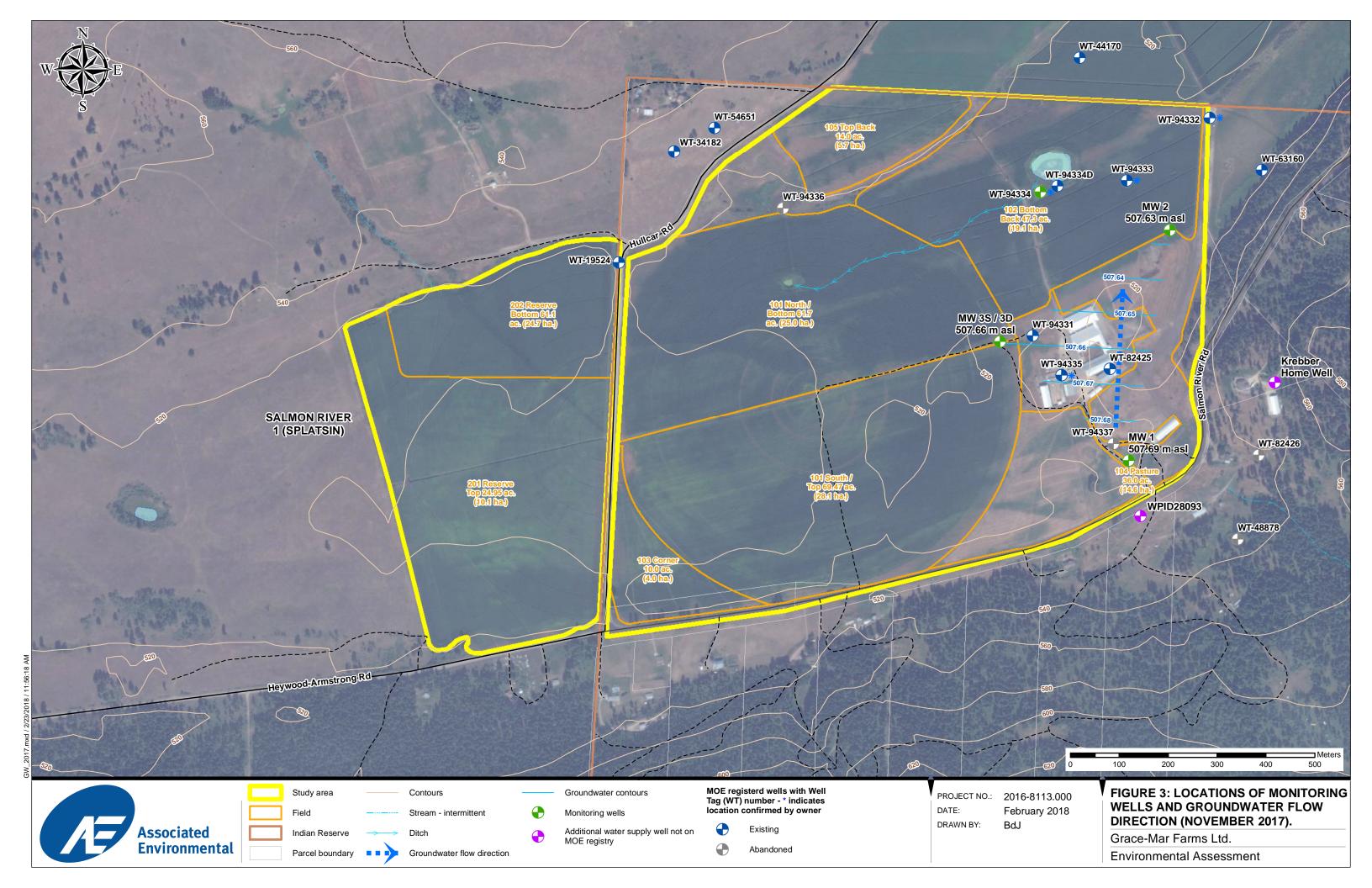
whether or not the past or current agricultural practices are affecting the underlying groundwater. In addition, the ability to draw conclusions is limited by a lack of information on farm operations before Grace-Mar acquired the property. Furthermore, the net flux (movement) of nitrate-N through the unsaturated zone has not been estimated. Drain gauges (or sampling lysimeters), which can be used to monitor nitrate-N concentrations in pore water in the unsaturated zone, have been installed by Grace-Mar below the root zone and will help to estimate net flux of nitrate-N. In addition, we understand that the volumes of irrigation water applied are also being recorded. Additional assessment into the source of the nitrate-N in groundwater, making use of all these data, is recommended after the 2018 sampling is complete.

4.3 OPERATIONAL CHANGES TO AGRICULTURAL PRACTICES (OBJECTIVE II)

Since the Pollution Abatement Order was issued, Grace-Mar Farms as been working to reduce the number of livestock on the study area to reduce the probability of further pollution related to their farming practices. When the original POA was given, Grace-Mar Farm housed 250 head of cattle. As of February 15, 2018, a total of 75 head of cattle were still on the study area, and as of end of March 2018, all cattle were removed from the study area (J Kampman, personal communications 2018). Since then, Grace-Mar has sold the subject property, with the new owners taking possession on May 1, 2018.









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4.4 QUALITY ASSURANCE/QUALITY CONTROL DATA (QA/QC)

The relative percent difference (RPD) calculations from the duplicate sample set collected from WTN 94334 in November 2017 indicated good reproducibility, suggesting acceptable precision of the analytical data. Once values less than five times their respective detection limit were removed,⁴ the highest calculated RPD was 13.3%, and the average was 5.6%.

Information about the laboratory's QA/QC are provided as part of the attached laboratory reports. The laboratory used for the analysis (CARO) is accredited with the Canadian Association for Laboratory Accreditation.

5 RECOMMENDATIONS (OBJECTIVE V)

Two changes to the monitoring program are recommended as follows:

- Continue to sample for water quality in the spring and fall of 2018, and report on the findings in a third annual report (Spring 2019). Past results indicate that high levels of nitrate-N are still present at some locations and further monitoring is needed to determine if the measures taken by Grace-Mar to reduce pollution are influencing water quality.
- 2. Limit the sampling in the spring and fall of 2018 to only the five monitoring locations that have been shown to have elevated nutrient levels in the past. These locations are MW1, MW2, MW3S, Krebber's Well, and Floyd's Swamp. The purpose of Action #14 is to assess whether Grace-Mar Farms practices are influencing groundwater quality. Based on Grace-Mar farms' decision to cease cattle operations at this location all together, there is little value in continuing to sample locations that have already been shown to not be affected by Grace-Mar's farming operations.

In addition, after the 2018 sampling is complete, carry out further assessment into the source of the nitrate-N in groundwater, making use of drain gauge data, nutrient management plans, soil data, and irrigation water records.

⁴ RPD tends to increase as the result approaches the detection limit. Therefore, use of this threshold is restricted to duplicate pair values that are greater than five times their detection limit (MWLAP 2013).





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6 CLOSURE

We trust that this report satisfactorily meets the requirements of Action Plan Item #14. Please contact the undersigned if you have any questions.

Yours truly,

Marta Green, P.Geo. Senior Hydrogeologist

MG/HH/PH

ATTACHMENTS

Attachment 1: Table A1: Groundwater Quality Results Attachment 2: Table A2: Surface Water Quality Results Attachment 3: Field Sheets – November Sampling Attachment 4: Laboratory Reports – November Sampling

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REFERENCES

- Associated Environmental Consultants Inc. (Associated). 2017a. Comprehensive Monitoring Program and Environmental Impact Assessment. Grace-Mar Farms Ltd. Pollution Abatement Order File AMS#350101. February 2017.
- Associated Environmental Consultants Inc. (Associated). 2017b. Grace-Mar Farms Ltd. Action Plan: AMS# 350101 (UA Hullcar Aquifer). March 2017.
- Associated Environmental Consultants Inc. (Associated). 2017c. Grace-Mar Farms Spring 2017 Water Sampling Results. Ministry of Environment File No. 350101 – Action Plan Item #14. June 29, 2017.
- British Columbia Ministry of Environment (MOE). 2016. Pollution Abatement Order File: UA Hullcar Aquifer AMS# 350101.
- British Columbia Ministry of Environment (MOE). 2017a. British Columbia Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. Ministry of Environment, Water Protection and Sustainability Branch. June 2017. Available at: <u>http://www2.gov.bc.ca/assets/gov/environment/airland-water/water/waterquality/wqgs-wqos/bc_env_working_water_quality_guidelines.pdf</u>
- British Columbia Ministry of Environment and Climate Change Strategy (MOE). 2017b. British Columbia Source Drinking Water Quality Guidelines – Guideline Summary. Ministry of Environment and Climate Change Strategy, Water Protection and Sustainability Branch. December 2017. Available at: <u>https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/waterguality-guidelines/approved-water-guality-guidelines</u>
- British Columbia Ministry of Environment and Climate Change Strategy (MOE). 2018. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture Summary Report. Ministry of Environment and Climate Change Strategy, Water Protection and Sustainability Branch. March 2018. Available at: <u>https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-water-quality-guidelines</u>
- British Columbia Ministry of Water, Land and Air Protection (MWLAP). 2013. British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples. 2013 Edition. Available at: <u>http://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre</u> /field_sample_man2013.pdf





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- Golder Associates and Summit Environmental Consultants Ltd. (2009) Phase 2 Okanagan Water Supply and Demand Project: Groundwater Objectives 2 and 3 Basin Study (July 2009)
- Health Canada. 2015. Guidelines for Canadian Drinking Water Quality. Guideline Technical Document pH. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. Available at: <u>https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadiandrinking-water-quality-guideline-technical-document-ph.html</u>
- Health Canada. 2017. Guidelines for Canadian Drinking Water Quality Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. Updated February 2017. Available at: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table-health-canada-2012.html
- Kampman, J. 2018. Personal Communication with M. Green, of Associated, between February 22 and April 23, 2018. Owner, Grace-Mar Farms.
- Monahan, P.A. (2006) North Okanagan aquifer mapping project. Unpublished report prepared for BC Bulletin 46, Ministry of Energy, Mines and Petroleum Resources, 46 pp.



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ATTACHMENT 1: TABLE A-1: GROUNDWATER QUALITY RESULTS



Table A-1 Grace-Mar Farms Groundwater Quality Results (Action #14 Sampling) Water Quality Results

	1					uideline		Sar	npling Location Date Sampled Lab Sample ID Sample Type	James Krebber Home 20-Jun-17 7061861-01 Normal	James Krebber Home 15-Nov-17 7111411-03 Normal	MW1 18-Oct-16 6101246-01 Normal	MW1 24-May-17 7052134-01 Normal	MW1 14-Nov-17 7111412-01 Normal	MW2 04-Oct-16 6100258-01 Normal	MW2 24-May-17 7052134-02 Normal
Analyte	Unit	BCAWQG I	BCWWQG I	BCAWQG L			BC SDWQG AO	GCDWQ MAC	GCDWQ AO							
Field Results				<u>и</u> Т												
Conductivity	µS/cm	NG	700 ^{2.1}	NG	NG	NG	NG	NG	NG	1730	1070	1441	880	1140	1320	1080
Dissolved oxygen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG		1.78			1.54		, ,
Oxidation reduction potential	mV	NG	NG	NG	NG	NG	NG	NG	NG	110	-18	66	13	50	34	15
рН		5.0 - 9.0 ^{1.1}	NG	5.0 - 9.5 ^{3.1}	NG	NG	NG	NG	7.0 - 10.5 ^{7.1}	6.95	7.52	7.17	7.5	7.46	7.06	7.3
Temperature	°C	N ^{1.2}	NG	N ^{3.2}	NG	NG	15	NG	15	12.2	8.8	10.1	7.9	10.1	12.9	8.4
Turbidity	NTU	N ^{1.3}	NG	N ^{3.3}	NG	N ^{4.1}	NG	N ^{6.1}	NG		6.34	2.02		0.51	3.6	
Lab Results																
General																
Chloride	mg/L	100	NG	600 ^{3.4}	NG	NG	250	NG	250	28.1	12.9	47.5	22.6	36.0	41.9	35.6
Nutrients																
Ammonia (total, as N)	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	<0.020	0.042	0.031	0.030	<0.020	0.050	0.022
Nitrate (as N)	mg/L	NG	NG	100 ^{3.5}	NG	10	NG	10	NG	<u>13.0</u>	0.021	<u>21.0</u>	<0.010	8.70	7.82	<0.010
Nitrate + Nitrite (as N)	mg/L	NG	NG	100 ^{3.6}	NG	NG	NG	10 ^{6.2}	NG	13.0	0.0212	21.0	<0.0100	8.70	7.91	0.0420
Nitrite (as N)	mg/L	NG	NG	10 ^{3.7}	NG	1.0	NG	1	NG	0.028	<0.010	<0.010	<0.010	<0.010	0.094	0.042
Organic nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.446	0.116	0.525		0.542	0.644	
Total nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	13.5	0.179	21.5	0.457	9.24	8.61	0.335
Total kjeldahl nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.446	0.158	0.56	0.457	0.542	0.69	0.293
Phosphorus (total, APHA 4500-P)	mg/L	NG	NG	NG	NG	NG	N ^{5.1}	NG	NG	<0.0020	<0.0020	0.025	0.0452	0.0512		0.0096
Phosphorus (dissolved, APHA 4500-P)	mg/L	NG	NG	NG	NG	NG	N ^{5.2}	NG	NG			0.019				
¹ See attachments for guideline notes.																
Legend																
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<u>egena</u>	
<	Less than reported detection limit
NG	No Guideline
Ν	Narrative type of guideline or standard, or Result Note.
Calc	Calculated guideline. The guideline is dependent on the value of one or more other analytes, and is calculated from a formula or table.
BCAWQG I	Highlighted value exceeds the BC Approved Water Quality Guidelines for irrigation (BCAWQG I)
BCWWQG I	Highlighted value exceeds the BC Working Water Quality Guidelines for irrigation (BCWWQG I)
BCAWQG L	Highlighted value exceeds the BC Approved Water Quality Guidelines for livestock (BCAWQG L)
BCWWQG L	Highlighted value exceeds the BC Working Water Quality Guidelines for livestock (BCWWQG L)
BC SDWQG AO	BC Source Drinking Water Quality Guidelines - Aesthetic Objectives (2017 and updates)
BC SDWQG MAC	BC Source Drinking Water Quality Guidelines - Maximum Acceptable Concentrations (2017 and updates)
GCDWQ MAC	Highlighted value exceeds the Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC)
GCDWQ AO	Highlighted value exceeds the Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)



