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April 25<sup>th</sup>, 2021 File No. W2020-019.2020

### FERNIE ALPINE RESORT UTILITIES CORPORATION

1505 17<sup>th</sup> Avenue SW Calgary, Alberta T2T 0E2

Attention: Mr. Patrick Majer

Dear Mr. Majer:

Re: FERNIE ALPINE RESORT

**WASTEWATER TREATMENT PLANT** 

**2020 ANNUAL REPORT** 

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Forwarded is a pdf copy of the 2020 Annual Wastewater Report for the above property.

Should you have any questions, please call us at 403-238-9510 or email to jana@iqwater.ca.

Sincerely,

**IQWATER INC.** 

Jana Zverina, M.Sc., P.Eng.



# 2020 WASTEWATER TREATMENT PLANT ANNUAL REPORT

FERNIE ALPINE RESORT FERNIE, B.C.

### Prepared for:

## FERNIE ALPINE RESORT UTILITIES CORPORATION

1505-17<sup>th</sup> Avenue SW Calgary, Alberta T2T 0E2

Prepared by:

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April 25<sup>tht</sup>, 2021 Report # W2020-019.2020

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### 1.0 INTRODUCTION

### 1.1 BACKGROUND

The following annual report for the Wastewater Treatment Plant at Fernie Alpine Resort (FAR) operated by Fernie Alpine Resort Utilities Corporation (FARUC) is compiled in accordance with the requirements of the Municipal Sewage Regulation (MSR). This report covers the 2020 calendar year.

Due to the nature of the resort the plant is subjected to a large seasonal swing in utilization with the winter ski period imposing the highest demands. The critical time for sewage flows at the resort is from mid-December to the end of March during the peak ski season. Summer utilization of the treatment work is generally low.

FARUC treats its wastewater at a tertiary treatment plant designed to remove BOD<sub>5</sub>, suspended solids, ammonia, and phosphorous. Wastewater is disinfected with ultraviolet (UV) lamps prior to discharge into the Elk River.

Plant effluent quality has been high during the year. There is a clearly decreasing trend in orthophosphorus and total phosphorus levels during the last several years. All the results for orthophosphorus and total phosphorus were below the MSR discharge limits with an exception of two ortho-phosphate result. FARUC began a monitoring and Clearpac dosing investigation in the winter of 2007 to reduce effluent phosphorous concentrations. The reduction program has shown significant improvement of phosphorus levels in plant effluent. This work will continue to maintain all the ortho and total phosphorus concentrations below the discharge limits.

### 2.0 REGISTRATION REQUIREMENTS

This section describes operating requirements as specified in the Resorts of the Canadian Rockies Inc.'s (RCRI) Registration Letter RE 17139 issued on September 30<sup>th</sup>, 2002. The registration describes parameters that must be tested for operating conditions, sampling frequency, and sampling locations.

### 2.1 PARAMETERS

The following parameters are to be monitored:

pH Field Sample

Temperature Field Sample, measured in Celsius Flow Field Samples, measured as m³/d

BOD<sub>5</sub> Five day biochemical oxygen demand, measured in mg/l

TSS Total suspended solids or non-filterable residue, measured in mg/l

NH<sub>3</sub> Ammonia concentration, expressed as nitrogen in mg/l
 NO<sub>3</sub> Nitrate concentration, expressed as nitrogen in mg/l
 NO<sub>2</sub> Nitrite concentration, expressed as nitrogen in mg/l
 Total-P Total phosphorous concentration, measured in mg/l
 Ortho-P Orthophosphate concentration, measured in mg/l

Fecal coliform Bacterial concentration, measured as colony forming units per 100ml

Toxicity Bioassay 96 hour toxicity test, recorded as pass or fail

### 2.2 REGISTRATION LETTER OPERATING CONDITIONS

The treatment plant is required to meet the effluent discharge conditions outlined in Table 1.

Table 1
Effluent Limits

Parameter	Limit	Unit
Flow	1280	m³/d
BOD₅	45	mg/l
TSS	45	mg/l
Total-P	1.0	mg/l
Ortho-P	0.5	mg/l
Coliforms*	200	CFU/100ml
Toxicity Bioassay	pass	n/a

<sup>\*</sup>Limit for recreational waters only, not included in RCRI registration letter

Primary screenings and dewatered sludge are to be disposed of at the Crowsnest Pass/Pincher Creek Landfill. Disposal at other sites requires authorization under the Waste Management Act.

Operators at the plant are required to be certified in accordance with Section 22 of the MSR.

### 2.3 REPORTING REQUIREMENTS

An annual report demonstrating the performance of the facility is to be publicly posted on the Internet within 120 days of the end of the calendar year. The report must include tabulated standards and results for all test samples, interpretation of the results, an indication of the state of compliance of the facility, and the total wastewater flow for the reported period.

In addition the report must also include the following:

- Notification of significant operating events including discharge variances outside given limits,
- Recommendations for operational or facility modifications,
- Notification of proposed or implemented plant modifications,
- Details of proposed or implemented water conservation measures,
- A plan indicating existing and proposed developments,
- A comparison of projected and actual wastewater flows,
- Projected wastewater flows resulting from proposed development compared to the remaining waste water treatment plant (WWTP) capacity, and
- A comparison of water supply and wastewater flows.

As with the previous Annual Reports, this report includes additional information on wasted sludge volumes.

### 2.4 SAMPLING FREQUENCY

The MSR Registration requires RCR and, as such, the contract operator FARUC, to undertake the environmental testing program outlined in Table 2 below.

Elk River testing requires that a minimum of 18 samples annually are taken from each of the upstream, initial dilution zone (IDZ) and downstream river locations, relative to the outfall diffuser. The sampling locations were identified in the April 2001 Environmental Impact Study.

A minimum of 12 influent samples are required for  $BOD_5$  and TSS. Flow data is to be collected continuously.

The intent of the environmental testing procedure outlined in Table 2 is to collect influent and effluent samples during peak demand periods as indicated by resort bookings. To correspond with peak plant loading, river samples are to be collected on the same day as effluent samples.

In addition to the program and tests listed above, other in-plant testing is needed to permit operational control of the process as shown in Table 2 below.

<u>Table 2</u> Sampling Location/Frequency/Type

Doromotor			L	ocation		
Parameter	Elk River	QTY	Influent	QTY	Effluent	QTY
рН	WS/G	18	1	/	M/G, WS/G	25
Temp	WS/G	18	1	/	1	/
Flow	/	/	D/C	n/a	D/C	n/a
BOD₅	/	/	M/G	12	M/G, WS/G	25
TSS	WS/G	18	M/G	12	M/G, WS/G, D/C	25
NH <sub>3</sub> -N	WS/G	18	1	/	M/G, WS/G	25
NO <sub>3</sub> -N	WS/G	18	1	1	M/G, WS/G	25
NO <sub>2</sub> -N	WS/G	18	/	/	M/G, WS/G	25
Total-P	WS/G	18	1	/	M/G, WS/G	25
Ortho-P	WS/G	18	/	/	M/G, WS/G	25
Fecal Coliform	WS/G	18	/	/	M/G, WS/G	25
Toxicity Bioassay	/	/	/	/	3 Y/G	3

### Where:

WS/G	Weekly seasonal grab sampling, required for three six-week periods during the winter peak, the spring after ice-out, and in the fall when river turbidity and flows are low.
D/C	Daily continuous sampling using an on-line instrument and data logger.
M/G	Monthly grab sample (not required when weekly seasonal testing is taking place).
3Y/G	Three samples per year to correspond with WS/G sampling periods.

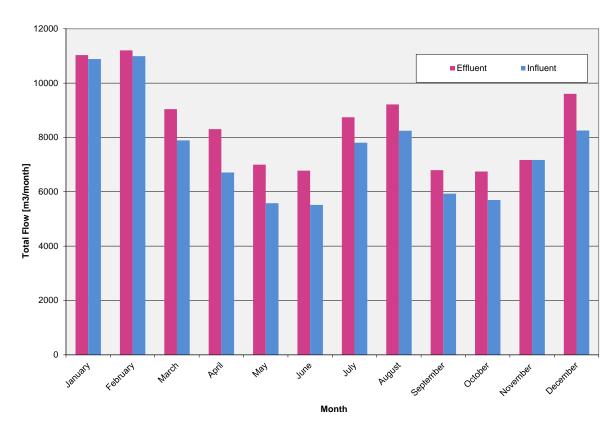
### 3.0 SEWAGE FLOW RECORDS

This section provides data and analysis regarding the plant influent and effluent flows, and compares 2020 data to previous years.

Total effluent flow from the WWTP for all of 2020 was recorded from the effluent weir type flow meter as 101,640 m³ and the average was 273.5 m³ per day. The graph below shows the 2020 total effluent flow per month vs total influent for the plant. The effluent flow follows very closely the influent.

Available monthly total effluent flow meter records for 2020 are provided in Figure 1a.

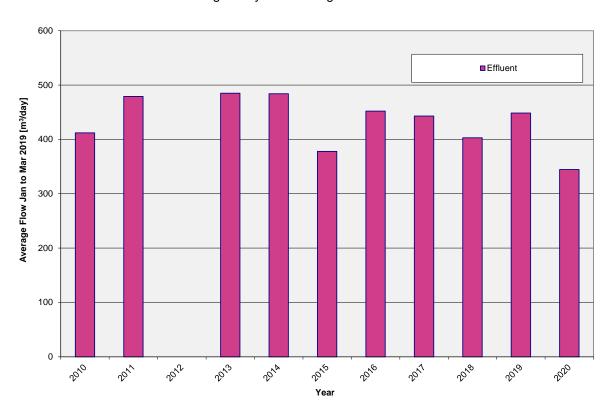
Figure 1a
Effluent and Influent Flow Meter Monthly Flow Totals



The ski resort operates with higher winter and late spring sewage flows (January to March) than during any other period. The average daily plant flow through January, February and March of 2020 was 344.6 m³/day compared to the previous year's (2019) January to March average flow at 448.6 m³/day.

Note that the January to March 2020 flow is the lowest when compared to the previous years, likely due to a significant decrease in March due to Covid-19 restrictions.

The average daily plant flow through January, February and March of 2018 was 403 m<sup>3</sup>/day. The average daily flow was 443 m<sup>3</sup>/day in 2017, 452 m<sup>3</sup>/day in 2016, 378 m<sup>3</sup>/day in 2015, 484 m<sup>3</sup>/day in 2014, 485 m<sup>3</sup>/day in 2013, the average daily flow could not be calculated in 2012 but it was 479 m<sup>3</sup>/day for the same time period in 2011, compared to 412 m<sup>3</sup>/day over the same period in 2010.



<u>Figure 1b</u> Average Daily Flow during Jan – Mar Period

Peak flow for the year reached 925  $\,$ m $^3$ /day on February 2 $^{nd}$ , 2020, which was 27  $\,$ % below the allowable daily limit of 1,280  $\,$ m $^3$ /day.

Historical peak flows are as follows: 2019 (1043  $m^3$ /day), 2018 (687  $m^3$ /day), 2017 (1,095  $m^3$ /day), 2016 (844  $m^3$ /day), 2015 (1,058  $m^3$ /day), 2014 (1,036  $m^3$ /day), 2013 (1,181  $m^3$ /day), 2012 (811  $m^3$ /day), 2011 (989  $m^3$ /day) and 2010 (823  $m^3$ /day) and 2009 (1,178  $m^3$ /day). The peak flow day occurred during the heavy ski season, which is to be expected.

A summary of sewage flow for years 2003 through 2020 is provided in Table 3 and Figures 2 and 3:

<u>Table 3</u> 2003 – 2020 Flow Comparisons

Year	Sewage Flow	/ (m³/day)		Days Over
i eai	Total	Average	Peak	Limit
2003	137,035	375	1,244	0
2004	151,815	414	1,307	1
2005	125,699	344	1,293	1
2006	127,202	348	1,058	0
2007	144,480	396	1,177	0
2008	135,767	372	873	0
2009	113,336	311	1,178	0
2010	104,815	287	823	0
2011	90,213* ( <b>122,275</b> ) <sup>1</sup>	335	989 <sup>2</sup>	0
2012	62,509** ( <b>122,610</b> ) <sup>1</sup>	335	811 <sup>2</sup>	0
2013	121,982	335	1,181	0
2014	125,437	344	1,036	0
2015	90,931	250	1,058	0
2016	108,326	296	844	0
2017	108,695	296	1,095	0
2018	105,073	288	687	0
2019	105,748	290	1043	0
2020	101,640	274	925	0

- not including part of Sept and all of Oct, Nov, and Dec 2011
- \*\* not including all of Jan, Feb, part of Aug, and all of Sept, Oct, and Nov 2012
- <sup>1</sup> (data) in brackets estimate based on daily average
- <sup>2</sup> the number does not reflect a true peak as all the data was not available during high flow months

### 2004 to 2012

Higher flows in 2004 were caused by severe infiltration through the collection system.

Lower flows in 2005 and 2006 can also be attributed to the fact that a lot of sludge together with water was trucked away from the WWTP itself due to the volumes of sewage the existing plant would not handle without an equalization tank.

Through 2008 total and average flow decreased somewhat from 2007, there were no instances where flow exceeded the 1,280 m³/day registration limit, compared to one day in each of 2004 and 2005. Peak flow dropped due to full operation of the equalizing tank and collection system improvements to eliminate storm water infiltration.

The average flow for 2009 further decreased from 2008 (372 m³/day down to 311 m³/day) and there were no instances where the flow exceeded the 1,280 m³/day. The peak flow increased from 2008 but is comparable to the other years.

The average flow for 2010 further decreased from 2009 (311 m³/day down to 287 m³/day) and there were no instances where the flow exceeded the 1,280 m³/day. The peak flow decreased from 2009 and is comparable to 2008.

The average flow for 2011 had increased slightly from 2010 (287 m³/day) and 2009 (311 m³/day) and there were no instances where the flow exceeded the 1,280 m³/day limit. The peak flow had increased slightly from 2010; however it was still lower than 2008 and prior. Please note, the average flow was calculated for the data available and may not have been representative of the whole year as October, November and December were usually lower flow months.

Note that historically from 2004 to 2010 the peak flow occurred systematically in January, February, March and December, which was consistent with the facility operations. Although some data was missing, the values for 2011 were considered "as is". However, there was more data missing in 2012. In addition, the missing data was among others in January and February, which were historically two out of four highest flows in a year. January was on average the highest month.

The average flow for 2012 was the same as observed in 2011 (335 m³/day) which had increased slightly from 2010 (287 m³/day) and 2009 (311 m³/day). There were no instances where the flow exceeded the registration limit of 1,280 m³/day; however, there was no data for January and February (two out of four peak months in a year). The peak flow of 811 m³/day was recorded in December, which was one of the four peak flow months, and therefore it was reasonable to assume that it would be close to or somewhat above the same number in January or February. Based on the remaining measurements it was unlikely that the peak in January or February would exceed the registration limit.

Please note, the average flow was calculated for the data available and may not have been representative of the whole year as January, February, part of August and all of September, October, and November information was not available. This average flow was used to estimate the total yearly effluent flow, which likely represented a reasonable estimate.

The records for 2011 and 2012 were incomplete due to the effluent flow meter failure from a lightning strike. The meter was repaired and fully functional for 2013.

### 2013 to 2020

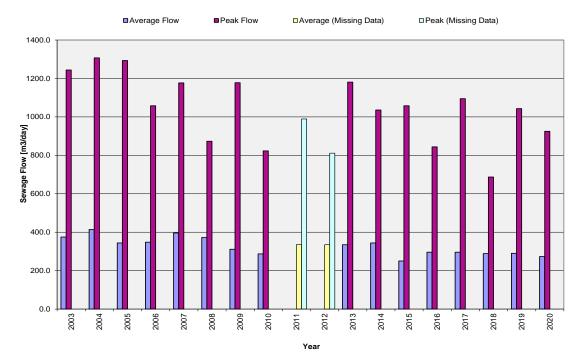
The average flow for 2020 was low and well below previous several years, which can likely be attributed to the Covid-19 restrictions implemented in March 2020. There are no instances where the flow exceeded the plant maximum allowable flow and daily discharge of 1,280 m³/day. The peak flow is higher than that of 2018 but very similar to 2013 to 2015 and 2017.

Contrary to the previous years, when the highest peak was in December, in 2020 the highest peak was recorded in February. High peak flows also occurred systematically in January and March followed with May and December, which is consistent with the facility operations. The highest month in 2019 for average flows was in February followed by January and December.

Daily wastewater flows are strongly correlated to weather and the number of day-users at the resort with the peak ski season having the highest flows. Summer flow results from non-skiing related recreational activities, generally hiking or mountain biking events. The lowest plant flow is experienced in the shoulder season periods (April to June and September to November).

The approximately 85 permanent residents in addition to several year-round restaurants providing services to casual visitors ensure that the sewage flows never drop to zero. Figure 2 provides monthly average and peak day sewage flows since 2003.

Figure 2
Average and Peak Sewage Flow Comparison Graph



\* Note that the values for 2011 and 2012 may not be representative as some of the effluent flow data for these years are missing

Figure 3
Total Sewage Flow Graph

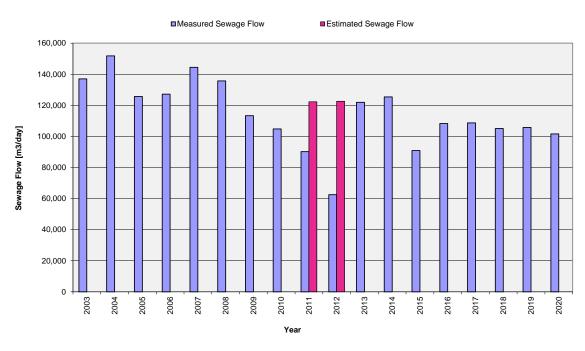
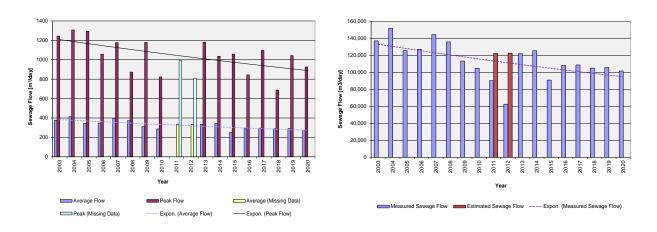
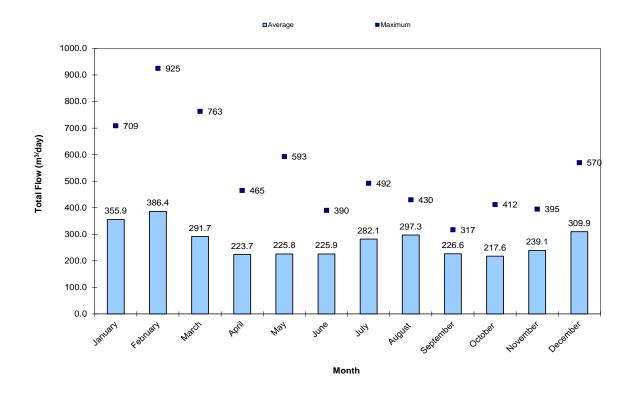


Figure 3a and Figure 3b
Trendlines for Average, Peak and Total Sewage Flow Graphs



Sewage flow trend is shown on Fig 3a and 3b above, note that total sewage production has in general a declining trend with stable flow numbers over the last five years.

Figure 4
2020 Sewage Effluent Average and Peak Flows by Month



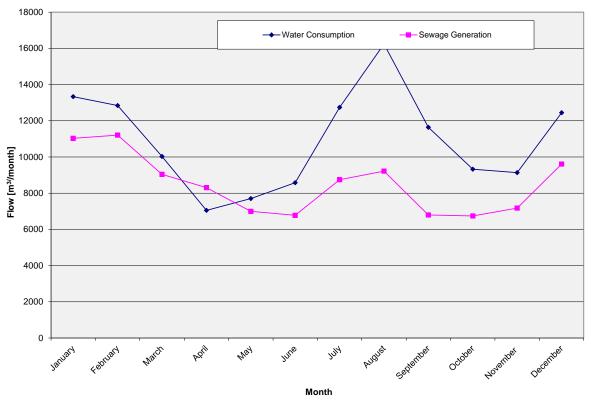
The Resort's ongoing program to reduce sewer infiltration is demonstrated by the reduction in return flow to the plant vs. total water usage. In 2007 the total sewage flow was equal to 92% of the total water production; however this number may not be representative as the total water production values were incomplete. In 2008 this figure decreased to 51%, which is considered to be a more representative. In 2009, this figure decreased even further to 45%. In 2012, the total sewage flow was equal to 54% of the total water production, and was consistent with 2010 and 2011. This again is slightly higher than in 2009 but similar to 2008. In 2013, the total sewage flow was 41% of the total water production, which was the lowest observed to date. In 2014, the total sewage flow was 53% of the total water production which was a slight increase from 2013 but comparable to that of 2008, 2010, 2011 and 2012. There was a slight decrease in 2015. The total sewage flow was 48% of the total water production which is comparable to 2013. The total sewage flow for 2016 was 47% which was very similar to that found in 2015. The total sewage flow for 2017, 2018 and 2019 was 67%, 64%, and 59%. The total sewage flow for 2020 was 77% showing a slightly increasing trend.

Note that in general, with the exception of 2007, there is relatively steady trend in % of return flow vs total water usage with the exception of 2017 and 2018. The percent sewage flow vs the water production for each year since 2007 has been plotted in Figure 5 below.

Percent Sewage Flow vs Water Production 100 90 80 70 60 Percent (%) 50 40 30 20 10 2007 2020

Water use at the hill is compared to the amount of sewage received at the WWTP in Figure 6 for 2020.

Figure 6 2020 Water Consumption and Sewage Generation



The impact of rainfall and snowmelt on sewage flow has decreased each year since 2007 as a result of system improvements, the use of water restrictive fixtures and the infiltration reduction program.

### 4.0 SEWAGE FLOW PROJECTION

This section shows projected wastewater flow for 2007 through 2020 based on current development plans and provides an estimate of remaining plant capacity.

Based on unit generation rates provided in the BC Health Act for various lodging types, the estimated highest day wastewater generation for 2011 would have been 1302.3 m³/day. Using the actual peak flow of 811 m³/day, a correction factor of 0.62 was calculated. Averaged correction factor for 2007, 2008, 2009, 2010, 2011, 2012, 2013 and 2014 was calculated and multiplied by the future estimated flows to more accurately reflect potential resort sewage generation rates.

In 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019, respectively, the correction factors were 1.20, 0.89, 1.14, 0.65, 0.76, 0.62, 0.91, 080, 0.81, 0.65, 0.84, 0.51 and 0.78, which showed that the resort had reduced the impact of both storm water infiltration and reduced peak flows.

Projected daily peak wastewater flows until 2010 by year were provided in Table 4 for the Resort's planned expansions. The highest water generation for 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019 and 2020 was calculated based on the BC Health Act (refer to Table 11 enclosed at the end of this report). The future flows will be re-evaluated if further expansion occurs. The resort is committed to continuing the initiative on introducing a storm water infiltration program, flow restrictive devices, and other water consumption measures.

Flow restrictive devices are intended to be utilized in all new construction and the infiltration/rehabilitation program is expected to be ongoing. The intent is to reduce the amount of per unit sewage generation and to reduce the amount of ground and surface water infiltration into the sewer system. FARUC will monitor sewage flows to determine the efficacy of the program.

Based on a report prepared by Urban Systems, Wastewater Treatment Plant Assessment, prepared in October 2017, it was concluded that even with the additional expansion of the proposed Timberlanding, 27 residential lots (Phase 1) possibly in 2018 FARUC may not require an increase to permit discharge above the current limit of 1280 m³/day if the flow restriction measures prove sustainable. Note that Phase 2 development may need a licence amendment to increase the maximum daily flow from 1280 m³ to a maximum plant capacity of 1760 m³. Sewage discharge rates will be monitored and an application will be submitted to increase the maximum daily discharge when warranted.

From the 27 lots that were registered in Phase 1 of the Timberlanding Development all 27 lots have been sold. 4 of the sold lots were consolidated into 2 as the owners wanted larger parcels to accommodate larger homes. 7 lots are connected 4 others are also planning on beginning construction this summer. Future Phase 2 development, which has not been included in the current calculations yet, will include 20 single family lots and 2 multi-family lots.

Based on the 2020 flow data, the plant has an unused capacity of 355 m³/day due to the flow saving measures. Note that also, Covid-19 restrictions may have contributed to lower outputs in 2020. This still needs to be closely monitored during 2021 and further considered when adding additional development.

<u>Table 4</u> Projected Peak Flows: 2007-2020

	2007	2008	2009	2010	2011	2012
Estimated Wastewater Flow (m³/day)	979.2	979.9	1032.4	1261.4	1302.3	1302.3
Actual and Corrected (m³/day)	1177 (a)	873 (a)	1178(a)	823 (a)	989 (a)	811 (a)

	2013	2014	2015	2016	2017	2018
Estimated Wastewater Flow (m³/day)	1302.3	1302.3	1302.3	1302.3	1302.3	1337.6
Actual and Corrected (m³/day)	1181 (a)	1036 (a)	1058 (a)	844 (a)	1095 (a)	687 (a)

	2019	2020	2021
Estimated Wastewater Flow (m³/day)	1344.5*	1344.5*	1344.5*
Actual and Corrected (m³/day)	1043 (a)	925 (a)	1076 (b)

<sup>\*</sup>Note that all 27 lots for Timberlanding Phase 1 are included in the Estimated Flow (only 9 including 2 double lots or 11 single lots are either developed, under development or beginning construction)

- (a) actual peak flow
- (b) corrected daily peak flows by the averaged correction faction for 2007 to 2020 and correction factor

2007	correction factor of	1177/979.2	1.2
2008		873/979.9	0.89
2009		1178/1032.4	1.14
2010		823/1261.4	0.65
2011		989/1302.3	0.76
2012		811*/1302.3	0.62
2013		1181/1302.3	0.91
2014		1036/1302.3	0.8
2015		1058/1302.3	0.81
2016		844/1302.3	0.65
2017		1095/1302.3	0.84
2018		687/1337.6	0.51
2019		1043/1344.5	0.78
2020		925/1344.5	0.69
	0.80		

<sup>\*</sup>Since only two out of the four months with the historically highest peaks were recorded, this number may be underestimated.

Note that based on the historical data and the above projections the actual flows based on Phase 1 Timberlanding expansion should not exceed the permitted discharge of 1280 m<sup>3</sup>/d.

Graphs showing estimated vs actual historical peak flows and general trending of the correction factor are shown below.

<u>Figure 7a</u> Estimated vs Actual Peak Flows (Historical)

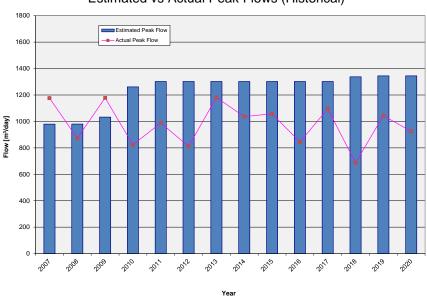
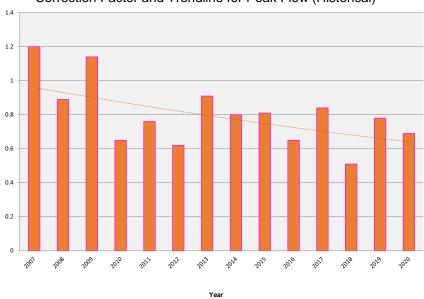


Figure 7b

Correction Factor and Trendline for Peak Flow (Historical)



### 5.0 OVERVIEW OF ELK RIVER SAMPLE RESULTS

This section provides data and analysis for the Elk River samples taken during 2020.

Table 5 provides a summary record of the Elk River test results for the time period from December 23<sup>rd</sup>, 2019 to January 18<sup>th</sup>, 2021.