					G	uideline			Date Sampled Lab Sample ID Sample Type	14-Nov-17 7111412-02 Normal	05-Oct-16 6100374-01 Normal	24-May-17 7052134-04 Normal	14-Nov-17 7111412-04 Normal	04-Oct-16 6100258-02 Normal	24-May-17 7052134-03 Normal	14-Nov-17 7111412-03 Normal
Analyte	Unit	BCAWQG I	BCWWQG I	BCAWQG L	BCWWQG L	BC SDWQG MAC	BC SDWQG AO	GCDWQ MAC	GCDWQ AO							
Field Results																
Conductivity	µS/cm	NG	700 ^{2.1}	NG	NG	NG	NG	NG	NG	1250	1510	1280	1240	1720	1410	1400
Dissolved oxygen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.95			0.52			0.98
Oxidation reduction potential	mV	NG	NG	NG	NG	NG	NG	NG	NG	14	18	24	123	83	16	17
рН		5.0 - 9.0 ^{1.1}	NG	5.0 - 9.5 ^{3.1}	NG	NG	NG	NG	7.0 - 10.5 ^{7.1}	7.22	7.23	7.4	7.51	6.80	7.1	7.17
Temperature	°C	N ^{1.2}	NG	N ^{3.2}	NG	NG	15	NG	15	11.9	9.4	9.1	8.9	9.7	9.0	9.3
Turbidity	NTU	N ^{1.3}	NG	N ^{3.3}	NG	N ^{4.1}	NG	N ^{6.1}	NG	1.24	6.3		5.79	0.8		0.21
Lab Results																
General																
Chloride	mg/L	100	NG	600 ^{3.4}	NG	NG	250	NG	250	45.0	30.3	30.3	35.9	54.5	50.5	62.5
Nutrients																
Ammonia (total, as N)	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	<0.020	0.257	0.176	0.227	<0.020	0.031	0.028
Nitrate (as N)	mg/L	NG	NG	100 ^{3.5}	NG	10	NG	10	NG	1.51	<0.010	<0.010	0.140	<u>16.6</u>	<0.010	<u>13.3</u>
Nitrate + Nitrite (as N)	mg/L	NG	NG	100 ^{3.6}	NG	NG	NG	10 ^{6.2}	NG	1.51	<0.010	0.0147	0.140	16.7	0.0292	13.3
Nitrite (as N)	mg/L	NG	NG	10 ^{3.7}	NG	1.0	NG	1	NG	<0.010	<0.010	0.015	<0.010	0.016	0.029	0.069
Organic nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.445	0.211		0.156	0.525		0.525
Total nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	1.96	0.468	0.429	0.523	17.2	0.423	13.9
Total kjeldahl nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.445	0.47	0.414	0.383	0.52	0.394	0.553
Phosphorus (total, APHA 4500-P)	mg/L	NG	NG	NG	NG	NG	N ^{5.1}	NG	NG	0.0088	0.026	0.0399	0.0690		<0.0020	0.0141
Phosphorus (dissolved, APHA 4500-P)	mg/L	NG	NG	NG	NG	NG	N ^{5.2}	NG	NG		0.021					
¹ See attachments for guideline notes.																

Table A-1 Grace-Mar Farms Groundwater Quality Results (Action #14 Sampling) Water Quality Results

Less than reported detection limit < NG No Guideline Ν Narrative type of guideline or standard, or Result Note. Calculated guideline. The guideline is dependent on the value of one or more other analytes, and is calculated from a Calc formula or table. BCAWQG I Highlighted value exceeds the BC Approved Water Quality Guidelines for irrigation (BCAWQG I) BCWWQG I Highlighted value exceeds the BC Working Water Quality Guidelines for irrigation (BCWWQG I) BCAWQG L Highlighted value exceeds the BC Approved Water Quality Guidelines for livestock (BCAWQG L) BCWWQG L Highlighted value exceeds the BC Working Water Quality Guidelines for livestock (BCWWQG L) BC SDWQG AO BC Source Drinking Water Quality Guidelines - Aesthetic Objectives (2017 and updates) BC SDWQG MAC BC Source Drinking Water Quality Guidelines - Maximum Acceptable Concentrations (2017 and updates) Highlighted value exceeds the Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations GCDWQ MAC (GCDWQ MAC) GCDWQ AO Highlighted value exceeds the Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)



												-				
								San	npling Location	WPID 28093	WPID 28093	WT 94335	WT 94335	WTN 94334	WTN 94334	WTN 94334
									Date Sampled	24-May-17	15-Nov-17	24-May-17	15-Nov-17	04-Oct-16	24-May-17	24-May-17
									Lab Sample ID	7052134-06	7111411-02	7052134-08	7111411-01	6100258-03	7052134-09	7052134-07
									Sample Type	Normal	Normal	Normal	Normal	Normal	Duplicate	Normal
					G	uideline			oumple Type	Norman	Norman	Norman	Normai	Normal	Duplicate	Normal
				1	T	Γ										
Analyte	Unit	BCAWQG I	BCWWQG	BCAWQG L	BCWWQG L	BC SDWQG MAC	<u>BC SDWQG</u> <u>AO</u>	GCDWQ MAC	GCDWQ AO							
Field Results				T												
Conductivity	µS/cm	NG	700 ^{2.1}	NG	NG	NG	NG	NG	NG	1180	980	1110	700	1550	1580	1580
Dissolved oxygen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG		1.60		0.16	, 		
Oxidation reduction potential	mV	NG	NG	NG	NG	NG	NG	NG	NG	16	-18	99	-264	38	78	78
рН		5.0 - 9.0 ^{1.1}	NG	5.0 - 9.5 ^{3.1}	NG	NG	NG	NG	7.0 - 10.5 ^{7.1}	7.4	7.49	8.0	8.80	7.16	7.4	7.4
Temperature	°C	N ^{1.2}	NG	N ^{3.2}	NG	NG	15	NG	15	10.0	5.1	9.5	8.9	10.9	9.7	9.7
Turbidity	NTU	N ^{1.3}	NG	N ^{3.3}	NG	N ^{4.1}	NG	N ^{6.1}	NG		73.3		9.82	0.1		
Lab Results																
General														1		
Chloride	mg/L	100	NG	600 ^{3.4}	NG	NG	250	NG	250	6.72	8.72	36.2	27.0	18.9	26.4	26.1
Nutrients																
Ammonia (total, as N)	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.025	<0.020	0.036	0.057	0.330	0.356	0.375
Nitrate (as N)	mg/L	NG	NG	100 ^{3.5}	NG	10	NG	10	NG	<0.010	0.416	<0.010	0.020	<0.010	<0.010	<0.010
Nitrate + Nitrite (as N)	mg/L	NG	NG	100 ^{3.6}	NG	NG	NG	10 ^{6.2}	NG	<0.0100	0.416	<0.0100	0.0402	<0.010	<0.0100	<0.0100
Nitrite (as N)	mg/L	NG	NG	10 ^{3.7}	NG	1.0	NG	1	NG	<0.010	<0.010	<0.010	0.020	<0.010	<0.010	<0.010
Organic nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG		0.152		0.144	0.222		
Total nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.0890	0.568	0.275	0.241	0.552	0.558	0.563
Total kjeldahl nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.089	0.152	0.275	0.201	0.55	0.558	0.563
Phosphorus (total, APHA 4500-P)	mg/L	NG	NG	NG	NG	NG	N ^{5.1}	NG	NG	0.0027	<0.0020	0.0056	0.0074		0.0408	0.0401
Phosphorus (dissolved, APHA 4500-P)	mg/L	NG	NG	NG	NG	NG	N ^{5.2}	NG	NG							
¹ See attachments for guideline notes.	•		•												-	
Legend																
<		an reported d	etection limit													
NG	No Gui															
Ν		ve type of guid														
Calc	formula	or table.	-	·			e other analytes		lated from a							
BCAWQG I					•		gation (BCAWO	,								
BCWWQG I	Highlig	hted value exc	ceeds the BC	Working Wate	er Quality Gui	delines for irrig	ation (BCWWC	QG I)								

Table A-1 Grace-Mar Farms Groundwater Quality Results (Action #14 Sampling) Water Quality Results

Legend	
<	Less than reported detection limit
NG	No Guideline
Ν	Narrative type of guideline or standard, or Result Note.
Calc	Calculated guideline. The guideline is dependent on the value of one or more other analytes, and is calculated from a formula or table.
BCAWQG I	Highlighted value exceeds the BC Approved Water Quality Guidelines for irrigation (BCAWQG I)
BCWWQG I	Highlighted value exceeds the BC Working Water Quality Guidelines for irrigation (BCWWQG I)
BCAWQG L	Highlighted value exceeds the BC Approved Water Quality Guidelines for livestock (BCAWQG L)
BCWWQG L	Highlighted value exceeds the BC Working Water Quality Guidelines for livestock (BCWWQG L)
BC SDWQG AO	BC Source Drinking Water Quality Guidelines - Aesthetic Objectives (2017 and updates)
BC SDWQG MAC	BC Source Drinking Water Quality Guidelines - Maximum Acceptable Concentrations (2017 and updates)
GCDWQ MAC	Highlighted value exceeds the Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC)
GCDWQ AO	Highlighted value exceeds the Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)



								Sam	pling Location	WTN 94334	WTN 94334
									Date Sampled	14-Nov-17	14-Nov-17
									Lab Sample ID	7111412-05	7111412-07
										Normal	Duplicate
	T					uideline			Sample Type	Normai	Duplicate
			1		9						
Analyte	Unit	BCAWOGI	BCWWQG I	BCAWQG I	BCWWQG	BC SDWQG	BC SDWQG	GCDWQ	GCDWQ AO		
		Dorandor	Donnaol	20,11,40 2	L	MAC	<u>AO</u>	MAC	000110710		
Field Results											
Conductivity	µS/cm	NG	700 ^{2.1}	NG	NG	NG	NG	NG	NG	1090	1090
Dissolved oxygen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.39	0.39
Oxidation reduction potential	mV	NG	NG	NG	NG	NG	NG	NG	NG	131	131
pH		5.0 - 9.0 ^{1.1}	NG	5.0 - 9.5 ^{3.1}	NG	NG	NG	NG	7.0 - 10.5 ^{7.1}	7.26	7.26
Temperature	°C	N ^{1.2}	NG	N ^{3.2}	NG	NG	15	NG	15	9.4	9.4
Turbidity	NTU	N ^{1.3}	NG	N ^{3.3}	NG	N ^{4.1}	NG	N ^{6.1}	NG	3.66	3.66
	NIO	IN		IN	NO	IN	NO	IN		0.00	0.00
Lab Results											
General											
Chloride	mg/L	100	NG	600 ^{3.4}	NG	NG	250	NG	250	24.8	24.4
Nutrients											
Ammonia (total, as N)	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.575	0.576
Nitrate (as N)	mg/L	NG	NG	100 3.5	NG	10	NG	10	NG	0.045	<0.010
Nitrate + Nitrite (as N)	mg/L	NG	NG	100 3.6	NG	NG	NG	10 ^{6.2}	NG	0.0452	<0.0100
Nitrite (as N)	mg/L	NG	NG	10 3.7	NG	1.0	NG	1	NG	<0.010	<0.010
Organic nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.195	0.304
Total nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.815	0.880
Total kjeldahl nitrogen	mg/L	NG	NG	NG	NG	NG	NG	NG	NG	0.770	0.880
Phosphorus (total, APHA 4500-P)	mg/L	NG	NG	NG	NG	NG	N ^{5.1}	NG	NG	0.0583	0.0613
Phosphorus (dissolved, APHA 4500-P)	mg/L	NG	NG	NG	NG	NG	N ^{5.2}	NG	NG		0.0010
¹ See attachments for guideline notes.						110		110			
Legend										1	
<	Less that	an reported de	etection limit								
NG	No Guio	-									
Ν	Narrativ	e type of guid	leline or stand	ard, or Result	Note.						
Calc		-	The guideline	is dependent	on the value	of one or more	other analytes	, and is calcula	ated from a		
	-	or table.									
BCAWQG I					-		gation (BCAWC				
BCWWQG I				-	-	-	ation (BCWWQ				
BCAWQG L BCWWQG L					•		stock (BCAWC	,			
BC SDWQG AO	0 0			0		ectives (2017 a		G L)			
BC SDWQG AO BC SDWQG MAC							nd updates) ntrations (2017	and updates)			
		-	-				ty - Maximum A		ncentrations		
GCDWQ MAC	(GCDW	Q MAC)									
	I I arte I arte	4		1.1	and an Date 11			Linetherne (OO)		4	

Highlighted value exceeds the Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)

Table A-1 Grace-Mar Farms Groundwater Quality Results (Action #14 Sampling) Water Quality Results



GCDWQ AO

Guideline Notes for Reports for 2016-8113.010 Grace-Mar Farms Water Quality Results

1. Notes for BC Approved Water Quality Guidelines for irrigation (BCAWQG I)

General Notes:

The Water Quality Guidelines (Criteria) Reports by BC Ministry of Environment were used as references for the guidelines. (Internet address: http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html). Overview Reports (BC MOE) were used as the references for the guidelines unless the note for specific analyte indicates that the Technical Appendix (BC MOE) was **Note 1.1 for pH:**

The recommended criterion for irrigation waters is a pH ranging between 5.0 and 9.0. This guideline recognizes that soil acidity, alkalinity and salinity are a concern in agriculture.

Note 1.2 for Temperature:

The recommended guideline for temperature is + or - 1 degree Celsius change from natural ambient background. **Note 1.3 for Turbidity:**

Induced turbidity should not exceed 10 NTU when background turbidity is less than or equal to 50 NTU, nor should induced turbidity be more than 20 % of background when background is greater than 50 NTU.

2. Notes for Working Water Quality Guidelines for British Columbia for irrigation (BCWWQG I) General Notes:

Reference: Working Water Quality Guidelines for British Columbia (2015). WWQG values are long-term (i.e. average) concentrations unless identified as a short-term maximum in the "Notes" for a specific analyte. Long-term WWQGs represent average substance concentrations calculated from 5 samples in 30 days. WWQG are given for total substance concentrations unless otherwise noted.

Note 2.1 for Conductivity:

The guideline varies from 700 to 5000 μ S/cm depending on the type of crop. The most stringent guideline has been used for this report.

3. Notes for BC Approved Water Quality Guidelines for livestock (BCAWQG L)

General Notes:

The Water Quality Guidelines (Criteria) Reports by BC Ministry of Environment were used as references for the guidelines. (Internet address: http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html). Overview Reports (BC MOE) were used as the references for the guidelines unless the note for specific analyte indicates that the Technical Appendix (BC MOE) was **Note 3.1 for pH:**

pH does not interfere with the palatability of water or the health of livestock.

Note 3.2 for Temperature:

The recommended guideline for temperature is + or - 1 degree Celsius change from natural ambient background.

Note 3.3 for Turbidity:

Induced turbidity should not exceed 5 NTU when background turbidity is less than or equal to 50 NTU, nor should induced turbidity be more than 10 % of background when background is greater than 50 NTU.

Note 3.4 for Chloride:

The water quality guideline for chloride for livestock watering is 600 mg/L.

Note 3.5 for Nitrate (as N):

Overview Report Update, September 2009.

Note 3.6 for Nitrate + Nitrite (as N):

The guideline maximum for nitrate as nitrogen is 100 mg/l. Where nitrate and nitrite are present, the total nitrate+nitrite nitrogen should not exceed this value. Overview Report Update, September 2009.

Note 3.7 for Nitrite (as N):

Overview Report Update, September 2009.

4. Notes for BC Source Drinking Water Quality Guidelines - Maximum Acceptable Concentrations (2017 and updates) (BC SDWQG MAC)

General Notes:

The source drinking water quality guidelines presented in this document apply to the ambient water before it is treated and distributed for domestic use. The guidelines apply to drinking water sources from surface water and groundwater. Metal guidelines are based on total concentrations.

Note 4.1 for Turbidity:

For raw drinking water with treatment for particulates, the guideline is:

Change from background of 5 NTU at any time when background is \leq 50 NTU; and change from background of 10% when background is > 50 NTU.

For raw drinking water without treatment for particulates, the guideline is:

Change from background of 1 NTU at any time when background is ≤ 5 NTU; and change from background of 5 NTU at any time.

If natural background turbidity is > 50 NTU, the guideline is:

Induced turbidity should not exceed 10% of the background turbidity.

5. Notes for BC Source Drinking Water Quality Guidelines - Aesthetic Objectives (2017 and updates) (BC SDWQG AO)

General Notes:

The source drinking water quality guidelines presented in this document apply to the ambient water before it is treated and distributed for domestic use. The guidelines apply to drinking water sources from surface water and groundwater. Metal guidelines are based on total concentrations.

Note 5.1 for Phosphorus (total, APHA 4500-P):

The AO for lakes is 0.01 mg/L. For lakes with residence time > 6 months, measure total P during spring overturn. For lakes with residence time < 6 months, measure mean epilimnetic total P during the growing season (ENV 1985).

Note 5.2 for Phosphorus (dissolved, APHA 4500-P):

The AO for lakes is 0.01 mg/L. For lakes with residence time > 6 months, measure total P during spring overturn. For lakes with residence time < 6 months, measure mean epilimnetic total P during the growing season (ENV 1985).

6. Notes for Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC) Note 6.1 for Turbidity:

Waterworks systems that use a surface water source or a groundwater source under the direct influence of surface water should filter the source water to meet health-based turbidity limits, as defined for specific treatment technologies. Where possible, filtration systems should be designed and operated to reduce turbidity levels as low as possible, with a treated water turbidity target of less than 0.1 NTU at all times. Where this is not achievable, the treated water turbidity levels from individual filters should meet the requirements described in GCDWQ.

For systems that use groundwater that is not under the direct influence of surface water, which are considered less vulnerable to faecal contamination, turbidity should generally be below 1.0 NTU.

For effective operation of the distribution system, it is good practice to ensure that water entering the distribution system has turbidity levels below 1.0 NTU.

Note 6.2 for Nitrate + Nitrite (as N):

The MAC for Nitrate (as N) is 10 mg/L

7. Notes for Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO) Note 7.1 for pH:

The operational guideline for pH is a range of 7.0 to 10.5 in finished drinking water.



April 27, 2018 Brady Nelless BC Ministry of Environment

ATTACHMENT 2: TABLE A-2: SURFACE WATER QUALITY REPORT



Samp

Guideline Analyte Unit BC SDWQG BCAWQG AL BCWWQG AL BCAWQG I BCWWQG I BCAWQG L BCWWQG L BC SDWQG AO GCDWQ MAC MAC Field Results **700**^{3.1} µS/cm NG NG NG Conductivity NG NG NG NG NG mg/L min 5 ^{1.1} NG NG NG NG NG NG NG NG Dissolved oxygen Oxidation reduction potential mV NG NG NG NG NG NG NG NG NG N ^{1.2} 5.0 - 9.5 ^{4.1} 5.0 - 9.0^{2.1} NG NG NG NG NG NG pН N ^{2.2} Temperature °C 19 ^{1.3} NG NG N ^{4.2} NG NG 15 NG NTU N ^{1.4} NG N ^{2.3} NG N ^{4.3} NG N ^{5.1} NG N ^{7.1} Turbidity Lab Results General **600**^{1.5} 600 4.4 Chloride mg/L NG 100 NG NG NG 250 NG Nutrients Calc ^{1.6} Ammonia (total, as N) mg/L NG NG NG NG NG NG NG NG 32.8^{1.7} 100^{4.5} mg/L NG NG NG NG 10 NG 10 Nitrate (as N) 10 7.2 **32.8**^{1.8} 100 4.6 NG NG Nitrate + Nitrite (as N) mg/L NG NG NG NG Calc 1.9 10 4.7 Nitrite (as N) mg/L NG NG NG NG 1.0 NG 1 NG NG NG NG NG NG NG Organic nitrogen mg/L NG Total nitrogen mg/L NG Total kjeldahl nitrogen mg/L N ^{1.10} N ^{6.1} Phosphorus (total, APHA 4500-P) NG NG NG NG NG NG NG mg/L

¹ See attachments for guideline notes.

Legend	
<	Less than reported detection limit
NG	No Guideline
Ν	Narrative type of guideline or standard, or Result Note.
Calc	Calculated guideline. The guideline is dependent on the value of one or more other analytes, and is calculated from a formula or table.
BCAWQG AL	Highlighted value exceeds the BC Approved Water Quality Guidelines for aquatic life (BCAWQG AL)
BCWWQG AL	Highlighted value exceeds the BC Working Water Quality Guidelines for aquatic life (BCWWQG AL)
BCAWQG I	Highlighted value exceeds the BC Approved Water Quality Guidelines for irrigation (BCAWQG I)
BCWWQG I	Highlighted value exceeds the BC Working Water Quality Guidelines for irrigation (BCWWQG I)
BCAWQG L	Highlighted value exceeds the BC Approved Water Quality Guidelines for livestock (BCAWQG L)
BCWWQG L	Highlighted value exceeds the BC Working Water Quality Guidelines for livestock (BCWWQG L)
BC SDWQG AO	BC Source Drinking Water Quality Guidelines - Aesthetic Objectives (2017 and updates)
BC SDWQG MAC	BC Source Drinking Water Quality Guidelines - Maximum Acceptable Concentrations (2017 and updates)
GCDWQ MAC	Highlighted value exceeds the Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC)
GCDWQ AO	Highlighted value exceeds the Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)



mpling Location Date Sampled Lab Sample ID Sample Type GCDWQ AO	Floyd's Swamp 24-May-17 7052134-05 Normal	Floyd's Swamp 14-Nov-17 7111412-06 Normal
NG	1490	1040
NG		7.28
NG	3	202
7.0 - 10.5 ^{8.1}	7.7	6.81
15	<u>15.3</u>	1.3
NG		4.49
250	30.4	22.8
NG	1.14	2.10
NG	<0.010	0.175
NG	0.720	0.175
NG	0.720	<0.010
NG		1.75
NG	4.72	4.03
NG	4.00	3.86
NG	0.410	0.513

1. Notes for BC Approved Water Quality Guidelines for freshwater aquatic life (BCAWQG AL) General Notes:

The Water Quality Guidelines (Criteria) Reports by BC Ministry of Environment were used as references for the guidelines. (Internet address: http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html). Overview Reports (BC MOE) were used as the references for the guidelines unless the note for specific analyte indicates that the Technical Appendix (BC MOE) was used. / For some parameters, guidelines are specified as two values: the maximum value or the acute criterion, and the 30-day average value or the chronic criterion. The maximum value was used in this report for parameters that have both guideline values.

Note 1.1 for Dissolved oxygen:

The instantaneous minimum guideline for dissolved oxygen is 5 mg/L for all life stages other than buried embryo/alevin. The instantaneous minimum guideline for dissolved oxygen in the water column is 9 mg/L for buried embryo/alevin. The instantaneous minimum guideline for dissolved oxygen in interstitial water is 6 mg/L for buried embryo/alevin.

The 30-day mean guideline (minimum) for dissolved oxygen is 8 mg/L for all life stages other than buried embryo/alevin. The 30-day mean guideline (minimum) for dissolved oxygen in the water column is 11 mg/L for buried embryo/alevin. The 30-day mean guideline (minimum) for dissolved oxygen in interstitial water is 8 mg/L for buried embryo/alevin.

Note 1.2 for pH:

pH less than 6.5: No statistically significant decrease in pH from background.

pH from 6.5 to 9.0: Unrestricted change permitted within this range.

pH over 9.0: No statistically significant increase in pH from background.

See BC MOE Overview Report for additional details.

Note 1.3 for Temperature:

The maximum daily temperature of 19 degrees Celsius is for streams with unknown fish distribution. See BC MOE Overview Report for additional details for streams with unknown fish distribution, and specific guidelines for streams with known fish distribution, and guideline for lakes and impoundments.

Note 1.4 for Turbidity:

When background is less than or equal to 8 NTU:

- Maximum Induced Turbidity of 8 NTU in 24 hours.

- For sediment inputs that last between 24 hours and 30 days (daily sampling preferred) the mean turbidity should not exceed background by more than 2 NTU.

Maximum Induced Turbidity of 5 NTU when background is between 8 and 50 NTU.

Maximum Induced Turbidity of 10% when background is greater than 50 NTU.

Note 1.5 for Chloride:

To protect freshwater aquatic life from acute and lethal effects, the maximum concentration of chloride (mg/L as NaCl) at any time should not exceed 600 mg/L.

To protect freshwater aquatic life from chronic effects, the average (arithmetic mean computed from five weekly samples collected over a 30-day period) concentration of chloride (mg/L as NaCl) should not exceed 150 mg/L.

Note 1.6 for Ammonia (total, as N):

The maximum guideline for ammonia varies as a function of pH and temperature. See Table 3 in Overview Report Update September 2009.

The 30-day average guideline for ammonia varies as a function of pH and temperature. See Table 4 in Overview Report Update September 2009. / The lab pH and field temperature results were used for determining the maximum ammonia for this report. If a lab pH result was not available then the field pH result was used.

Note 1.7 for Nitrate (as N):

The guideline maximum for nitrate (as N) is 32.8 mg/l.

The 30-day average guideline for nitrate (as N) is 3.0 mg /L. The 30-day average (chronic) concentration is based on 5 weekly samples collected within a 30-day period.

Where nitrate and nitrite are present, the total nitrate+nitrite nitrogen should not exceed these values.

Note 1.8 for Nitrate + Nitrite (as N):

The guideline maximum for nitrate (as N) is 32.8 mg/l.

The 30-day average guideline for nitrate (as N) is 3.0 mg /L. The 30-day average (chronic) concentration is based on 5 weekly samples collected within a 30-day period.

Where nitrate and nitrite are present, the total nitrate+nitrite nitrogen should not exceed these values. Note 1.9 for Nitrite (as N):

The guideline maximum for nitrite as N is:

0.06~mg/L if chloride less than 2 mg/L

0.12 mg/L if chloride is 2 to 4 mg/L 0.18 mg/L if chloride is 4 to 6 mg/L

0.24 mg/L if chloride is 6 to 8 mg/L

0.30 mg/L if chloride is 8 to 10 mg/L

0.60 mg/L if chloride is greater than 10 mg/L.

The guideline 30-day average for nitrite as N is:

0.02 mg/L if chloride less than 2 mg/L

0.04 mg/L if chloride is 2 to 4 mg/L

0.06 mg/L if chloride is 4 to 6 mg/L

0.08 mg/L if chloride is 6 to 8 mg/L

0.10 mg/L if chloride is 8 to 10 mg/L

0.20 mg/L if chloride is greater than 10 mg/L.

Note 1.10 for Phosphorus (total, APHA 4500-P):

Streams: None proposed for streams.

Lakes: It is not possible to specify a single phosphorous concentration to achieve protection of aquatic life in lakes. A range of total phosphorous concentrations (5-15 μ g/L) is suggested as the criterion which can be used as the basis for site specific water quality objectives.

2. Notes for BC Approved Water Quality Guidelines for irrigation (BCAWQG I) General Notes:

The Water Quality Guidelines (Criteria) Reports by BC Ministry of Environment were used as references for the guidelines. (Internet address: http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html). Overview Reports (BC MOE) were used as the references for the guidelines unless the note for specific analyte indicates that the Technical Appendix (BC MOE) was **Note 2.1 for pH:**

The recommended criterion for irrigation waters is a pH ranging between 5.0 and 9.0. This guideline recognizes that soil acidity, alkalinity and salinity are a concern in agriculture.

Note 2.2 for Temperature:

The recommended guideline for temperature is + or - 1 degree Celsius change from natural ambient background.

Note 2.3 for Turbidity:

Induced turbidity should not exceed 10 NTU when background turbidity is less than or equal to 50 NTU, nor should induced turbidity be more than 20 % of background when background is greater than 50 NTU.

3. Notes for Working Water Quality Guidelines for British Columbia for irrigation (BCWWQG I)

General Notes:

Reference: Working Water Quality Guidelines for British Columbia (2015). WWQG values are long-term (i.e. average) concentrations unless identified as a short-term maximum in the "Notes" for a specific analyte. Long-term WWQGs represent average substance concentrations calculated from 5 samples in 30 days. WWQG are given for total substance concentrations unless otherwise noted.

Note 3.1 for Conductivity:

The guideline varies from 700 to 5000 μ S/cm depending on the type of crop. The most stringent guideline has been used for this report.

4. Notes for BC Approved Water Quality Guidelines for livestock (BCAWQG L)

General Notes:

The Water Quality Guidelines (Criteria) Reports by BC Ministry of Environment were used as references for the guidelines. (Internet address: http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html). Overview Reports (BC MOE) were used as the references for the guidelines unless the note for specific analyte indicates that the Technical Appendix (BC MOE) was **Note 4.1 for pH:**

pH does not interfere with the palatability of water or the health of livestock.

Note 4.2 for Temperature:

The recommended guideline for temperature is + or - 1 degree Celsius change from natural ambient background. **Note 4.3 for Turbidity:**

Induced turbidity should not exceed 5 NTU when background turbidity is less than or equal to 50 NTU, nor should induced turbidity be more than 10 % of background when background is greater than 50 NTU.

Note 4.4 for Chloride:

The water quality guideline for chloride for livestock watering is 600 mg/L.

Note 4.5 for Nitrate (as N):

Overview Report Update, September 2009.

Note 4.6 for Nitrate + Nitrite (as N):

The guideline maximum for nitrate as nitrogen is 100 mg/l. Where nitrate and nitrite are present, the total nitrate+nitrite nitrogen should not exceed this value. Overview Report Update, September 2009.

Note 4.7 for Nitrite (as N):

Overview Report Update, September 2009.

5. Notes for BC Source Drinking Water Quality Guidelines - Maximum Acceptable Concentrations (2017 and updates) (BC SDWQG MAC)

General Notes:

The source drinking water quality guidelines presented in this document apply to the ambient water before it is treated and distributed for domestic use. The guidelines apply to drinking water sources from surface water and groundwater. Metal guidelines are based on total concentrations.

Note 5.1 for Turbidity:

For raw drinking water with treatment for particulates, the guideline is:

Change from background of 5 NTU at any time when background is \leq 50 NTU; and change from background of 10% when background is > 50 NTU.

For raw drinking water without treatment for particulates, the guideline is:

Change from background of 1 NTU at any time when background is \leq 5 NTU; and change from background of 5 NTU at any time.

If natural background turbidity is > 50 NTU, the guideline is:

Induced turbidity should not exceed 10% of the background turbidity.

6. Notes for BC Source Drinking Water Quality Guidelines - Aesthetic Objectives (2017 and updates) (BC SDWQG AO)

General Notes:

The source drinking water quality guidelines presented in this document apply to the ambient water before it is treated and distributed for domestic use. The guidelines apply to drinking water sources from surface water and groundwater. Metal guidelines are based on total concentrations.