<u>Table 5</u> 2020 Elk River Sample Results

Sample Date	A	mmonia	-N		Ortho-P Coliform - Fecal		То	tal P mg	g/L			
(yyyy-mm-dd)	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN
2019-12-23	0.05	0.05	0.05	0.006	0.013	0.005	4	1	5	0.018	0.026	0.014
2020-01-02	0.05	0.05	0.05	0.005	0.011	0.005	1	3	2	0.005	0.015	0.005
2020-03-04	0.05	0.05	0.05	0.005	0.007	0.005	3	1	1	0.019	0.008	0.005
2020-03-11	0.05	0.05	0.05	0.005	0.008	0.005	9	1	8	0.005	0.009	0.006
2020-03-18	0.05	0.05	0.05	0.005	0.007	0.005	2	1	1	0.005	0.007	0.005
2020-03-25	0.05	0.05	0.05	0.005	0.006	0.005	1	14	1	0.007	0.008	0.006
2020-04-01	0.05	0.05	0.05	0.005	0.006	0.005	1	1	1	0.006	0.013	0.007
2020-04-08	0.05	0.05	0.05	0.005	0.005	0.007	2	1	1	0.012	0.015	0.007
2020-09-29	0.05	0.05	0.05	0.005	0.010	0.005	2	17	1	0.005	0.028	0.010
2020-10-07	0.05	0.07	0.05	0.005	0.017	0.005	2	4	1	0.005	0.017	0.005
2020-10-14	0.05	0.05	0.05	0.005	0.010	0.005	4	61	11	0.005	0.021	0.005
2020-10-21	0.05	0.05	0.05	0.005	0.010	0.005	1	12	2	0.005	0.015	0.005
2020-10-28	0.05	0.05	0.05	0.005	0.011	0.005	2	4	1	0.006	0.010	0.005
2020-11-04	0.05	0.05	0.05	0.005	0.017	0.005	34	112	27	0.014	0.058	0.009
2020-12-15	0.05	0.05	0.05	0.005	0.019	0.005	3	3	5	0.005	0.029	0.005
2020-12-21	0.05	0.05	0.05	0.005	0.011	0.005	3	3	5	0.005	0.013	0.005
2020-12-29	0.05	0.05	0.05	0.005	0.098	0.005	1	1	2	0.005	0.154	0.005
2021-01-04	0.05	0.05	0.05	0.005	0.009	0.005	1	4	1	0.005	0.018	0.005
2021-01-11	0.05	0.05	0.25	0.005	0.024	0.005	6	3	11	0.005	0.029	0.005
2021-01-18	0.05	0.05	0.05	0.005	0.041	0.005	11	2	9	0.006	0.044	0.005
# Samples	21	21	21	21	21	21	21	21	21	21	21	21
Average	0.05	0.05	0.06	0.005	0.017	0.005	5	12	5	0.007	0.027	0.006
Maximum	0.05	0.07	0.25	0.006	0.098	0.007	34	112	27	0.019	0.154	0.010
Minimum	0.05	0.05	0.05	0.005	0.005	0.005	1	1	1	0.005	0.007	0.005

Light green squares show tests reported at less than the stated value, for calculations these are listed as equal to the value stated, ie. <0.05 is assumed to be 0.05

UP – Upstream

IDZ – Initial Dilution Zone

DN – Downstream

## Table 5 cont.

Sample Date		TSS			pН			N-NO <sub>3</sub>			N-NO <sub>2</sub>	
(yyyy-mm-dd)	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN
2019-12-23	5.30	6.70	4.00	8.20	8.20	8.20	1.14	0.11	1.28	0.01	0.01	0.01
2020-01-02	3.00	3.00	3.00	8,34	8.26	8.33	1.78	0.11	1.80	0.01	0.01	0.01
2020-03-04	3.70	3.00	3.30	8.46	8.45	8.45	1.70	0.11	1.81	0.01	0.01	0.01
2020-03-11	3.30	3.00	8.00	8.23	8.20	8.22	1.60	0.06	1.72	0.01	0.01	0.01
2020-03-18	7.30	3.30	8.00	8.28	8.20	8.29	1.95	0.26	2.09	0.01	0.01	0.01
2020-03-25	3.00	3.00	5.00	8.44	8.43	8.44	1.85	0.01	1.96	0.01	0.01	0.01
2020-04-01	4.70	4.70	4.70	8.33	8.29	8.34	2.02	0.04	2.03	0.01	0.01	0.01
2020-04-08	6.70	9.30	6.70	8.31	8.55	8.32	2.18	0.08	2.22	0.01	0.01	0.01
2020-09-29	3.00	3.00	3.00	8.50	8.51	8.48	1.86	0.13	1.71	0.01	0.01	0.01
2020-10-07	3.00	8.42	3.00	8.49	8.50	8.49	1.53	1.21	1.76	0.01	0.01	0.01
2020-10-14	3.00	3.00	3.00	8.47	8.34	8.46	1.74	0.05	1.72	0.01	0.01	0.01
2020-10-21	3.00	3.00	3.00	8.36	8.32	8.36	1.88	0.09	1.90	0.01	0.01	0.01
2020-10-28	3.00	3.00	3.00	8.43	8.40	8.44	1.95	0.10	1.99	0.01	0.01	0.01
2020-11-04	8.60	6.30	8.70	8.39	8.31	8.41	1.41	0.06	1.56	0.01	0.01	0.01
2020-12-15	3.00	3.00	3.00	8.32	8.25	8.32	1.90	1.49	1.91	0.01	0.01	0.01
2020-12-21	3.00	3.00	3.00	8.40	8.37	8.40	1.90	0.29	1.92	0.01	0.01	0.01
2020-12-29	9.00	9.00	9.00	8.39	8.28	8.40	2.18	15.50	2.02	0.01	0.01	0.01
2021-01-04	3.00	3.00	3.00	8.37	8.44	8.43	1.91	0.15	1.89	0.01	0.01	0.01
2021-01-11	3.00	3.00	3.00	8.33	8.25	8.33	2.08	3.73	2.08	0.01	0.01	0.01
2021-01-18	3.00	3.20	8.20	8.42	8.28	8.39	1.92	5.99	1.93	0.01	0.01	0.01
# Samples	20	20	20	20	20	20	20	20	20	20	20	20
Average	4.23	4.35	4.78	8.37	8.34	8.38	1.82	1.48	1.90	0.01	0.01	0.01
Maximum	9.00	9.30	9.00	8.50	8.55	8.49	2.18	15.50	2.22	0.01	0.01	0.01
Minimum	3.00	3.00	3.00	8.23	8.20	8.22	1.41	0.01	1.56	0.01	0.01	0.01

Light green squares show tests reported at less than the stated value, for calculations these are listed as equal to the value stated, ie. <0.05 is assumed to be 0.05 UP – Upstream

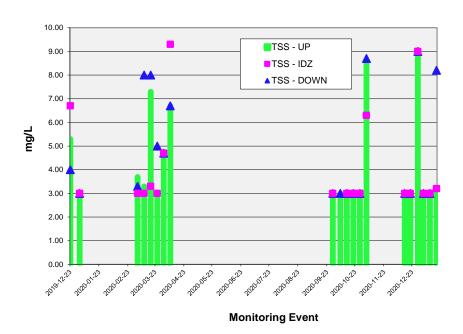
IDZ – Initial Dilution Zone DN – Downstream

### <u>TSS</u>

Outfall results slightly exceeded the upstream (background) results on December 23<sup>rd</sup>, 2019, April 8<sup>th</sup>, 2020, October 7<sup>th</sup>, 2020 and January 18<sup>th</sup>, 2021. Although below detection limit or low upstream and at the outfall, downstream TSS results were elevated above both on March 11<sup>th</sup>, 18<sup>t,</sup> 2020 and January 18<sup>th</sup>, 2021.

Note that there were no changes higher than 5 mg/L (B.C. Approved Water Quality Guidelines; Aquatic Life, Wildlife and Agriculture, August 2019; further BC AWQG) between the upstream and downstream values due to the effluent discharge with the exception of January 18<sup>th</sup>, 2021 with a very minimal change of 5.2 mg/L. The effluent results throughout the season were below their respective detection limits including January 18<sup>th</sup>, 2021.

Figure 8a 2020 TSS Results in the River Upstream, at the Outfall and Downstream

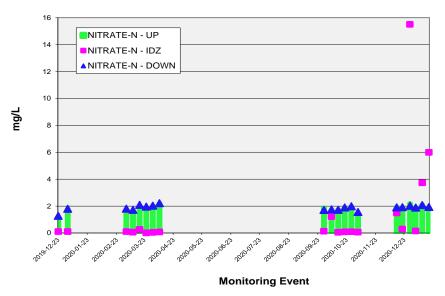


### Nitrate-N & Nitrite-N

The highest levels of nitrate-n (15.5 mg/L) were observed at the outfall on December 29<sup>th</sup>, 2020. The levels of nitrate-n up-stream and down-stream on the same day were significantly lower (2.18 mg/L and 2.02 mg/L, respectively). The level of nitrate-n in the effluent on the same day was 40.4 mg/L, which is consistent with other weekly samples from the plant effluent and suggests the effluent was not the cause of the elevate nitrate levels at the outfall. Note that all the downstream results were very similar to the background levels and within the BC AWQG Long Term Chronic threshold at 3.0 mg/L.

All downstream nitrite-n results were below the detection limits and, therefore, below the BC AWQG Long Term Chronic threshold at 0.02 mg/L (the most stringent guideline for chloride < 2 mg/L).

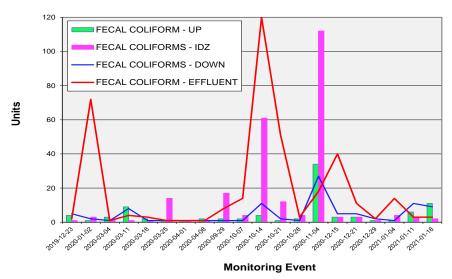
Figure 8b
2019 Nitrate-N Results in the River Upstream, at the Outfall and Downstream



### Fecal Coliform

Elevated levels of coliforms were tested at the outfall on March 25<sup>th</sup>, September 29<sup>th</sup>, October 14<sup>th</sup> and November 4<sup>th</sup>, 2020 when compared to the background location (upstream). Note that the elevated levels at the outfall and downstream did not correspond with elevated effluent levels with the exception of October 14<sup>th</sup>, 2020, when the level in the river downstream was more than 5 CFU/100 mL above the background levels. On October 14<sup>th</sup>, 2020 fecal coliforms levels of 1200 CFU/100 mL were tested in the effluent.

Figure 8c
2020 Fecal Coliform Results in the River Upstream, at the Outfall, Downstream and Effluent (The graph shows the October 14<sup>th</sup>, 2020 effluent result at 120 instead of 1200 CFU/100 mL)



No significant changes were observed in <u>ammonia-n</u>, <u>pH</u> or <u>phosphorus</u> concentrations during any of the river sample periods. Majority of ammonia-n samples downstream were below their detection limits and/or well below the BC AWQG guideline). In general, ortho and total phosphorus was highest in the outfall but the majority of the results from down-stream were below laboratory detection limits and/or within the background (upstream) values.

Overall, the analyzed concentrations remain constant between the upstream (US) sampling zone and the downstream (DS) sampling zone. The data indicates that the plant's effluent appears not to have any adverse effect on background nutrient concentrations in the Elk River.

 $\underline{pH}$  results in the downstream samples followed closely those in the upstream with no guideline (6.5 – 9.0) exceedance.

### 6.0 OVERVIEW OF INFLUENT TEST RESULTS

This section provides data and analysis for the plant influent (raw sewage) samples taken during 2020.

Table 6 provides a summary record of the influent test results for the period of December 23<sup>rd</sup>, 2019 to January 18<sup>th</sup>, 2021.

Table 6 2020 Influent Results

Data		2020	Influent Re	sults Sum	mary	
Date	Flow	Temp	рН	TSS	BOD	COD
(yyyy/mm/dd)	m³/d	С		mg/L	mg/L	mg/L
2019-12-23	698	-2.0	7.82	151.0	170.0	-
2020-01-02	642	-2.0	7.80	525.0	247.0	-
2020-03-04	263	-2.0	7.86	230.0	152.0	-
2020-03-11	230	2.0	7.78	207.0	113.0	-
2020-03-18	207	-6.0	7.81	195.0	101.0	-
2020-03-25	207	2.0	7.77	111.0	95.0	-
2020-04-01	361	-10.0	7.89	88.8	61.0	-
2020-04-08	251	-4.0	8.12	85.0	55.0	-
2020-05-20	175	10.0	7.78	240.0	57.9	-
2020-06-17	280	6.0	8.17	43.8	94.0	-
2020-07-15	185	9.0	7.86	68.4	85.0	-
2020-08-12	296	20.0	8.05	81.2	70	-
2020-09-29	217	9.0	8.13	136	101.0	-
2020-10-07	174	7.0	8.22	50.2	54.0	-
2020-10-14	346	2.0	7.99	48.1	33.0	-
2020-10-21	226	0.0	7.81	231.0	286.0	-
2020-10-28	162	1.0	7.96	139.0	91.0	-
2020-11-04	210	6.0	8.11	33.4	15.9	-
2020-12-15	283	-1.0	7.63	113.0	101.0	-
2020-12-21	417	1.0	7.57	211	98.0	-
2020-12-29	417	-6.0	8.07	262.0	147.0	-
2021-01-04	458	-2.0	7.86	292.0	166.0	-
2020-01-11	391	0.0	7.96	145.0	128.0	-
2021-01-18	363	-7.0	8.05	217.0	108.0	-
# Samples	24	24	24	24	24	0
Average	311	1.4	7.92	162.7	109.6	-
High	698	20	8.22	525.0	286.0	-
Low	162	-10	7.57	33.4	15.9	-

Note: Only 20 effluent samples were analysed in 2020. Samples from January 4, 11 and 18<sup>th</sup>, 2021 were included in order to cover 6 weeks of winter period.

FARUC recognizes this and has implemented a new testing schedule which will eliminate the testing overlap that occurs during the winter EMS 6-week testing period. This change will ensure an adequate number of tests are taken in every given year.

A total of 24 BOD and TSS samples were analysed.

### **BOD**

Inlet BOD ranged from 15.5 mg/l to 286.0 mg/L with an average of 109.6 mg/L. The average influent sewage strength was measured at 90.0 mg/L in 2019, 102 mg/L in 2018, 114.5 mg/L in 2017, 95.8 mg/L in 2016, 190.1 mg/L in 2015, 92.3 mg/L in 2014, 106 mg/L in 2013, 220 mg/L in 2012, 108 mg/L in 2011, 142 mg/L in 2010, 143 mg/L in 2009, 99 mg/L in 2008 and 488 mg/L in 2007. Since a typical municipal waste water BOD is in the range of 100 to 300 mg/L, it is assumed that the average BOD is well within the expected level.

<u>TSS</u>
TSS values ranged in the influent from 33.4 to 525.0 mg/L with an average of 162.7 compared to 2019 average at 124.9 mg/L. High value was recorded on January 2<sup>nd</sup>, 2020. The remaining values fall well within the expected municipal wastewater values between 100 and 350 mg/L.

### 7.0 OVERVIEW OF EFFLUENT RESULTS

This section provides data and analysis for the effluent (treated) samples and plant flows for 2020.

A total of 365 effluent samples were collected and analyzed for TSS; 20 samples were laboratory tested for TSS in 2020 plus 1 sample in December 2019 and 3 samples in January 2021. 20 samples were laboratory tested for BOD<sub>5</sub>, ortho-phosphate, total phosphate, fecal coliforms in 2020, 1 sample in 2019 and 3 samples in 2021 to cover the winter 6-week period. 3 samples were laboratory tested for 96-hr LC50 Bioassay.

Effluent samples were collected on the same dates as influent samples to permit an evaluation of plant performance. Table 7 summarizes the laboratory effluent test results for 2020.

Table 7 2020 Effluent Results

	2020 Effluent Results Summary											
Date							Coliforms	-				
	Flow	Temp	NH <sub>3</sub> -N	BOD	COD	P-OP04	Fecal	Total P	TSS	pН	NO <sub>3</sub> -N	NO <sub>2</sub> -N
(yyyy/mm/dd)	m³/d	С	mg/L	mg/L	mg/L	mg/L	cfu/100ml	mg/L	mg/L		mg/L	mg/L
2019-12-23	602	-2.0	0.050	2.0	14	0.249	2	0.416	9.0	7.94	44.4	0.050
2020-01-02	638	-2.0	0.050	2.0	19	0.721	72	0.766	3.0	7.50	45.1	0.050
2020-03-04	541	-2.0	0.050	2.0	14	0.213	1	0.268	3.0	7.62	49.8	0.050
2020-03-11	249	2.0	0.050	2.0	13	0.103	4	0.091	3.0	7.42	47.1	0.050
2020-03-18	207	-6.0	0.050	2.0	10	0.169	3	0.190	3.0	7.59	43.6	0.050
2020-03-25	236	2.0	0.050	2.0	10	0.125	1	0.132	3.0	7.84	31.1	0.050
2020-04-01	361	-10.0	0.050	2.0	10	0.146	1	0.175	3.0	7.97	19.8	0.010
2020-04-08	251	-4.0	0.050	2.0	10	0.346	1	0.357	5.0	8.19	22.9	0.010
2020-05-20	175	10.0	0.050	2.0	-	0.395	1	0.408	3.0	8.19	28.3	0.018
2020-06-17	280	6.0	0.050	2.0	-	0.373	2	0.415	3.0	8.29	16.4	0.010
2020-07-15	185	9.0	0.050	2.0	-	0.325	1	0.356	3.0	8.45	11.1	0.010
2020-08-12	296	20.0	0.050	2.0	-	0.281	2	0.313	3.0	8.37	15.8	0.010
2020-09-29	217	9.0	0.050	2.0	13	0.220	8	0.275	3.0	8.35	20.0	0.010
2020-10-07	174	7.0	0.050	2.0	11	0.214	14	0.199	3.0	8.32	26.4	0.050
2020-10-14	346	2.0	0.050	2.0	12	0.293	1200	0.376	3.0	3.44	5.5	0.010
2020-10-21	226	0.0	0.050	2.0	10	0.197	51	0.278	3.0	8.25	14.9	0.010
2020-10-28	162	1.0	0.050	2.0	-	0.156	3	0.267	3.0	8.34	19.1	0.010
2020-11-04	250	6.0	0.050	2.0	20	0.179	18	0.243	3.0	8.35	18.3	0.010
2020-12-15	383	-1.0	0.050	2.0	10	0.365	40	0.477	3.0	8.06	30.5	0.050
2020-12-21	417	1.0	0.050	2.0	10	0.540	11	0.601	3.0	8.04	34.5	0.050
2020-12-29	465	-6.0	0.050	2.0	14	0.249	2	0.416	9.0	7.94	44.4	0.050
2021-01-04	535	-2.0	0.050	3.4	21	0.118	14	0.301	3.0	8.16	28.6	0.050
2020-01-11	416	0.0	0.050	2.0	11	0.235	3	0.275	3.0	7.74	43.5	0.050
2021-01-18	418	-7.0	0.050	2.0	15	0.183	3	0.257	3.0	8.09	39.9	0.050
# Samples	21	21	24	24	24	24	24	24	24	24	24	24
Average	335	1	0.05	2.1	13	0.266	61	0.3	4	7.85	29.7	0.03
High	638	20	0.05	3.4	21	0.721	1200	0.8	9	8.45	49.8	0.05
Low	162	-10	0.00	2.0		0.103	1	0.1	3			0.01
Limit	1280	-	N/A		N/A	0.5	200	1		N/A	N/A	N/A
# Over Limit	0	N/A	N/A	0	N/A	2	1	0	0	N/A	N/A	N/A

Notes: 1. Light green squares show tests reported at less than the stated value, for calculations these are listed as equal to the value stated, ie. <0.05 is assumed to be 0.05

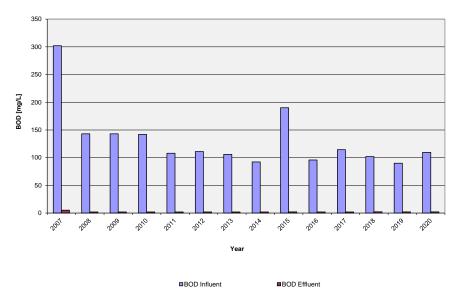
### 7.1 RESULTS ANALYSIS

#### BOD

The average BOD in the effluent was 2.1 mg/L in 2020, which was low and similar to the previous years (all but one sample were below the detection limit). Historically, the average BOD was 2.1 in 2019, 2.3 mg/L in 2018, 2.2 mg/L in 2015, 5.0 mg/L in 2007 and <2.0 mg/L in 2017, 2016 and between 2008 and 2014. None of the samples was over the limit.

<sup>2.</sup> Geometric mean is used for coliform results

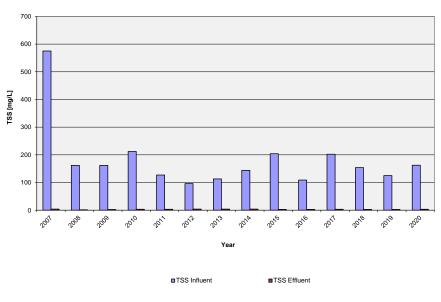
Figure 9
Historical BOD Test Results for Influent vs Effluent



<u>TSS</u>
Laboratory tests indicated that all TSS samples were below the laboratory detection at <3.0 mg/L or <9.0 mg/L.

The plant measured TSS on a daily basis. The highest result measured at the plant was recorded on December 18<sup>th</sup>, 2020 at 5.9 mg/L. Average TSS measured at the plant was at 1.5 mg/L with the highest results in the fourth quarter of the year at 1.7 mg/L (January 1 to December 31, 2020). All the results measured at the plant were well below the discharge limit.

Figure 10
Historical TSS Test Results for Influent vs Effluent



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Based on the above results the plant provides excellent BOD<sub>5</sub> and TSS treatment with average removals of 100%.

### Fecal Coliforms

Due to the relatively low levels of TSS, UV disinfection was able to effectively control the amount of coliform concentration found in the effluent. The UV disinfection was able to keep the coliform levels well below the acceptable limits for recreational waters (200 CFU/100 mL) throughout the year with the exception of one event on October 14<sup>th</sup>, 2020 with the fecal coliform results at 1200 CFU/100 ml. FARUC is currently reviewing this result and determining whether this was operator error or another factor. FAR does pump out outhouse facilities in the fall which are delivered to the facility as per our MSR. FARUC will closely monitor this during 2021 and take appropriate action, including monitoring and slower the treatment time, to ensure this was not the cause of process disruption.

The levels of coliforms tested in the Elk River downstream between December 23<sup>rd</sup>, 2019 and January 18<sup>th</sup>, 2021 were well below the acceptable limit for all monitoring events with the exception of October 14<sup>th</sup>, 2020, when downstream level was 7 CFU/100 mL higher than the upstream value.

### Ammonia-n

All effluent ammonia-n concentrations were below the detection limit of 0.05 mg/L.

Effluent data shows the plant is effectively oxidizing ammonia nitrogen and that there is no evidence of elevated ammonia levels in the Elk River as a result of discharge from the treatment plant.

As was the case in previous years, the bioassay toxicity tests in 2020 shows that plant effluent is non-toxic. The results of these tests are shown below in Table 8.

<u>Table 8</u> Toxicity Test Results

Sample Date	Result			
2019/12/04	Pass			
2020/10/14	Pass			
2021/01/11	Pass			

\*Please note one trout test was completed in the calendar year for 2020; however, one test was completed at the very end of December 2019 and one at the beginning of January 2021. The December 2019 test was included in both 2019 and this report.

The level of ortho-phosphorus exceeded the allowable limit on January 2<sup>nd</sup>, 2020 at 0.721 mg/L and very marginally on December 21<sup>st</sup>, 2020 at 0.540 mg/L vs the allowable limit of 0.500 mg/L. All the other ortho phosphorus results were below the allowable limit. All the total phosphorus levels were below the discharge limits for 2020.

A phosphorus reduction strategy, as outlined in Section 11, was started in the winter of 2007 to address the removal of soluble phosphorus from the effluent stream. The plant has sufficient infrastructure to remove precipitated nutrients and no additional treatment processes are required.

Phosphorus in the plant effluent has no discernable impact on background nutrient levels in the Elk River, with upstream and downstream concentrations being virtually identical. A 2001 report by Highwood Environmental indicated that phosphorus releases would have a negligible impact on aquatic life in the Elk River.

FARUC completed plant modifications for phosphorous removal.

### 7.2 COMPLIANCE SUMMARY

Table 9 summarizes the number of days that samples exceeded MSR effluent requirements.

<u>Table 9</u> 2020 MSR Parameter Compliance

Parameter	Unit	MSR Limit	No. of Samples	Average Value	Max. Value	Samples Over Limit
Flow	m³/day	1280	365	273.5	925	0
BOD <sub>5</sub>	mg/l	45	24 <sup>1</sup>	2.1	3.4	0
TSS	mg/l	45	389	4** (1.5)***	9**	0
Total Phosphorous	mg/l	1	24 <sup>1</sup>	0.3	0.78	0
Ortho Phosphate	mg/l	0.5	24 <sup>1</sup>	0.266	0.721	2
Fecal Coliforms*	CFU/100ml	200	24 <sup>1</sup>	61	1200	1
96 hr LC <sub>50</sub> Bioassay	/	Non-toxic	3.0	/	/	0

<sup>\*</sup> Limit for recreational waters only, not included in FAR registration letter

In 2020 the number of samples for BOD, total phosphorus, ortho-phosphorus and fecal coliform did not comply with the MSR requirements.

Two (2) ortho-phosphorus results exceeded the discharge limits and one fecal coliforms result exceeded the recreational waters limit. All remaining parameters were within the allowable limits in 2020.

<sup>\*\*</sup> Laboratory tests only (<3 considered at 3 mg/L)

<sup>\*\*\*</sup> Average of daily measurements

<sup>&</sup>lt;sup>1</sup> Only 24 laboratory tests done in 2020 instead of 25

### 8.0 SLUDGE PRODUCTION AND DISPOSAL

This section provides data regarding the disposal of bio-solids (sludge) from the treatment facility in 2020.

Operation of the 200 m³ aerated sludge digester allowed the plant to bag and landfill all of its biosolids without resorting to vacuum truck services. All solids were transported to the Crowsnest/Pincher Creek Landfill site.

Hauling data for bagged solids are in Table 10.

Table 10 2020 Bagged Solids Data

Month	Vol. Bagged (m³)
January	162.2
February	127.4
March	155.0
April	141.8
Мау	103.0
June	67.0
July	48.3
August	87.0
September	86.2
October	118.6
November	88.7
December	53.7
Total	1238.9

The aerated sludge digester has allowed the operators to store liquid sludge during peak winter weekend periods and bag at the less active midweek times, avoiding the need for emergency vacuum truck services. Sludge bag data indicates the winter season is most active for the plant.

Please note, the calculations for bagged solids are being reviewed to ensure consistency.

### 9.0 BYPASS EVENTS

This section provides information about bypass events in 2020.

Bypass events result in elevated effluent suspended solids concentrations, which decrease the effectiveness of the UV disinfection system; an increase in TSS results in a simultaneous increase in coliform counts. While soluble BOD is removed though the aeration basins, the overflow of TSS also results in an increase in BOD readings due to the presence of biological floc.

There were no bypass events in 2020.

### 10.0 PLANT IMPROVEMENTS

In January of 2015 the plant was retrofitted with a submersible pump in the Clearwell in order to utilize Clearwell effluent to spray down clarifiers. This was done to rectify the discrepancy between influent and effluent flows and to hopefully reduce the effluent flows. As seen in Figure 1 and Table 3, the influent and effluent flows were very similar and the total effluent and average effluent decreased from 2014.

The continuous strive for the improvements of the Waste Water Treatment System by FARUC will continue along with minimization of the potable water use ie clear well water will be used to spray down the clarifiers instead of potable water.

There were no major plant improvements in 2020, however FARUC has recognized that the current bagger disposal method is near capacity and will need upgrading in the near future.

### 11.0 PHOSPHORUS REMOVAL

This section describes the phosphorus monitoring and removal strategy being implemented to bring the plant into compliance with effluent limits.

In the winter of 2007, the plant increased chemical dosing with Clearpac to reduce effluent phosphorus concentrations. By late January 2008 sample results showed marked improvement with both ortho and total phosphorus concentrations falling below discharge requirements.

The increased application of Clearpac in 2008, while effective, has been operationally costly; the relationship between chemical dose and nutrient removal will be adjusted for best efficiency.

The monitoring and removal program continued in the summer of 2008 with the plant evaluating additional removal strategies, including:

- Implementation of sampling procedures to measure total phosphorus concentrations at the following locations; auger monster (raw sewage), clarifier supernatant, RBC overflow, mix tank liquor, sand filter filtrate, filter backwash, sludge digester supernatant, and effluent,
- Evaluation of precipitant dose on effluent phosphorous levels at the current chemical addition point (clarifier overflow),
- Evaluation of changing the precipitant dose location, and
- Evaluation of alternative chemicals.

The plant planned to continually monitor and optimize coagulant dosages for improved phosphorus removal.

In 2009 upgrades to the phosphorus injections points and mixing tanks began. In the spring of 2011 the final stage of this improvement was completed with the installation of a rapid mixer and flocculation system and the relocation of the UV system. This resulted in the better usage of tertiary filtration. Longer runs, less backwash water, better phosphorus removal and better effluent quality were to be the result.

2010 data shows further improvement in phosphorus concentrations with only three exceedances for ortho phosphorus (all results for total phosphorus were below the limits) with only a 15% exceedance compared to 2008 results with 50% exceedance and to 2009 with only a 18% exceedance.

2011 data showed further improvement in phosphorus concentrations with only one exceedances for each total phosphorus and ortho-phosphorus, both on July 14<sup>th</sup>, 2011. The exceedances for ortho phosphorus was only 4% and for total phosphorus was only 13% above the limit with is less than those of previous years.

The 2012 data showed similar results to that of 2011. Two samples exceeded the limit both for ortho phosphorus. The exceedance was 14% on January 5<sup>th</sup> and 16% on December 27<sup>th</sup>. It was anticipated that the program will continue to show improvement to plan effluent quality in 2013.

The 2013 data showed slightly elevated results to that of 2012. Six samples exceeded the limit for ortho phosphorus and one for total phosphorus. The exceedance ranged from 4% to 54% for ortho phosphorus and 9% for total phosphorus. The exceedances for ortho phosphorus were observed on January 3<sup>rd</sup>, January 17<sup>th</sup>, January 23<sup>rd</sup>, February 26<sup>th</sup>, July 30<sup>th</sup> and December 26<sup>th</sup>. The exceedance for total phosphorus was observed on January 3<sup>rd</sup>.

The 2014 data showed slightly lower results than those in 2013. Only one sample for each total and ortho phosphorus were above the limits. The exceedance was 9% for ortho-phosphorus and 40% for total phosphorus. The exceedance for ortho phosphorus was observed on December 21<sup>st</sup>. The exceedance for total phosphorus was observed on January 16<sup>th</sup>.

The average total phosphorus and ortho phosphorus for 2015 were slightly lower than in 2014. Three samples exceeded the limit for ortho phosphorus and none for total phosphorus. The exceedances for ortho phosphorus were 22% on January 1<sup>st</sup>, 3% on January 7<sup>th</sup> and 19% on December 22<sup>nd</sup>.

The average total phosphorus and ortho phosphorus for 2016 were similar to previous years. One sample exceeded the limit for ortho phosphorus and one for total phosphorus. The exceedance for ortho phosphorus was 18% December 28<sup>th</sup> and for total phosphorus was it 23% on December 28<sup>th</sup>.

The results for total and ortho phosphorus have decreased and during the 2017 season, all the ortho and total phosphorus results were below the discharge limits.

The results for total phosphorus remained low (no days above the discharge limit) for 2018. There was one ortho phosphorus result from March 21<sup>st</sup> that slightly exceeded the discharge limit (0.703 mg/L vs 0.5 mg/L); however all the remaining results were below the discharge limit for the year.

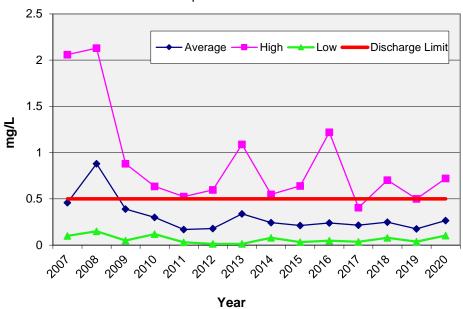
In 2019 and 2020 the results for total phosphorus remained low and mostly below the discharge limit of 1 mg/L with one ortho-phosphorus exceedance in 2019 and two exceedances in 2020.

3.5
3
Average High Low Discharge Limit

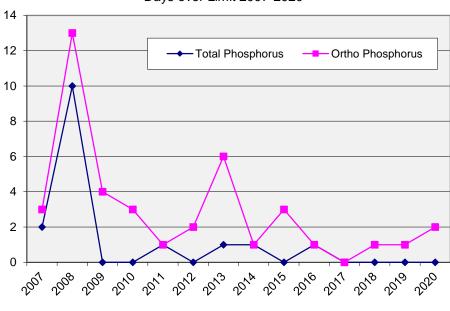
2.5
1
0.5
1
0.5
1
Year

Figure 11
Total Phosphorus Levels 2007-2020

Figure 12 Ortho Phosphorus Levels 2007-2020



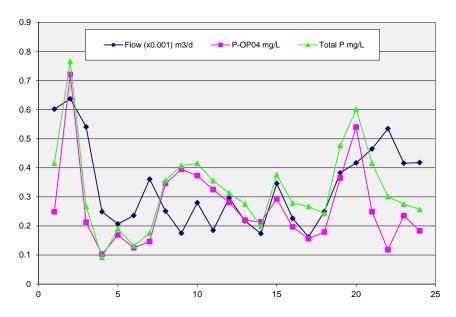
<u>.Figure 13</u> Days over Limit 2007-2020



Year

Phosphorus and ortho-phosphorus follow relatively closely the effluent flows in the plant as shown below.

Figure 14
Total Flow and Phosphorus Levels



#### 12.0 ASSESSMENT SUMMARY

In 2020 the number of samples for BOD, total phosphorus, ortho-phosphorus and fecal coliform did not comply with the MSR requirements. Two (2) ortho-phosphorus results exceeded the discharge limits and one fecal coliforms result exceeded the recreational waters limit. All remaining parameters were within the allowable limits in 2020.

There does not appear to be any significant adverse impacts to the Elk River from the effluent discharged.

The plant has produced high quality effluent with <u>BOD</u><sub>5</sub> normally below the regulated limit of 45 mg/l and for all but one instance (January 4<sup>th</sup>, 2021 at 3.4 mg/L), the results were less than 2 mg/L.

<u>TSS</u> results were less than laboratory detection limit for all samples tested and, therefore, below the MSR allowable limits. All daily samples from the plant were also low and below the limits.

### Nitrogen

Ammonia-n results in the effluent were low and below the laboratory detection limits.

Nitrate-n values vary between 5.5 and 49.8 mg/L, these values are fairly typical for a municipal wastewater effluent and fairly consistent throughout the years. Nitrite-n values are also very low with majority of the results below the detection limits. Nitrogen results indicate that the plant functioned well again in 2020.

### Phosphorus and Ortho-phosphorus

There has been a significant decrease in both total phosphorus and ortho-phosphorus concentrations as well as non-compliance events during the last several years. In 2019 and 2020 the results for total phosphorus remained low and mostly below the discharge limit of 1 mg/L with one ortho-phosphorus exceedance in 2019 and two exceedances in 2020.

### Fecal Coliforms

Generally, fecal coliforms in the effluent conformed to the applicable discharge levels throughout the year. Elevated coliform levels in the effluent did not coincide very well with elevated levels found in Elk River at the outfall and downstream with the exception of October 14<sup>th</sup>, 2020 when high fecal coliforms were tested in the effluent (1200 CFU/100 mg/L) in exceedance of the recreational levels at 200 mg/L.

Operation of the sludge digester has eliminated the need for emergency liquid sludge hauling. All sludge was bagged and disposed of at the approved landfill site.

FARUC recognizes the requirement to inspect the diffuser (outfall) every five years, an inspection has been scheduled for the summer of 2021.

A new subdivision has been approved and is currently under construction (Timberlanding). A capacity report from Urban Systems has been submitted and approved by the RDEK for the tying in of the subdivision into the WWTP. Details of the subdivision at build-out include 48 single family lots (27 in the first phase). The second phase includes the remaining 21 single family lots and 2 multifamily lots, each with a maximum density of approximately 56 units. Please note the first phase also includes 4 infill lots on Lower Timberline Crescent.

Analysis shows sufficient capacity in the WWTP for the first phase of development but likely an increase to the maximum allowable daily discharge will be required for Phase 2. Please note that when the WWTP was upgraded in 2005, additional capacity was built into the plant which would allow it to operate to a maximum flow of 1760 m³. In order to utilize this capacity, a licence amendment to increase the maximum daily flow from 1280 m³ to 1760 m³ will be required. The facility operators will have to monitor flows closely and ensure this application happens in a timely fashion.

### 13.0 AUTHORIZATION AND CLOSING

This report, titled 2020 Sewage Treatment Plant Annual Report, was prepared for FARUC by IQWATER Inc. The material in this report reflects the best judgement of IQWATER Inc. based on the information available at the time of preparation. Any use that a third party makes of this report, or reliance on or decisions based on it, is the responsibility of the third party. IQWATER Inc. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions taken based on this report.

IQWATER INC.

Jana Zverina, M.Sc., P. Eng. Manager, Water & Wastewater

iqw/jobs/W2020-019.2020

### 14.0 REFERENCES

- American Public Health Association, American Water Works Association and the Water Environment Federation: Standard Methods for Examination of Water and Wastewater
- American Public Health Association, American Water Works Association and Water Environment Federation. Standard Methods for the Examination of Water and Wastewater. 23<sup>rd</sup> Edition
- BC Environmental Management Act, Municipal Wastewater Regulation B.C. Reg. 87/2012, lasts Amended April 1<sup>st</sup>, 2018 by B.C. Reg. 46/2018
- BC Ministry of Health, Health Protection Branch, Sewerage System Standard Practice Manual, Version 3, September 2014
- BC Ministry of Environment & Climate Change Strategy, British Columbia Approved Water Quality Guidelines; Aquatic Life, Wildlife and Agriculture, August 2019
- Canadian Council of Ministers of the Environment. Canadian Water Quality Guidelines for the Protection of Aquatic Life
- Canadian Council of Ministers of the Environment. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses
- Canadian Council of Ministers of the Environment. Protocols Manual for Water Quality Sampling in Canada. 2011
- Health Canada. Guidelines for Canadian Drinking Water Quality. September 2020

### 15. TERMS AND CONDITIONS

- 1. Our reports are prepared to specifically fulfil our Clients' requirements. The conclusions are based on the time limitations and scope of the services provided and information obtained from those services. The Inspector certifies that he/she has no present or contemplated future interest in the inspected property.
- 2. IQWATER INC. will provide skill, care and diligence in accordance with generally accepted engineering practices and procedures at the time and location in which the services are performed. With time, conditions may change and the interpretation of the findings may be altered.
- 3. IQWATER INC. cannot assume responsibility for any deficiency, misstatement or inaccuracy in the report resulting from the omissions or misrepresentations of persons providing information to use in the report. Any sketch appearing in or attached to the inspection report, or any statement of dimensions, capacities, quantities, or distances, are approximate and are included to assist the reader in visualizing the property.
- 4. The contents of the report are for the sole use of the Client. The report is the property of the Client and copies shall only be made by the Client or with the approval of the Client. IQWATER INC. is not responsible for any use of information contained in the report, or any reliance or decisions made based on it by an unauthorized third party.
- 5. This report represents the conditions investigated and sampled at the time of study. Some of the services performed were based on visual observations of the site and the areas surrounding the site, and our opinion cannot be extended to areas that were unavailable for direct observation.
- 6. The Client is responsible for all permits, authorization, or consents and giving any required notices that enable EDI to perform the services required.

IQWATER INC. may use any contractor with appropriate recognized professional status or with special skills or knowledge to assist in performing the services, at the expense of the client.

- 7. Any documents provided to IQWATER INC. from the Client will remain the property of the Client, and upon written request IQWATER INC. will return such documents as soon as possible. Any information or documents obtained by IQWATER INC. while performing the services requested will remain the property of IQWATER INC.
- 8. IQWATER INC. and the client will take reasonable care to prevent any disclosure of the reports or documents, or any information obtained or contained in the reports prepared by IQWATER INC., unless it is to the persons who require such access to the information in order to discharge their responsibilities to IQWATER INC. or as required by law.
- 9. This report is not intended to have any direct effect on the value of the property, but rather to provide information on apparent site conditions. The Client acknowledges that IQWATER INC. is not making any recommendations with respect to the purchase, sale, investment, or development of the property; and that all decisions associated therewith are the sole responsibility and liability of the Client. Further, IQWATER INC. assumes no responsibility for matters of legal nature affection the property or title thereto.
- 10. Limits of Liability To the fullest extent permitted by law, and notwithstanding any other provision of the Service Agreement between the Client and IQWATER INC., total liability, in the aggregate, of IQWATER INC. and the IQWATER INC. officers, directors, partners, employees and sub-consultants, and any of them, to the Client and anyone claiming by or through the Client, for any and all claims, losses, costs or damages, including attorneys' fees and costs and expert-witness fees and costs of nay nature whatsoever or claims expenses resulting from or in any way related to the Project shall not exceed the limit of IQWATER's insurance in effect at the time of this report.
- 11. In accepting and using this report the Client agrees to indemnify and hold harmless IQWATER INC., its officers, partners, employees and consultant (collectively IQWATER INC.) from and against any and all claims, suits, demands, liabilities, losses, damages or costs, including reasonable attorney's fees and defence costs arising out of or in any way connected to the findings and results of the proposed work, whether liability arises under breach of contract or warranty, tort, including negligence, strict liability or statutory liability or any other cause of action.
- 12. IQWATER INC. will exercise due diligence, however, IQWATER INC. will not assume any liability for any damage to any facilities, utilities, ground or above-ground surface infrastructure within or outside the subject property boundary since any sampling if needed is intrusive in nature and damage may have to be done to obtain samples.
- 13. IQWATER INC. will not assume any responsibility for any actual or perceived loss of business to owner's operations as a result of the work proposed herein.
- 14. The governing law for this contract will be the Alberta law.
- 15. All claims of costs, losses, damages, etc. have to be immediately forward to IQWATER INC. insurance.

Table 11 - Fernie Alpine Resort Estimated Sewage Generation (m3/day)

Existing Development	Flow*		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Existing Development	(I/unit/day)	Units	Generation (m3/day)										
Griz Inn	1136	45	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1
Wolf's Den	318	42	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Cornerstone	1136	26	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Timberline Condos	1022	58	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3	59.3
Polar Peaks (4-Plex Units)	1136	24	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3
Timberline Single Family & B&B	1363	51	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5
	Subtotal	246	250.1	250.1	250.1	250.1	250.1	250.1	250.1	250.1	250.1	250.1	250.1
-													

Infill Units	Flow*		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
IIIIII OIIIts	(I/unit/day)	Units	Generation (m3/day)											
Timberline Infills	1022	141	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1	
Timberline Single Family	1363	2	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	
Timberline Infills	1022	106	108.3	108.3	108.3	108.3	108.3	108.3	108.3	108.3	108.3	108.3	108.3	
Timberlanding Multifamily	1022	45	60.0	60.0	60.0	60.0	60.0	60.0	60.0	46.0	46.0	46.0	46.0	
Timberlanding Single Family <sup>1)</sup>	1363	59.5	44.3	44.3	44.3	44.3	44.3	44.3	44.3	81.1	81.1	81.1	81.1	
Highline Infill	1022	26	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	
	Subtotal	379.5	386.0	386.0	386.0	386.0	386.0	386.0	386.0	408.8	408.8	408.8	408.8	

Highline Subdivision	Flow*		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
riigiilille Subulvisioli	(I/unit/day)	Units	Generation (m3/day)										
Single Family	1363	54	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8	73.6	73.6	73.6
Duplexes	1363	10	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6
Parcel 31-Condotel	318	61	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4
Parcel 32-Duplex	1363	16	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
Parcel 36-Hotel	318	101	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1	32.1
Parcel 37-Townhouses	1363	8	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
Parcel 38-Townhouses	1363	23	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3
Parcel 3-Condominium	1363	12	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
Parcel 8-Condominium	1363	42	57.2	57.2	57.2	57.2	57.2	57.2	57.2	57.2	57.2	57.2	57.2
	Subtotal	327	269.5	269.5	269.5	269.5	269.5	269.5	269.5	269.5	276.4	276.4	276.4

Day Users	Flow*	Population	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020
Day Osers	(I/unit/day)	(each)	Generation (m3/day)										
Skiers	36	700	252	252	252	252	252	252	252	252	252	252	252
	Subtotal	700	252	252	252	252	252	252	252	252	252	252	252

Dining Facilites/Bars	Flow*	Area	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Diffing Facilities/Bars	(l/m²/day)	(m2)	Generation (m3/day)										
Lizard Creek - Dining	97	54.7	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Lizard Creek - Bar	145	40.4	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Kelseys - Dining	97	204.4	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8
Kelseys - Bar	145	65	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Daylodge - Dining	97	358.6	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8
Daylodge - Bar	145	260.7	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8
Mean Bean	97	26.8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Gabrielles	97	133.8	13	13	13	13	13	13	13	13.0	13.0	13.0	13.0
Powder House Inn	97	232.2	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Bears Den	97	62.4	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
	Subtotal	1439	157.2	157.2	157.2	157.2	157.2	157.2	157.2	157.2	157.2	157.2	157.2

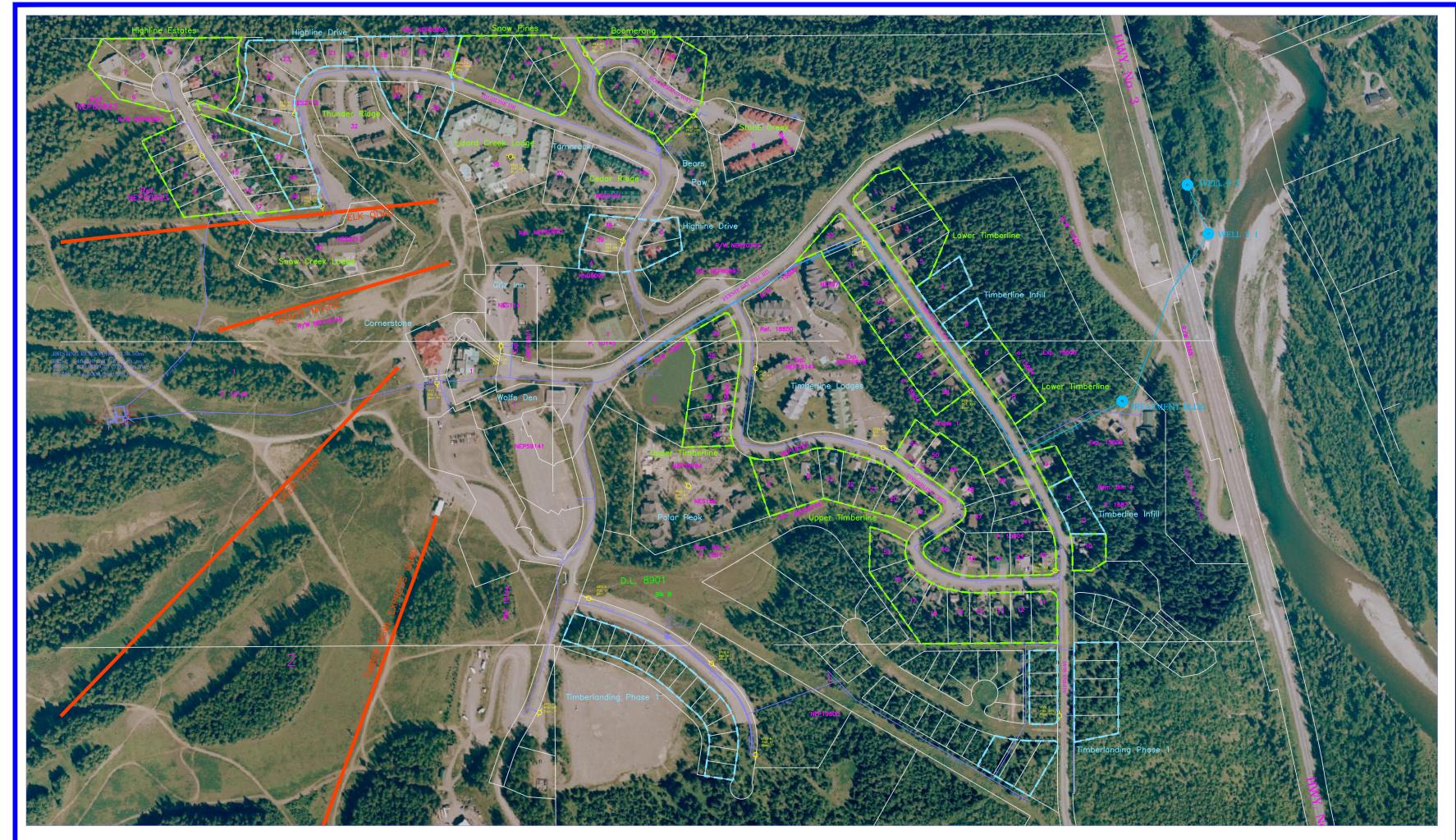
Daily Wastewater Flow (m3/day)*	1302.3	1302.3	1302.3	1302.3	1302.3	1302.3	1302.3	1337.6	1344.5	1344.5	1344.5
Corrected Daily Peak Flow Projections**	989 (actual)	811***(actual)	1181 (actual)	1036 (actual)	1058 (actual)	844 (actual)	1095 (actual)	687 (actual)	1043 (actual)	925 (actual)	1076 (projected)

<sup>\*</sup>Estimated Wastewater flows from BC Health Act, Sewage Disposal Regulation

<sup>\*\*</sup>Based on 2005 flow for peak day flows

<sup>\*\*\*</sup> Note that the number does not reflect a true peak as all the data were not available during high flow months

<sup>1) 27</sup> units added for Phase 1 Timberlanding in 2018



FERNIE ALPINE RESORT - EXISTING DEVELOPMENT



**FERNIE ALPINE RESORT - FUTURE DEVELOPMENT 2021 - 2025** 



Date: September 30, 2002

Our File RE 17139

### MEGESTERED MAD

Resorts of the Canadian Rockles Inc. PO Box 997 Victoria, BC VSW 288 Resorts of the Canadian Rockies inc. 1507 - 17th Avenue, SW ... Chigary Albora T2T 052

Door Sir.

Res Registration under the Municipal Sewage Regulation of the discharge to the Ele-River from the Fernic Alpino Resort sewage treatment plant located at District Let \$900, Rectency District (Plan 1687) near Regula British Coldinata

This is to acknowledge your registration form under the Mithicipal Service Regulation (the Regulation) deted August 30, 2001; and received at this office on October 31, 2001, for this registration of the westeward fractment plant owned and operated by Resorts of the Canadian Rockies Inc. at the Femile Alpine Resort ski hill totated near Femile, British Columbia. Forement to Part 2, section 3 of the Regulation, the effective date of registration of this discharge is the date of this letter. The polalistry the number for this discharge is RB 17139. Please indicate this member on all future correspondence regarding this discharge.

The bildel registration too is \$148.55. Please submit to the Regional Manager (the Manager) a cisage payable to the Minister of Finance and Corporate Relations, for this amount by September 25, 2002. An armust registration the will be described according to the Waste Management Parasit Peas Regulation and you will be receiving an annual involve from the ministery for payment of this fee. Payment of all fees such a necessary to comply with the Regulation. Pace will be calculated using a maximum afficient flow of 1280 in 1659, a maximum BODs of 45 regil, and a maximum TSS of 45 regil.

We wish to remind you that the discharges is responsible for compliance with the requirements of the Regulation, the registration, the Woste Management Act (the Act) and this registration letter. Your attention is respectfully directed to the terms and conditions outlined in the Regulation, the registration, this registration letter and the Act. Compliance with all the terms and conditions of the Regulation, the registration and this registration letter is required. Commercial of any of the conditions of the Regulation, the registration and this letter is a violation of the Act and may result in prosecution.



We also wish to draw your attention to the Havironmental Impact Study Guideline dated December 2000 or the latest version and the Regulation Compliance Guideline dated Fanuary 2001 or the latest version, these policy documents are used in conjunction with the Regulation, the registration and the Act.

The Regulation and postoy documents are available at :

http://wiegwww.gov.bc.co/opd/epdps/mpp/msrhome.html

This least does not replace the Act, regulations issued under the Act or the Regulation. It does not list all provisions relating to municipal sewage discharges. If there are differenced or omissions in this document then the Act, the regulations issued under the Act and the Regulation apply except where expressly noted in this latter.

Registration under the Regulation about the construent as a representation that the sutherized works are adequately designed or will eatiefy the Regulation. It is the responsibility of the discharger to ensure that the works are adequately designed, constructed and operated and that the discharge quality compiles with the Regulation and this latter. Registration under the Regulation and this latter are without projudice to any additional works that may be required or any additional requirements that may be specified by the Manager. The Manager may also leave Orders under the Act.

Registration under the Regulation does not eatherise entry upon, crossing over, or use for any purpose of private or Carwa labels or weaks, unless and except as authorised by the owner of such lands or works. The responsibility for obtaining such subnority shall rest with the discharger. It is also the responsibility of the discharger to ensure that all activities conducted under this registration are carried out with regard to the rights of units parties and comply with other applicable legislation that may be in force. The discharger must also obtain any necessary approvals from other arenoles.

Administration of the Act, the Regulation, the registration and this registration letter will be carried out by staff from our Sub-Regional Office located at #205 Industrial Road C, Crasbrook, British Columbia, VIC 705, (telephone. (250) 489-8570) or from our Regional Office located at #401 - 333 Victoria Street, Nation, British Columbia, VIL 4K3. Pluns, data and reports perfinent to the Regulation, registration and this letter are to be submitted to the Manager at the Sub-Regional office address at Crasbrook, British Columbia in the form required by the Manager. The ministry uses a reference number to track monitoring data associated with discharges. The site reference number for this discharge is BI02571.



### Regulatration Reference Documents

This registration under the Regulation is bound on the following documents:

- The Fermis Alpine Resort Limited, Registration Form dated August 20, 200) and received October 51, 200).
- Environmental Impact Study, Sewage Treatment Plant at Famile Alpine Reservance for Fernic Alpine Reservation by Highwood Environmental Management Limited dated April 2001.
- Environmental Impact Study for Persia Alpina Resont's Wastewater Discharge Into the Elk River, Interim Report prepared by Contr Pacific Brytromnenou Technologies Incorporated desco May 1, 2001.
- Permin Alpine Resort, Westewater Treatment Plant, Guiding Document for Proposed Improvement 2001 prepared by Orban Systems dated May 2001.
- Lithm Systems drawings titled Fornio Alpine Report Westewater Treatment Plans Expansion dated August, 2001.

### Treatment Plant Works

The treatment plant works are one believed more some and screen, two sension flow equalization tanks, a separate equalization tank, two cladifiers, two there stage rotating blological contament, two flocupiation tanks, two cladifiers and congulant feed, two send filters, a backwark water southing tank, UV distriction units, one sension blosolide (stage) digestion tank, blosolide (stage) dewelsting equipment and a pipelian and outfall to the like River and related apparateness approximately as shown on Urban Systems drawings timed Fernis Alpine Report Washewater Treatment Plant Expansion duted August, 2001 or on the stages at the Figure The plant maximum delay flow and discharge to the environment in 1280 m/day. The efficient guality shall be BOD; of 45 mg/L, TSS of 45 mg/L, total phosphorus of 1,0 mg/L, onthe phosphasts Q,3 mg/L, and the efficient shall also pains a 90 hour LCSD blostary test.

### Privatery Secrements and Destatored Biombide (Kintige) Disputed

Primary screenings and downtored blosolids (aladge) from the treatment plant shall be disposed at the Crownest/Planter Creek Landfill. The discharger shall submit confirmation of acceptance of the surroungs and blosolids by the Crownest/Planter Creek Landfill Authority on or behine Detector 25, 2002. If primary screenings and dewatered blosolids (shalps) from the positional plant are not disposed at the Crownest/Planter Creek Landfill they must be disposed in accordance with an authorization issued under the Act, the Organic Matter Recycling Regulation or in a pastner approved by the Manager.

### Semi-polid Weste

The filecharger shell not accept semi-solid wastes in the treatment plant. Semi-solid wastes means septic tank pumpage, helding tank solids or studge from sewage facilities.

### Plant Design

The treatment plant design must be in accordance with Schedule 7 of the Regulation and meet reliability Category I. The discharger shall provide written confirmation that the treatment plant works must reliability Category I and confirm that multiple disinfection units have been installed. The confirmation shall be submitted on as before October 23, 2002.

### Quitait Biffner

The discharges shall install an outfall diffusor in accordance with Part 4, Section 3 and Schedule 7, Condition 4 of the Regulation. The diffusor shall be installed on or before August 31, 2003. The discharges must obtain all accessary approvals from other agentum prior to installing the diffusor.

### Admittengi Works

The works are to be designed to allow for additional facilities in haure to reduce efficient ammonia levels if unmonia levels in the Elk River exceed the ownerst British Columbia Approved Water Quality Guidelines (Criteria) or if manistering results indicate exceedence of the sumon Criteria for ammonis is implicent. Water quality Criteria apply at the edge of the initial dilution zone.

The works are also to be designed to slow for increased phosphorus removal if signs problems develop in the Bik River,

# g chief at

### Oreguter Qualifications and Cartification

The discharger shall ensure that the treatment plant is classified and the transment plant operators conditied in accordance with Part 6, floration 25 of the Regulation. Proof of insurment plant classification (copy of classification) and egurator certification (copy of conditionation) shall be submitted to the Manager on or before Gotober 25, 2002.

### Munitoring

The discharger shall undertake monitoring in accordance with Parl 7 and applicable conditions of Schedule 6 of the Regulation subject to the regularments to follows:

### Sampling and Applyale

Sampling and enalysis chall be in eccordance with Part 7, Section 25 of the Regulation Minimum detection limits for subjects shall be:

Ammonia	5pg/L	( Nouse)
Nitrain	5 Ag/L	11.1
Nitrita	2 me/L	
Total Phosphorus	3 MR/L	
Orthopkombate	3 yell	

These detection limits shall only apply to the enalysis of samples obtained from the Elk-River. These detection limits will not apply to the analysis of samples obtained from the plant influent and effluent.