Note 6.1 for Phosphorus (total, APHA 4500-P):

The AO for lakes is 0.01 mg/L. For lakes with residence time > 6 months, measure total P during spring overturn. For lakes with residence time < 6 months, measure mean epilimnetic total P during the growing season (ENV 1985).

7. Notes for Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC) Note 7.1 for Turbidity:

Waterworks systems that use a surface water source or a groundwater source under the direct influence of surface water should filter the source water to meet health-based turbidity limits, as defined for specific treatment technologies. Where possible, filtration systems should be designed and operated to reduce turbidity levels as low as possible, with a treated water turbidity target of less than 0.1 NTU at all times. Where this is not achievable, the treated water turbidity levels from individual filters should meet the requirements described in GCDWQ.

For systems that use groundwater that is not under the direct influence of surface water, which are considered less vulnerable to faecal contamination, turbidity should generally be below 1.0 NTU.

For effective operation of the distribution system, it is good practice to ensure that water entering the distribution system has turbidity levels below 1.0 NTU.

Note 7.2 for Nitrate + Nitrite (as N):

The MAC for Nitrate (as N) is 10 mg/L

8. Notes for Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO) Note 8.1 for pH:

The operational guideline for pH is a range of 7.0 to 10.5 in finished drinking water.



April 27, 2018 Brady Nelless BC Ministry of Environment

ATTACHMENT 3: FIELD SHEETS - NOVEMBER SAMPLING



	acility Nar		Gracer	mar Fai	rms	Client:		Gracer	nar Farms	3
Nell I				1335		Project Nu	umber:		8113.010	
Date:			Novem	ber 🕼	2017	Sampled t			Manna	
	g Diameter	r:	6 11	W			Cloud			
	Stick-up:					Remarks	C 11	L.	A num	a louge the
_	tion of well	:	good	needs a	attention	1017	could	hal g	2. milin	g in well.
oona			gee				m app	in and e	7.5 0.11111	1
						Is the well	marked/flag	aged? Y	es No	
DTB:			~41	m	ľ	Pressure:				
DTW:			1	m	negative	positive	none	UTM Coor	dinates:	
	ence:		34.955			sing volume	= 18l /m	Easting (6		
	ing volume ((L/m)	10	L/m	1	asing volume			774	
_	e of water in		209.73		1	sing volume =		Northing (
	x 3 (for sa		5 (for develop		1			5594		
Volum	e of water to		629.19		1				U U	
	e actually p		4600	L	1			//		A 10 1-
				~~~~	51	6mc-	rsible	=   IOU	s tlow	@ 10-1- depth
Purge	method:		Bailer	Pump	Waterra	None	Other:			depth
_	d to dry:		Yes	No						
Purge	water disp	osai:	Ground	Container			Was sheen Yes	observed (	during purging	or sampling?
Field F	arameters						100			
	Time	Volume (L)	рН	Temp °C	Cond. (µS/cm)	ORP (mv)	DO (mg/L)	Turbidity	DTW (m btoc)	Comments
1st	3:53		8.83	8.2	650	-12	1.20	37.1		
2nd	13:58		8.84	8.6	650	-58	1.06	30.0		
3rd	14:05		8,85	8.7	650	-114	1.05	30.5		
	14:10		8.79	8.9		-118		17.4		
					670		1.15			
	14:15		8,85	0.1	690	- 279	0.25	15.2		
	14:20		8.43	89	700	- 7.48	0.19	10.9		
7th	14:73		8,01	9.0	690	-760	0.20	11.8		
8th	14'35		8,80	8.9	700	-264	0,16	9.8Z		
		s on the back								
Samp	ole Descrip		6	2017		4	1n			
Sample	e date:	Novemb		-	_Sample time	<u>(4)</u>		- 1	•	
Арреа	rance:	slight	hy cloud	1 10 11	110wish	tivit	_Sample Cold	our: Clea	rish yello	w
Order	of bottles coll	ected:	Genera	11, Nut	rients					
	-		npled/bottles							
Were	Samples Fi	Itered and I	Preserved?	Yes No						
				N						
Dupli	cate Samp	ole?	Yes	No	Duplicate	Sample ID	):			
Additi	onal Notes	·								
	access									
	en well locatio	on								
- hidd	V CODCORDE									
- hidd - safei	y concerns ual well beha	aviour								
- hidd - safei		aviour								
- hidd - safei		aviour					2			

Associated Environmental

323

-	acility Nar		Grace	mar Fai	rms	Client:		Gracen	ar Farms			
Well			WPIDZ			Project Nu	mber:	2016-8113.010.003				
Date		10		ber 15	2017	Sampled b			Manna	000		
	ng Diameter	r			*	Weather:			6			
	Stick-up:			/		Remarks: untreated gw well From hose in horse Fredhit.						
	lition of well	Ŀ	good	needs	attention		hose L	n hors	e Fredhat			
									200	way - 2		
						Is the well	marked/flag	gged? Y	es No			
DTB:		10		m		Pressure:	4		•7.			
DTW	!:			m	negative	positive	none	UTM Coor	dinates:			
Diffe	rence:			m	15cm (6") ca	sing volume =	= 18L/m 🔏	Easting (6	digits)			
	sing volume			L/m	10cm (4") ca	sing volume =	= 8L/m					
Volur	ne of water in			L/m	5cm (2") cas	ing volume =	2L/m	Northing (7	7 digits)			
	x 3 (for sa		5 (for develop	oing)				-				
	ne of water to			L				Zone:				
Volur	ne actually p	urged:		L								
Dure	e method:		Bailer	Pump	Waterra	None	Other:					
	ed to dry:		Yes	No	Valena	None	oulor.					
	e water disp	posal:	Ground	Container					luring purging o	r sampling?		
Field	Parameters						Yes	No				
	Time	Volume (L)	рН	Temp °C	Cond. (µS/cm)	ORP (mv)	DO (mg/L)	Turbidity	DTW (m btoc)	Comments		
1st	15.55		7.101	5.2	1040	-7.	1,28	63.2				
2nd	<u> </u>		7.52	6 1	1040	- 16	1.16			- /		
3rd	16:05		7.52	E 1	980	-15	1.21	9.2.4				
-				D.1		-17		72 3				
4th	0.0	,	7.49	5.2	980		1.68	12, 2				
5th	16:15		7.49	5.1	940	-18	1.60					
6th												
7th	2											
8th												
	additional line ple Descri		13			÷						
Samp	le date:	Novemb	per 🧖, 🛛	2017	_Sample time	6.	15		- /			
Appe	arance:	·					Sample Cold	o <u>ur: Slig</u> t	t yellow	1		
Order	of bottles col	llected:	Genera	al, Nut	rients			V	ē			
List	any Parame	ters not Sar	npled/bottle	s missed:								
Were	Samples F	iltered and	Preserved?	Yes No	)							
Dup	licate Sam	ple?	Yes	No	Duplicate	Sample ID	):					
		X		$\bigcirc$								
	tional Notes	3:								24		
	den well locati	ion										
	ety concerns isual well beha	aviour										
	5											
		A 17 19	L									
	Contraction of the second	Associated										
		ASSOCIATED	ntal									
	1E	Environmer										
	Æ	Environmer										
	A	Environmer										

Field Sampling Sheet - Gr	oundwater			G.				
Site/Facility Name:		nar Far	rms	Client:			ar Farms	
Well ID:	MWI			Project Nur	nber:		3113.010	.003
Date:		oer K,	2017	Sampled by		Jesse	Manna	
Casing Diameter:	て"			Weather:	400			
Well Stick-up:				Remarks:				
Condition of well:	good/	needs a	attention					
	$\cup$					~		
				Is the well	marked/flag	ged? (e	s) No	
DTB:		m		Pressure:				
DTW:	5.785	m	negative	positive	none	UTM Coord	800000 (Sec	
Difference:	2.035	m	15cm (6") ca	sing volume =	18L/m	Easting (6		
X Casing volume (L/m)	2.0	L/m	1 .	ising volume =		033		
Volume of water in well:		L/m	5cm (2") cas	ing volume = :	2L/m 🖌	Northing (7		
	5 (for develop	ng)	-				4648	
Volume of water to purge:	12.21	L	-			Zone:	0	
Volume actually purged:	715.0	L	S.L	mersib	Le			
Purge method:	Bailer	Pump	Waterra	None	Other:			
Purged to dry:	Yes	No						
Purge water disposal:	Ground	Container					uring purging	or sampling?
Field Parameters	$\bigcirc$				Yes	(No)		
Time Volume (L)	рН	Temp °C	Cond.	ORP (mv)	DO (mg/L)	Turbidity	DTW (m btoc)	Comments
	7.70	8.4	(µS/cm)	29	1.66	11.6		
1st 15:30	7.70		1.00	33	121	11 /		
2nd 15:35	1.45	9,0	1140		$\frac{1}{1}$	7.14		
3rd 15:40	7.45	9.8	1140	38	1.71			
4th 15:45	7.46	10.0	1140	42	1.67	4,52		
5th 15:50	7.46	10,0	1140	41	1.66	0.63		
6th 15:55	7.46	10.0	1140	44	1.65	0.54		
7th 16:00	7.46	10.1	1140	50	1.54	0.34		
8th 10:05	7.46	10.1	1140	50	1.54	0.51		
write additional lines on the back					,			
Sample Descriptions:		017		16:10	<b>`</b>			
oumpie dute.	per 18, 2	2017	_Sample time	B: 10 1				
Appearance: <u>C</u> EA		1 37			Sample Cold			
Order of bottles collected:			crients	5				
List any Parameters not Sar		$\sim$						
Were Samples Filtered and	Preserved?	Yes No						
	Vee	(Ta)	Dunligate	e Sample ID				
Duplicate Sample?	Yes		Duplicate	s Sample is				
Additional Notes:	1							
- site access - hidden well location								3
- safety concerns								
- unusual well behaviour								
Contraction of the								



Field Sampling Sheet - Gro	oundwater							
Site/Facility Name:	Gracen		rms	Client:			ar Farms	
Well ID:	MW3			Project Nur			3113.010	.003
Date:		oer 🖡,	2017	Sampled b			Manna	
Casing Diameter:	Z"			Weather:	4.0			
Well Stick-up:				Remarks:				6
Condition of well:	good	needs a	attention					
		1000		$\leq$				
				Is the well	marked/flag	iged? Ye	es) No	
DTB:	9,655	m		Pressure:	-			
DTW:	7.000	m	negative	positive	none	UTM Coord	dinates:	
Difference:	2.655	m	15cm (6") ca	sing volume =	= 18L/m	Easting (6		
X Casing volume (L/m)	2	L/m	10cm (4") ca	sing volume =	= 8L/m	0337		
Volume of water in well:	5.3	L/m	5cm (2") cas	ing volume =	2L/m 🖍	Northing (7		
(x 3 (for sampling) x	5 (for develop	oing)					1647	
Volume of water to purge:	15.93	L				Zone:    (	J	
Volume actually purged:	716.0	L		mersil	ok			
		$\langle \rangle$						
Purge method:	Bailer Yes	(Pump (No)	Waterra	None	Other:			
Purged to dry: Purge water disposal:	Ground	Container			Was sheen	observed d	luring purging	or sampling?
r digo nator dispession	$\mathcal{O}$				Yes	No		
Field Parameters	1		Cond.		<b>DO</b> (	Turbidite	DTW (m btoc)	Comments
Time Volume (L)		Temp °C	(µS/cm)	ORP (mv)	DO (mg/L)	Turbidity		Commenta
1st 14:30	7.17	9.3	1400	- 2	1.01	3.40		
2nd 14:35	717	9.3	1400	7	0.96	4.06		
3rd 14:40	7.17	9.4	1400	H	0.98	4.00		
4th 14:45	7.17	9.3	1400	16	6.99	2.31		
	7,17	07	1400	10	0.98	1.37		
5th 14:50				17		A 14		
6th 14:55	7.17	9.3	400		0.98			
7th 15:00	7.17	9.3	1400	17	0.98	0.21		
8th						1		
write additional lines on the back								
Sample Descriptions:	per <b>4</b> , 2	2017		10	.00			
Sample date.			_Sample time		,00	our: Clea	ar	
Appearance:C	lear	- 1 NT-++	i.anta		_Sample Cold			
Order of bottles collected:	-		rients					
List any Parameters not San		· · · ·	<u> </u>				1	
Were Samples Filtered and	Preserved?	Yes No	/					
Duplicate Sample?	Yes	NO	Duplicate	Sample ID	):			
Additional Notes:								
- site access								
- hidden well location - safety concerns								
- unusual well behaviour								
Associated Environmen	ntal							

Field Sampling Sheet - C				1				
Site/Facility Name:	Gracer	nar Fai	rms	Client:			ar Farms	
Well ID:	MW			Project Nu			8113.010	.003
Date:		ber N,	2017	Sampled b		Jesse	Manna	
Casing Diameter:	Z"			Weather:	4°C			
Well Stick-up:				Remarks:			11 (00)	only has
Condition of well:	good	needs	attention	71	equir	es me	1 cap	. Only has
1				\$	plng		/	
				Is the well	marked/flag	ged? Y	es No	
DTB:		m		Pressure:				
DTW:	7.050	m	negative	positive	none	UTM Coord	dinates:	
Difference:	10.50	m	15cm (6") ca	sing volume =	= 18L/m	Easting (6		
X Casing volume (L/m)	2.0	L/m		sing volume =			7870	
Volume of water in well:	21.0	L/m	5cm (2") casi	ing volume =	2L/m 🖍	Northing (7		
(x) (for sampling)	x 5 (for develop	oing)	_				1958	
Volume of water to purge:	63	L				Zone:	0	
Volume actually purged;	763	L	Subu	ersib	he			
Denne and the state	D-8	Fump	>U.Sv~	None	Other:			
Purge method: Purged to dry:	Bailer Yes		vvaterra	None	Other.			
Purge water disposal:	Ground	Container			Was sheen	observed d	luring purging	or sampling?
	$\bigcirc$				Yes	No		
Field Parameters			Cond.	ORP (mv)		Turbidity	DTW (m btoc)	Comments
Time Volume (		Temp °C	(µS/cm)		DO (mg/L)			
1st 13:28	7.50	8.9	1230	121	0,56	4.98		
2nd 13:35	1.51	8.9	1240	121	0,59	5.15		
3rd 13:40	7.51	9.0	1240	122	0.57	6.04		
4th 13:45	7.51	9.0	17.40	122	0.56	8.29		
5th 12:50	7.51	9.0	17.30	122	0.54	9.47		
6th 13;55	7,51	8.9	1250	123	0.50	8.76		
				123				
7th 14:00	7.51	8.9	1240	145	0.52	5,79		
8th								
write additional lines on the ba Sample Descriptions:	ick							
Nover	nber 18, 2	2017	Sample time	14:0	90			
Sample date.	Par	_	- Jampie unie			ur: Clea	(	
		al. Nut	rients		_ Jampie Colo	JEA		
Order of bottles collected: List any Parameters not S								
		$\sim$						
Were Samples Filtered an	a Preservea (	Yes No						
Duplicate Sample?	Yes	No	Duplicate	Sample ID	:			
Additional Notes:								
- site access - hidden well location								
- safety concerns								
- unusual well behaviour								
						_		
Associate	ed							
Environm								