Please gote the requirement to submit does in accordance with the Environmental Daru Quality Assurance Regulation as per Section 25 (3) of the Regulation,

### Discharge Monitoring and Receiving Sevironment Monitoring

In accordance with Part 7, Section 26 and 27 of the Regulation the discharger shall undertake the following monitoring program:

	ing Location Free Elk River* ( At Sites UP, IDZ and DN)		Plant Millumi
	MENG JOAN	-84	+
Parameter		man .	To Sunti
pH (field test)	WS/O		M/G and WS/G
temperature (field test)	WS/G	النفا	
flow.		b/con.	DYCON
BOD, 1		M/G	M/O and WS/G
TSS	WS/G	M/G	M/O and WS/G and D/CON,
epumonia (es	W&/G		M/G and WalG
nitrate (se nitrogen)	Wa/G	V	M/G and WS/G
nistita (es nitrogan)	WS/U		M/G und WS/G
total phosphorus	D/WW		M/G and WS/G
	Elk River <sup>3</sup> ( At Sites UP, IDE and DN)	Plant Influent <sup>3</sup>	Plant Eiffment
orthophophaid	WS/G		M/G and WS/G
fecal coliforms	Ws/G		M00 and W8/G
Totality			3Y/G

1. BOD; - mesos the total 5-day blooberrical oxygen demand.

2. TSS - means total suspended solids or non-filterable residue.

3. Plant influent and afflicent complex must be obtained at peak times on peak flow days. The peak flow days shall be based on bookings at the resort. An influent flow meter shall be installed on or before December 31, 2003.

4. Sampling of the Elk River shall be done on the same day as plant influent and effluent sampling and also currespond with peak flow days at the resort in a

manner similar to plant influent/effluent sampling.

dalah dib	ing Lucation Fred Elk River <sup>4</sup> ( At Sites UP, IDZ and DN)	Finnt Imfuent <sup>3</sup>	Plant Efficient
Paramoter		mus	
pH (field test)	WS/0		M/O end WS/G
temperature (field	WS/O		
How.	ala, citallia	D/CON.	D/CON.
BOD <sub>5</sub> <sup>3</sup>		M/o	M/G and WS/G
7332	WS/G	M/G	M/O and WS/O ami D/CON.
ammonta (as nitrogen)	Wa/G		DI&W bus DIM
altrate (as nitrogen)	WS/C	- TANGULA	M/G and WS/G
nistite (as nitragen)	WS/G		M/G and WS/G
total phosphorus	W8/G		M/O and WS/O
Through the second	Elk River (At Sites UP, IIII and DN)	Plent Influent	Plant Effluent <sup>2</sup>
orthophosphaid	W9/G	-	M/G and WS/G
fical collianus	WS/Q		M/O and W8/G
Toxioity			3Y/G

BOD<sub>5</sub> - means the local 5-day biochemical oxygen demand.
 TS3 - means total suspended solids or non-filterable residue.

3. Plant influent and effluent escapies must be obtained at peak does on peak fluor days. The peak flow days shall be based on bookings at the cased. An influent flow meter shall be installed on or before December 31, 2003.

4. Sampling of the Elk River shall be done on the same day as plant influent and efficient sampling and also correspond with peak flow days at the resort in a manner similar to plant influent/offluent sampling.

### Sampling Prequency:

D - means deliy.

M - means monthly.

WS — weakly someonal (This means obtaining mappies weakly for a six week period in the spring, in the fall and during the Christmes senson at peak flow times and days. Peak flow days will be predicted on the beam of resort bookings. The commencement of the spring and fall sampling sociations depends on weather and hydrologic conditions. The spring sampling should begin early in the spring after force ont when river flows are low and the fall sampling should begin when river flows are low and arbidity is low. Professional judgment should be used regarding the start times of the weakly sampling programs in the spring and fall. The Christmes sampling should begin in mid December; and extend into Japoury. During the six week sampling period his monthly sampling is not necessary.)

3Y - means three times per year to correspond with the WS sampling.

### Simple Type:

If - means grab sample (Note: who obtaining samples of the influent and offluent the grab samples will be taken on peak flow days at peak flow times during the day. Peak days shall be profiled on the basis of bookings at the resort.)

CON, "means continuous using a data logger. (Note: Flow meters and TSS arounds shall be exhibited. The flow meter and TSS moler calibration frequency and procedures shall be contained to the operating plan.)

### Mondtoring for Plant Operation Phrocass

The discharger is expected to undertake additional monitoring for plant operation purposes. The monitoring program collined in this letter is not considered adequate for plant operation purposes.

### Environmental Monttoring System (BMS) Numbers

The following are the EMS alte numbers exalgned to the monitoring sites bland above. These numbers are to be used when entering dess directly into the Ministry BMS database in accordance with Part 7, Section 28 (2) of the Regulation. It tooltoxing data shall be submitted to the Ministry data base questerly within 30 days of the end of each quarter.



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### Monitoring Proptem Changes

The Manager may medify the monitoring program from time to time. The annual report shall contain recommendations regarding changes (additional delicus/medifications) to the monitoring program.

### Supervisory Control and Data Acquisition (SCADA)

The discharger is encouraged to install a SCADA system. SCADA systems may be a requirement in the future.

If you have any questions concerning this registration, pieces consect our Cranbrook Sub-Regional Office at (230) 489-8540.

Your truly,

Carl Johnson, P.Bas.

Anslatent Regional Waste Manager

ΠĐ

co: Paul Bairs, Resorts of the Canadian Rockies, Calgary
Tody Todano, Resorts of the Canadian Rockies, Calgary
Spenis Gigilotti, P. Sng. Urban Systems, Kalowna
Andrew Wells, Fernis Alpine Resort, Fernis
Andrew Brown, Fernis Alpine Resort, Fernis
Ken van Heyningen, Fernis Alpine Resort, Fernis
Gary Lawrence, MWLAP, Crambrook



FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 24-DEC-19

Report Date: 02-JAN-20 14:41 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2400117

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - WINTER 2019 EMS WK #5

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.

Account Manager

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L2400117 CONTD.... PAGE 2 of 5 Version: FINAL

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2400117-1 WWTP INFLUENT							
Sampled By: HUNGRY BAYTALUKE on 23-DEC-19 @	14:00						
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	170	DLHC	75	mg/L		24-DEC-19	R4956626
Total Suspended Solids	151	DLHC	5.0	mg/L		30-DEC-19	R4958015
pH	7.82		0.10	pН		30-DEC-19	R4958137
L2400117-2 WWTP EFFLUENT							
Sampled By: HUNGRY BAYTALUKE on 23-DEC-19 @	14:15						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		31-DEC-19	R4958324
Biochemical Oxygen Demand	<2.0		2.0	mg/L		24-DEC-19	R4956626
Chemical Oxygen Demand	12		10	mg/L		30-DEC-19	R4957916
Orthophosphate-Dissolved (as P)	0.183	DLHC	0.010	mg/L		24-DEC-19	R4955084
Coliform Bacteria - Fecal	139		1	CFU/100mL		24-DEC-19	R4956888
Nitrate (as N)	17.0		0.020	mg/L		24-DEC-19	R4957366
Nitrite (as N)	<0.010		0.010	mg/L		24-DEC-19	R4957366
Phosphorus (P)-Total	0.243	DLHC	0.025	mg/L		27-DEC-19	R4955311
Total Suspended Solids	<3.0		3.0	mg/L		30-DEC-19	R4958015
рН	7.66		0.10	pН		30-DEC-19	R4958137
L2400117-3 ELKRIVER UPSTREAM							
Sampled By: HUNGRY BAYTALUKE on 23-DEC-19 @	14:30						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		31-DEC-19	R4958324
Orthophosphate-Dissolved (as P)	0.0063		0.0050	mg/L		24-DEC-19	R4955084
Coliform Bacteria - Fecal	4		1	CFU/100mL		24-DEC-19	R4956888
Nitrate (as N)	1.14		0.020	mg/L		24-DEC-19	R4957366
Nitrite (as N)	<0.010		0.010	mg/L		24-DEC-19	R4957366
Phosphorus (P)-Total	0.0177		0.0050	mg/L		27-DEC-19	R4955311
Total Suspended Solids	5.3		3.0	mg/L		30-DEC-19	R4958015
pH	8.20		0.10	pН		30-DEC-19	R4958137
L2400117-4 ELKRIVER OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 23-DEC-19 @	14:45						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		31-DEC-19	R4958324
Orthophosphate-Dissolved (as P)	0.0130		0.0050	mg/L		24-DEC-19	R4955084
Coliform Bacteria - Fecal	1		1	CFU/100mL		24-DEC-19	R4956888
Nitrate (as N)	0.105		0.020	mg/L		24-DEC-19	R4957366
Nitrite (as N)	<0.010		0.010	mg/L		24-DEC-19	R4957366
Phosphorus (P)-Total	0.0258		0.0050	mg/L		27-DEC-19	R4955311
Total Suspended Solids	6.7		3.0	mg/L		30-DEC-19	R4958015
рН	8.20		0.10	pН		30-DEC-19	R4958137
L2400117-5 ELKRIVER DOWNSTREAM							
Sampled By: HUNGRY BAYTALUKE on 23-DEC-19 @	15:00						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		31-DEC-19	R4958324
					1	1	I .

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2400117 CONTD.... PAGE 3 of 5 Version: FINAL

# ALS ENVIRONMENTAL ANALYTICAL REPORT

L2400117-5   ELKRIVER DOWNSTREAM   Sampled By: HUNGRY BAYTALUKE on 23-DEC-19 @ 15:00   Matrix: WATER   Coliform Bacteria - Fecal   5   1   CFU/100mL   24-DEC-19   CFU/100mL   24-DEC-19   CFU/100mL   CFU/100mL	R4957366 R4957366 R4955311 R4958015
Sampled By:       HUNGRY BAYTALUKE on 23-DEC-19 @ 15:00       15:00       Long the control of the	R4957366 R4957366 R4955311 R4958015
Matrix:         WATER         5         1         CFU/100mL         24-DEC-19           Nitrate (as N)         1.28         0.020         mg/L         24-DEC-19           Nitrite (as N)         <0.010	R4957366 R4957366 R4955311 R4958015
Coliform Bacteria - Fecal         5         1         CFU/100mL         24-DEC-19           Nitrate (as N)         1.28         0.020         mg/L         24-DEC-19           Nitrite (as N)         <0.010	R4957366 R4957366 R4955311 R4958015
Nitrate (as N)       1.28       0.020       mg/L       24-DEC-19         Nitrite (as N)       <0.010	R4957366 R4957366 R4955311 R4958015
Nitrite (as N)         <0.010         0.010         mg/L         24-DEC-19           Phosphorus (P)-Total         0.0143         0.0050         mg/L         27-DEC-19           Total Suspended Solids         4.0         3.0         mg/L         30-DEC-19	R4957366 R4955311 R4958015
Phosphorus (P)-Total         0.0143         0.0050         mg/L         27-DEC-19           Total Suspended Solids         4.0         3.0         mg/L         30-DEC-19	R4955311 R4958015
Total Suspended Solids 4.0 3.0 mg/L 30-DEC-19	R4958015
ул 0.20 0.10 ул 00 020 к	114330137

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - WINTER 2019 EMS WK #5

L2400117 CONTD....

Reference Information

PAGE 4 of 5 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier Description

**DLHC** Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

**BOD-CL** Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry Water

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

FCC-MF-CL Fecal Coliform Count-MF Water APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

NH3-F-CL Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC Water

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water рΗ APHA 4500 H-Flectrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water **Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

**Laboratory Definition Code Laboratory Location** CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

FARUC - WINTER 2019 EMS WK #5

L2400117 CONTD....

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### **Reference Information**

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

### ALS Environmental

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ANALYTICAL CHEMISTRY & TESTING SERVICES



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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 03-JAN-20

Report Date: 10-JAN-20 09:43 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2401750

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - WINTER 2019/2020 EMS WK #6

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2401750 CONTD.... PAGE 2 of 5 Version: FINAL

### ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2401750-1 WWTP INFLUENT							
Sampled By: BO CHOROSZEWSKI on 02-JAN-20 @	15:10						
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	247	DLHC	75	mg/L		04-JAN-20	R4965966
Total Suspended Solids	525	DLHC	15	mg/L		03-JAN-20	R4959650
рН	7.80		0.10	pН		03-JAN-20	R4958954
L2401750-2 WWTP EFFLUENT							
Sampled By: BO CHOROSZEWSKI on 02-JAN-20 @	15:15						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		03-JAN-20	R4959393
Biochemical Oxygen Demand	<2.0		2.0	mg/L		04-JAN-20	R4965966
Chemical Oxygen Demand	19		10	mg/L		05-JAN-20	R4959273
Orthophosphate-Dissolved (as P)	0.721	DLHC	0.050	mg/L		03-JAN-20	R4958983
Coliform Bacteria - Fecal	72		1	CFU/100mL		03-JAN-20	R4959246
Phosphorus (P)-Total	0.766	DLHC	0.050	mg/L		06-JAN-20	R4959766
Total Suspended Solids	<3.0		3.0	mg/L		03-JAN-20	R4959650
рН	7.50		0.10	pН		03-JAN-20	R4958954
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC		51110		,,,		00 1411 00	
Nitrate (as N)	45.1	DLHC	0.10	mg/L		03-JAN-20	R4959061
Nitrate+Nitrite Nitrate and Nitrite (as N)	45.1		0.11	mg/L		05-JAN-20	
Nitrite in Water by IC	45.1		0.11	ilig/ L		00 0/11 20	
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		03-JAN-20	R4959061
L2401750-3 ELKRIVER UPSTREAM							
Sampled By: BO CHOROSZEWSKI on 02-JAN-20 @	15:00						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		03-JAN-20	R4959393
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		03-JAN-20	R4958983
Coliform Bacteria - Fecal	1		1	CFU/100mL		03-JAN-20	R4959246
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		06-JAN-20	R4959766
Total Suspended Solids	<3.0		3.0	mg/L		03-JAN-20	R4959650
рН	8.34		0.10	pН		03-JAN-20	R4958954
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.78		0.020	mg/L		03-JAN-20	R4959061
Nitrate+Nitrite Nitrate and Nitrite (as N)	1 70		0.022	ma/l		05-JAN-20	
Nitrite in Water by IC	1.78		0.022	mg/L		05-JAN-20	
Nitrite in water by iC Nitrite (as N)	<0.010		0.010	mg/L		03-JAN-20	R4959061
L2401750-4 ELKRIVER OUTFALL	13.0.0			<i>y</i> -			
Sampled By: BO CHOROSZEWSKI on 02-JAN-20 @	14:50						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		03-JAN-20	R4959393
Orthophosphate-Dissolved (as P)	0.0111		0.0050	mg/L		03-JAN-20	R4958983
Coliform Bacteria - Fecal	3		1	CFU/100mL		03-JAN-20	R4959246
Phosphorus (P)-Total	0.0146		0.0050	mg/L		06-JAN-20	R4959766
Total Suspended Solids	<3.0		3.0	mg/L		03-JAN-20	R4959650
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		0.0	9, ⊏		55 07 11 20	1.1303030

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2401750 CONTD.... PAGE 3 of 5 Version: FINAL

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2401750-4 ELKRIVER OUTFALL							
Sampled By: BO CHOROSZEWSKI on 02-JAN-20 @	14:50						
Matrix: WATER							
pH	8.26		0.10	pН		03-JAN-20	R4958954
NO2, NO3 and Sum of NO2/NO3				,			
Nitrate in Water by IC							
Nitrate (as N)	0.106		0.020	mg/L		03-JAN-20	R4959061
Nitrate+Nitrite Nitrate and Nitrite (as N)	0.106		0.022	mg/L		05-JAN-20	
Nitrite in Water by IC	0.100		0.022	IIIg/L		03-3/11-20	
Nitrite (as N)	<0.010		0.010	mg/L		03-JAN-20	R4959061
L2401750-5 ELKRIVER DOWNSTREAM							
Sampled By: BO CHOROSZEWSKI on 02-JAN-20 @	14:35						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		03-JAN-20	R4959393
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		03-JAN-20	R4958983
Coliform Bacteria - Fecal	2		1	CFU/100mL		03-JAN-20	R4959246
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		06-JAN-20	R4959766
Total Suspended Solids	<3.0		3.0	mg/L		03-JAN-20	R4959650
pH NO2, NO3 and Sum of NO2/NO3	8.33		0.10	pН		03-JAN-20	R4958954
Nitrate in Water by IC							
Nitrate (as N)	1.80		0.020	mg/L		03-JAN-20	R4959061
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.80		0.022	mg/L		05-JAN-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		03-JAN-20	R4959061
TNITILE (as IV)	<0.010		0.010	IIIg/L		03-3AN-20	K4939001

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

#### L2401750 CONTD....

PAGE 4 of 5
Version: FINAL

### Reference Information

Sample Parameter Qualifier Key:

Qualifier Description

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

ALS Test Code Matrix Test Description Method Reference\*\*

BOD-BC-CL Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

 Laboratory Definition Code
 Laboratory Location

 CL
 ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

L2401750 CONTD....

PAGE 5 of 5 Version: FINAL

### **Reference Information**

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

#### ALS Environmental

ANALYTICAL CHEMISTRY & TESTING SERVICES



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L2401750-COFC

504-253-6700

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/80-437-2311 3 Fax: 403-291-0298 ax: 306-668-6383

# www.aisenviro.com Calgary AB, 8ay 7, 1313 - . Sasketoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-868-8370, 10 million 1 milli

CHAIN OF CUSTODY FORM SEND REPORT TO: PAGE OF ATTN: PATRICK MAJER FERNIE ALPINE RESORT UTILITIES CORPORATION COMPANY ANALYSIS REQUESTED: 1505 - 17TH Avenue South East **ADDRESS** PROV: ALBERTA CALGARY T2T 0E2 CITY: POSTAL CODE 1 - 800 - 258 - 7669 Bo Choroszewski TEL: FAX: 403 - 244 - 3774 SAMPLER FARUC-Winter 2019/2020 EMS wk #8 PROJECT NAME AND NO.: QUOTE NO ALS CONTACT: patryk.wojciak@alsglobal.com PO NO. aje @skircr.com Coliforms REPORT FORMAT: WO# NO3-N NO2-N DATE / TIME COLLECTED 8005 <u>E</u> Ortho NOTES (sample specific SAMPLE (DENTIFICATION MATRIX Total TSS comments, due dates, etc.) 돐 YYYY-MM-00 TIME 5:10 х Х WWTP Influent Routine 2020 - 01 -02 Water temp = C WWTP Influent BOD х 2020 - 01 -02 Water temp = × X С WWTP Effluent Routine 2020 - 01 -02 Water Х temp = WWTP Effluent BOD Х C 2020 - 01 -02 Water temp = С WWTP Effluent Nutrient 2020 - 01 -02 Water X X x temp = WWTP Effluent Bacti 2020 - 01 -02 Water х С temp = ONLY Х х  $\Omega$ C Elkriver Upstream Routine 2020 - 01 -02 Water temp = LAB USE Elkriver Upstream Nutrient 2020 - 01 -02 ∖∵ଫ⊃ Water Х Х Х Х Х С temp = С Elkriver Upstream Bacti 2020 - 01 -02 Water Х 0 temp = FOR 4 Х Х С Elkriver Outfall Routine 2020 - 01 -02 Water temp = С Х 2020 - 01 -02 Water Х Х Х Elkriver Outfall Nutrient temp = Elkriver Outfall Bacti 2020 - 01 - 02Water х С temp = Elkriver downstream Routine 2020 - 01 -02 х Х С Water temp = С Elkriver downstream Nutrient 2020 - 01 -02 Water х Х Х Х Х , O Elkriver downstream Bacti 2020 - 01 - 02Water С Х temp = DATE 2020-01-02 RECEIVED BY: DATE: 01 / 03 RELINQUISHED BY TURN AROUND REGUIRED. Bo Choroszewski 9:00 TIME TIME: DA~F DOC SOUSHED BY: RECEIVED BY: DATE TIME TIME: FUNCTAR USE ONLY Yes No NiA (Frozen? icepacks \_\_\_lce \_\_\_None Yes



FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 12-MAR-20

Report Date: 18-MAR-20 15:40 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2427123

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - SPRING 2020 EMS WK #2

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.

Account Manager

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L2427123 CONTD.... PAGE 2 of 5 Version: FINAL

### ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2427123-1 WWTP INFLUENT							
Sampled By: Hungry Baytaluke on 11-MAR-20 @ 14:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	113	DLHC	6.0	mg/L		12-MAR-20	R5030151
Total Suspended Solids	207	DLHC	8.0	mg/L		17-MAR-20	R5029486
pH	7.78		0.10	рН		12-MAR-20	R5024095
L2427123-2 WWTP EFFLUENT							
Sampled By: Hungry Baytaluke on 11-MAR-20 @ 14:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		12-MAR-20	R5022969
Biochemical Oxygen Demand	<2.0		2.0	mg/L		12-MAR-20	R5030151
Chemical Oxygen Demand	13		10	mg/L		13-MAR-20	R5025266
Orthophosphate-Dissolved (as P)	0.103	DLHC	0.010	mg/L		12-MAR-20	R5024127
Coliform Bacteria - Fecal	4		1	CFU/100mL		12-MAR-20	R5025168
Phosphorus (P)-Total	0.0914		0.0050	mg/L		13-MAR-20	R5024729
Total Suspended Solids	<3.0		3.0	mg/L		17-MAR-20	R5029486
pH	7.42		0.10	pН		12-MAR-20	R5024095
NO2, NO3 and Sum of NO2/NO3 Nitrate in Water by IC							
Nitrate in water by iC Nitrate (as N)	47.1	DLHC	0.10	mg/L		12-MAR-20	R5024548
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	47.1		0.11	mg/L		13-MAR-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		12-MAR-20	R5024548
L2427123-3 ELKRIVER UPSTREAM							
Sampled By: Hungry Baytaluke on 11-MAR-20 @ 14:30							
Matrix: Water							
Miscellaneous Parameters	0.050		0.050			40 144 17 00	D500000
Ammonia, Total (as N)	<0.050		0.050	mg/L		12-MAR-20	R5022969
Orthophosphate-Dissolved (as P) Coliform Bacteria - Fecal	<0.0050		0.0050	mg/L		12-MAR-20	R5024127
Phosphorus (P)-Total	9 <0.0050		1	CFU/100mL		12-MAR-20	R5025168 R5024729
Total Suspended Solids	3.3		0.0050	mg/L		13-MAR-20 17-MAR-20	R5024729 R5029486
pH	3.3 8.23		3.0 0.10	mg/L pH		12-MAR-20	
NO2, NO3 and Sum of NO2/NO3	0.23		0.10	pri		12-WAK-20	R5024095
Nitrate in Water by IC							
Nitrate (as N)	1.60		0.020	mg/L		12-MAR-20	R5024548
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.60		0.022	mg/L		13-MAR-20	
Nitrite in Water by IC	-0.040		0.040	m ~/I		12 MAD 22	DE004540
Nitrite (as N)	<0.010		0.010	mg/L		12-MAR-20	R5024548
L2427123-4 ELKRIVER OUTFALLL							
Sampled By: Hungry Baytaluke on 11-MAR-20 @ 14:45							
Matrix: Water Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		12-MAR-20	R5022969
Orthophosphate-Dissolved (as P)	0.0076		0.050	mg/L		12-MAR-20	R5022909
Coliform Bacteria - Fecal	0.0076		1	CFU/100mL		12-MAR-20	R5025168
Phosphorus (P)-Total	0.0087		0.0050	mg/L		13-MAR-20	R5024729
Total Suspended Solids	<3.0		3.0	mg/L		17-MAR-20	R5029486
. Sta. Suspended Condo	<b>\0.0</b>		5.0	111g/L		17 101/313-20	10029400

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2427123 CONTD.... PAGE 3 of 5 Version: FINAL

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2427123-4 ELKRIVER OUTFALLL							
Sampled By: Hungry Baytaluke on 11-MAR-20 @ 14:4	5						
Matrix: Water							
pH	8.20		0.10	pН		12-MAR-20	R5024095
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.063		0.020	mg/L		12-MAR-20	R5024548
Nitrate+Nitrite Nitrate and Nitrite (as N)	0.063		0.022	mg/L		13-MAR-20	
Nitrite in Water by IC	0.003		0.022	1119/2		10 10 10 10 10 10 10 10 10 10 10 10 10 1	
Nitrite (as N)	<0.010		0.010	mg/L		12-MAR-20	R5024548
L2427123-5 ELKRIVER DOWNSTREAM							
Sampled By: Hungry Baytaluke on 11-MAR-20 @ 15:0	o						
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		12-MAR-20	R5022969
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		12-MAR-20	R5024127
Coliform Bacteria - Fecal	8		1	CFU/100mL		12-MAR-20	R5025168
Phosphorus (P)-Total	0.0058		0.0050	mg/L		13-MAR-20	R5024729
Total Suspended Solids	8.0		3.0	mg/L		17-MAR-20	R5029486
pH NO2, NO3 and Sum of NO2/NO3	8.22		0.10	pН		12-MAR-20	R5024095
Nitrate in Water by IC							
Nitrate (as N)	1.72		0.020	mg/L		12-MAR-20	R5024548
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.72		0.022	mg/L		13-MAR-20	
Nitrite in Water by IC	0.040		0.040			40 MAD 00	D5004540
Nitrite (as N)	<0.010		0.010	mg/L		12-MAR-20	R5024548

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - SPRING 2020 EMS WK #2

L2427123 CONTD....

PAGE 4 of 5 Version: FINAL

### Reference Information

Sample Parameter Qualifier Key:

Qualifier Description

**DLHC** Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

**BOD-BC-CL** Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry Water

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL **CALCULATION** Water Nitrate+Nitrite

NH3-F-CL J. ENVIRON. MONIT., 2005, 7, 37-42, RSC Water Ammonia by Fluorescence

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

рΗ APHA 4500 H-Electrode PH-CI Water

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water **Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

**Laboratory Definition Code Laboratory Location** CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

FARUC - SPRING 2020 EMS WK #2

L2427123 CONTD....

PAGE 5 of 5 Version: FINAL

### **Reference Information**

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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I-9878 Fax: 780-513-2191

¥1-1586

9878 Fax: 780-437-2311 10-668-9878 Fax: 403-291-0298 \_67-7645 Fax: 306-668-8383

CHAIN OF CUSTODY FORM SEND REPORT TO: PAGE OF ATTN: PATRICK MAJER FERNIE ALPINE RESORT UTILITIES CORPORATION ANALYSIS REQUESTED: COMPANY 1505 - 17TH Avenue South East ADDRESS CALGARY ALBERTA T2T 0E2 CITY: PROV POSTAL CODE: SAMPLER: Hungry Baytaluke 1 - 800 - 258 - 7669 FAX: 403 - 244 - 3774 TEL: QUOTE NO: Q33058 FARUC - Spring 2020 EMS wk #2 PROJECT NAME AND NO. ALS CONTACT: patryk.wojciak@alsglobal.com PO NO. @skircr.com REPORT FORMAT: N-SON NO2-N WO# DATE / TIME COLLECTED **BOD5** NOTES (sample specific SAMPLE IDENTIFICATION MATRIX otal 755 comments, due dates, etc.) YYYY-MM-DD TIME Х WWTP Influent Routine 2020 - 3 - 11х 14:00 Water temp = WWTP Influent BOD х 2020 - 3 - 1114:00 Water temp = х С WWTP Effluent Routine 2020 - 3 - 11 14:15 х Х Water temp = WWTP Effluent BOD 2020 - 3 - 1114:15 Water х С temp = С WWTP Effluent Nutrient 2020 - 3 - 11 14:15 Water x ..! х х Х х temo = С WWTP Effluent Bacti 2020 - 3 - 1114:15 Water temp =/ 🥏 ONLY Х х С Elkriver Upstream Routine 2020 - 3 - 1114:30 Water temo = USE ( х С 14:30 Х х х Х Elkriver Upstream Nutrient 2020 - 3 - 11Water Z K C Elkriver Upstream Bacti 2020 - 3 - 1114:30 Water х temp = FOR х С х Elkriver Outfall Routine 2020 - 3 - 1114:45 Water Х Х Х х Х С Elkriver Outfall Nutrient 2D20 - 3 - 11 14:45 Water temp = С 2020 - 3 - 11 Water х Elkriver Outfall Bacti 14:45 Elkriver downstream Routine 2020 - 3 - 1115:00 Water Х х temp = С х С Х Х х Elkriver downstream Nutrient -2020 - 3 - 1115:00 Water Х temo = Ċ Elkriver downstream Bacti 2020 - 3 - 1115:00 Water Х temp = DATE: 2020 - 3 - 11 RECEIVED/BY: DATE SPECIFY DATE: RELINQUISHED BY: TURN AROUND REQUIRED 5:00 pm Hungry Baytaluke TIME TIME: SEND INVOICE TO: RECEIVED BY: DATE: RELINQUISHED BY: DATE: INVOICE FORMAT: TIME: TIME: SPECIAL INSTRUCTIONS PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO FOR LAB USE ONLY wastewater@skifemie.com Cooler Seal Intact? Sample Temperature: Cooling Method?

Yes \_\_\_No

Frozen?

Yes

\_lce



FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 19-MAR-20

Report Date: 26-MAR-20 11:13 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2429710

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - SPRING 2020 EMS WK #3

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2429710 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2429710-1 WWTP INFLUENT							
Sampled By: HUNGRY BAYTALUKE on 18-MAR-20 @	14:00						
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	101	DLHC	75	mg/L		19-MAR-20	R5036586
Total Suspended Solids	195	DLHC	11	mg/L		24-MAR-20	R5038826
рН	7.81		0.10	pН		19-MAR-20	R5032912
L2429710-2 WWTP EFFLUENT							
Sampled By: HUNGRY BAYTALUKE on 18-MAR-20 @	14:15						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		20-MAR-20	R5033279
Biochemical Oxygen Demand	<2.0		2.0	mg/L		19-MAR-20	R5036586
Chemical Oxygen Demand	10		10	mg/L		23-MAR-20	R5035731
Orthophosphate-Dissolved (as P)	0.169	DLHC	0.010	mg/L		19-MAR-20	R5032901
Coliform Bacteria - Fecal	3		1	CFU/100mL		19-MAR-20	R5033901
Phosphorus (P)-Total	0.190	DLHC	0.025	mg/L		25-MAR-20	R5038171
Total Suspended Solids	<3.0		3.0	mg/L		24-MAR-20	R5038826
pH	7.59		0.10	pН		19-MAR-20	R5032912
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	43.6	DLHC	0.10	mg/L		19-MAR-20	R5033069
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	43.6		0.11	mg/L		20-MAR-20	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLHC	0.050	mg/L		19-MAR-20	R5033069
L2429710-3 ELKRIVER UPSTREAM							
Sampled By: HUNGRY BAYTALUKE on 18-MAR-20 @	14:30						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		20-MAR-20	R5033279
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		19-MAR-20	R5032901
Coliform Bacteria - Fecal	2		1	CFU/100mL		19-MAR-20	R5033901
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		25-MAR-20	R5038171
Total Suspended Solids	7.3		3.0	mg/L		24-MAR-20	R5038826
pH NO2, NO3 and Sum of NO2/NO3	8.28		0.10	pН		19-MAR-20	R5032912
Nitrate in Water by IC							
Nitrate in Water by IC  Nitrate (as N)	1.95		0.020	mg/L		19-MAR-20	R5033069
Nitrate+Nitrite				3			
Nitrate and Nitrite (as N)	1.95		0.022	mg/L		20-MAR-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-MAR-20	R5033069
L2429710-4 ELKRIVER OUTFALLL							
Sampled By: HUNGRY BAYTALUKE on 18-MAR-20 @	14:45						
Matrix: WATER							
Miscellaneous Parameters	40.0E0		0.050	ma/l		20 MAB 20	DE022270
Ammonia, Total (as N) Orthophosphate-Dissolved (as P)	<0.050		0.050	mg/L		20-MAR-20	R5033279
Coliform Bacteria - Fecal	0.0072		0.0050	mg/L CFU/100mL		19-MAR-20 19-MAR-20	R5032901
	<1 0.0070		1			25-MAR-20	R5033901
Phosphorus (P)-Total Total Suspended Solids			0.0050	mg/L			R5038171
Total Suspended Solids	3.3		3.0	mg/L		24-MAR-20	R5038826

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2429710 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2429710-4 ELKRIVER OUTFALLL							
Sampled By: HUNGRY BAYTALUKE on 18-MAR-20 @	14:45						
Matrix: WATER							
рН	8.20		0.10	pН		19-MAR-20	R5032912
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.259		0.020	mg/L		19-MAR-20	R5033069
Nitrate+Nitrite Nitrate and Nitrite (as N)	0.259		0.022	mg/L		20-MAR-20	
Nitrite in Water by IC	0.233		0.022	IIIg/ L		20 1417 11 20	
Nitrite (as N)	<0.010		0.010	mg/L		19-MAR-20	R5033069
L2429710-5 ELKRIVER DOWNSTREAM							
Sampled By: HUNGRY BAYTALUKE on 18-MAR-20 @	15:00						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		20-MAR-20	R5033279
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		19-MAR-20	R5032901
Coliform Bacteria - Fecal	<1		1	CFU/100mL		19-MAR-20	R5033901
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		25-MAR-20	R5038171
Total Suspended Solids	8.0		3.0	mg/L		24-MAR-20	R5038826
pH	8.29		0.10	pН		19-MAR-20	R5032912
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	2.09		0.020	mg/L		19-MAR-20	R5033069
Nitrate+Nitrite	2.00		0.020	9/ =			
Nitrate and Nitrite (as N)	2.09		0.022	mg/L		20-MAR-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-MAR-20	R5033069

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - SPRING 2020 EMS WK #3

L2429710 CONTD....

PAGE 4 of 5 Version: FINAL

#### Reference Information

Sample Parameter Qualifier Key:

Qualifier Description

**DLHC** Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

**BOD-BC-CL** Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry Water

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL **CALCULATION** Water Nitrate+Nitrite

NH3-F-CL J. ENVIRON. MONIT., 2005, 7, 37-42, RSC Water Ammonia by Fluorescence

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

рΗ APHA 4500 H-Electrode PH-CI Water

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water **Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

**Laboratory Definition Code Laboratory Location** CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

FARUC - SPRING 2020 EMS WK #3

L2429710 CONTD....

PAGE 5 of 5 Version: FINAL

### **Reference Information**

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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SEND REPORT TO: CHAIN OF CUSTODY FORM PAGE											PAGE		)F												
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	wastewater@skifemie.com  Copier Seal Intact? Sample Temperature: Cooling Method?																								
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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: Patrick Majer

1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 05-MAR-20

Report Date: 12-MAR-20 15:48 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2424482

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC SPRING 2020 EMS WK #1

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2424482 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2424482-1 WWTP INFLUENT							
Sampled By: Hungry Baytaluke on 04-MAR-20 @ 14:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	152	DLHC	75	mg/L		05-MAR-20	R5020739
Total Suspended Solids	230	DLHC	9.0	mg/L		11-MAR-20	R5022790
рН	7.86		0.10	рН		07-MAR-20	R5019616
L2424482-2 WWTP EFFLUENT							
Sampled By: Hungry Baytaluke on 04-MAR-20 @ 14:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		05-MAR-20	R5018148
Biochemical Oxygen Demand	<2.0		2.0	mg/L		05-MAR-20	R5020739
Chemical Oxygen Demand	14		10	mg/L		06-MAR-20	R5019146
Orthophosphate-Dissolved (as P)	0.213	DLHC	0.050	mg/L		05-MAR-20	R5018409
Coliform Bacteria - Fecal	<1		1	CFU/100mL		05-MAR-20	R5019240
Phosphorus (P)-Total	0.268	DLHC	0.025	mg/L		07-MAR-20	R5019610
Total Suspended Solids	<3.0		3.0	mg/L		11-MAR-20	R5022790
pH	7.62		0.10	pН		05-MAR-20	R5018771
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	49.8	DLHC	0.10	mg/L		05-MAR-20	R5018673
Nitrate+Nitrite	10.0		0.10	9, =		00 20	110010070
Nitrate and Nitrite (as N)	49.8		0.11	mg/L		06-MAR-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		05-MAR-20	R5018673
L2424482-3 WWTP UPSTREAM							
Sampled By: Hungry Baytaluke on 04-MAR-20 @ 14:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-MAR-20	R5018148
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		05-MAR-20	R5018409
Coliform Bacteria - Fecal	3		1	CFU/100mL		05-MAR-20	R5019240
Phosphorus (P)-Total	0.0189		0.0050	mg/L		07-MAR-20	R5019610
Total Suspended Solids	3.7		3.0	mg/L		11-MAR-20	R5022790
pH NO2, NO3 and Sum of NO2/NO3	8.46		0.10	рН		05-MAR-20	R5018771
Nitrate in Water by IC							
Nitrate (as N)	1.70		0.020	mg/L		05-MAR-20	R5018673
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.70		0.022	mg/L		06-MAR-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-MAR-20	R5018673
L2424482-4 WWTP OUTFALL							
Sampled By: Hungry Baytaluke on 04-MAR-20 @ 14:45							
Matrix: Water							
Miscellaneous Parameters			0.05-			05 4445 25	DE0121:
Ammonia, Total (as N)	<0.050	DDV/	0.050	mg/L		05-MAR-20	R5018148
Orthophosphate-Dissolved (as P)	0.0073	RRV	0.0050	mg/L		05-MAR-20	R5018409
Coliform Bacteria - Fecal	<1		1	CFU/100mL		05-MAR-20	R5019240
Phosphorus (P)-Total	0.0077		0.0050	mg/L		07-MAR-20	R5019610
Total Suspended Solids	<3.0		3.0	mg/L		11-MAR-20	R5022790

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2424482 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2424482-4 WWTP OUTFALL							
Sampled By: Hungry Baytaluke on 04-MAR-20 @ 14:4	5						
Matrix: Water							
pH	8.45		0.10	pН		05-MAR-20	R5018771
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.107		0.020	mg/L		05-MAR-20	R5018673
Nitrate+Nitrite Nitrate and Nitrite (as N)	0.107		0.022	mg/L		06-MAR-20	
Nitrite in Water by IC	0.107		0.022	g, L		00 1111 111 20	
Nitrite (as N)	<0.010		0.010	mg/L		05-MAR-20	R5018673
L2424482-5 WWTP DOWNSTREAM							
Sampled By: Hungry Baytaluke on 04-MAR-20 @ 15:0	0						
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-MAR-20	R5018148
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		05-MAR-20	R5018409
Coliform Bacteria - Fecal	1		1	CFU/100mL		05-MAR-20	R5019240
Phosphorus (P)-Total Total Suspended Solids	<0.0050		0.0050	mg/L		07-MAR-20	R5019610
pH	3.3 8.45		3.0 0.10	mg/L pH		11-MAR-20 05-MAR-20	R5022790
p⊓ NO2, NO3 and Sum of NO2/NO3	8.45		0.10	рπ		05-IVIAR-20	R5018771
Nitrate in Water by IC							
Nitrate (as N)	1.81		0.020	mg/L		05-MAR-20	R5018673
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.81		0.022	mg/L		06-MAR-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		05-MAR-20	R5018673
	40.010		0.010	g, L		00 1111 111 20	110010070

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC SPRING 2020 EMS WK #1

L2424482 CONTD....

PAGE 4 of 5 Version: FINAL

#### Reference Information

Sample Parameter Qualifier Key:

Qualifier Description **DLHC** Detection Limit Raised: Dilution required due to high concentration of test analyte(s). RRV Reported Result Verified By Repeat Analysis

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day IncubO2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

FCC-MF-CL Water Fecal Coliform Count-MF **APHA 9222D** 

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite **CALCULATION** 

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

Nitrite in Water by IC NO2-IC-N-CL Water EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

Diss. Orthophosphate in Water by Colour

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Total Suspended Solids APHA 2540 D-Gravimetric Water

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

#### **Chain of Custody Numbers:**

FARUC SPRING 2020 EMS WK #1

L2424482 CONTD....

PAGE 5 of 5 Version: FINAL

### **Reference Information**

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

### ALS Environmental

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ANALYTICAL CHEMISTRY & TESTING SERVICES

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L2424482-COFC

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I: 1-800-668-9878 Fax: 780-513-2191

Fáx: 780-791-1586

1-800-668-9878, Fax: 780-437-2311 pil Free: 1-800-668-9878 Fax: 403-291-0298 98: 1-800-867-7645 Fax: 306-668-8383

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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 26-MAR-20

Report Date: 01-APR-20 08:33 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2431720

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - SPRING 2020 EMS WK #4

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2431720 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2431720-1 WWTP INFLUENT							
Sampled By: HUNGRY BAYTALUKE on 25-MAR-20 @	2 14:00						
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	95	DLHC	20	mg/L		26-MAR-20	R5047850
Total Suspended Solids	111	DLHC	6.0	mg/L		30-MAR-20	R5046068
pH	7.77		0.10	pН		27-MAR-20	R5042994
L2431720-2 WWTP EFFLUENT							
Sampled By: HUNGRY BAYTALUKE on 25-MAR-20 @	2 14:15						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		27-MAR-20	R5042406
Biochemical Oxygen Demand	<2.0		2.0	mg/L		26-MAR-20	R5047850
Chemical Oxygen Demand	<10		10	mg/L		27-MAR-20	R5042587
Orthophosphate-Dissolved (as P)	0.125	DLHC	0.010	mg/L		26-MAR-20	R5041231
Coliform Bacteria - Fecal	1		1	CFU/100mL		26-MAR-20	R5042488
Phosphorus (P)-Total	0.132		0.0050	mg/L		27-MAR-20	R5042175
Total Suspended Solids	<3.0		3.0	mg/L		30-MAR-20	R5046068
рН	7.84		0.10	pН		27-MAR-20	R5042994
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	31.1	DLHC	0.10	ma/l		26-MAR-20	R5045186
Nitrate (as N) Nitrate+Nitrite	31.1	DLIIC	0.10	mg/L		20-IVIAR-20	K3043166
Nitrate and Nitrite (as N)	31.1		0.11	mg/L		30-MAR-20	
Nitrite in Water by IC	•		0	9 =			
Nitrite (as N)	< 0.050	DLHC	0.050	mg/L		26-MAR-20	R5045186
L2431720-3 ELKVIEW UPSTREAM							
Sampled By: HUNGRY BAYTALUKE on 25-MAR-20 @	2 14:30						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		27-MAR-20	R5042406
Orthophosphate-Dissolved (as P)	0.0054		0.0050	mg/L		26-MAR-20	R5041231
Coliform Bacteria - Fecal	<1		1	CFU/100mL		26-MAR-20	R5042488
Phosphorus (P)-Total	0.0072		0.0050	mg/L		27-MAR-20	R5042175
Total Suspended Solids	<3.0		3.0	mg/L		30-MAR-20	R5046068
pH	8.44		0.10	pН		27-MAR-20	R5042994
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	1.85		0.020	mg/L		26-MAR-20	R5045186
Nitrate+Nitrite	1.00		0.020	mg/L		20 1017 (17 20	113043100
Nitrate and Nitrite (as N)	1.85		0.022	mg/L		30-MAR-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		26-MAR-20	R5045186
L2431720-4 ELKVIEW OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 25-MAR-20 @	2 14:45						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		27-MAR-20	R5042406
Orthophosphate-Dissolved (as P)	0.0060		0.0050	mg/L		26-MAR-20	R5041231
Coliform Bacteria - Fecal	14		1	CFU/100mL		26-MAR-20	R5042488
Phosphorus (P)-Total	0.0079		0.0050	mg/L		27-MAR-20	R5042175
Total Suspended Solids	<3.0		3.0	mg/L		30-MAR-20	R5046068

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2431720 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2431720-4 ELKVIEW OUTFALL							
Sampled By: HUNGRY BAYTALUKE on 25-MAR-20 @	14:45						
Matrix: WATER							
рН	8.43		0.10	pН		27-MAR-20	R5042994
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	0.000		0.000			00 144 5 00	55045400
Nitrate (as N) Nitrate+Nitrite	0.060		0.020	mg/L		26-MAR-20	R5045186
Nitrate and Nitrite (as N)	0.060		0.022	mg/L		30-MAR-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		26-MAR-20	R5045186
L2431720-5 ELKVIEW DOWNSTREAM							
Sampled By: HUNGRY BAYTALUKE on 25-MAR-20 @	15:00						
Matrix: WATER							
Miscellaneous Parameters	0.050		0.050	, /!		07 MAD 00	DE040400
Ammonia, Total (as N) Orthophosphate-Dissolved (as P)	<0.050		0.050	mg/L		27-MAR-20	R5042406
Coliform Bacteria - Fecal	<0.0050 <1		0.0050 1	mg/L CFU/100mL		26-MAR-20 26-MAR-20	R5041231 R5042488
Phosphorus (P)-Total	0.0057		0.0050	mg/L		27-MAR-20	R5042466 R5042175
Total Suspended Solids	5.0		3.0	mg/L		30-MAR-20	R5046068
рН	8.44		0.10	pH		27-MAR-20	R5042994
NO2, NO3 and Sum of NO2/NO3				ľ			
Nitrate in Water by IC							
Nitrate (as N)	1.96		0.020	mg/L		26-MAR-20	R5045186
Nitrate+Nitrite Nitrate and Nitrite (as N)	1.96		0.022	mg/L		30-MAR-20	
Nitrite in Water by IC	1.50		0.022	mg/L		00 1417 117 20	
Nitrite (as N)	<0.010		0.010	mg/L		26-MAR-20	R5045186

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2431720 CONTD....

**Reference Information** 

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Sample Parameter Qualifier Key:

Qualifier Description

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

ALS Test Code Matrix Test Description Method Reference\*\*

BOD-BC-CL Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

 Laboratory Definition Code
 Laboratory Location

 CL
 ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

L2431720 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

#### ALS Environmental

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L2431720-COFC

#### CHAIN OF CUSTODY FORM SEND REPORT TO: PAGE OF ATTN: PATRICK MAJER FERNIE ALPINE RESORT UTILITIES CORPORATION ANALYSIS REQUESTED: COMPANY: 1505 - 17TH Avenue South East ADDRESS: CALGARY PROV: ALBERTA POSTAL CODE: T2T 0E2 CITY: 1 - 800 - 254 - 7669 SAMPLER: Hungry Baytaluke TEL: FAX: 403 - 228 - 1544 F A R U C - Spring 2020 EMS wk #4 QUOTE NO: Q33058 PROJECT NAME AND NO.: ALS CONTACT: patryk.wojciak@alsglobal.com PO NO.: @skircr.com REPORT FORMAT: WO# N-con NO2-N DATE / TIME COLLECTED BODS Ortho NOTES (sample specific SAMPLE IDENTIFICATION MATRIX NH3comments, due dates, etc.) 듄 YYYY-MM-DD TIME WWTP Influent Routine 2020 - 3 - 2514:00 Water х х WWTP Influent BOD х 2020 - 3 - 2514:00 Water temp = WWTP Effluent Routine 2020 - 3 - 2514:15 Water Х Х Х temp = WWTP Effluent BOD х C 2020 - 3 - 2514:15 Water temp = WWTP Effluent Nutrient 2020 - 3 - 25 14:15 Water х Х х х х C WWTP Effluent Bacti 2020 - 3 - 2514:15 Wate: temp = ONLY Elkriver Upstream Routine 2020 - 3 - 2514:30 Water x l . X C USE ( Elkriver Upstream Nutrient 2020 - 3 - 2514:30 Water Х Х Х Χ С PB х С Elkriver Upstream Bacti 2020 - 3 - 2514:30 Water temp = FOR Elkriver Outfall Routine 2020 - 3 - 2514:45 Water х х С temo = Х х х С Elkriver Outfall Nutrient 2020 - 3 - 25 14:45 Water Х Х temp = х Elkriver Outfall Bacti 2020 - 3 - 2514:45 C Water temp = Elkriver downstream Routine Х 2020 - 3 - 2515:00 Water Х temp = С 15:00 х х х Х С Elkriver downstream Nutrient 2020 - 3 - 25Water Х Elkriver downstream Bacti С 2020 - 3 - 25 15:00 Water. Х temp = 2020 -3- 25 RECEIVED BY: SPECIFY DATE: RELINQUISHED BY: DATE: DATE TURN AROUND REQUIRED: Hungry Baytaluke 5:00 pm TIME: TIME SEND INVOICE TO: RECÉIVED BY: RELINQUISHED BY: DATE: DATE INVOICE FORMAT: TIME TIME SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO FOR LAB USE ONLY wastewater@skifemie.com PC Cooler Seal Intact? Sample Temperature: Cooling Method? No \_\_\_N/A Frozen? \_lcepacks



FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 02-APR-20

Report Date: 09-APR-20 10:24 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2433712

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - SPRING 2020 EMS WK #5

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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ADDRESS: 2559 29 Street NE, Calgary, AB T1Y 7B5 Canada | Phone: +1 403 291 9897 | Fax: +1 403 291 0298 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L2433712 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2433712-1 WWTP INFLUENT							
Sampled By: BO CHOROSZEWSKI on 01-APR-20 @	13:30						
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	61	DLHC	20	mg/L		03-APR-20	R5054427
Total Suspended Solids	88.8	DLM	6.0	mg/L		05-APR-20	R5051397
рН	7.89		0.10	рН		02-APR-20	R5050341
L2433712-2 WWTP EFFLUENT							
Sampled By: BO CHOROSZEWSKI on 01-APR-20 @	13:40						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-APR-20	R5050370
Biochemical Oxygen Demand	<2.0		2.0	mg/L		03-APR-20	R5054427
Chemical Oxygen Demand	<10		10	mg/L		06-APR-20	R5051636
Orthophosphate-Dissolved (as P)	0.146	DLHC	0.010	mg/L		02-APR-20	R5050388
Coliform Bacteria - Fecal	1		1	CFU/100mL		02-APR-20	R5051159
Phosphorus (P)-Total	0.175	DLHC	0.050	mg/L		05-APR-20	R5051156
Total Suspended Solids	<3.0		3.0	mg/L		05-APR-20	R5051397
pH	7.97		0.10	рН		02-APR-20	R5050341
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	19.8		0.020	mg/L		02-APR-20	R5050548
Nitrate+Nitrite	19.0		0.020	IIIg/L		02-AFK-20	K3030346
Nitrate and Nitrite (as N)	19.8		0.022	mg/L		03-APR-20	
Nitrite in Water by IC							
Nitrite (as N)	0.010		0.010	mg/L		02-APR-20	R5050548
L2433712-3 ELKVIEW UPSTREAM							
Sampled By: BO CHOROSZEWSKI on 01-APR-20 @	14:00						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-APR-20	R5050370
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		02-APR-20	R5050388
Coliform Bacteria - Fecal	1		1	CFU/100mL		02-APR-20	R5051159
Phosphorus (P)-Total	0.0055		0.0050	mg/L		05-APR-20	R5051156
Total Suspended Solids	4.7		3.0	mg/L		05-APR-20	R5051397
pH	8.33		0.10	рН		02-APR-20	R5050341
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	2.02		0.020	mg/L		02-APR-20	R5050548
Nitrate+Nitrite	2.02		0.020	IIIg/L		02 AI IV 20	113030340
Nitrate and Nitrite (as N)	2.02		0.022	mg/L		03-APR-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		02-APR-20	R5050548
L2433712-4 ELKVIEW OUTFALL							
Sampled By: BO CHOROSZEWSKI on 01-APR-20 @	14:10						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-APR-20	R5050370
Orthophosphate-Dissolved (as P)	0.0062		0.0050	mg/L		02-APR-20	R5050388
Coliform Bacteria - Fecal	<1		1	CFU/100mL		02-APR-20	R5051159
Phosphorus (P)-Total	0.0126		0.0050	mg/L		05-APR-20	R5051156
. ,							

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2433712 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2433712-4 ELKVIEW OUTFALL							
Sampled By: BO CHOROSZEWSKI on 01-APR-20 @	14:10						
Matrix: WATER							
pH	8.29		0.10	pН		02-APR-20	R5050341
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	0.040		0.000			00 ADD 00	D=0=0=40
Nitrate (as N) Nitrate+Nitrite	0.040		0.020	mg/L		02-APR-20	R5050548
Nitrate and Nitrite (as N)	0.040		0.022	mg/L		03-APR-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		02-APR-20	R5050548
L2433712-5 ELKVIEW DOWNSTREAM							
Sampled By: BO CHOROSZEWSKI on 01-APR-20 @	13:50						
Matrix: WATER							
Miscellaneous Parameters				,,,			
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-APR-20	R5050370
Orthophosphate-Dissolved (as P) Coliform Bacteria - Fecal	<0.0050		0.0050	mg/L CFU/100mL		02-APR-20 02-APR-20	R5050388
Coliform Bacteria - Fecal Phosphorus (P)-Total	0.0072		1 0.0050	mg/L		02-APR-20 05-APR-20	R5051159 R5051156
Total Suspended Solids	4.7		3.0	mg/L		05-APR-20 05-APR-20	R5051136
pH	8.34		0.10	pH		02-APR-20	R5050341
NO2, NO3 and Sum of NO2/NO3	0.04		0.10	Pr.		027111120	110000041
Nitrate in Water by IC							
Nitrate (as N)	2.03		0.020	mg/L		02-APR-20	R5050548
Nitrate+Nitrite Nitrate and Nitrite (as N)	2.02		0.000	ma/l		03-APR-20	
Nitrite in Water by IC	2.03		0.022	mg/L		U3-AFK-20	
Nitrite (as N)	<0.010		0.010	mg/L		02-APR-20	R5050548
	I.			1	1	l	

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2433712 CONTD....

**Reference Information** 

PAGE 4 of 5 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

#### **Test Method References:**

ALS Test Code Matr		Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day IncubO2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

<b>Laboratory Definition Code</b>	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
Chain of Custody Numbers:	

FARUC-SPRING 2020 EMS WK #5

L2433712 CONTD....

PAGE 5 of 5 Version: FINAL

### **Reference Information**

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

### ALS Environmental

ANALYTICAL CHEMISTRY & TESTING SERVICES



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SEN	D REPORT TO	ORT TO: CHAIN OF CUSTODY FORM PAGE OF								TO	DY	FO	RM					OF								
COM	PANY:	FERNIE ALF	INE RESORT	UTILITIES	CORPO	RATION	ATTN:	PATRICK MAJER	AN	NALYSIS REQUESTED:											]					
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TEL:		403 - 256 - 6	1473	FAX:	403 - 24	4 - 3774	SAMPLER:	Bo Choroszewski	]:																	
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		WWTP Efflu	ent BOD	4		2020-04-01	13-40	Water									x							~		1
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FOR LAB USE ONLY		Elk River Up	stream Bacterio	ological <sup>1</sup>	a	2020-04-01	14:00	Water	х														1.2.0	$\overline{\overline{}}$		]
JSE		Elk River @	Outfall Routine		10	2020-04-01	14-10	Water		Х	Х													<u></u>		]
AB I		Elk River @	Outfall Nutrient	8	11	2020-04-01	14:10	Water				х	Х	Х	х	х					,		1-10	<u>C · </u>		
뭐		Elk River @	Outfall Bacterio	ological	12	2020-04-01	14:10	Water	X														1-10	(		
5		Elk River Do	wnstream Rout	ine	13	2020-04-01	13:50	Water		х	х												1.40	<u>'C</u>		
		Elk River Do	wnstream Nutri	ients	14	2020-04-01	13.50	Water				Х	Х	Х	х	X							1.40	$\subseteq$		
		Elk River Do	wnstream Bact	eriological	15	2020-04-01	13.50	Water	X														1.400			]
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SPE	CIAL INSTRU	CTIONS:	PLEASE FAX wastewater@s	A COPY O skifemle.com	FTHER M	ESULTS TO 25	0-423-4652 OR	E-MAIL TO					3 US		ILY	c	(a. T-			2 –	20	lo	M-45 : ·			4
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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 09-APR-20

Report Date: 17-APR-20 16:36 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2435773

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - SPRING EMS WEEK 6

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2435773 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2435773-1 WWTP INFLUENT							
Sampled By: Bo Choroszewski on 08-APR-20 @ 14:25							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	55	DLHC	20	mg/L		11-APR-20	R5058034
Total Suspended Solids	85	DLHC	23	mg/L		15-APR-20	R5057517
pH	8.12		0.10	pН		11-APR-20	R5055688
L2435773-2 WWTP EFFLUENT							
Sampled By: Bo Choroszewski on 08-APR-20 @ 14:35							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		13-APR-20	R5056017
Biochemical Oxygen Demand	<2.0		2.0	mg/L		11-APR-20	R5058034
Chemical Oxygen Demand	<10		10	mg/L		13-APR-20	R5056357
Orthophosphate-Dissolved (as P)	0.346	DLHC	0.050	mg/L		11-APR-20	R5055809
Coliform Bacteria - Fecal	<1		1	CFU/100mL		09-APR-20	R5055826
Phosphorus (P)-Total	0.357	DLHC	0.025	mg/L		15-APR-20	R5057242
Total Suspended Solids	<5.0	DLIS	5.0	mg/L		15-APR-20	R5057517
pH	8.19		0.10	pН		11-APR-20	R5055688
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	22.9		0.020	mg/L		10-APR-20	R5055716
Nitrate+Nitrite Nitrate and Nitrite (as N)	22.0		0.022	ma/l		12-APR-20	
Nitrite in Water by IC	22.9		0.022	mg/L		12-AFR-20	
Nitrite (as N)	<0.010		0.010	mg/L		10-APR-20	R5055716
L2435773-3 ELK RIVER UPSTREAM							
Sampled By: Bo Choroszewski on 08-APR-20 @ 14:00							
Matrix: Water							
Miscellaneous Parameters	0.050		0.050			40 400 00	D5050047
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-APR-20	R5056017
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		11-APR-20	R5055809
Coliform Bacteria - Fecal	2		1	CFU/100mL		09-APR-20	R5055826
Phosphorus (P)-Total	0.0117		0.0050	mg/L		15-APR-20	R5057242
Total Suspended Solids	6.7		3.0	mg/L		15-APR-20	R5057517
pH NO2, NO3 and Sum of NO2/NO3	8.31		0.10	pН		11-APR-20	R5055688
Nitrate in Water by IC							
Nitrate (as N)	2.18		0.020	mg/L		10-APR-20	R5055716
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.18		0.022	mg/L		12-APR-20	
Nitrite in Water by IC Nitrite (as N)	-0.010		0.010	ma/l		10-APR-20	DE055716
,	<0.010		0.010	mg/L		10-AFK-20	R5055716
L2435773-4 ELK RIVER @ OUTFALL Sampled Bv: Bo Choroszewski on 08-APR-20 @ 13:40							
, , , , , , , , , , , , , , , , , , , ,							
Matrix: Water Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-APR-20	R5056017
Orthophosphate-Dissolved (as P)	<0.050		0.050	mg/L		11-APR-20	R5055809
Coliform Bacteria - Fecal	1		1	CFU/100mL		09-APR-20	R5055826
Phosphorus (P)-Total	0.0153		0.0050	mg/L		15-APR-20	R5057242
Total Suspended Solids		1 1		_			
	9.3		3.0	mg/L		15-APR-20	R5057517

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2435773 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2435773-4 ELK RIVER @ OUTFALL							
Sampled By: Bo Choroszewski on 08-APR-20 @ 13:40	)						
Matrix: Water							
pH	8.55		0.10	pН		11-APR-20	R5055688
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.076		0.020	mg/L		10-APR-20	R5055716
Nitrate+Nitrite Nitrate and Nitrite (as N)	0.076		0.022	mg/L		12-APR-20	
Nitrite in Water by IC	0.070		0.022	g, L		127111120	
Nitrite (as N)	<0.010		0.010	mg/L		10-APR-20	R5055716
L2435773-5 ELK RIVER DOWNSTREAM							
Sampled By: Bo Choroszewski on 08-APR-20 @ 13:30	)						
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		13-APR-20	R5056017
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		11-APR-20	R5055809
Coliform Bacteria - Fecal	<1		1	CFU/100mL		09-APR-20	R5055826
Phosphorus (P)-Total Total Suspended Solids	0.0069 6.7		0.0050 3.0	mg/L mg/L		15-APR-20 15-APR-20	R5057242
pH	6.7 8.32		0.10	pH		15-APR-20 11-APR-20	R5057517 R5055688
NO2, NO3 and Sum of NO2/NO3	0.32		0.10	pri		11-AFR-20	K3033666
Nitrate in Water by IC							
Nitrate (as N)	2.22		0.020	mg/L		10-APR-20	R5055716
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	2.22		0.022	mg/L		12-APR-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		10-APR-20	R5055716
	10.0.0		0.0.0				

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - SPRING EMS WEEK 6

**Reference Information** 

PAGE 4 of 5 Version: FINAL

L2435773 CONTD....