Site/Facility Name:	Groundwater Gracen	nar Fai	rms	Client:		Gracem	ar Farms	
Vell ID:		4334		Project Nu	mber:	2016-	8113.010.0	003
Date:		per 118,	2017	Sampled b			Manna	
Casing Diameter:	6"			Weather:	YºC			
Vell Stick-up:				Remarks:	A 1		10.	I he a
Condition of well:	good	needs a	attention		runge	i we	1 101	held a dos
					10	,   7	5. Sec	I hr @ ield notes
				Is the well	marked/flag	ged? Y	es No	
DTB:	12.345	m		Pressure:				
DTW:	1.460		negative	positive	none	UTM Coor	dinates:	
Difference:	10.885	m	15cm (6") ca	ising volume =	= 18L/m 🗸	Easting (6		
X Casing volume (L/m)		L/m		ising volume =			7869	
Volume of water in well:		L/m	5cm (2") cas	ing volume =	2L/m	Northing (7	4957	
x 3 (for sampling)	x 5 (for develop	oing)	-			2.2.1	1126	
Volume of water to purge:	548	L	-				0	
Volume actually purged:	>588	L	Sub	merso	ble p	mp		14
Purge method:	Bailer	Pump	Waterra	None	Other:	1		
Purged to dry:	Yes	No						
Purge water disposal:	Ground	Container			Was sheen Yes	observed o	luring purging or	sampling?
Field Parameters					165			
Time Volume	(L) pH	Temp °C	Cond. (uS/cm)	ORP (mv)	DO (mg/L)	Turbidity	DTW (m btoc)	Comments
1st \  ;[7	7.25	9.1	1090	129	0.53	8.14		
2nd 11:25	7,75	9.4	1100	131	0.44	722		
	7.25	9.4	1100	130	0.42	6,00		+
11 30			1100		1.000			
4th 11:35	7,76	1 ( 1	110	1.10	0.42	3.94		
5th 11:40	7.76	9,4	1090	130	0,40	0 11	*	
6th 11;45	7.76	9.4	1090	13/	0,39	3,60		.4
7th						x 2		44
8th								
write additional lines on the t Sample Descriptions:	ack						-	
Nove	mber 📕, 2	2017	Sample time	11:4	15			
	lear		- Sample time		Sample Colo	ur che	ar	
Appearance:	Genera	al. Nut	rients		oumple colo		- 100	
List any Parameters not	-						1	
Were Samples Filtered a							all started	
	le rescreet						- 2	
were Samples Fillered a		No	Duplicate	Sample ID	: MW	Ч		1 1 1
Duplicate Sample?	'Yes						1.124	
Duplicate Sample?	(Yes/							
Duplicate Sample? Additional Notes:	'*es/							
Duplicate Sample?	"tes							
Duplicate Sample? Additional Notes: - site access - hidden well location - safety concerns	'(es/							
Duplicate Sample? Additional Notes: - site access - hidden well location	'tes/							
Duplicate Sample? Additional Notes: - site access - hidden well location - safety concerns	'tes/							
Duplicate Sample? Additional Notes: - site access - hidden well location - safety concerns	'tes/							
Duplicate Sample? Additional Notes: - site access - hidden well location - safety concerns	'tes/		e.					
Duplicate Sample? Additional Notes: - site access - hidden well location - safety concerns - unusual well behaviour								
Duplicate Sample? Additional Notes: - site access - hidden well location - safety concerns	ted		U.					

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asing Diameter: $\chi$ Weather: $\Psi \bullet C$ rell Stick-up:good needs attentionRemarks:pondition of well:good needs attentionIs the well marked/flagged?YesTW: $\chi$ $\chi_{good}$ TW: $\chi$ $\chi_{good}$ TW: $\chi$ $\chi_{good}$ Twi: $\chi$ $\chi_{good}$ The interval of the second sec	Site/F	acility Nar	me:		nar Far		Client:			nar Farms		
ate:       November 14, 2017       Sampled by:       Jesse Manna         asing Diameter:       Z.       Weather:       4°C         eil Stick-up:       Remarks:       Remarks:         ondition of well:       9503       needs attention         Is the well marked/flagged?       (*es)       No         TB:       5.7.220 m       negative       positive       none         TW:       7.3.80 m       negative       positive       none         TW:       7.3.80 m       negative       positive       none         Casing oulume (J/m)       Z       L/m       100m (4) casing volume = 18L/m       Easting (6 digits)         Casing volume of water to purge:       JT.0.4 L       Som (2) casing volume = 2L/m       Northing (7 digits)         varge method:       Bailer       Gump       Vatera       None       Other:         arge to dry:       Yes       Gond.       (bits)       Container       Wase sheen observed during purging or sampling?         ves       No       Trop 11.1.1       1260       16       1.47.3       7.3.54         ind       J0:3.7       7.7.7.1       11.4       1260       1.0.7       1.0.74         ind       I0:45       7.7.2.11.9 <td< td=""><td>Well I</td><td>D:</td><td></td><td>MW</td><td>2</td><td></td><td>Project Nu</td><td>mber:</td><td></td><td></td><td>.003</td></td<>	Well I	D:		MW	2		Project Nu	mber:			.003	
ell Stick-up:       Remarks:         andition of well:       goods       needs attention         Is the well marked/flagged?       Yes       No         TB:       5,7220 m       regative positive none       UTM Coordinates:         TW:       2,320 m       negative positive none       UTM Coordinates:         Casing volume (L/m)       Z       L/m       15cm (°) casing volume = 18L/m       Easting (6 digits)         Casing volume of water in well:       5,621 L/m       Scm (2') casing volume = 18L/m       Easting (6 digits)         Casing volume of water in well:       5,621 L/m       Scm (2') casing volume = 2L/m       Morthing (7 digits)         (x 3 (for sampling) x 5 (for developing)       scm (2') casing volume = 2L/m       Scm (2') casing volume = 2L/m       Northing (7 digits)         starge method:       yes       Yes       None       Other:       Scm (2') casing volume = 2L/m         yrge water disposal:       Forulat       Container       Waterra       None       Other:       Scm (2') casing volume = 2L/m         string water disposal:       Forulat       Tem pro (       Good       None       Other:       Scm (2') casing volume = 18L/m         string water disposal:       Forulat       Tem pro (       Good       None       Other:       Yes <t< td=""><td>Date:</td><td></td><td></td><td>Novem</td><td>ber   ,</td><td>2017</td><td>Sampled b</td><td></td><td>Jesse</td><td>Manna</td><td></td></t<>	Date:			Novem	ber   ,	2017	Sampled b		Jesse	Manna		
Is the well marked/flagged? (vest No         Is the well marked/flagged? (vest No         TB:       STATEO In negative positive none         TW:       Z. (%) In negative positive none         Colspan="2">The colspan="2">UTM Coordinates:         Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2"         The well marked/flagged? (vest None         Colspan="2"         Colspan="2"         Colspan="2"         Colspan="2"         Value of water to purge:       17:0 H         Colspan="2"       Vester None       Other:         varget do dry:       Value of water disponal         Origin Container       Was sheen observed during purging or sampling?         ves       No <th c<="" td=""><td>Casin</td><td>g Diamete</td><td>r:</td><td>21</td><td></td><td></td><td>Weather:</td><td>4.0</td><td></td><td></td><td></td></th>	<td>Casin</td> <td>g Diamete</td> <td>r:</td> <td>21</td> <td></td> <td></td> <td>Weather:</td> <td>4.0</td> <td></td> <td></td> <td></td>	Casin	g Diamete	r:	21			Weather:	4.0			
State       Good       needs attention         Is the well marked/flagged?       Yes)       No         TB:       \$7.320 m       ressure:       UTM Coordinates:         TW:       7.380 m       negative positive none       UTM Coordinates:         Casing volume (Um)       Z       Um       15cm (6') casing volume = 18Um       Easting (6 digits)         Casing volume (Um)       Z       Um       10cm (4') casing volume = 8Um       Oradits (1 - 2)         plume of water in welt:       5.672 Um       15cm (2') casing volume = 2Um       Oradits (1 - 2)         plume of water to purge:       17.04 L       Scm (2') casing volume = 2Um       Northing (7 digits)         plume actually purged:       11.04 L       Per isfa (1 + 2)       Cone: 11 U         prege water disposal:       Ground       Container       Wase sheen observed during purging or sampling?         reg do tory:       Yes       No       Northing (7 digits)       Conmentation         stat (D: 37       7.72       11.1       17.69       Watera       No       Off (1 - 2)         red for a dotter       Yes       No       No       Off (1 - 2)       Yes       No         stat (D: 37       7.72       11.7       17.69       1.07       1.72       1	Well S	Stick-up:					Remarks:					
Is the well marked/flagged? (vs) No         Pressure:         Pressure:         Distribution of the second state of the second s			l:	good	needs a	attention						
TB:       S.TZO m       Pressure: negative positive none       UTM Coordinates:         TW:       7.380 m       negative positive none       UTM Coordinates:         Casing volume(L/m)       Z       L/m       15cm (6°) casing volume = 18L/m       Easting (6 digits)         Casing volume (L/m)       Z       L/m       10cm (4°) casing volume = 8L/m       Easting (6 digits)         Outure of water in well:       S. LS // L/m       Scm (2°) casing volume = 8L/m       Northing (7 digits)         Som (2°) casing volume = 2L/m       Scm (2°) casing volume = 2L/m       Northing (7 digits)         Som (2°) casing volume = 18L/m       Scm (2°) casing volume = 2L/m       Northing (7 digits)         Som (2°) casing volume = 2L/m       Scm (2°) casing volume = 2L/m       Northing (7 digits)         Som (2°) casing volume = 18L/m       Scm (2°) casing volume = 2L/m       Northing (7 digits)         Som (2°) casing volume = 18L/m       Scm (2°) casing volume = 2L/m       Northing (7 digits)         Som (2°) casing volume = 18L/m       Scm (2°) casing volume = 18L/m       Northing (7 digits)         Som (2°) casing volume = 19L/m       Waterra       None       Other:         urge water disposal:       Ground Container       Waterra       None       Otm (m/u)         Time Volume (L)       pH       Temp °C       Cond										<u> </u>		
TW:       7.380 m       negative positive none       UTM Coordinates:         ifference:       Z.670 m       15cm (6') casing volume = 18L/m       Easting (6 digits)         Casing volume (L/m)       Z       L/m       10cm (4') casing volume = 8L/m       O.3.38 1.74         Nume of water in well:       S.69 L/m       10cm (4') casing volume = 8L/m       Som (2') casing volume = 8L/m       Northing (7 digits)         stampling) x.5 (for developing)       sto (for developing)       Som (2') casing volume = 2L/m       Northing (7 digits)         stample diver to purge:       17.04 L       Easting (6 digits)       Som (2') casing volume = 2L/m         viget of dry:       Yes       Som (2') casing volume = 0 were a volume = 2L/m       Northing (7 digits)         runge water disposal:       Soround       Container       Waterra       None       Other:         urge water disposal:       Soround       Container       Waterra       None       Other:         stat (D:37       7.27       11.1       1260       1.43       7.38       Ommen         tat (D:37       7.27       11.7       1250       1.07       1.97       2.06         rd       10:50       7.27       11.9       1250       1.07       1.97       2.06         th							Is the well	marked/flag	gged? (Y	es) No		
fifterence:       Z. $g/g/v$ n       15cm (6°) casing volume = 18L/m       Easting (6 digits)         Casing volume (L/m)       Z       L/m       10cm (4°) casing volume = 8L/m       Easting (6 digits)         Jume of water in well:       S $g/g/l       L/m       Scm (2°) casing volume = 8L/m       Easting (6 digits)         (x 3 (for sampling)       x 5 (for developing)       Dume of water to purge:       ) 7.0 4 L       Northing (7 digits)         Jume actually purged:       ) 17.0 4 L       Waterra       None       Other:       Scm (2°) casing volume = 8L/m       Northing (7 digits)         urge water disposal:       Ground       Container       Waterra       None       Other:       Scm (2°) casing volume = 70 mpc         urge water disposal:       Ground       Container       Was sheen observed during purging or sampling?       Yes       No         eld Parameters       Yes       No       Off (1, 1/2, 1/2, 1/2, 1/2, 1/2, 1/2, 1/2, 1/$	DTB:			8.220	m		Pressure:					
Casing volume (L/m) $2$ $L/m$ bolume of water in well: $5 . 6.4$ $L/m$ (x3 (for sampling) x5 (for developing) bolume of water to purge: $17.04$ L bolume actually purged: $17.04$ L constant of water to purge: $17.04$ L bolume actually purged: $17.04$ L bolume actually purged: $17.04$ L constant of water to purge: $17.04$ L bolume actually purged: $17.04$ L bolume actually purged: $17.04$ L constant of water to purge: $17.04$ L constant of water to purged: $11.11$ L constant of water to purged: $11.12$ V constant of water to purged: $11.12$ V constant of water to purged: $11.04$ C constant of water to purged:	DTW:			2.380	m	negative	positive	none	UTM Coor	dinates:		
Classing volume = 2L/m       Classing volume = 2L/m       Classing volume = 2L/m         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         Som (2') casing volume = 2L/m       Northing (7 digits)         urge water disposal       Ground Container         Was sheen observed during purging or sampling?       Yes         eld Parameters       7.27         II. 1       IZ&O	Differe	ence:		2,840	m	15cm (6") ca	sing volume :	= 18L/m				
(x3 (for sampling)       x 5 (for developing)         Durne of water to purge:       17.04 L         Durne actually purged:       >17.04 L         Durne actually purged:       Yes         Station:       Station:         PH       Temp 'C         Cond.       ORP (mv)       D0 (mg/L)       Turbidity         DTW (m btoc)       Conmention         Ist       10:50       7.27       11.7         If 250       7.27       17.50	X Casi	ng volume	(L/m)	Z	L/m					50		
Jolume of water to purge:       17.04 L         Jolume actually purged:       17.04 L         Jurge method:       Bailer         Jurge method:       State of the purge         Jurge method:       Bailer         Jurge method:       Ground         Jurge method:       Bailer         Jurge method:       Bailer         Jurge method:       Peristation         Jurge method:       Mailer         Jurge method:       Peristation	√olum	e of water in	n well:	5.68	L/m	5cm (2") casi	ing volume =	2L/m 🗸				
Dume actually purged:       None of the colspan="2">Peristattic         urge method:       Bailer       Pump Waterra       None Other:         urge water disposal:       Ground:       Cond.       ORP (mv) DO (mg/L)       Turbidity DTW (m btoc)       Comment         Image water disposal:       Ground:       Cond. (us/cm)       DO (mg/L)       Turbidity DTW (m btoc)       Comment         Image water disposal:       Ground:       Cond. (us/cm)       DO (mg/L)       Turbidity DTW (m btoc)       Comment         Image water disposal:       Ground:       Cond. (us/cm)       DO (mg/L)       Turbidity DTW (m btoc)       Comment         Image water disposal:       Ground:       Cond.       (NPP (mv) DO (mg/L)       Turbidity DTW (m btoc)       Comment         Image disposal:       7       7       Cond.       (NPP (mv) DO (mg/L)       Turbidity DTW (m btoc)       Comment         Image disposal:       7       7		(x 3 (for sa	ampling) x	5 (for develop	oing)				and the second se			
Urge method:       Bailer       Pump       Waterra       None       Other:       Start President Pres	√olum	e of water t	o purge:	17.04	L				Zone: 11(	1		
urge method:       Bailer       Gund       Waterra       None       Other:       Other:         urge water disposal:       Ground       Container       Was sheen observed during purging or sampling?         eld Parameters       Time       Volume (L)       pH       Temp °C       Cond.       Was sheen observed during purging or sampling?         eld Parameters       Time       Volume (L)       pH       Temp °C       Cond.       ORP (mv)       DO (mg/L)       Turbidity       DTW (m btoc)       Comment         ist       10:37       7.27       11.1       1260       16       1.47       7.38       Comment         ind       10:45       7.27       11.8       1250       6       1.07       1.42       -         ind       10:56       7.27       11.9       1250       15       1.07       2.08       -         sth       10:56       7.27       11.9       1260       14       0.74       -       -         sth       11:0       7.27       11.9       1260       1.07       1.74       -         isth       11:0       7.27       11.9       1260       1.07       5.08       -       -         inte additional lines on the	√olum	e actually p	urged:	>17.04	L	0. 1.	1.11.	c				
urged to dry:       Yes       No         urge water disposal:       Found       Container       Was sheen observed during purging or sampling? Yes         eld Parameters       Time       Volume (L)       pH       Temp °C       Cond. (uSicm)       ORP (mv)       DO (mg/L)       Turbidity       DTW (m btoc)       Comment Comment         ist       10:37       7.72       11.1       17.60       1.43       7.38       Image: Cond.       Comment         ist       10:50       7.72       11.7       1258       1.6       1.12       4.52       Image: Cond.       Comment         ist       10:50       7.72       11.9       17.50       1.07       1.92       Image: Cond.       Cond.       Comment         ist       10:50       7.72       11.9       17.50       1.07       1.92       Image: Cond.       Cond.       Cond.       Comment         isth       10:50       7.72       11.9       17.50       1.07       1.92       Image: Cond.					$\mathcal{O}$							
urge water disposal:       Ground Container       Was sheen observed during purging or sampling?         Ves       No         Time Volume (L)       pH       Temp °C       Cond. (µS/cm)       ORP (mv)       DO (mg/L)       Turbidity       DTW (m btoc)       Comment Yes       No         Image Volume (L)       pH       Temp °C       Cond. (µS/cm)       ORP (mv)       DO (mg/L)       Turbidity       DTW (m btoc)       Comment ist 10:37       7.27       11.1       12.56       16       1.1.7       1.258       1.6       1.07       Ves       No         of 10:50       7.27       11.9       12.56       1.07       1.07       Sample 1.07       Sample 1.07       Sample 1.07       Colspan= 1.0       Value         III.9       12.56       II       0         III.9       IZE <th colspan<="" td=""><td>-</td><td></td><td></td><td></td><td>1 Chan</td><td>Waterra</td><td>None</td><td>Other:</td><td></td><td></td><td>\$</td></th>	<td>-</td> <td></td> <td></td> <td></td> <td>1 Chan</td> <td>Waterra</td> <td>None</td> <td>Other:</td> <td></td> <td></td> <td>\$</td>	-				1 Chan	Waterra	None	Other:			\$
Yes (No)         Yes (No)         Time Volume (L) $pH$ Temp °C (Cond. (µS(cm)) $ORP (mv)$ $DO (mg/L)$ )       Turbidity $DTW (m btoc)$ Comment         Ist $[0:37]$ 7.27       II.1       IZG $[16]$ 1.43       7.38         Ind $[0:45]$ 7.27       II.7       IZG $[16]$ I.1.7       IZG $[16]$ I.1.7       IZG $[16]$ I.1.7       IZG $[16]$ I.1.7       IZG $[16]$ I.1.9       IZG $[16]$ II.9       IZG $[16]$ II.9       III.9       IZG $[16]$ <th< td=""><td></td><td></td><td>noeal:</td><td></td><td></td><td></td><td></td><td>Was sheer</td><td colspan="4">observed during purging or sampling?</td></th<>			noeal:					Was sheer	observed during purging or sampling?			
Time         Volume (L)         pH         Temp °C         Cond. (µS/cm)         ORP (mv)         DO (mg/L)         Turbidity         DTW (m btoc)         Comment Comment (µS/cm)           ist         /0:37         7.27         II.1         IZ60         I%         1.43         7.3%         Image: Comment (µS/cm)         1.12         4.5Z         Image: Comment (µS/cm)         1.12         4.5Z         Image: Comment (µS/cm)         Image: Comment (µS/cm)<	uige	water uisp	J03al.	Ciduna	Container					- Sellah		
Time       Volume (L)       pH       Temp *C       (µS/cm)       ORP (m)       DO (mg/c)       Turbuly       Div (m d.d.)       Columnation         Ist       [0:37       7.27       II.1       IZ60       IS       1.43       7.38       Image: State (L)       1.43       7.38         Ind       [0:45       7.27       II.7       IZ60       IS       1.43       7.38       Image: State (L)       1.43       7.38       Image: State (L)       1.45       7.38       Image: State (L)       1.45       7.38       Image: State (L)       1.45       7.38       Image: State (L)       1.43       7.38       Image: State (L)       1.45       7.38       Image: State (L)       1.45       7.38       Image: State (L)       1.45       1.45       Image: State (L)       1.45       1.45<	Field F	arameters			F	Cond				r I		
10:45       7.27       11.7       1258       16       1.12       4.52         and       10:50       7.27       11.8       1250       6       1.07       .42         ath       10:55       7.27       11.9       1250       16       1.07       .42         ath       10:55       7.27       11.9       1250       15       1.07       .42         ath       10:55       7.27       11.9       1250       15       1.07       2.08         ath       11.9       12.50       14       0.95       1.74			Volume (L)	рН	Temp °C					DTW (m btoc)	Comment	
ID:50       7.22       II.8       I250       I.07       I92         Ith       ID:55       7.27       II.9       I250       I5       I.07       I92         Sth       II.90       7.22       II.9       I250       I4       O.95       I.74         Sth       II.90       7.22       II.9       I260       I4       O.95       I.74         Sth       II.90       Sample time:       II.90       II.90       II.90       II.90         Sth       II.90       Sample time:       II.90       II.90       II.90       II.90         appearance:       November I4, 2017       Sample time:       II.90       Sample Colour:       Clear         opearance:       General, Nutrients       Sample Colour:       Clear       II.90         ist any Parameters not Sampled/bottles missed:       III.90       III.90       III.90 <td>1st</td> <td>10:37</td> <td></td> <td>7.27</td> <td></td> <td>1260</td> <td>18</td> <td>1.43</td> <td>7.38</td> <td></td> <td>1. 18 MS</td>	1st	10:37		7.27		1260	18	1.43	7.38		1. 18 MS	
ID:50       7.22       II.8       I250       6       I.07       I.42         Ith       ID:55       7.27       II.9       I250       I5       I.07       I.42         Sth       II.90       7.22       II.9       I250       I4       O.45       I.74         Sth       II.90       7.22       II.9       I260       I4       O.45       I.74         Sth       II.90       7.22       II.9       I260       I4       O.45       I.74         Sth       II.90       7.22       II.9       I260       I4       O.45       I.74         Sth       II.90       Stripped in the state of the state o	2nd	10:45		7.22	11.7	1258	16	1.12	4.52			
In       In <th< td=""><td></td><td>*</td><td></td><td>777</td><td>118</td><td></td><td></td><td>107</td><td>1.47</td><td></td><td>*</td></th<>		*		777	118			107	1.47		*	
ith     I/100     I/27     I/9     I260     I4     O A5     I,24       ith     Image: I				1				1 1	7	1		
ith     ith     ith       ith     ith       ith     ith       ite additional lines on the back       ample Descriptions:       ample date:     November       November     2017       Sample time:     11:05       opearance: <u>Alean</u> Sample colour: <u>Clean</u> ist any Parameters not Sampled/bottles missed:		1		1 - Land				1 1		<u>                                      </u>		
Image: State of bottles collected:     Image: State of bottles collected:	-	11:00		1.66	<u> </u>	11.50		10MJ	1107	<u> </u>  -		
Bith     Image: State of the st										<u> </u>		
rite additional lines on the back ample Descriptions: ample date: November 19, 2017 Sample time: 11:05 Sample Colour: Clear rder of bottles collected: General, Nutrients ist any Parameters not Sampled/bottles missed:	7th							•				
ample Descriptions:         ample date:       November 14, 2017         ample date:	8th											
ample date: November , 2017 Sample time: // 'OS opearance:				C								
ample date.				per ld :	2017 -		11:0	) <				
rder of bottles collected: General, Nutrients	•					Sample time			11	inv		
ist any Parameters not Sampled/bottles missed:	••					mi or to -		_Sample Cold	our: Olt	1		
						.rrents						
					$\sim$							
						D!!1	Comple ID	<b>.</b> .				
	Dupli	cate Sam	ple?	Yes	NO	Duplicate	Sample ID					
uplicate Sample? Yes No Duplicate Sample ID:	Additi	onal Note:	s:							2		
	- site a	access										
dditional Notes: site access			ION									
dditional Notes: site access hidden well location			aviour									
dditional Notes: site access											3	
dditional Notes: site access hidden well location safety concerns												
dditional Notes: site access hidden well location safety concerns unusual well behaviour												
dditional Notes: site access hidden well location safety concerns					8.						٠	