Sample Parameter Qualifier Key:

 Qualifier
 Description

 DLHC
 Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

 DLIS
 Detection Limit Adjusted: Insufficient Sample

#### **Test Method References:**

ALS Test Code Matrix		Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day IncubO2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in the water. The sample is added to COD tubes, which contain a premixed volume of reagents. The sample is then heated for two hours on the COD reactor with a strong oxidizing agent, potassium dichromate. The COD reagents also contain silver and mercury ions. Silver is used as a catalyst and mercury is used to complex chloride interference. Oxidizable organic compounds react, reducing the dichromate ion to green chromic ion. For samples in the 10 - 150 mg/L range the remaining Cr6+ is measured colormetrically and a decrease in absorbance at 420 nm is proportional to the COD. Samples with concentrations > 150 mg/L can be diluted into the linear range.

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

<b>Laboratory Definition Code</b>	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
Chain of Custody Numbers:	

**FARUC - SPRING EMS WEEK 6** L2435773 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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Edmonton AB, 9936 - 87th A
Calgary AB, Bsy 7, 1313 - 44
Saskatoon SK, 819 - 58th Street



L2435773-COFC

1-253-8700

0-513-2191

-437-2311 ax; 403-291-0298 J06-668-8383

#### **CHAIN OF CUSTODY FORM** SEND REPORT TO: PAGE OF ATTN: PATRICK MAJER COMPANY FERNIE ALPINE RESORT UTILITIES CORPORATION **ANALYSIS REQUESTED:** ADDRESS: 1505 - 17TH AVENUE SOUTH WEST CALGARY PROV: ALBERTA CITY: T2T 0E2 POSTAL CODE: 403 - 256 - 8473 TEL: SAMPLER: Bo Choroszewski FAX: 403 - 244 - 3774 FARUC- Spring EMS week 6 Q 33058 PROJECT NAME AND NO.: QUOTE NO: ALS CONTACT: Patryk Woyciak PO NO.: aid @skircr.com REPORT FORMAT: Coliforms WO# NO3-N NO2-N DATE / TIME COLLECTED NOTES (sample specific SAMPLE IDENTIFICATION 2 MATRIX comments, due dates, etc.) YYYY-MM-DD TIME WWTP influent Routing х х 2020-04-08 Water WWTP Influent BOD 2020-04-08 Water Х $\cap$ WWTP Effluent Routine 2020-04-08 Х х Х Water WWTP Effluent BOD Х 2020-04-08 Water WWTP Effluent Nutrients Х 2020-04-08 Water х Х х Х WWTP Effluent Bacteriological х 2020-04-08 Water Elk River Upstream Routine 2020-04-08 Water X х ONLY Elk River Upstream Nutrients 2020-04-08 Water х Х Х х х Elk River Upstream Bacteriological х 2020-04-08 Water USE Elk River @ Outfall Routine Water Х х 2020-04-08 8 7-8 Eik River @ Outfall Nutrients 2020-04-08 х Х Х Х х Water FOR Eik River @ Outfall Bacteriological 2020-04-08 Water х Elk River Downstream Routine х 2020-04-08 Water Х Elk River Downstream Nutrients 2020-04-08 Х х х х Water Eik River Downstream Bacteriological 2020-04-08 Water SPECIFY DATE: 2020-04-08 RECEIVED BY RELINQUISHED BY: DATE DATE: TURN AROUND REQUIRED: 7:00 Bo Choroszewski TIME TIME: SEND INVOICE TO: RELINQUISHED BY: DATE RECEIVED BY DATE: INVOICE FORMAT: TIME TIME: SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO FOR LAB USE ONLY wastewater@skifemie.com Cooler Seal Intect? Sample Temperature: Cooling Method? \_N/A Yes \_\_\_No Frozen? |cepacks \_\_\_lce



FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 21-MAY-20

Report Date: 31-MAY-20 14:18 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2449972

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

WASTEWATER -MAY 2020 MONTHLY EMS

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2449972 CONTD.... PAGE 2 of 4 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2449972-1 WWTP INFLUENT							
Sampled By: BO CHOROSZEWSKI on 20-MAY-20 @	14:15						
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	57.9		2.0	mg/L		23-MAY-20	R5102035
Total Suspended Solids	240	DLHC	9.0	mg/L		27-MAY-20	R5100185
рН	7.89		0.10	рН		22-MAY-20	R5095393
L2449972-2 WWTP EFFLUENT							
Sampled By: BO CHOROSZEWSKI on 20-MAY-20 @	14:30						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-MAY-20	R5100133
Biochemical Oxygen Demand	<2.0		2.0	mg/L		23-MAY-20	R5102035
Orthophosphate-Dissolved (as P)	0.395	DLHC	0.050	mg/L		22-MAY-20	R5095338
Coliform Bacteria - Fecal	1		1	CFU/100mL		21-MAY-20	R5095738
Phosphorus (P)-Total	0.408	DLHC	0.025	mg/L		22-MAY-20	R5095081
Total Suspended Solids	<3.0		3.0	mg/L		27-MAY-20	R5100185
рН	8.19		0.10	pН		22-MAY-20	R5095393
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	28.3		0.020	mg/L		23-MAY-20	R5099944
Nitrate+Nitrite	20.2		0.000			20 MAY 20	
Nitrate and Nitrite (as N)	28.3		0.022	mg/L		28-MAY-20	
Nitrite in Water by IC Nitrite (as N)	0.018	RRV	0.010	mg/L		23-MAY-20	R5099944

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

#### L2449972 CONTD....

PAGE 3 of 4 Version: FINAL

### Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
RRV	Reported Result Verified By Repeat Analysis

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day IncubO2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

FCC-MF-CL Water Fecal Coliform Count-MF

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite **CALCULATION** 

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

**Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

<b>Laboratory Definition Code</b>	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
Chain of Custody Numbers	

Chain of Custody Numbers:

L2449972 CONTD....

PAGE 4 of 4 Version: FINAL

### **Reference Information**

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 18-JUN-20

Report Date: 25-JUN-20 16:43 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2462443

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

WASTEWATER - JUNE 2020 MONTHLY EMS

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.

Account Manager

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L2462443 CONTD.... PAGE 2 of 4 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2462443-1 WWTP INFLUENT							
Sampled By: CB on 17-JUN-20 @ 14:15							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	85	DLHC	20	mg/L		20-JUN-20	R5132300
Total Suspended Solids	68.4	DLHC	9.0	mg/L		24-JUN-20	R5132232
pH	7.86		0.10	pH		18-JUN-20	R5126576
L2462443-2 WWTP EFFLUENT							
Sampled By: CB on 17-JUN-20 @ 14:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JUN-20	R5131322
Biochemical Oxygen Demand	<2.0		2.0	mg/L		20-JUN-20	R5132300
Orthophosphate-Dissolved (as P)	0.373	DLHC	0.025	mg/L		18-JUN-20	R5125647
Coliform Bacteria - Fecal	2		1	CFU/100mL		18-JUN-20	R5126125
Phosphorus (P)-Total	0.415	DLHC	0.025	mg/L		24-JUN-20	R5131227
Total Suspended Solids	<3.0		3.0	mg/L		24-JUN-20	R5132232
pH	8.29		0.10	pH		18-JUN-20	R5126576
NO2, NO3 and Sum of NO2/NO3			-				
Nitrate in Water by IC							
Nitrate (as N)	16.4		0.020	mg/L		19-JUN-20	R5126544
Nitrate+Nitrite				,,			
Nitrate and Nitrite (as N)	16.4		0.022	mg/L		20-JUN-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		19-JUN-20	R5126544

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2462443 CONTD....

**Reference Information** 

PAGE 3 of 4 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier Description

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

ALS Test Code Matrix Test Description Method Reference\*\*

BOD-BC-CL Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

 Laboratory Definition Code
 Laboratory Location

 CL
 ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

L2462443 CONTD....

**Reference Information** 

PAGE 4 of 4 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

### **ALS Environmental**

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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 16-JUL-20

Report Date: 27-JUL-20 14:03 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2475128

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

WASTEWATER - JUNE 2020 MONTHLY EMS

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.

Account Manager

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L2475128 CONTD.... PAGE 2 of 4 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2475128-1 WWTP INFLUENT							
Sampled By: CB on 15-JUL-20 @ 14:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	94	DLHC	20	mg/L		18-JUL-20	R5164517
Total Suspended Solids	43.8		3.0	mg/L		21-JUL-20	R5162484
pH	8.17		0.10	pН		18-JUL-20	R5157884
L2475128-2 WWTP EFFLUENT							
Sampled By: CB on 15-JUL-20 @ 14:10							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JUL-20	R5166671
Biochemical Oxygen Demand	<2.0		2.0	mg/L		18-JUL-20	R5164517
Orthophosphate-Dissolved (as P)	0.325	DLHC	0.025	mg/L		16-JUL-20	R5156119
Coliform Bacteria - Fecal	<1		1	CFU/100mL		16-JUL-20	R5157402
Phosphorus (P)-Total	0.356	DLHC	0.025	mg/L		23-JUL-20	R5165183
Total Suspended Solids	<3.0		3.0	mg/L		21-JUL-20	R5162484
pH	8.45		0.10	pН		18-JUL-20	R5157884
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	11.1		0.020	ma/l		16-JUL-20	R5157075
Nitrate (as N) Nitrate+Nitrite	11.1		0.020	mg/L		10-JUL-20	N0101010
Nitrate and Nitrite (as N)	11.1		0.022	mg/L		17-JUL-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		16-JUL-20	R5157075
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<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2475128 CONTD....

Reference Information

PAGE 3 of 4 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier Description

**DLHC** Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

**BOD-BC-CL** Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

FCC-MF-CL Fecal Coliform Count-MF **APHA 9222D** Water

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water CALCULATION Nitrate+Nitrite

NH3-F-CL Water J. ENVIRON. MONIT., 2005, 7, 37-42, RSC Ammonia by Fluorescence

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL APHA 4500-P PHOSPHORUS Total P in Water by Colour

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS Water

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water **Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

**Laboratory Definition Code Laboratory Location** 

CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

L2475128 CONTD....

**Reference Information** 

PAGE 4 of 4 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

## **ALS Environmental**

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ANALYTICAL CHEMISTRY & TESTING SERVICES



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150-261-5587 568-9878 Fax: 780-513-2191 )-791-1586

58-9878 Fax: 780-437-2311 1-800-668-9878 Fax: 403-291-0298

0-667-7645 Fax: 306-668-8383 CHAIN OF CUSTODI SEND REPORT TO: PAGE OF ATTN: PATRICK MAJER FERNIE ALPINE RESORT UTILITIES CORPORATION **ANALYSIS REQUESTED:** COMPANY 1505 - 17TH AVENUE SOUTH WEST ADDRESS: CALGARY PROV. ALBERTA POSTAL CODE: T2T 0E2 CITY: Carter Barrett 403 - 256 - 8473 FAX: 403 - 244 - 3774 SAMPLER TEL: 33058 Wastewater -June 2020 Monthly EMS QUOTE NO PROJECT NAME AND NO. ALS CONTACT: Patryk Wojciak PO NO.: Coliforms REPORT FORMAT: WO# NO3-N NO2-N N-STN DATE / TIME COLLECTED BODS Fecal Ortho Total NOTES (sample specific MATRIX SAMPLE IDENTIFICATION TSS comments, due dates, etc.) 표 YYYY-MM-DD TIME 14:00 х X WWTP Influent Routine 2020-07-15 Water WWTP Influent BOD 14:00 Х 2020-07-15 Water WWTP Effluent Routine 2020-07-15 14:10 Water X X 16.7°C 14:00 14:10 CB Х WWTP Effluent BOD 2020-07-15 Water X X WWTP Effluent Nutrients 2020-07-15 Water X X X 14:10 WWTP Effluent Bacteriological 2020-07-15 Water LAB USE ONL SPECIFY DATE: 2020-07-15 DATE: RECEIVED BY RELINQUISHED BY: DATE: (surcharge may apply) TURN AROUND REQUIRED: 16:30 Carter Barrett TIME TIME: SEND INVOICE TO: 2020-07-15 RECEIVED BY: DATE: DATE RELINQUISHED BY: INVOICE FORMAT: CARTER BARRETT TIME: TIME PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO SPECIAL INSTRUCTIONS: FOR LAB USE ONLY wastewater@skifemie.com Sample Temperature: \_\_\_\_\_°C Cooling Method? Cooler Seal Intact?

Frozen?

\_Yes \_

\_No \_

Icepacks V Ice

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES





### **Environmental Division**

#### **COLIFORM SAMPLE DECLARATION FORM**

In British Columbia, the Drinking Water Protection Act requires laboratories to immediately report positive results for Fecal Coliform and Escherichia coli in drinking water samples directly to the Water Supplier, the Drinking Water Officer, and the Medical Health Officer in the region the water samples were taken. Immediate reporting is not required if the sample is water for which a public advisory to boil for drinking water has been issued, or if the sample is not a drinking water.

A. <u>PLEASE</u> complete and sign this Declaration for <u>EVERY</u> sample or sample batch submitted to ALS Environmental for Coliform and/or Escherichia coli analysis.
ARE the sample(s) submitted herein Drinking Water Samples? YES NO (A drinking water sample is any water sample intended for human consumption.)
STOP HERE IF YOU ANSWERED NO, AND PLEASE SIGN AND DATE BELOW.  Please submit samples by 1:00 pm Monday to Friday, or contact ALSE to make other arrangements.

B. Please complete this section ONLY if samples are Drinking Water (DW) Sample(s). THIS COLUMN INDIVIDUAL SAMPLE DECLARATION FOR LAB USE SAMPLE IDENTIFICATION DATE / TIME COLLECTED (Please select yes or no from drop down menu) ONLY Sample Subject to BC **Boil Water Advisory** DW Protection Act?1 in Effect? ALS SAMPLE # 24 Hour Time Yes No Yes No Yes No No Yes Yes No Yes No Yes No Yes No

	ection Act <u>only</u> if the water supply system serves <u>more than</u> one single-family fou are unsure whether this applies to your sample(s).
Carter Barrett	Operator
Name (Please print)	Title 15- 2
Carton Branott	July 12, 20,20
Signature	Date
	ERENGONOSMENT

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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 13-AUG-20

Report Date: 26-AUG-20 16:40 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2488032

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

WASTEWATER - AUGUST 2020 MONTHLY EMS

C of C Numbers: Legal Site Desc:

Comments: L2488032 BOD were analyzed past hold time.

Patryk Wojciak, B.Sc., P.Chem.

Account Manager

 $[This\ report\ shall\ not\ be\ reproduced\ except\ in\ full\ without\ the\ written\ authority\ of\ the\ Laboratory.]$ 

ADDRESS: 2559 29 Street NE, Calgary, AB T1Y 7B5 Canada | Phone: +1 403 291 9897 | Fax: +1 403 291 0298 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L2488032 CONTD.... PAGE 2 of 4 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2488032-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 12-AUG-20 @ 14:20							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	70	HTA	20	mg/L		21-AUG-20	R5201160
Total Suspended Solids	81.2		3.0	mg/L		18-AUG-20	R5191108
pH	8.05		0.10	рН		16-AUG-20	R5189915
L2488032-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 12-AUG-20 @ 14:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		17-AUG-20	R5191182
Biochemical Oxygen Demand	<2.0	HTA	2.0	mg/L		21-AUG-20	R5201160
Orthophosphate-Dissolved (as P)	0.281	DLHC	0.050	mg/L		13-AUG-20	R5186820
Coliform Bacteria - Fecal	2		1	CFU/100mL		13-AUG-20	R5188936
Phosphorus (P)-Total	0.313	DLHC	0.025	mg/L		17-AUG-20	R5190317
Total Suspended Solids	<3.0		3.0	mg/L		18-AUG-20	R5191108
рН	8.37		0.10	рН		16-AUG-20	R5189915
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	15.8		0.020	ma/l		13-AUG-20	DE190702
Nitrate (as N) Nitrate+Nitrite	13.6		0.020	mg/L		13-AUG-20	R5189702
Nitrate and Nitrite (as N)	15.8		0.022	mg/L		15-AUG-20	
Nitrite in Water by IC				3			
Nitrite (as N)	<0.010		0.010	mg/L		13-AUG-20	R5189702

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

#### L2488032 CONTD....

PAGE 3 of 4 Version: FINAL

### Reference Information

Sample Parameter Qualifier Key:

Qualifier Description **DLHC** Detection Limit Raised: Dilution required due to high concentration of test analyte(s). HTA Analytical holding time was exceeded.

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day IncubO2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

FCC-MF-CL Water Fecal Coliform Count-MF

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite **CALCULATION** 

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended

hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined

colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

**Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

**Laboratory Definition Code Laboratory Location** CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

L2488032 CONTD....

**Reference Information** 

PAGE 4 of 4 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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не: 1-800-668-9878 Fax: 780-513-2191

Fax: 780-791-1586

: 1-800-668-9878 Fax: 780-437-2311 off Free: 1-800-668-9878 Fax: 403-291-0298

riree: 1-800-667-7645 Fax: 308-668-8383

SEND REPORT TO	o;				CHAIN OF	CUS	STO	DY	FO	RM									PAGE		OF
COMPANY:	FERNIE ALPINE RESORT	UTILITIES CO	RPORATION	ATTN:	PATRICK MAJER	AN	IALY	SIS	REQU	JEST	ED:										
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## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES





## **Environmental Division**

## COLIFORM SAMPLE DECLARATION FORM

In British Columbia, the *Drinking Water Protection Act* requires laboratories to immediately report **positive results for Fecal Coliform and** *Escherichia coli* in drinking water samples directly to the Water Supplier, the Drinking Water Officer, and the Medical Health Officer in the region the water samples were taken. Immediate reporting is not required if the sample is water for which a public advisory to boil for drinking water has been issued, or if the sample is not a drinking water.

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A. PLEAS to ALS Er	<u>SE</u> complete and sign this invironmental for Coliform a	Decla and/or	ratio Esc	n fo her	r <u>EVERY</u> sa ichia coli ar	ample or sample ba nalysis.	tch submitted
	mple(s) submitted herein Dri vater sample is any water sample					YES NO	
Ple	STOP HERE IF YOU ANSW ase submit samples by 1:00 pm	Monda	y to F	rida	y, or contact A	LSE to make other arra	angements.
B. Please	complete this section ONL	Y if s	amp	les	are Drinkin	g Water (DW) Samp	ole(s).
THIS COLUMN FOR LABUSE ONLY		DA	TE / T	IME (	COLLECTED	INDIVIDUAL SAMPL (Please select yes or no l	
ALS SAMPLE	#	Υ	M	D	24 Hour Time	Sample Subject to BC DW Protection Act? <sup>1</sup>	Boil Water Advisory in Effect?
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Carter	er Barrett se print) Bawatt				Aug/o	ator 1,2020	

## TURN OVER TO COMPLETE

ALS CANADA LTD.

Signature

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Vancouver, BC 1988 Triumph Street, V5L 1K5 Tel: 604 253 4188 Toll Free: 1 800 665 0243 Fax: 604 253 6700
Calgary, AB 1313 44 Avenue NE, T2E 6L5, Canada Tel: 403 291 9897 Fax: 403 291 0298 Toll Free: 1 800 668 9878
Grandhaven, BC 10345A Dogwood Street, V1J 6W7, Canada Tel: 1 250 261 5517 Toll Free: 1800 668 9878 Fax: 1 250 261 5587
Form # 0129
Revision 3

Date '





## COLIFORM SAMPLE DECLARATION FORM (Page 2 of 2)

C. Please complete this section	n <u>ONLY</u> if samples a	are Drinking Water	Sample(s).
Company, Water System Name or Name of	f Home Owner:		,
ompany, Water System Name or Name of Home Owner:  FERNIE ALDINE RESOLT UTILITIES CORP.  ddress:  No.  No.  No.  17th AUE SUARY (403) 256 8473 (403) 244 3774 (403) 861 873 of later supplier?  Phone No:  Fax No:  After Hours/Emergency No:  CarterSparrett  Phone No:  Fax No:  (403) 244 3774 (403) 861 873 of later suppliers  Fax No:  After Hours/Emergency No:  Carter Samples if different than Water Supplier.  Phone No:  Phone No:  Fax No:  After Hours/Emergency No:  (250) 420 2240 (1)  (250) 421 3471  After Hours/Emergency No:  (250) 421 3471  After Hours/Emergency No:  (250) 427 3471  After Hours/Emergency			
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Address: 17th AUC SWARY (403) 256 8473 (403) 244 3774 (403) 86 / 873 o Water Supplier': Phone No: Fax No:			
Water Supplier:	i none ito.	Fax No:	After Hours/Emergency
	(405)256 8473	(403) 244 3774	(403)86/ 8730
Sampler/Submitter3:	Phone No:	Fax No:	/ / ((1) - (
CarterParrer	506 1861-7001		Carrer barrett 119 mail. con
<sup>2</sup> Person to whom results should be sent.			
<sup>3</sup> Sampler or submitter of samples if different tha	an Water Supplier.		
		All and the second seco	
		are subject to regul	ation under the
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Drinking Water Officer Name:	Phone No:	Fax No:	No:
Drinking Water Officer Name: DAU BYROル	Phone No: (250)420 2240		No: (250)421 3471
Drinking Water Officer Name: DAU BYROル	Phone No: (250)420 2240		No: (255)421 3471 After Hours/Emergency No:
Drinking Water Officer Name: DAU BYROル	Phone No: (250)420 2240		No: (255)421 3471 After Hours/Emergency No:
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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 30-SEP-20

Report Date: 30-OCT-20 10:42 (MT)

Version: FINAL REV. 2

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2510107

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - FALL EMS WEEK 1

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2510107 CONTD.... PAGE 2 of 5 Version: FINAL REV.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2510107-1 WWTP INFLUENT							
Sampled By: Bo Choroszewski on 29-SEP-20 @ 14:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	101	DLHC	75	mg/L		02-OCT-20	R5251086
Total Suspended Solids	136		3.0	mg/L		05-OCT-20	R5245297
pH	8.13		0.10	рН		02-OCT-20	R5244118
L2510107-2 WWTP EFFLUENT							
Sampled By: Bo Choroszewski on 29-SEP-20 @ 15:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		01-OCT-20	R5244214
Biochemical Oxygen Demand	<2.0		2.0	mg/L		02-OCT-20	R5251086
Chemical Oxygen Demand	13		10	mg/L		06-OCT-20	R5251008
Orthophosphate-Dissolved (as P)	0.220	DLHC	0.025	mg/L		30-SEP-20	R5242968
Coliform Bacteria - Fecal	8		1	CFU/100mL		30-SEP-20	R5243812
Phosphorus (P)-Total	0.275	DLHC	0.025	mg/L		05-OCT-20	R5245759
Total Suspended Solids	<3.0		3.0	mg/L		03-OCT-20	R5245297
рН	8.35		0.10	рН		02-OCT-20	R5244118
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	20.0		0.020	mg/L		30-SEP-20	R5243180
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	20.0		0.022	mg/L		01-OCT-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		30-SEP-20	R5243180
L2510107-3 ELK RIVER UPSTREAM							
Sampled By: Bo Choroszewski on 29-SEP-20 @ 15:00							
Matrix: Water							
Miscellaneous Parameters						04 007 00	<b>D</b> =0.4.04.4
Ammonia, Total (as N)	<0.050		0.050	mg/L		01-OCT-20	R5244214
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		30-SEP-20	R5242968
Coliform Bacteria - Fecal	2		1	CFU/100mL		30-SEP-20	R5243812
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		05-OCT-20	R5245759
Total Suspended Solids	<3.0		3.0	mg/L		03-OCT-20	R5245297
pH NO2, NO3 and Sum of NO2/NO3	8.50		0.10	рН		02-OCT-20	R5244118
Nitrate in Water by IC							
Nitrate (as N)	1.86		0.020	mg/L		30-SEP-20	R5243180
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.86		0.022	mg/L		01-OCT-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		30-SEP-20	R5243180
	<0.010		0.010	IIIg/L		30-0EF-20	110240100
L2510107-4 ELK RIVER OUTFALL							
Sampled By: Bo Choroszewski on 29-SEP-20 @ 14:50							
Matrix: Water Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		01-OCT-20	R5244214
Orthophosphate-Dissolved (as P)	0.0103		0.050	mg/L		30-SEP-20	R5244214 R5242968
Coliform Bacteria - Fecal	0.0103		0.0050	CFU/100mL		30-SEP-20 30-SEP-20	R5242968 R5243812
Phosphorus (P)-Total			0.0050			05-OCT-20	
	0.0284			mg/L		03-OCT-20	R5245759
Total Suspended Solids	<3.0		3.0	mg/L		03-001-20	R5245297

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2510107 CONTD....
PAGE 3 of 5
Version: FINAL REV.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2510107-4 ELK RIVER OUTFALL							
Sampled By: Bo Choroszewski on 29-SEP-20 @ 14:50							
Matrix: Water							
pH	8.51		0.10	pН		02-OCT-20	R5244118
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.129		0.020	mg/L		30-SEP-20	R5243180
Nitrate+Nitrite Nitrate and Nitrite (as N)	0.129		0.022	mg/L		01-OCT-20	
Nitrite in Water by IC	0.120		0.022	g, L		01 001 20	
Nitrite (as N)	<0.010		0.010	mg/L		30-SEP-20	R5243180
L2510107-5 ELK RIVER DOWNSTREAM							
Sampled By: Bo Choroszewski on 29-SEP-20 @ 14:40							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		01-OCT-20	R5244214
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		30-SEP-20	R5242968
Coliform Bacteria - Fecal	<1		1	CFU/100mL		30-SEP-20	R5243812
Phosphorus (P)-Total Total Suspended Solids	0.0097		0.0050 3.0	mg/L mg/L		05-OCT-20 03-OCT-20	R5245759
pH	<3.0 8.48		0.10	pH		03-OCT-20 02-OCT-20	R5245297 R5244118
NO2, NO3 and Sum of NO2/NO3	0.40		0.10	pri		02-001-20	K3244116
Nitrate in Water by IC							
Nitrate (as N)	1.71		0.020	mg/L		30-SEP-20	R5243180
Nitrate+Nitrite				,,		04 007 00	
Nitrate and Nitrite (as N)	1.71		0.022	mg/L		01-OCT-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		30-SEP-20	R5243180
				3			

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - FALL EMS WEEK 1 L2510107 CONTD....

**Reference Information** 

PAGE 4 of 5 Version: FINAL REV

Sample Parameter Qualifier Key:

Qualifier Description

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

ALS Test Code Matrix Test Description Method Reference\*\*

BOD-BC-CL Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after

persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended

hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined

colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code Laboratory Location

CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

**FARUC - FALL EMS WEEK 1** L2510107 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL REV

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 08-OCT-20

Report Date: 30-OCT-20 10:42 (MT)

Version: FINAL REV. 2

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2514050

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - FALL EMS WEEK 2

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2514050 CONTD....
PAGE 2 of 5
Version: FINAL REV.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2514050-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 07-OCT-20 @ 13:50							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	54	DLHC	20	mg/L		10-OCT-20	R5255234
Total Suspended Solids	50.2		3.0	mg/L		14-OCT-20	R5255075
рН	8.22		0.10	рН		13-OCT-20	R5253860
L2514050-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 07-OCT-20 @ 14:00							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		15-OCT-20	R5255807
Biochemical Oxygen Demand	<2.0		2.0	mg/L		10-OCT-20	R5255234
Chemical Oxygen Demand	11		10	mg/L		15-OCT-20	R5256005
Orthophosphate-Dissolved (as P)	0.214	DLHC	0.025	mg/L		08-OCT-20	R5252370
Coliform Bacteria - Fecal	14		1	CFU/100mL		08-OCT-20	R5253195
Phosphorus (P)-Total	0.199	DLHC	0.025	mg/L		15-OCT-20	R5255264
Total Suspended Solids	<3.0		3.0	mg/L		14-OCT-20	R5255075
рН	8.32		0.10	рН		13-OCT-20	R5253860
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	26.4	DLHC	0.10	mg/L		08-OCT-20	R5252355
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	26.4		0.11	mg/L		09-OCT-20	
Nitrite in Water by IC Nitrite (as N)	<0.050	DLHC	0.050	mg/L		08-OCT-20	R5252355
L2514050-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 07-OCT-20 @ 15:25							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		15-OCT-20	R5255807
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		08-OCT-20	R5252370
Coliform Bacteria - Fecal	2		1	CFU/100mL		08-OCT-20	R5253195
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		15-OCT-20	R5255264
Total Suspended Solids	<3.0		3.0	mg/L		14-OCT-20	R5255075
pH	8.49		0.10	рН		13-OCT-20	R5253860
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	1.53		0.020	mg/L		08-OCT-20	R5252355
Nitrate+Nitrite	1.55		0.020	mg/L		00 001 20	10202000
Nitrate and Nitrite (as N)	1.53		0.022	mg/L		09-OCT-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		08-OCT-20	R5252355
L2514050-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 07-OCT-20 @ 15:10							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	0.066		0.050	mg/L		15-OCT-20	R5255807
Orthophosphate-Dissolved (as P)	0.0173		0.0050	mg/L		08-OCT-20	R5252370
Coliform Bacteria - Fecal	4		1	CFU/100mL		08-OCT-20	R5253195
Phosphorus (P)-Total	0.0167		0.0050	mg/L		15-OCT-20	R5255264
Total Suspended Solids	<3.0		3.0	mg/L		14-OCT-20	R5255075

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2514050 CONTD....
PAGE 3 of 5
Version: FINAL REV.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2514050-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 07-OCT-20 @ 15:10							
Matrix: Water							
pH	8.50		0.10	pН		13-OCT-20	R5253860
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC				,,,			
Nitrate (as N)	1.21		0.020	mg/L		08-OCT-20	R5252355
Nitrate+Nitrite Nitrate and Nitrite (as N)	1.21		0.022	mg/L		09-OCT-20	
Nitrite in Water by IC			0.022	9/ =		00 00 1 20	
Nitrite (as N)	<0.010		0.010	mg/L		08-OCT-20	R5252355
L2514050-5 ELK RIVER DOWNSTREAM							
Sampled By: Carter Barrett on 07-OCT-20 @ 15:00							
Matrix: Water							
Miscellaneous Parameters						45.00=	<b>D - -</b>
Ammonia, Total (as N)	<0.050		0.050	mg/L		15-OCT-20	R5255807
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L CFU/100mL		08-OCT-20	R5252370
Coliform Bacteria - Fecal Phosphorus (P)-Total	1 <0.0050		1 0.0050	mg/L		08-OCT-20 15-OCT-20	R5253195 R5255264
Total Suspended Solids	<0.0050		3.0	mg/L		15-OCT-20 14-OCT-20	R5255264 R5255075
pH	8.49		0.10	pH		13-OCT-20	R5253860
NO2, NO3 and Sum of NO2/NO3	0.43		0.10	P11		10 001 20	11020000
Nitrate in Water by IC							
Nitrate (as N)	1.76		0.020	mg/L		08-OCT-20	R5252355
Nitrate+Nitrite	4.70		0.000	m a/I		00 OCT 20	
Nitrate and Nitrite (as N)  Nitrite in Water by IC	1.76		0.022	mg/L		09-OCT-20	
Nitrite (as N)	<0.010		0.010	mg/L		08-OCT-20	R5252355

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

**FARUC - FALL EMS WEEK 2** L2514050 CONTD....

Reference Information

PAGE 4 of 5 Version: FINAL REV

Sample Parameter Qualifier Key:

Qualifier Description

**DLHC** Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

**BOD-BC-CL** Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Chemical Oxygen Demand (COD) Water APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL **APHA 9222D** Water Fecal Coliform Count-MF

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite **CALCULATION** 

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Total P in Water by Colour APHA 4500-P PHOSPHORUS Water

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CI Water APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended

hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined

colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

**Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

**Laboratory Definition Code Laboratory Location** 

CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

**FARUC - FALL EMS WEEK 2** L2514050 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL REV

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

### **ALS Environmental**

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L2514050-COFC

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)-668-9878 Fax: 780-437-2311 a: 1-800-668-9878 Fax: 403-291-0298 100-667-7645 Fax: 306-668-8383

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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 15-OCT-20

Report Date: 22-OCT-20 15:42 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2516839

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - FALL EMS WEEK 3

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2516839 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2516839-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 14-OCT-20 @ 14:05							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	33	DLHC	20	mg/L		16-OCT-20	R5262540
Total Suspended Solids	48.1		3.0	mg/L		19-OCT-20	R5258939
рН	7.99		0.10	рН		17-OCT-20	R5257580
L2516839-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 14-OCT-20 @ 14:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		21-OCT-20	R5264117
Biochemical Oxygen Demand	<2.0		2.0	mg/L		16-OCT-20	R5262540
Chemical Oxygen Demand	12		10	mg/L		19-OCT-20	R5258625
Orthophosphate-Dissolved (as P)	0.293	DLHC	0.025	mg/L		15-OCT-20	R5255349
Coliform Bacteria - Fecal	1200	DLA	100	CFU/100mL		15-OCT-20	R5256321
Phosphorus (P)-Total	0.376	DLHC	0.025	mg/L		20-OCT-20	R5259471
Total Suspended Solids	<3.0		3.0	mg/L		19-OCT-20	R5258939
рН	8.44		0.10	рН		17-OCT-20	R5257580
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	5.47		0.020	mg/L		15-OCT-20	R5257198
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	5.47		0.022	mg/L		19-OCT-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		15-OCT-20	R5257198
L2516839-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 14-OCT-20 @ 15:55							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		21-OCT-20	R5264117
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		15-OCT-20	R5255349
Coliform Bacteria - Fecal	4		1	CFU/100mL		15-OCT-20	R5256321
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		20-OCT-20	R5259471
Total Suspended Solids	<3.0		3.0	mg/L		19-OCT-20	R5258939
pH	8.47		0.10	рН		17-OCT-20	R5257580
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	1.74		0.020	mg/L		15-OCT-20	R5257198
Nitrate+Nitrite	1.74		0.020	IIIg/L		13 001 20	13237 190
Nitrate and Nitrite (as N)	1.74		0.022	mg/L		19-OCT-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-OCT-20	R5257198
L2516839-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 14-OCT-20 @ 15:45							
Matrix: Water Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		21-OCT-20	R5264117
Orthophosphate-Dissolved (as P)	0.0096		0.0050	mg/L		15-OCT-20	R5255349
Coliform Bacteria - Fecal	61		1	CFU/100mL		15-OCT-20	R5256321
Phosphorus (P)-Total	0.0208		0.0050	mg/L		20-OCT-20	R5259471
Total Suspended Solids	<3.0		3.0	mg/L		19-OCT-20	R5258939
300000000000000000000000000000000000000	35.0		0.0	9/ _		10 001 20	1.020000

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2516839 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2516839-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 14-OCT-20 @ 15:45							
Matrix: Water							
pH	8.34		0.10	pН		17-OCT-20	R5257580
NO2, NO3 and Sum of NO2/NO3				<b>'</b>			
Nitrate in Water by IC							
Nitrate (as N)	0.046		0.020	mg/L		15-OCT-20	R5257198
Nitrate+Nitrite	0.040		0.000			40.007.00	
Nitrate and Nitrite (as N)  Nitrite in Water by IC	0.046		0.022	mg/L		19-OCT-20	
Nitrite in Water by IC  Nitrite (as N)	<0.010		0.010	mg/L		15-OCT-20	R5257198
L2516839-5 ELK RIVER DOWNSTREAM				3			
Sampled By: Carter Barrett on 14-OCT-20 @ 15:35							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		21-OCT-20	R5264117
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		15-OCT-20	R5255349
Coliform Bacteria - Fecal	11		1	CFU/100mL		15-OCT-20	R5256321
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		20-OCT-20	R5259471
Total Suspended Solids	<3.0		3.0	mg/L		19-OCT-20	R5258939
pΗ	8.46		0.10	pН		17-OCT-20	R5257580
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	1.72		0.020	mg/L		15-OCT-20	R5257198
Nitrate+Nitrite	1.72		0.020	IIIg/L		13-001-20	K3237 190
Nitrate and Nitrite (as N)	1.72		0.022	mg/L		19-OCT-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		15-OCT-20	R5257198

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - FALL EMS WEEK 3 L2516839 CONTD....

Reference Information

PAGE 4 of 5 Version: FINAL

Sample Parameter Qualifier Kev:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day IncubO2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

 Laboratory Definition Code
 Laboratory Location

 CL
 ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

**FARUC - FALL EMS WEEK 3** L2516839 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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4 Fax: 780-791-1586

e: 1-600-668-9878 Fax: 780-437-2311 Toll Free: 1-800-668-9878 Fax: 403-291-0298

SEND REPORT TO:

COMPANY:

ADDRESS:

# ree: 1-800-667-7645 Fax: 306-668-8383 CHAIN OF CUSTODY FORM OF PAGE ATTN: PATRICK MAJER ANALYSIS REQUESTED: POSTAL CODE: T2T 0E2

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	CE FORMAT:				THE RESULTS TO	250-423-4652 OR	E-MAIL TO			FOR	R LAE	3 [ ]5	E ON	II V	<u> </u>	IME:		<del></del>	0	<u> </u>			TIME:	
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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: PATRICK MAJER 1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 22-OCT-20

Report Date: 29-OCT-20 12:47 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2520141

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - FALL EMS WEEK 4

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2520141 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2520141-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 21-OCT-20 @ 13:20							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	286	BODQ	75	mg/L		23-OCT-20	R5270479
Total Suspended Solids	231		3.0	mg/L		27-OCT-20	R5270297
pH	7.81		0.10	pН		23-OCT-20	R5266696
L2520141-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 21-OCT-20 @ 13:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-OCT-20	R5269964
Biochemical Oxygen Demand	<2.0		2.0	mg/L		23-OCT-20	R5270479
Chemical Oxygen Demand	10		10	mg/L		26-OCT-20	R5269174
Orthophosphate-Dissolved (as P)	0.197	DLHC	0.025	mg/L		22-OCT-20	R5265546
Coliform Bacteria - Fecal	51		1	CFU/100mL		22-OCT-20	R5267378
Phosphorus (P)-Total	0.278	DLHC	0.025	mg/L		26-OCT-20	R5268849
Total Suspended Solids	<3.0		3.0	mg/L		27-OCT-20	R5270297
pH	8.25		0.10	pН		23-OCT-20	R5266696
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	14.9		0.020	mg/L		23-OCT-20	R5269524
Nitrate+Nitrite	14.9		0.020	IIIg/L		25-001-20	K3209324
Nitrate and Nitrite (as N)	14.9		0.022	mg/L		27-OCT-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		23-OCT-20	R5269524
L2520141-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 21-OCT-20 @ 14:10							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-OCT-20	R5269964
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		22-OCT-20	R5265546
Coliform Bacteria - Fecal	1		1	CFU/100mL		22-OCT-20	R5267378
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		26-OCT-20	R5268849
Total Suspended Solids	<3.0		3.0	mg/L		27-OCT-20	R5270297
pH	8.36		0.10	pН		23-OCT-20	R5266696
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	4.00		0.000	ma/l		22 OCT 20	DE260E24
Nitrate (as N) Nitrate+Nitrite	1.88		0.020	mg/L		23-OCT-20	R5269524
Nitrate+Nitrite Nitrate and Nitrite (as N)	1.88		0.022	mg/L		27-OCT-20	
Nitrite in Water by IC			J.J	······································			
Nitrite (as N)	< 0.010		0.010	mg/L		23-OCT-20	R5269524
L2520141-4 ELK RIVER @ OUTFALL							
Sampled By: Carter Barrett on 21-OCT-20 @ 14:20							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		28-OCT-20	R5269964
Orthophosphate-Dissolved (as P)	0.0097		0.0050	mg/L		22-OCT-20	R5265546
Coliform Bacteria - Fecal	12		1	CFU/100mL		22-OCT-20	R5267378
Comonii Bacteria i coai						t contract of the contract of	1
Phosphorus (P)-Total	0.0152		0.0050	mg/L		26-OCT-20	R5268849

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2520141 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2520141-4 ELK RIVER @ OUTFALL							
Sampled By: Carter Barrett on 21-OCT-20 @ 14:20							
Matrix: Water							
pH	8.32		0.10	pН		23-OCT-20	R5266696
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC				,,			
Nitrate (as N) Nitrate+Nitrite	0.090		0.020	mg/L		23-OCT-20	R5269524
Nitrate+Nitrite Nitrate and Nitrite (as N)	0.090		0.022	mg/L		27-OCT-20	
Nitrite in Water by IC	0.000		0.022	9/=			
Nitrite (as N)	<0.010		0.010	mg/L		23-OCT-20	R5269524
L2520141-5 ELK RIVER DOWNSTREAM							
Sampled By: Carter Barrett on 21-OCT-20 @ 13:45							
Matrix: Water							
Miscellaneous Parameters	_						
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-OCT-20	R5269964
Orthophosphate-Dissolved (as P) Coliform Bacteria - Fecal	<0.0050		0.0050	mg/L CFU/100mL		22-OCT-20	R5265546
Coliform Bacteria - Fecal Phosphorus (P)-Total	2 <0.0050		1 0.0050	mg/L		22-OCT-20 26-OCT-20	R5267378 R5268849
Total Suspended Solids	<3.0		3.0	mg/L		27-OCT-20	R5200049
pH	8.36		0.10	pH		27-OCT-20 23-OCT-20	R5266696
NO2, NO3 and Sum of NO2/NO3	0.50		0.10	Pii		20 001 20	113200030
Nitrate in Water by IC							
Nitrate (as N)	1.90		0.020	mg/L		23-OCT-20	R5269524
Nitrate+Nitrite	1.00		0.000	ma/l		27-OCT-20	
Nitrate and Nitrite (as N)  Nitrite in Water by IC	1.90		0.022	mg/L		27-001-20	
Nitrite (as N)	<0.010		0.010	mg/L		23-OCT-20	R5269524

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

**FARUC - FALL EMS WEEK 4** L2520141 CONTD....

**Reference Information** 

PAGE 4 of 5 Version: FINAL

Sample Parameter Qualifier Kev:

Qualifier	Description
BODQ	BOD Qualification: Lab Control Sample outside standard 85-115% objective (see QC report). Sample(s) cannot be rerun due to hold time expiry.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day IncubO2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL APHA 5220 D Colorimetry Water Chemical Oxygen Demand (COD)

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL Water Fecal Coliform Count-MF **APHA 9222D** 

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL J. ENVIRON. MONIT., 2005, 7, 37-42, RSC Water Ammonia by Fluorescence

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Nitrate in Water by IC NO3-IC-N-CI Water EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water **Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

<b>Laboratory Definition Code</b>	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
Chain of Custody Numbers	

Chain of Custody Numbers:

**FARUC - FALL EMS WEEK 4** L2520141 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

## **ALS Environmental**

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L2520141-COFC

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x: 250-261-5587

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780-791-1586

6-668-9878 Fax: 780-437-2311 e: 1-800-568-9878 Fax: 403-291-0298 -800-567-7645 Fax: 306-668-8383

LZ520/4)

SENI	REPORT T	О:				CHAIN OF	CUS	TO	DY	FO	RM										PAGE	OF
СОМ	PANY:	FERNIE ALPINE RESORT	UTILITIES	CORPORATION	ATTN	PATRICK MAJER	AN	ALYSIS REQUESTED:														
ADDI	RESS:	1505 - 17TH AVENUE SOU	TH WEST				1															
CITY	:	CALGARY	PROV:	ALBERTA	POSTAL CODE	T2T 0E2																
TEL:		403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER	Carter Barrett									. • •				1			
PRO.	JECT NAME	AND NO.: FARUC - Fall 6	EMS week	4	QUOTE NO		1															
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		WWTP Influent Routine	$\frac{J_{ij}}{2}$	2020-07-21*	13:20	Water	ļ	X	X			· . '	<u> </u>	-			-		1		19.7	<u> </u>
		WWTP Influent BOD	2	2020-07-21	13:2G	Water	_		7						X	7.45.		<u> </u>	1 13		795	00
	-	WWTP Effluent Routine	3	2020-07-21	13:30	Water		X	X			* i				X	_	_	1		17.2	<u></u>
		WWTP Effluent BOD	4	2020-07-21	13:30	Water	-							1,31	Х	: :	1	<del>  -</del> -	<u> </u>			
		WWTP Effluent Nutrients	5	2020-07-21	13:30	Water	_			Х	×	Х	Х	Х					<u> </u>			
		WWTP Effluent Bacteriologi		2020-07-21	13:30	Water	×						,						<u> </u>		// 00	
	:	Elk River Upstream Routine		2020-07-21	14:10	Water		X	.X.											-	4.5°C	
ONLY		Elk River Upstream Nutrient	<u> </u>	2020-07-21	14:10	Water	<u> </u>			Х	Х	Х	X	Х	-,		L					
	1	Elk River Upstream Bacterio	logical 5	2020-07-21	14:10	Water	X											1.		te.	<del></del>	
LAB USE		Elk River @ Outfall Routine	16	2020-07-21	14:20	Water		X	X	_				_					_		4.5℃	
Ϋ́		Elk River @ Outfall Nutrients	11	2020-07-21	14:20	Water		,		Х	`x	X	X	X				<u> </u>	ļ			
FOR I		Elk River @ Outfall Bacteriol	logical / )	2020-07-21	1420	Water	Χ.															
щ		Elk River Downstream Routi	ne ノブ	2020-07-21	13:45	Water		Х	Х	32.	. *:							- "			3,500	•
		Elk River Downstream Nutrie	ents 14	2020-07-21	13:45	Water				X	х	X	Х	х								
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TURN	ANDONDA	EGVISED							Carte	er Bari	rett			Т	ME:	/5:	15	_		B	TIME	XUC
SEND	INVOICE TO	): □	4 II	]])][		RF			RELI	NQUIS	HED	BY:		Ð	ATE:				RECI	ENED	BY: DATE	
	CE FORMAT		<u> </u>						TIME:							TIME						
SPEC	AL INSTRU	CTIONS: PLEASE FAX A wastewater@sk	COPY OF	THE RESULTS TO 250	423-4652 OR E	-MAIL TO			FOR LAB USE ONLY													
		Mazicagrei@sk								r Seal				Sampl				J-	°C 1		g Method?	
									. Y	es	_No	N	/A	Frozer	17	_Yes		No ·		ICO	packslos	None



FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: Patrick Majer

1505 - 17TH AVENUE SW CALGARY AB T2T 0E2

Date Received: 29-OCT-20

Report Date: 05-NOV-20 13:41 (MT)

Version:

FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2523074

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC-FALL EMS WEEK 5

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2523074 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2523074-1 WWTP INFLUENT							
Sampled By: CB on 28-OCT-20 @ 16:00							
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	91	DLHC	20	mg/L		30-OCT-20	R5278841
Total Suspended Solids	139		3.0	mg/L		02-NOV-20	R5275801
рН	7.96		0.10	pН		30-OCT-20	R5272286
L2523074-2 WWTP EFFLUENT							
Sampled By: CB on 28-OCT-20 @ 16:10							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-NOV-20	R5272822
Biochemical Oxygen Demand	<2.0		2.0	mg/L		30-OCT-20	R5278841
Orthophosphate-Dissolved (as P)	0.156	DLHC	0.010	mg/L		29-OCT-20	R5271394
Coliform Bacteria - Fecal	3		1	CFU/100mL		29-OCT-20	R5272226
Phosphorus (P)-Total	0.267	DLHC	0.025	mg/L		30-OCT-20	R5271887
Total Suspended Solids	<3.0		3.0	mg/L		02-NOV-20	R5275801
рН	8.34		0.10	pН		30-OCT-20	R5272286
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	40.4		0.000	,,			D.5070004
Nitrate (as N)	19.1		0.020	mg/L		30-OCT-20	R5272281
Nitrate+Nitrite Nitrate and Nitrite (as N)	19.1		0.022	mg/L		31-OCT-20	
Nitrite in Water by IC	15.1		0.022	1119/2		01 001 20	
Nitrite (as N)	<0.010		0.010	mg/L		30-OCT-20	R5272281
L2523074-3 ELK RIVER UPSTREAM							
Sampled By: CB on 28-OCT-20 @ 14:25							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-NOV-20	R5272822
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		29-OCT-20	R5271394
Coliform Bacteria - Fecal	2		1	CFU/100mL		29-OCT-20	R5272226
Phosphorus (P)-Total	0.0060		0.0050	mg/L		30-OCT-20	R5271887
Total Suspended Solids	<3.0		3.0	mg/L		02-NOV-20	R5275801
рН	8.43		0.10	pН		30-OCT-20	R5272286
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	4.05		0.000			00 007 00	D.5070004
Nitrate (as N)	1.95		0.020	mg/L		30-OCT-20	R5272281
Nitrate+Nitrite Nitrate and Nitrite (as N)	1.95		0.022	mg/L		31-OCT-20	
Nitrite in Water by IC	1.55		0.022	9, _		3. 33. 20	
Nitrite (as N)	<0.010		0.010	mg/L		30-OCT-20	R5272281
L2523074-4 ELK RIVER OUTFALL				-			
Sampled By: CB on 28-OCT-20 @ 14:15							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-NOV-20	R5272822
Orthophosphate-Dissolved (as P)	0.0106		0.0050	mg/L		29-OCT-20	R5271394
Coliform Bacteria - Fecal	4		1	CFU/100mL		29-OCT-20	R5272226
Phosphorus (P)-Total	0.0099		0.0050	mg/L		30-OCT-20	R5271887
Total Suspended Solids	<3.0		3.0	mg/L		02-NOV-20	R5275801
рН	8.40		0.10	pН		30-OCT-20	R5272286
NO2, NO3 and Sum of NO2/NO3							

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2523074 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2523074-4 ELK RIVER OUTFALL							
Sampled By: CB on 28-OCT-20 @ 14:15							
Matrix: WATER							
Nitrate in Water by IC							
Nitrate (as N)	0.099		0.020	mg/L		30-OCT-20	R5272281
Nitrate+Nitrite	0.000		0.020				
Nitrate and Nitrite (as N)	0.099		0.022	mg/L		31-OCT-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		30-OCT-20	R5272281
L2523074-5 ELK RIVER DOWNSTREAM							
Sampled By: CB on 28-OCT-20 @ 14:00							
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		02-NOV-20	R5272822
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		29-OCT-20	R5271394
Coliform Bacteria - Fecal	1		1	CFU/100mL		29-OCT-20	R5272226
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		30-OCT-20	R5271887
Total Suspended Solids	<3.0		3.0	mg/L		02-NOV-20	R5275801
рН	8.44		0.10	pН		30-OCT-20	R5272286
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.99		0.020	mg/L		30-OCT-20	R5272281
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.99		0.022	mg/L		31-OCT-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		30-OCT-20	R5272281
	<b>VO.010</b>		0.010	mg/L		00 001 20	113272201

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

**FARUC-FALL EMS WEEK 5** L2523074 CONTD....

Reference Information

PAGE 4 of 5 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier Description

**DLHC** Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

**BOD-BC-CL** Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

FCC-MF-CL Fecal Coliform Count-MF **APHA 9222D** Water

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water CALCULATION Nitrate+Nitrite

NH3-F-CL Water J. ENVIRON. MONIT., 2005, 7, 37-42, RSC Ammonia by Fluorescence

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS Water

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water **Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

**Laboratory Location** CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

**Laboratory Definition Code** 

**FARUC-FALL EMS WEEK 5** L2523074 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

## **ALS Environmental**

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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: Patrick Majer

1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 05-NOV-20

Report Date: 13-NOV-20 14:14 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2526154

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - FALL 2020 EMS WK #6

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2526154 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2526154-1 WWTP INFLUENT							
Sampled By: Hungry Baytaluke on 04-NOV-20 @ 14:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	15.9	BODP	6.0	mg/L		06-NOV-20	R5284360
Total Suspended Solids	33.4		3.0	mg/L		09-NOV-20	R5283597
pH	8.11		0.10	pН		07-NOV-20	R5282234
L2526154-2 WWTP EFFLUENT							
Sampled By: Hungry Baytaluke on 04-NOV-20 @ 14:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		06-NOV-20	R5282103
Biochemical Oxygen Demand	<2.0		2.0	mg/L		06-NOV-20	R5284360
Chemical Oxygen Demand	20		10	mg/L		12-NOV-20	R5284518
Orthophosphate-Dissolved (as P)	0.179	DLHC	0.010	mg/L		05-NOV-20	R5281831
Coliform Bacteria - Fecal	18		1	CFU/100mL		05-NOV-20	R5281953
Nitrate (as N)	18.3	DLDS	0.040	mg/L		06-NOV-20	R5282126
Nitrite (as N)	<0.020	DLDS	0.020	mg/L		06-NOV-20	R5282126
Phosphorus (P)-Total	0.243	DLHC	0.025	mg/L		07-NOV-20	R5282330
Total Suspended Solids	<3.0		3.0	mg/L		09-NOV-20	R5283597
рН	8.35		0.10	рН		07-NOV-20	R5282234
NO2, NO3 and Sum of NO2/NO3							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	18.3		0.045	mg/L		07-NOV-20	
L2526154-3 ELKRIVER UPSTREAM							
Sampled By: Hungry Baytaluke on 04-NOV-20 @ 14:30							
Matrix: Water							
Miscellaneous Parameters	0.050		0.050			00 NOV 00	D5000400
Ammonia, Total (as N)	<0.050		0.050	mg/L		06-NOV-20	R5282103
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		05-NOV-20	R5281831
Coliform Bacteria - Fecal	34		1	CFU/100mL		05-NOV-20	R5281953
Nitrate (as N)	1.41		0.020	mg/L		07-NOV-20	R5282249
Nitrite (as N)	<0.010		0.010	mg/L		07-NOV-20	R5282249
Phosphorus (P)-Total	0.0143		0.0050	mg/L		07-NOV-20	R5282330
Total Suspended Solids	8.6		3.0	mg/L		09-NOV-20	R5283597
pH NO2, NO3 and Sum of NO2/NO3	8.39		0.10	pН		07-NOV-20	R5282234
Noz, Nos and Sum of Noz/Nos Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.41		0.022	mg/L		10-NOV-20	
L2526154-4 ELKRIVER OUTFALL							
Sampled By: Hungry Baytaluke on 04-NOV-20 @ 14:45							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		06-NOV-20	R5282103
Orthophosphate-Dissolved (as P)	0.0165		0.0050	mg/L		05-NOV-20	R5281831
Coliform Bacteria - Fecal	112	DLM	2	CFU/100mL		05-NOV-20	R5281953
Nitrate (as N)	0.058		0.020	mg/L		07-NOV-20	R5282249
Nitrite (as N)	<0.010		0.010	mg/L		07-NOV-20	R5282249
Phosphorus (P)-Total	0.0582		0.0050	mg/L		07-NOV-20	R5282330
Total Suspended Solids	6.3		3.0	mg/L		10-NOV-20	R5284088
pH	8.31		0.10	pН		07-NOV-20	R5282234
NO2, NO3 and Sum of NO2/NO3							

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2526154 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2526154-4 ELKRIVER OUTFALL							
Sampled By: Hungry Baytaluke on 04-NOV-20 @ 14:4	5						
Matrix: Water							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.058		0.022	mg/L		10-NOV-20	
L2526154-5 ELKRIVER DOWNSTREAM							
Sampled By: Hungry Baytaluke on 04-NOV-20 @ 15:0	0						
Matrix: Water							
Miscellaneous Parameters						<b>_</b>	
Ammonia, Total (as N)	<0.050		0.050	mg/L		06-NOV-20	R5282103
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		05-NOV-20	R5281831
Coliform Bacteria - Fecal	27		1	CFU/100mL		05-NOV-20	R5281953
Nitrate (as N)	1.56		0.020	mg/L		07-NOV-20	R5282249
Nitrite (as N)	<0.010		0.010	mg/L		07-NOV-20	R5282249
Phosphorus (P)-Total	0.0088		0.0050	mg/L		07-NOV-20	R5282330
Total Suspended Solids	8.7		3.0	mg/L		10-NOV-20	R5284088
pH NO2, NO3 and Sum of NO2/NO3	8.41		0.10	pН		07-NOV-20	R5282234
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.56		0.022	mg/L		10-NOV-20	

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - FALL 2020 EMS WK #6 L2526154 CONTD....