Site/F	acility Nar	ne:	Grace	mar Fai		Client:			nar Farms		
Well I	D:			15 SW	anp	Project Nu	mber:		8113.010.	.003	
Date:				ber 14,	2017	Sampled b		Jesse	Manna		
Casin	g Diameter	r:	NA			Weather:					
Well S	Stick-up:		NA			Remarks:	Nearly	froz	en over	•	
Condi	ition of well	12	good	needs	attention		•				
						Is the well	marked/flag	gged? Y	es No		
DTB:				m		Pressure:					
DTW:				m	negative	positive	none	dinates:			
Differ	ence:			m	15cm (6") ca	sing volume =	= 18L/m	Easting (6	digits)		
X Cas	ing volume	(L/m)		L/m	10cm (4") ca	sing volume =	= 8L/m				
	e of water in			L/m	1	ing volume =		Northing (	7 digits)		
	x 3 (for sa		5 (for develo	ping)							
Volum	e of water to			L				Zone:			
Volum	ne actually p	urged:		L	]	face wa	ter sa	mphe			
					Sur	take wa		,			
	e method:		Bailer	Pump	Waterra	None	Other:				
-	ed to dry:		Yes	No			Was abor-	observed	luring pursies a	or compling?	
Purge	e water disp	iosal:	Ground	Container			Yes	n observed during purging or sampling?			
Field F	Parameters			-	0	r	·		r		
	Time	Volume (L)	pН	Temp °C	Cond. (µS/cm)	ORP (mv)	DO (mg/L)	Turbidity	DTW (m btoc)	Comments	
1st	6:45		1.81	1.3	1040	202	7.28	4.49			
2nd	0 1		6.01		1 for s						
3rd						0					
4th											
5th											
6th											
7th											
8th											
write a	dditional line	s on the back		1					LL		
Samp	ple Descrij	ptions:	141			<i>d</i> . <i>–</i>	- 1				
Sample	e date:	Novemb		2017	_Sample time	8.5	6	/	<b>_</b> ?		
Appea	rance:	chear					Sample Cold	our: Che	ar		
Order	of bottles col	lected:	Gener	al, Nut	rients						
List a	ny Parame	ters not Sam	pled/bottle	s missed:							
Were	Samples F	iltered and P	vreserved?	Yes No	$\overline{)}$						
Dupli	icate Sam	ple?	Yes	(No)	Duplicate	Sample ID					
	ional Notes										
المام ا	Ional Notes access										
		on								9	
- site : - hidd	en well locati										
- site - hidd - safe	ty concerns	aviour									
- site - hidd - safe		aviour									
- site - hidd - safe	ty concerns	aviour									

		Sheet - Gro	oundwater							
	acility Nan	ne:		nar Fai		Client:			nar Farms	
Well I	D:		Mr. Kr			Project Nu			8113.010	.003
Date:			Novem	ber 15	2017	Sampled b	ру:	Jesse	Manna	
	g Diameter			/		Weather:			a	
	Stick-up:					Remarks:	eated	9W F	rom gar	der hose.
Condi	tion of well	:	good	needs	attention				1	
*						Is the well	marked/flag	ged? Y	es No	Terr
DTB:				m		Pressure:				
DTW:			/	m	negative	positive	none	UTM Coor	dinates:	
Differ	ence:			m	15cm (6") ca	ising volume :	= 18L/m	Easting (6	digits)	
X Cas	ing volume (	(L/m)		L/m	10cm (4") ca	sing volume	= 8L/m			
Volum	e of water ir	20-20G		L/m	5cm (2") cas	ing volume =	2L/m	Northing (	7 digits)	
	x 3 (for sa		5 (for develo	oing)	-					
	e of water to			L				Zone:		
Volum	e actually p	urged:		L	_ <	ampled	From	gode.	n hose	
l°.	un ath - di		Doilor	Dumo	Waterra	None	Other:)	5-7-0		
-	method: d to dry:		Bailer Yes		vvateria	NULLE	Uner.)			
-	water disp	osal:	Ground	Container					during purging	or sampling?
Field	Parameters		$\bigcirc$				Yes	No		
neiu I	-arameters Time	Volume (L)	рН	Temp °C	Cond. (µS/cm)	ORP (mv)	DO (mg/L)	Turbidity	DTW (m btoc)	Comments
1st	15:00		7.61	8.5	105U	-37	1,69	43.4	-	
2nd	15:05		7.56	8.7	1070	- 3/	1.98	61.1	Need	ed to
	_			8.7	1070	- 27	1.94	55.8		rf-zeroed
3rd	15.10		7.56						PI	IT- CUICC
4th	15:15		7.52	8.7	1060	- 2.4	1.84	790	1	
5th	15:20		7.49	8.7 20	1070	-70	1.79	29.5	ļ	
6th	15:25		7.46	8.8	1040	-18	1.78	6.69		
7th	15:30		7.52	8.8	1040	-14	1.78	6.34		
8th							<u>^</u>			
	dditional line	s on the back otions:	15							
	e date:	Novemb	52.17	2017	Sample time	: 15	30			
•	irance:	×					Sample Col	our		
	of bottles col		Genera	al, Nut	trients		-			
			npled/bottle							
	•		Preserved?	2	)					
vvere	Jampies F		16361VEU f							
Dupl	icate Sam	ple?	Yes	(No)	Duplicate	Sample ID	):			
1°	ional Notes access	S:								
- hido	len well locat	ion								
	ety concerns sual well beh	aviour								
					1					
						-				
					10					
		Associated								



April 27, 2018 Brady Nelless BC Ministry of Environment

ATTACHMENT 4: LABORATORY REPORTS - NOVEMBER SAMPLING





## **CERTIFICATE OF ANALYSIS**

REPORTED TO	Associated Environmental Consultants Inc. (Vernon) #200 - 2800 29th Street Vernon, BC V1T 9P9		
ATTENTION	Nicole Penner	WORK ORDER	7111412
PO NUMBER PROJECT PROJECT INFO	2016-8113.010.000 - Water Gracemar Action 14	RECEIVED / TEMP REPORTED COC NUMBER	2017-11-15 14:00 /  4°C 2017-11-22 16:43 No Number

#### Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

We've Got Chemistry

#### Big Picture Sidekicks



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too. It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

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Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre the for technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at sgulenchyn@caro.ca

Authorized By:

Sara Gulenchyn, B.Sc, P.Chem. Client Service Manager

Sara Sulend

#### 1-888-311-8846 | www.caro.ca

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7

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Associated Environmental Consultants Inc. (Vernon) 2016-8113.010.000 - Water

WOR	K ORDER
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7111412 2017-11-22 16:43

|--|

### MW1 (7111412-01) | Matrix: Fresh Water | Sampled: 2017-11-14 16:10

Anions			
Chloride	36.0	0.10 mg/L	2017-11-18
Nitrate (as N)	8.70	0.010 mg/L	2017-11-18
Nitrite (as N)	< 0.010	0.010 mg/L	2017-11-18
General Parameters			
Ammonia, Total (as N)	< 0.020	0.020 mg/L	2017-11-20
Nitrogen, Total Kjeldahl	0.542	0.050 mg/L	2017-11-20
Phosphorus, Total (as P)	0.0512	0.0020 mg/L	2017-11-19
Calculated Parameters			
Nitrate+Nitrite (as N)	8.70	0.0100 mg/L	N/A
Nitrogen, Total	9.24	0.0500 mg/L	N/A
Nitrogen, Organic	0.542	0.0500 mg/L	N/A

### MW2 (7111412-02) | Matrix: Fresh Water | Sampled: 2017-11-14 11:05

Anions			
Chloride	45.0	0.10 mg/L	_ 2017-11-22
Nitrate (as N)	1.51	0.010 mg/L	_ 2017-11-18
Nitrite (as N)	< 0.010	0.010 mg/L	_ 2017-11-18
General Parameters			
Ammonia, Total (as N)	< 0.020	0.020 mg/L	2017-11-20
Nitrogen, Total Kjeldahl	0.445	0.050 mg/L	2017-11-20
Phosphorus, Total (as P)	0.0088	0.0020 mg/L	2017-11-19
Calculated Parameters			
Nitrate+Nitrite (as N)	1.51	0.0100 mg/L	N/A
Nitrogen, Total	1.96	0.0500 mg/L	. N/A
Nitrogen, Organic	0.445	0.0500 mg/L	- N/A

### MW3S (7111412-03) | Matrix: Fresh Water | Sampled: 2017-11-14 15:00

Anions			
Chloride	62.5	0.10 mg/L	2017-11-18
Nitrate (as N)	13.3	0.010 mg/L	2017-11-18
Nitrite (as N)	0.069	0.010 mg/L	2017-11-18
General Parameters			
Ammonia, Total (as N)	0.028	0.020 mg/L	2017-11-20
Nitrogen, Total Kjeldahl	0.553	0.050 mg/L	2017-11-20
Phosphorus, Total (as P)	0.0141	0.0020 mg/L	2017-11-19

**Calculated Parameters** 

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Associated Environmental Consultants Inc. (Vernon) 2016-8113.010.000 - Water

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7111412 2017-11-22 16:43

Analyte	Result	RL	Units	Analyzed	Qualifier
MW3S (7111412-03)   Ma	trix: Fresh Water   Sampled: 2017-11-14 15:00, Continued				

Calculated Parameters, Continued				
Nitrate+Nitrite (as N)	13.3	0.100 mg/L	N/A	
Nitrogen, Total	13.9	0.100 mg/L	N/A	
Nitrogen, Organic	0.525	0.0500 mg/L	N/A	
U		ŭ		

### MW3D (7111412-04) | Matrix: Fresh Water | Sampled: 2017-11-14 14:00

35.9	0.10 m	g/L 2017-11-18
0.140	0.010 m	g/L 2017-11-18
< 0.010	0.010 m	g/L 2017-11-18
0.227	0.020 m	g/L 2017-11-20
0.383	0.050 m	g/L 2017-11-20
0.0690	0.0020 m	g/L 2017-11-19
0.140	0.0100 m	g/L N/A
0.523	0.0500 m	g/L N/A
0.156	0.0500 m	g/L N/A
	0.140 < 0.010 0.227 0.383 0.0690 0.140 0.523	0.140         0.010 m           < 0.010

### WT94334 (7111412-05) | Matrix: Fresh Water | Sampled: 2017-11-14 11:45

Anions			
Chloride	24.8	0.10 m	ıg/L 2017-11-18
Nitrate (as N)	0.045	0.010 m	g/L 2017-11-18
Nitrite (as N)	< 0.010	0.010 m	g/L 2017-11-18
General Parameters			
Ammonia, Total (as N)	0.575	0.020 m	g/L 2017-11-20
Nitrogen, Total Kjeldahl	0.770	0.050 m	g/L 2017-11-20
Phosphorus, Total (as P)	0.0583	0.0020 m	g/L 2017-11-19
Calculated Parameters			
Nitrate+Nitrite (as N)	0.0452	0.0100 m	Ig/L N/A
Nitrogen, Total	0.815	0.0500 m	Ig/L N/A
Nitrogen, Organic	0.195	0.0500 m	ig/L N/A

### Floyd's Swamp (7111412-06) | Matrix: Water | Sampled: 2017-11-14 08:56

Anions			
Chloride	22.8	0.10 mg/L	2017-11-18
Nitrate (as N)	0.175	0.010 mg/L	2017-11-18
	Caring About Results, O	bviously.	Page 3 of 7

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Associated Environmental Consultants Inc. (Vernon)

WORK ORDER
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7111412 2017-11-22 16:43

JECT 2016-8113.010.000 - Water

Analyte	Result	RL U	Units	Analyzed	Qualifier								
loyd's Swamp (7111412-06)   Matrix: Water   Sampled: 2017-11-14 08:56, Continued													
Anions, Continued													
Nitrite (as N)	< 0.010	0.010 n	mg/L	2017-11-18									
General Parameters													
Ammonia, Total (as N)	2.10	0.020 n	mg/L	2017-11-20									
Nitrogen, Total Kjeldahl	3.86	0.050 n	ng/L	2017-11-20									
Phosphorus, Total (as P)	0.513	0.0020 n	ng/L	2017-11-19									
Calculated Parameters													
Nitrate+Nitrite (as N)	0.175	0.0100 n	mg/L	N/A									
Nitrogen, Total	4.03	0.500 n	ng/L	N/A									
Nitrogen, Organic	1.75	0.500 n	ng/L	N/A									

### MW4 (7111412-07) | Matrix: Fresh Water | Sampled: 2017-11-14 11:50

24.4	0.10	mg/L	2017-11-18
< 0.010	0.010	mg/L	2017-11-18
< 0.010	0.010	mg/L	2017-11-18
0.576	0.020	mg/L	2017-11-20
0.880	0.050	mg/L	2017-11-20
0.0613	0.0020	mg/L	2017-11-19
< 0.0100	0.0100	mg/L	N/A
0.880	0.0500	mg/L	N/A
0.304	0.0500	mg/L	N/A
	< 0.010 < 0.010 0.576 0.880 0.0613 < 0.0100 0.880	<0.010 0.010 <0.010 0.010 0.576 0.020 0.880 0.050 0.0613 0.0020 <0.0100 0.0100 0.880 0.0500	<ul> <li>&lt; 0.010</li> <li>&lt; 0.010 mg/L</li> <li>&lt; 0.010</li> <li></li> <li>&lt; 0.010</li> <li></li> <li>&lt; 0.020 mg/L</li> <li></li> <li>&lt; 0.0613</li> <li></li> <li>&lt; 0.0100 mg/L</li> <li></li> <li>&lt; 0.0100 mg/L</li> <li></li> <li>&lt; 0.0100 mg/L</li> <li></li> <li></li></ul> <li></li>

REPORTED TO PROJECT



# **APPENDIX 1: SUPPORTING INFORMATION**

# **REPORTED TO**Associated Environmental Consultants Inc. (Vernon)**PROJECT**2016-8113.010.000 - Water

 WORK ORDER
 7111412

 REPORTED
 2017-11

7111412 2017-11-22 16:43

Analysis Description	Method Ref.	Technique	Location
Ammonia, Total in Water	SM 4500-NH3 G* (2011)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2011)	Ion Chromatography	Kelowna
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2011)	Block Digestion and Flow Injection Analysis	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2011)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

#### **Glossary of Terms:**

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

#### **General Comments:**

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.



<b>REPORTED TO</b>	Associated Environmental Consultants Inc. (Vernon)	WORK ORDER	7111412
PROJECT	2016-8113.010.000 - Water	REPORTED	2017-11-22 16:43

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- Method Blank (Blk): A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- Duplicate (Dup): An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- Blank Spike (BS): A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- Matrix Spike (MS): A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B7K1329									
Blank (B7K1329-BLK1)			Prepared	I: 2017-11-1	7, Analyze	ed: 2017-1	1-17		
Chloride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Blank (B7K1329-BLK2)			Prepared	I: 2017-11-1	8, Analyze	ed: 2017-1	1-18		
Chloride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
LCS (B7K1329-BS1)			Prepared	I: 2017-11-1	7, Analyze	ed: 2017-1	1-17		
Chloride	15.9	0.10 mg/L	16.0		99	90-110			
Nitrate (as N)	4.11	0.010 mg/L	4.00		103	93-108			
Nitrite (as N)	1.84	0.010 mg/L	2.00		92	85-114			
LCS (B7K1329-BS2)			Prepared	I: 2017-11-1	8, Analyze	ed: 2017-1	1-18		
Chloride	15.9	0.10 mg/L	16.0		99	90-110			
Nitrate (as N)	4.27	0.010 mg/L	4.00		107	93-108			
Nitrite (as N)	1.87	0.010 mg/L	2.00		93	85-114			
Duplicate (B7K1329-DUP2)	Sou	rce: 7111412-07	Prepared	I: 2017-11-1	8, Analyze	ed: 2017-1	1-18		
Chloride	26.4	0.10 mg/L		24.4			8	10	
Nitrate (as N)	0.010	0.010 mg/L		< 0.010				10	
Nitrite (as N)	< 0.010	0.010 mg/L		< 0.010				6	
Matrix Spike (B7K1329-MS2)	Sou	rce: 7111412-07	Prepared	I: 2017-11-1	8, Analyze	ed: 2017-1	1-18		
Chloride	42.4	0.10 mg/L	16.0	24.4	112	75-125			
Nitrate (as N)	4.01	0.010 mg/L	4.00	< 0.010	100	75-125			
Nitrite (as N)	1.87	0.010 mg/L	2.00	< 0.010	93	80-120			
General Parameters, Batch B7K1389			Proparad	l: 2017-11-1		d. 2017 /	11 20		
Blank (B7K1389-BLK1)	< 0.050	0.050	Fiepaleu	. 2017-11-1	r, Analyze	u. 2017-	11-20		
Nitrogen, Total Kjeldahl	< 0.050	0.050 mg/L							
Blank (B7K1389-BLK2)			Prepared	I: 2017-11-1	7, Analyze	ed: 2017-1	1-20		

Nitrogen, Total Kjeldahl

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0.050 mg/L

< 0.050



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Analyte		Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifie
General Parameter	s, Batch B7K1389	), Continued								
LCS (B7K1389-BS	1)			Prepared	1: 2017-11-1	17, Analyze	d: 2017-1	1-20		
Nitrogen, Total Kjelda	ihl	1.14	0.050 mg/L	1.00		114	84-121			
LCS (B7K1389-BS	2)			Prepared	1: 2017-11-1	17, Analyze	d: 2017-1	1-20		
Nitrogen, Total Kjelda	hl	1.14	0.050 mg/L	1.00		114	84-121			
General Parameter	s, Batch B7K1413	}								
Blank (B7K1413-B	LK1)			Prepared	1: 2017-11-1	17, Analyze	d: 2017-1	1-19		
Phosphorus, Total (as	s P)	< 0.0020	0.0020 mg/L							
Blank (B7K1413-B	LK2)			Prepared	: 2017-11-1	17, Analyze	d: 2017-1	1-19		
Phosphorus, Total (as	s P)	< 0.0020	0.0020 mg/L							
LCS (B7K1413-BS	2)			Prepared	1: 2017-11-1	17, Analyze	d: 2017-1	1-19		
Phosphorus, Total (as	- D)	0.108	0.0020 mg/L	0.100		108	80-112			
Filosphorus, total (as	5 P)	0.100								
General Parameter										
	s, Batch B7K1452			Preparec	1: 2017-11-2	20, Analyze	d: 2017-1	1-20		
General Parameter	s, Batch B7K1452 LK1)		0.020 mg/L	Preparec	1: 2017-11-2	20, Analyze	d: 2017-1	1-20		
General Parameter Blank (B7K1452-B	s, Batch B7K1452 LK1)	2	0.020 mg/L	•	: 2017-11-2 : 2017-11-2					
General Parameter Blank (B7K1452-B Ammonia, Total (as N	us, Batch B7K1452 LK1) I) LK2)	2	0.020 mg/L 0.020 mg/L	•						
General Parameter Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B	s, Batch B7K1452 LK1) I) LK2)	< 0.020		Preparec	1: 2017-11-2	20, Analyze	d: 2017-1	1-20		
General Parameter Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N	s, Batch B7K1452 LK1) I) LK2) I) LK3)	< 0.020		Preparec		20, Analyze	d: 2017-1	1-20		
General Parameter Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B	s, Batch B7K1452 LK1) LK2) LK2) LK3)	< 0.020	0.020 mg/L	Preparec	: 2017-11-2 : 2017-11-2	20, Analyze 20, Analyze	d: 2017-1 d: 2017-1	1-20 1-20		
General Parameter Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N	s, Batch B7K1452 LK1) LK2) LK2) LK3) J)	< 0.020	0.020 mg/L	Preparec	1: 2017-11-2	20, Analyze 20, Analyze	d: 2017-1 d: 2017-1	1-20 1-20		
General Parameter Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N LCS (B7K1452-BS	s, Batch B7K1452 LK1) (J) (LK2) (J) LK3) (J) (J) (J)	<ul> <li>&lt; 0.020</li> <li>&lt; 0.020</li> <li>&lt; 0.020</li> </ul>	0.020 mg/L 0.020 mg/L	Preparec Preparec Preparec 1.00	: 2017-11-2 : 2017-11-2	20, Analyze 20, Analyze 20, Analyze 102	d: 2017-1 d: 2017-1 d: 2017-1 90-115	1-20 1-20 1-20		
General Parameter Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N LCS (B7K1452-BS Ammonia, Total (as N	s, Batch B7K1452 LK1) LK2) LK2) LK3) LK3) LK3) LK3) LK3) LK3) LK3)	<ul> <li>&lt; 0.020</li> <li>&lt; 0.020</li> <li>&lt; 0.020</li> </ul>	0.020 mg/L 0.020 mg/L	Preparec Preparec Preparec 1.00	: 2017-11-2 : 2017-11-2 : 2017-11-2	20, Analyze 20, Analyze 20, Analyze 102	d: 2017-1 d: 2017-1 d: 2017-1 90-115	1-20 1-20 1-20		
General Parameter Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N LCS (B7K1452-BS Ammonia, Total (as N LCS (B7K1452-BS	s, Batch B7K1452 LK1) I) LK2) I) LK3) I) I) I) I) 2) I)	<ul> <li>&lt; 0.020</li> <li>&lt; 0.020</li> <li>&lt; 0.020</li> <li>1.02</li> </ul>	0.020 mg/L 0.020 mg/L 0.020 mg/L	Prepared Prepared 1.00 Prepared 1.00	: 2017-11-2 : 2017-11-2 : 2017-11-2	20, Analyze 20, Analyze 20, Analyze 102 20, Analyze 103	d: 2017-1 d: 2017-1 d: 2017-1 90-115 d: 2017-1 90-115	1-20 1-20 1-20 1-20		

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CONTA	CT: Nicole Penner			CON	TACT:						her* ontact		Γο Co	nfirm.	Surc	harge	May A	nnlv										other* /		
TEL/FA	X: 250-545-3672			TEL/I	FAX:																			<u>- Г</u>	IL.	L				
DATA FO EMAIL 1: EMAIL 2: EMAIL 3:	PRMAT: EXCEL [] WATERTF EQuIS [] BC EMS [ pennern@ae.ca	RAX 🔲 ESda	at [] ER* []	EMAIL EMAIL EMAIL PO #	_ 2: <u>anzej@a</u> _ 3: : <u>2016-8</u>	n@ae.ca e.ca 113.010	)	erk bere	OTHER*	PHC F1					ΠG	Hg	다 면 :	Hd .						-N, TOTAL N			ISOPHORUS			
	ED BY: Jesse Manna		MATRI		SAMPLI	ng: Time	ORINATED	CON	(e.g. flow/volume media ID/notes)					PHENULS Chlorinated		ATEF	METALS - WATER DISSOLVED					TOTAL COLIFORMS	ASBESTOS	NITRATE-N, NITRITE-N, TOTAL N	AMMONIA, TKN	CHLORIDE	LOW DETECTION PHSOPHORUS			НОГД
	CLIENT SAMPLE ID:	DRI	5 S	<b>5</b> ⁽¹⁾ ⁽²⁾ ⁽	1	нн:мм 16:10	J			BT	NOV V	EPH	PA	E Z	E	ME	N S		S S	BO	100		AS S							오
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## **CERTIFICATE OF ANALYSIS**

REPORTED TO	Associated Environmental Consultants Inc. (Vernon) #200 - 2800 29th Street Vernon, BC V1T 9P9		
ATTENTION	Nicole Penner	WORK ORDER	7111411
PO NUMBER PROJECT PROJECT INFO	2016-8113.010.000 - Water Gracemar Action 14	RECEIVED / TEMP REPORTED COC NUMBER	2017-11-16 11:00 / 3°C 2017-11-23 14:10 No Number

#### Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

We've Got Chemistry

#### Big Picture Sidekicks



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too. It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

31

Ahead of the Curve



Through research, regulation knowledge, and instrumentation, we are your analytical centre the for technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at sgulenchyn@caro.ca

Authorized By:

Sara Gulenchyn, B.Sc, P.Chem. Client Service Manager

Sara Sulend

#### 1-888-311-8846 | www.caro.ca

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7

Caring About Results, Obviously.



Associated Environmental Consultants Inc. (Vernon) 2016-8113.010.000 - Water

WORK ORDER
REPORTED

7111411 2017-11-23 14:10

Analyte	Result	RL Units	Analyzed	Qualifier

### WT94335 (7111411-01) | Matrix: Fresh Water | Sampled: 2017-11-15 14:40

Anions			
Chloride	27.0	0.10 mg/L	2017-11-18
Nitrate (as N)	0.020	0.010 mg/L	2017-11-18
Nitrite (as N)	0.020	0.010 mg/L	2017-11-18
General Parameters			
Ammonia, Total (as N)	0.057	0.020 mg/L	2017-11-20
Nitrogen, Total Kjeldahl	0.201	0.050 mg/L	2017-11-20
Phosphorus, Total (as P)	0.0074	0.0020 mg/L	2017-11-19
Calculated Parameters			
Nitrate+Nitrite (as N)	0.0402	0.0100 mg/L	N/A
Nitrogen, Total	0.241	0.0500 mg/L	N/A
Nitrogen, Organic	0.144	0.0500 mg/L	N/A

### WPID28093 (7111411-02) | Matrix: Fresh Water | Sampled: 2017-11-15 16:15

Anions				
Chloride	8.72	0.10 n	ng/L	2017-11-18
Nitrate (as N)	0.416	0.010 n	ng/L	2017-11-18
Nitrite (as N)	< 0.010	0.010 n	ng/L	2017-11-18
General Parameters				
Ammonia, Total (as N)	< 0.020	0.020 n	ng/L	2017-11-20
Nitrogen, Total Kjeldahl	0.152	0.050 n	ng/L	2017-11-20
Phosphorus, Total (as P)	< 0.0020	0.0020 n	ng/L	2017-11-19
Calculated Parameters				
Nitrate+Nitrite (as N)	0.416	0.0100 n	ng/L	N/A
Nitrogen, Total	0.568	0.0500 n	ng/L	N/A
Nitrogen, Organic	0.152	0.0500 n	ng/L	N/A

### Mr. Krebber's Well (7111411-03) | Matrix: Fresh Water | Sampled: 2017-11-15 15:30

Anions			
Chloride	12.9	0.10 mg/L	2017-11-18
Nitrate (as N)	0.021	0.010 mg/L	2017-11-18
Nitrite (as N)	< 0.010	0.010 mg/L	2017-11-18
General Parameters			
Ammonia, Total (as N)	0.042	0.020 mg/L	2017-11-20
Nitrogen, Total Kjeldahl	0.158	0.050 mg/L	2017-11-20
Phosphorus, Total (as P)	< 0.0020	0.0020 mg/L	2017-11-19

**Calculated Parameters** 

REPORTED TO PROJECT



REPORTED TO PROJECT	Associated Environmental Consultants Inc. (Vernon) 2016-8113.010.000 - Water			WORK ORDER REPORTED	7111411 2017-11-2	3 14:10
Analyte	Result		RL	Units	Analyzed	Qualifier
Mr. Krebber's We	ell (7111411-03)   Matrix: Fresh Water   Sampled: 2017-1	I-15 15:30, Co	ontir	nued		
Calculated Parame	eters, Continued					
Nitrate+Nitrite (as	N) 0.0212	0.0	0100	mg/L	N/A	
Nitrogen, Total	0.179	0.0	0500	mg/L	N/A	
Nitrogen, Organic	0.116	0.0	0500	mg/L	N/A	



# **APPENDIX 1: SUPPORTING INFORMATION**

# **REPORTED TO**Associated Environmental Consultants Inc. (Vernon)**PROJECT**2016-8113.010.000 - Water

 WORK ORDER
 7111411

 REPORTED
 2017-11

2017-11-23 14:10

Analysis Description	Method Ref.	Technique	Location
Ammonia, Total in Water	SM 4500-NH3 G* (2011)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2011)	Ion Chromatography	Kelowna
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2011)	Block Digestion and Flow Injection Analysis	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2011)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

#### **Glossary of Terms:**

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

#### **General Comments:**

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.



REPORTED TO	Associated Environmental Consultants Inc. (Vernon)	WORK ORDER	7111411
PROJECT	2016-8113.010.000 - Water	REPORTED	2017-11-23 14:10

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- Method Blank (Blk): A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- Duplicate (Dup): An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- Blank Spike (BS): A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- Matrix Spike (MS): A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL Units	Spike	Source	% REC	REC	% RPD	RPD	Qualifier
- maiy to	nooun		Level	Result	/0 IX20	Limit	/010 B	Limit	quanto

#### Anions, Batch B7K1329

Blank (B7K1329-BLK1)			Prepared: 2017	7-11-17, Analyze	ed: 2017-11-17	
Chloride	< 0.10	0.10 mg/L				
Nitrate (as N)	< 0.010	0.010 mg/L				
Nitrite (as N)	< 0.010	0.010 mg/L				
Blank (B7K1329-BLK2)			Prepared: 2017	7-11-18, Analyze	ed: 2017-11-18	
Chloride	< 0.10	0.10 mg/L				
Nitrate (as N)	< 0.010	0.010 mg/L				
Nitrite (as N)	< 0.010	0.010 mg/L				
LCS (B7K1329-BS1)			Prepared: 2017	7-11-17, Analyze	ed: 2017-11-17	
Chloride	15.9	0.10 mg/L	16.0	99	90-110	
Nitrate (as N)	4.11	0.010 mg/L	4.00	103	93-108	
Nitrite (as N)	1.84	0.010 mg/L	2.00	92	85-114	
LCS (B7K1329-BS2)			Prepared: 2017	7-11-18, Analyze	ed: 2017-11-18	
Chloride	15.9	0.10 mg/L	16.0	99	90-110	
Nitrate (as N)	4.27	0.010 mg/L	4.00	107	93-108	
	1.87	0.010 mg/L	2.00	93		

#### General Parameters, Batch B7K1389

Blank (B7K1389-BLK1)			Prepared: 2017	7-11-17, Analyze	ed: 2017-11-20	
Nitrogen, Total Kjeldahl	< 0.050	0.050 mg/L				
Blank (B7K1389-BLK2)			Prepared: 2017	7-11-17, Analyze	ed: 2017-11-20	
Nitrogen, Total Kjeldahl	< 0.050	0.050 mg/L				
LCS (B7K1389-BS1)			Prepared: 2017	7-11-17, Analyze	ed: 2017-11-20	
Nitrogen, Total Kjeldahl	1.14	0.050 mg/L	1.00	114	84-121	
LCS (B7K1389-BS2)			Prepared: 2017	7-11-17, Analyze	ed: 2017-11-20	
Nitrogen, Total Kjeldahl	1.14	0.050 mg/L	1.00	114	84-121	

#### General Parameters, Batch B7K1413



REPORTED TO         Associated Environ           PROJECT         2016-8113.010.000			tants Inc. (Vernor	ו)		WORK REPOR	ORDER TED		411 '-11-23	14:10
Analyte		Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifi
General Parameter	s, Batch B7K1413,	Continued								
Blank (B7K1413-B	LK1)			Prepared	: 2017-11-1	7, Analyze	d: 2017-1	1-19		
Phosphorus, Total (a	s P)	< 0.0020	0.0020 mg/L							
Blank (B7K1413-B	LK2)			Prepared	: 2017-11-1	7, Analyze	d: 2017-1	1-19		
Phosphorus, Total (a	s P)	< 0.0020	0.0020 mg/L							
LCS (B7K1413-BS	2)			Prepared	: 2017-11-1	7, Analyze	d: 2017-1	1-19		
Phosphorus, Total (as	s P)	0.108	0.0020 mg/L	0.100		108	80-112			
General Parameter	s, Batch B7K1452									
General Parameter Blank (B7K1452-B				Prepared	: 2017-11-2	0, Analyze	d: 2017-1	1-20		
	LK1)	< 0.020	0.020 mg/L							
Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B	LK1)  ) LK2)				: 2017-11-2 : 2017-11-2					
<b>Blank (B7K1452-B</b> Ammonia, Total (as N	LK1)  ) LK2)	< 0.020	0.020 mg/L 0.020 mg/L							
<b>Blank (B7K1452-B</b> Ammonia, Total (as N <b>Blank (B7K1452-B</b> Ammonia, Total (as N	LK1) D LK2)		0.020 mg/L	Prepared		0, Analyze	d: 2017-1	1-20		
Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B	LK1) ) LK2) ) LK3)			Prepared	: 2017-11-2	0, Analyze	d: 2017-1	1-20		
Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N	LK1) () LK2) () LK3) ()	< 0.020	0.020 mg/L	Prepared	: 2017-11-2	20, Analyze 20, Analyze	d: 2017-1 d: 2017-1	1-20 1-20		
Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N LCS (B7K1452-BS	LK1) () LK2) () LK3) () 1) () () () () () () () () () () () () ()	< 0.020	0.020 mg/L	Prepared	: 2017-11-2 : 2017-11-2	20, Analyze 20, Analyze	d: 2017-1 d: 2017-1	1-20 1-20		
Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N LCS (B7K1452-BS Ammonia, Total (as N	LK1)  LK2)  LK3)  1)  1)  1)	< 0.020 < 0.020	0.020 mg/L 0.020 mg/L	Prepared Prepared Prepared 1.00	: 2017-11-2 : 2017-11-2	20, Analyze 20, Analyze 20, Analyze 102	d: 2017-1 d: 2017-1 d: 2017-1 90-115	1-20 1-20 1-20		
Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N LCS (B7K1452-BS Ammonia, Total (as N	LK1) LK2) LK2) LK3) LK3) 1) 1) 2)	< 0.020 < 0.020	0.020 mg/L 0.020 mg/L	Prepared Prepared Prepared 1.00	: 2017-11-2 : 2017-11-2 : 2017-11-2	20, Analyze 20, Analyze 20, Analyze 102	d: 2017-1 d: 2017-1 d: 2017-1 90-115	1-20 1-20 1-20		
Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B	LK1) () LK2) () LK3) () 1) () 2) () () () () () () () () () () () () ()	< 0.020 < 0.020 1.02	0.020 mg/L 0.020 mg/L 0.020 mg/L	Prepared Prepared 1.00 Prepared 1.00	: 2017-11-2 : 2017-11-2 : 2017-11-2	20, Analyze 20, Analyze 20, Analyze 102 20, Analyze 103	d: 2017-1 d: 2017-1 d: 2017-1 90-115 d: 2017-1 90-115	1-20 1-20 1-20 1-20		
Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N Blank (B7K1452-B Ammonia, Total (as N LCS (B7K1452-BS Ammonia, Total (as N	LK1)  LK2)  LK2)  LK3)  LK3)  2)  3)  3)	< 0.020 < 0.020 1.02	0.020 mg/L 0.020 mg/L 0.020 mg/L	Prepared Prepared 1.00 Prepared 1.00	: 2017-11-2 : 2017-11-2 : 2017-11-2 : 2017-11-2	20, Analyze 20, Analyze 20, Analyze 102 20, Analyze 103	d: 2017-1 d: 2017-1 d: 2017-1 90-115 d: 2017-1 90-115	1-20 1-20 1-20 1-20		
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	ED BY: Jesse Manna		MAT			SAMPLI	NG:	T	C	OMMENTS:	HU	□ HdV	E2-	П/НЕРН	Chlorinated	DI	ATER T	ERC	(SAI			3	RMS	RMS		TRIT	z		ON P			
	CLIENT SAMPLE ID:	DRINKING WATER	CTHER WATER	SOIL		DATE DD-MMM-YY 15-Nov-17		CHLORINATED	FILTERED	(e.g. flow/volume media ID/notes)				PAH	S I		METALS - WATER TOTAL	METALS - V	-SIA	PH E			Ŭ	TOTAL COLIFORMS	ASBESTOS	-	AMMONIA, TKN	CHLORIDE				НОГD
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