Reference Information

PAGE 4 of 5 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier	Description
BODP	BOD dilution results differed by more than 30% RPD. Precision of reported BOD result may be less than usual.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day IncubO2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-SK Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-SK Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

<b>Laboratory Definition Code</b>	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
Chain of Custody Numbers:	

FARUC - FALL 2020 EMS WK #6 L2526154 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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L2526154-COFC

₹ax: 604-253-6700 37 ≈ax: 780-513-2191

ix: 780-437-2311

### CHAIN OF CUSTODY FORM

9878 Fax: 403-291-0298 Fax: 306-668-8383

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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: Patrick Majer

1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 16-DEC-20

Report Date: 28-DEC-20 12:40 (MT)

Version:

FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2540938

Project P.O. #:

NOT SUBMITTED

Job Reference:

**FARUC WEEK 1** 

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2540938 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2540938-1 WWTP INFLUENT							
Sampled By: Bo Choroszewski on 15-DEC-20 @ 10:45							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	101		20	mg/L		16-DEC-20	R5320079
Total Suspended Solids	113		3.0	mg/L		22-DEC-20	R5321856
рН	7.63		0.10	рН		21-DEC-20	R5321499
L2540938-2 WWTP EFFLUENT							
Sampled By: Bo Choroszewski on 15-DEC-20 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-DEC-20	R5324058
Biochemical Oxygen Demand	<2.0		2.0	mg/L		16-DEC-20	R5320079
Chemical Oxygen Demand	<10		10	mg/L		16-DEC-20	R5319063
Orthophosphate-Dissolved (as P)	0.365	DLM	0.050	mg/L		16-DEC-20	R5318628
Coliform Bacteria - Fecal	40		1	CFU/100mL		16-DEC-20	R5318765
Phosphorus (P)-Total	0.477	DLHC	0.025	mg/L		23-DEC-20	R5322219
Total Suspended Solids	<3.0		3.0	mg/L		22-DEC-20	R5321856
pH	8.06		0.10	pН		21-DEC-20	R5321499
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	30.5	DLHC	0.10	mg/L		16-DEC-20	R5319733
Nitrate+Nitrite	00.0		0.10	1119/2		10 520 20	110010700
Nitrate and Nitrite (as N)	30.5		0.11	mg/L		19-DEC-20	
Nitrite in Water by IC							
Nitrite (as N)	< 0.050	DLHC	0.050	mg/L		16-DEC-20	R5319733
L2540938-3 ELK RIVER UPSTREAM							
Sampled By: Bo Choroszewski on 15-DEC-20 @ 10:55							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-DEC-20	R5324058
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		16-DEC-20	R5318628
Coliform Bacteria - Fecal	3		1	CFU/100mL		16-DEC-20	R5318765
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		23-DEC-20	R5322219
Total Suspended Solids	<3.0		3.0	mg/L		22-DEC-20	R5321856
pH NO2, NO3 and Sum of NO2/NO3	8.32		0.10	рН		21-DEC-20	R5321499
Nitrate in Water by IC							
Nitrate (as N)	1.90		0.020	mg/L		16-DEC-20	R5319733
Nitrate+Nitrite				3			
Nitrate and Nitrite (as N)	1.90		0.022	mg/L		19-DEC-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		16-DEC-20	R5319733
L2540938-4 ELK RIVER OUTFALL							
Sampled By: Bo Choroszewski on 15-DEC-20 @ 10:50							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		24-DEC-20	R5324058
Orthophosphate-Dissolved (as P)	0.0186		0.0050	mg/L		16-DEC-20	R5318628
Coliform Bacteria - Fecal	3		1	CFU/100mL		16-DEC-20	R5318765
Phosphorus (P)-Total	0.0294		0.0050	mg/L		23-DEC-20	R5322219
Total Suspended Solids	<3.0		3.0	mg/L		22-DEC-20	R5321856

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2540938 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2540938-4 ELK RIVER OUTFALL							
Sampled By: Bo Choroszewski on 15-DEC-20 @ 10:50	)						
Matrix: Water							
pH	8.25		0.10	pН		21-DEC-20	R5321499
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.49		0.020	mg/L		16-DEC-20	R5319733
Nitrate+Nitrite Nitrate and Nitrite (as N)	1.49		0.022	mg/L		19-DEC-20	
Nitrite in Water by IC	1.40		0.022	g/ L		10 520 20	
Nitrite (as N)	<0.010		0.010	mg/L		16-DEC-20	R5319733
L2540938-5 ELK RIVER DOWNSTREAM							
Sampled By: Bo Choroszewski on 15-DEC-20 @ 11:00	)						
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-DEC-20	R5324058
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		16-DEC-20	R5318628
Coliform Bacteria - Fecal	5		1	CFU/100mL		16-DEC-20	R5318765
Phosphorus (P)-Total Total Suspended Solids	<0.0050		0.0050 3.0	mg/L mg/L		23-DEC-20 22-DEC-20	R5322219
pH	<3.0 8.32		0.10	pH		21-DEC-20	R5321856 R5321499
NO2, NO3 and Sum of NO2/NO3	0.32		0.10	pri		21-DEC-20	K5521499
Nitrate in Water by IC							
Nitrate (as N)	1.91		0.020	mg/L		16-DEC-20	R5319733
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.91		0.022	mg/L		19-DEC-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		16-DEC-20	R5319733
				3			

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC WEEK 1 L2540938 CONTD....

**Reference Information** 

PAGE 4 of 5 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

#### **Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
BOD-BC-CL	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day IncubO2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

<b>Laboratory Definition Code</b>	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA
Chain of Custody Numbers	

#### Chain of Custody Numbers:

**FARUC WEEK 1** L2540938 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

### **ALS Environmental**

ANALYTICAL CHEMISTRY & TESTING SERVICES

#### www.alsenviro.com



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ITY:	CALGARY PROV: A	LBERTA	POSTAL CODE	T2T 0E2	1												:			
EL:	403 - 256 - 8473 FAX: 4	03 - 244 - 3774	SAMPLER	Bo Choroszewski	1										1					
ROJECT NAME	AND NO.: FARUC - Winter EMS wee	1	QUOTE NO:		1															
NO.:	ALS CON	TACT: Patryk Woyciak	(		]															
PORT FORMA			p pajer@skiro	or.com	Coliforms										-					
WO#	SAMPLE IDENTIFICATION	DATE / TIME	COLLECTED	MATRIX		S		P Or	<u>                                      </u>	NH3-N	S.	NO2-N	BODS	٥	4				NOTES (sample s	specific
·		YYYY-MM-DD	TIME	1,,,,,,,,,,	Fecal	TSS	Ha.	Ortho	Total	Ξ	Š	2	8	8			- *		comments, due date	es, etc.)
	WWTP Influent Routine	2020-12-15	10:45	Water		X	X				<u> </u>								10.2°C	
	WWTP Influent BOD 2	2020-12-15	10:45	Water							ļ	<u> </u>	X						10.2°C	
	WWTP Effluent Routine 3	2020-12-15	10:30	Water		Х	X	-				1		X	<u> </u>				10.8°C	
	WWTP Effluent BOD 4	2020-12-15	10:30	Water							_		Х						10.8°C	
	WWTP Effluent Nutrients 5	2020-12-15	10:30	Water		· .		х	Х	х	X	Х	1						10.2 °C	
	WWTP Effluent Bacteriological 6	2020-12-15	10:30	Water	Х														10.8°C	
	Elk River Upstream Routine 7	2020-12-15	10:55	Water	J.	X	Х									_			0-1°C	
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5	Elk River @ Outfall Bacteriological 1	2020-12-15	10:50	Water	х														0.3%	
	Elk River Downstream Routine 13	2020-12-15	11:00	Water		X	х			17			A PTAG		-		-, :		D.1 °C	
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	wastewater@skifemie.com							r Seal				_			ture:	, ,	°C		ig Method?	



FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: Patrick Majer

1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 22-DEC-20

Report Date: 31-DEC-20 12:57 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2543012

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - WINTER EMS WEEK 2

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2543012 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2543012-1 WWTP INFLUENT ROUTINE							
Sampled By: CARTER BARRETT on 21-DEC-20 @ 11	:25						
Matrix: WATER							
Miscellaneous Parameters							
Biochemical Oxygen Demand	98	DLHC	75	mg/L		23-DEC-20	R5325278
Total Suspended Solids	211		3.0	mg/L		28-DEC-20	R5326276
рН	7.57		0.10	рН		30-DEC-20	R5329397
_2543012-2 WWTP EFFLUENT ROUTINE							
Sampled By: CARTER BARRETT on 21-DEC-20 @ 11	:20						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		28-DEC-20	R5326667
Biochemical Oxygen Demand	<2.0		2.0	mg/L		23-DEC-20	R5325278
Chemical Oxygen Demand	10		10	mg/L		28-DEC-20	R5324916
Orthophosphate-Dissolved (as P)	0.540	DLHC	0.050	mg/L		22-DEC-20	R5322038
Coliform Bacteria - Fecal	11		1	CFU/100mL		22-DEC-20	R5322397
Phosphorus (P)-Total	0.601	DLHC	0.050	mg/L		29-DEC-20	R5326697
Total Suspended Solids	<3.0		3.0	mg/L		28-DEC-20	R5326276
pH	8.04		0.10	рН		30-DEC-20	R5329397
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	34.5	DLHC	0.10	mg/L		22-DEC-20	R5321798
Nitrate+Nitrite	34.5	DLITO	0.10	IIIg/L		22-DLC-20	K3321790
Nitrate and Nitrite (as N)	34.5		0.11	mg/L		23-DEC-20	
Nitrite in Water by IC	22		• • • • • • • • • • • • • • • • • • • •				
Nitrite (as N)	< 0.050	DLHC	0.050	mg/L		22-DEC-20	R5321798
L2543012-3 ELK RIVER UPSTREAM ROUTINE							
Sampled By: CARTER BARRETT on 21-DEC-20 @ 10	):55						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		28-DEC-20	R5326667
Orthophosphate-Dissolved (as P)	< 0.0050		0.0050	mg/L		22-DEC-20	R5322038
Coliform Bacteria - Fecal	3		1	CFU/100mL		22-DEC-20	R5322397
Phosphorus (P)-Total	< 0.0050		0.0050	mg/L		29-DEC-20	R5326697
Total Suspended Solids	<3.0		3.0	mg/L		28-DEC-20	R5326276
pH	8.40		0.10	рН		30-DEC-20	R5329397
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	1.00		0.000	ma/l		22 DEC 20	DE224700
Nitrate (as N) Nitrate+Nitrite	1.90		0.020	mg/L		22-DEC-20	R5321798
Nitrate+Nitrite Nitrate and Nitrite (as N)	1.90		0.022	mg/L		23-DEC-20	
Nitrite in Water by IC			5.5 <b>22</b>	······································		== = = = = = = = = = = = = = = = = =	
Nitrite (as N)	<0.010		0.010	mg/L		22-DEC-20	R5321798
_2543012-4 ELK RIVER @ OUTFALL NUTRIENTS							
Sampled By: CARTER BARRETT on 21-DEC-20 @ 10	):50						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		28-DEC-20	R5326667
Orthophosphate-Dissolved (as P)	0.0109		0.0050	mg/L		22-DEC-20	R5322038
Coliform Bacteria - Fecal	3		1	CFU/100mL		22-DEC-20	R5322397
Phosphorus (P)-Total	0.0128		0.0050	mg/L		29-DEC-20	R5326697
							1

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2543012 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2543012-4 ELK RIVER @ OUTFALL NUTRIENTS							
Sampled By: CARTER BARRETT on 21-DEC-20 @ 1	0:50						
Matrix: WATER							
pH	8.37		0.10	pН		30-DEC-20	R5329397
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.288		0.020	mg/L		22-DEC-20	R5321798
Nitrate+Nitrite Nitrate and Nitrite (as N)	0.288		0.022	mg/L		23-DEC-20	
Nitrite in Water by IC	0.200		0.022	IIIg/L		20 020 20	
Nitrite (as N)	<0.010		0.010	mg/L		22-DEC-20	R5321798
L2543012-5 ELK RIVER DOWNSTREAM ROUTINE							
Sampled By: CARTER BARRETT on 21-DEC-20 @ 1	:40						
Matrix: WATER							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		28-DEC-20	R5326667
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		22-DEC-20	R5322038
Coliform Bacteria - Fecal	5		1	CFU/100mL		22-DEC-20	R5322397
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		29-DEC-20	R5326697
Total Suspended Solids	<3.0		3.0	mg/L		28-DEC-20	R5326276
pH NO2, NO3 and Sum of NO2/NO3	8.40		0.10	pН		30-DEC-20	R5329397
Nitrate in Water by IC							
Nitrate (as N)	1.92		0.020	mg/L		22-DEC-20	R5321798
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.92		0.022	mg/L		23-DEC-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		22-DEC-20	R5321798
Thane (do 14)	<0.010		0.010	mg/L		22 020 20	13321790

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - WINTER EMS WEEK 2

L2543012 CONTD....

PAGE 4 of 5 Version: FINAL

### Reference Information

Sample Parameter Qualifier Key:

Qualifier Description

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

ALS Test Code Matrix Test Description Method Reference\*\*

BOD-BC-CL Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after

persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended

hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined

colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code Laboratory Location

CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

**FARUC - WINTER EMS WEEK 2** L2543012 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

## **ALS Environmental**

ANALYTICAL CHEMISTRY & TESTING SERVICES



www.alsenviro.com

Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700 Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587 Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191 Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586 Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311 Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298 Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

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A03 - 256 - 8473   FAX   403 - 244 - 3774   SAMPLER   Carter   Barrett	ADDR	RESS:	1505 - 17TI	-AVENUE-SOU	TH WEST-					<u>`</u>	-,		-Milari															
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ALS CONTACT    Patryk Woyciak     L2543012-COFC	TEL:		403 - 256 -	8473	FAX:	403 - 24	4 - 3774	SAMPLER:	Carter	Barrett															!			
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WOR   SAMPLE DENTIFICATION   DATE / TIME COLLECTED   YMYNMM-DD   TIME   YMYNMM-DD   TIME   YMYNMM-DD   TIME   YMYNM-DD   TIME   YMYNTP Influent Routine   2020-12-21   //-35   Water   X X X X X X X X X X X X X X X X X X	PO N	O.:		•.	ALS CO	NTACT:	Patryk Woyciak								L25	430	12-	COF	-C			-		:				
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PECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO  wastewater@skifemie.com  FOR LAB USE ONLY  and the property of the results to 250-423-4652 OR E-MAIL TO  wastewater@skifemie.com	SPEC	IAL INSTRU	CTIONS:	PLEASE FAX / wastewater@s	A COPY Of kifemie.cor	F THE RE	ESULTS TO 250	0-423-4652 OR E	-MAIL	го	٠.	•	$\vdash$	<del></del>			<u> </u>					<del></del>	-					4
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1.2543012-COFC

# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

## **Environmental Division**

### **COLIFORM SAMPLE DECLARATION FORM**



In British Columbia, the *Drinking Water Protection Act* requires laboratories to immediately report **positive results for Fecal Coliform and** *Escherichia coli* in drinking water samples directly to the Water Supplier, the Drinking Water Officer, and the Medical Health Officer in the region the water samples were taken. Immediate reporting is not required if the sample is water for which a public advisory to boil for drinking water has been issued, or if the sample is not a drinking water.

A. <u>PLEASE</u> complete and sign this Declaration for <u>EVERY</u> to ALS Environmental for Coliform and/or Escherichia coli	sample analysi	or san s.	nple ba	tch sub	mitted
ARE the sample(s) submitted herein Drinking Water Samples?	YES		NO		

Please submit samples by 1:00 pm Monday to Friday, or contact ALSE to make other arrangements.

(A drinking water sample is any water sample intended for human consumption.)

STOP HERE IF YOU ANSWERED NO, AND PLEASE SIGN AND DATE BELOW.

B. Please complete this section ONLY if samples are Drinking Water (DW) Sample(s). THIS COLUMN INDIVIDUAL SAMPLE DECLARATION FOR LAB USE SAMPLE IDENTIFICATION DATE / TIME COLLECTED (Please select yes or no from drop down menu) ONLY Sample Subject to BC **Boil Water Advisory** DW Protection Act?1 in Effect? ALS SAMPLE# 24 Hour Time Pantry Store (NO) 20 12 21 (Yes No Yes Yes No Yes No Yes No Yes No Yes No Yes No

	otection Act <u>only</u> if the water supply system serves <u>mo</u> r if you are unsure whether this applies to your sample(s).	re than one single-family
Carter Barrett	Operator	
Name (Please print)	Title	
Carter Bearrett	Dec 21, 2020	
Signature	Date	
parties (	and the first of the second	į.

THURN SOMER TIONS ON DESTE



1.2543012-COFC



# COLIFORM SAMPLE DECLARATION FORM (Page 2 of 2)

C. Please complete this section	ONLY if sam	ples are Drinkin	g Water Sampl	e(s).
Company, Water System Name or Name of				
FERNIE ALDINE RESC		LITIES C	CORP.	
Address:	Phone No:	Fax No:	3	lours/Emergency
1505-17th AUE, SW	1402,250	3473 (403)244	1/3774 No:	1861 2730
Water Supplier: PATRICK MAJER	Phone No:	Fax No:	After I	lours/Emergency (
PATRICK MAJER	1405 12570	8473 (403) 24	No: 1403	76/8730
Sampler/Submitter <sup>3</sup> :	Phone No:	Fax No:	7	1 -1/11- 1
CarterBarrett	(36) 861-70	ſ	Carrer.	barrettllagmail.co
<sup>2</sup> Person to whom results should be sent.		1	- :	
Person to whom results should be sent.  3 Sampler or submitter of samples if different that	ın Water Supplier.			
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D. Please complete this section		iples are subject	to regulation	under the
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Health Authority Region and/or Service Are		1	1	
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DAN BYRON	(250)420	2240 ( )	No: 1 (25¢)	0)421 3471
Medical Health Officer Name:	Phone No:	Fax No:	After I	Hours/Emergency
	1,		No:	6) 457 5648
L <sub>_</sub>			Mobile	s) 45 / Je .U
<sup>4</sup> There are five B.C. Health Authority Region			livery Areas:	
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4. Vancouver Coastal: North Short	re / Coast Garibald	li, Vancouver and Richn		
5. Fraser: Fraser No.	rth, Fraser South a	nd Fraser East		
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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: Patrick Majer

1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 30-DEC-20

Report Date: 06-JAN-21 16:39 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2544268

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - WINTER EMS WEEK 3

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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ADDRESS: 2559 29 Street NE, Calgary, AB T1Y 7B5 Canada | Phone: +1 403 291 9897 | Fax: +1 403 291 0298 ALS CANADA LTD Part of the ALS Group An ALS Limited Company



L2544268 CONTD.... PAGE 2 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2544268-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 29-DEC-20 @ 11:00							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	147	DLHC	75	mg/L		30-DEC-20	R5332116
Total Suspended Solids	262		9.0	mg/L		05-JAN-21	R5334757
рН	8.07		0.10	pН		31-DEC-20	R5330144
L2544268-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 29-DEC-20 @ 10:50							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		04-JAN-21	R5333417
Biochemical Oxygen Demand	<2.0		2.0	mg/L		30-DEC-20	R5332116
Chemical Oxygen Demand	14		10	mg/L		02-JAN-21	R5330336
Orthophosphate-Dissolved (as P)	0.249	DLHC	0.025	mg/L		30-DEC-20	R5328644
Coliform Bacteria - Fecal	2		1	CFU/100mL		30-DEC-20	R5330177
Phosphorus (P)-Total	0.416	DLHC	0.025	mg/L		31-DEC-20	R5329005
Total Suspended Solids	<9.0		9.0	mg/L		05-JAN-21	R5334757
pH	7.94		0.10	pН		31-DEC-20	R5330144
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	44.4	DLHC	0.10	mg/L		30-DEC-20	R5328878
Nitrate+Nitrite	44.4	DEITO	0.10	IIIg/L		30 DE0 20	13320070
Nitrate and Nitrite (as N)	44.4		0.11	mg/L		31-DEC-20	
Nitrite in Water by IC							
Nitrite (as N)	< 0.050	DLHC	0.050	mg/L		30-DEC-20	R5328878
L2544268-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 29-DEC-20 @ 11:05							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		04-JAN-21	R5333417
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		30-DEC-20	R5328644
Coliform Bacteria - Fecal	1		1	CFU/100mL		30-DEC-20	R5330177
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		31-DEC-20	R5329005
Total Suspended Solids	<9.0		9.0	mg/L		05-JAN-21	R5334757
pH	8.39		0.10	pН		31-DEC-20	R5330144
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	2.18		0.020	mg/L		30-DEC-20	R5328878
Nitrate+Nitrite	2.10		0.020	mg/L		30-DEC-20	110020070
Nitrate and Nitrite (as N)	2.18		0.022	mg/L		31-DEC-20	
Nitrite in Water by IC	-						
Nitrite (as N)	<0.010		0.010	mg/L		30-DEC-20	R5328878
L2544268-4 ELK RIVER @ OUTFALL							
Sampled By: Carter Barrett on 29-DEC-20 @ 11:10							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	< 0.050		0.050	mg/L		04-JAN-21	R5333417
Outh and a sub-sta-Disasah and (sa-D)	0.0980		0.0050	mg/L		30-DEC-20	R5328644
Orthophosphate-Dissolved (as P)	0.0300						1
Coliform Bacteria - Fecal	1		1	CFU/100mL		30-DEC-20	R5330177
		DLHC	1 0.010	CFU/100mL mg/L		30-DEC-20 31-DEC-20	R5330177 R5329005

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2544268 CONTD.... PAGE 3 of 5 Version: FINAL

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2544268-4 ELK RIVER @ OUTFALL							
Sampled By: Carter Barrett on 29-DEC-20 @ 11:10							
Matrix: Water							
pH	8.28		0.10	pН		31-DEC-20	R5330144
NO2, NO3 and Sum of NO2/NO3				,			
Nitrate in Water by IC							
Nitrate (as N)	15.5		0.020	mg/L		30-DEC-20	R5328878
Nitrate+Nitrite Nitrate and Nitrite (as N)	15.5		0.022	mg/L		31-DEC-20	
Nitrite in Water by IC	10.0		0.022	mg/L		01 020 20	
Nitrite (as N)	<0.010		0.010	mg/L		30-DEC-20	R5328878
L2544268-5 ELK RIVER DOWNSTREAM							
Sampled By: Carter Barrett on 29-DEC-20 @ 11:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		04-JAN-21	R5333417
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		30-DEC-20	R5328644
Coliform Bacteria - Fecal	2		1	CFU/100mL		30-DEC-20	R5330177
Phosphorus (P)-Total Total Suspended Solids	<0.0050 <9.0		0.0050 9.0	mg/L mg/L		31-DEC-20 05-JAN-21	R5329005
pH	<9.0 8.40		9.0 0.10	pH		31-DEC-20	R5334757 R5330144
NO2, NO3 and Sum of NO2/NO3	0.40		0.10	pri		31-020-20	K3330144
Nitrate in Water by IC							
Nitrate (as N)	2.02		0.020	mg/L		30-DEC-20	R5328878
Nitrate+Nitrite				,,		04 850 00	
Nitrate and Nitrite (as N)	2.02		0.022	mg/L		31-DEC-20	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		30-DEC-20	R5328878
				3'			

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

**FARUC - WINTER EMS WEEK 3** L2544268 CONTD....

Reference Information

PAGE 4 of 5 Version: FINAL

Sample Parameter Qualifier Key:

Qualifier Description

**DLHC** Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

**BOD-BC-CL** Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Chemical Oxygen Demand (COD) Water APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL **APHA 9222D** Water Fecal Coliform Count-MF

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite **CALCULATION** 

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Total P in Water by Colour APHA 4500-P PHOSPHORUS Water

Diss. Orthophosphate in Water by Colour

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PO4-DO-COL-CL

PH-CI Water APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended

APHA 4500-P PHOSPHORUS

hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined

colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

**Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

**Laboratory Definition Code Laboratory Location** 

CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

**FARUC - WINTER EMS WEEK 3** L2544268 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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L2544268-COFC

Yes \_\_\_No \_\_\_N/A

Frozen?

Yes...

Fax: 604-253-6700 5587 Fax: 780-513-2191 36 Fax: 780-437-2311 -9878 Fax: 403-291-0298

Fax: 306-668-8383 Saskatoon SK, 619 CHAIN OF CUSTODY FORM SEND REPORT TO: PAGE OF ATTN: PATRICK MAJER COMPANY: FERNIE ALPINE RESORT UTILITIES CORPORATION **ANALYSIS REQUESTED:** ADDRESS 1505 - 17TH AVENUE SOUTH WEST PROV. ALBERTA POSTAL CODE: T2T 0E2 CALGARY CITY: 403 - 256 - 8473 SAMPLER: Carter Barrett FAX: 403 - 244 - 3774 TEL: FARUC - Winter EMS week 3 PROJECT NAME AND NO. QUOTE NO: ALS CONTACT: Patryk Woyciak PO NO. REPORT FORMAT: WO# NO3-N NO2-N DATE / TIME COLLECTED BODS NOTES (sample specific COD SAMPLE IDENTIFICATION MATRIX TSS comments, due dates, etc.) YYYY-MM-DD TIME WWTP Influent Routine 1:00 Water Х Х 2020-12-29 WWTP Influent BOD 2020-12-29 11:00 Water Х х WWTP Effluent Routine X 9 2020-12-29 10:50 Water Х WWTP Effluent BOD 2020-12-29 Water Х 10:50 Х Х WWTP Effluent Nutnents 2020-12-29 Water Χ Х Х 10:50 Х WWTP Effluent Bacteriological Water 2020-12-29 11:05 Elk River Upstream Routine 2020-12-29 Water Х Х 11:05 Х Х Х ONLY 2020-12-29 Х Х Elk River Upstream Nutrients Water 4-1011:05 Elk River Upstream Bacteriological 2020-12-29 Water X USE 11:10 Elk River @ Outfall Routine 2020-12-29 Water х Х 10 R 11:10 X. X X. 2020-12-29 Х Х Elk River @ Outfall Nutrients Water 11:10 Х Elk River @ Outfall Bacteriological 2020-12-29 Water FOR Elk River Downstream Routine 2020-12-29 Water х X 2020-12-29 11:15 X Х Х Х Elk River Downstream Nutrients Water х Elk River Downstream Bacteriological 2020-12-29 11:15 Water X 2020-12-29 RECEIVED BY: DATE SPECIFY DATE: RELINQUISHED BY: DATE (surcharge may apply) TURN AROUND REQUIRED: T: 30 Carter Barrett TIME TIME SEND INVOICE TO: DATE RECEIVED BY: DATE: RELINQUISHED BY: INVOICE FORMAT: TIME TIME: SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO FOR LAB USE ONLY wastewater@skifemie.com Cooler Seal Intact? Sample Temperature: ).ºC Cooling Method?



FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: Patrick Majer

1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 05-JAN-21

Report Date: 11-JAN-21 15:23 (MT)

Version:

FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2545155

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - EMS WEEK 4

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2545155 CONTD.... PAGE 2 of 5 Version: FINAL

### ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2545155-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:10							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	166	DLHC	75	mg/L		06-JAN-21	R5341658
Total Suspended Solids	292		3.0	mg/L		07-JAN-21	R5339339
рН	7.86		0.10	рН		06-JAN-21	R5336839
L2545155-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:15							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-JAN-21	R5334656
Biochemical Oxygen Demand	3.4		2.0	mg/L		06-JAN-21	R5341658
Chemical Oxygen Demand	21		10	mg/L		05-JAN-21	R5334536
Orthophosphate-Dissolved (as P)	0.118	DLHC	0.010	mg/L		05-JAN-21	R5334120
Coliform Bacteria - Fecal	14		1	CFU/100mL		05-JAN-21	R5335577
Phosphorus (P)-Total	0.301	DLHC	0.020	mg/L		06-JAN-21	R5334854
Total Suspended Solids	<3.0		3.0	mg/L		07-JAN-21	R5339339
рН	8.16		0.10	pН		06-JAN-21	R5336839
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	20.0	DLHC	0.40			05-JAN-21	DE225420
Nitrate (as N) Nitrate+Nitrite	28.6	DLITO	0.10	mg/L		05-JAIN-21	R5335120
Nitrate and Nitrite (as N)	28.6		0.11	mg/L		06-JAN-21	
Nitrite in Water by IC	20.0		<b></b>				
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		05-JAN-21	R5335120
L2545155-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:50							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-JAN-21	R5334656
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		05-JAN-21	R5334120
Coliform Bacteria - Fecal	1		1	CFU/100mL		05-JAN-21	R5335577
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		06-JAN-21	R5334854
Total Suspended Solids	<3.0		3.0	mg/L		07-JAN-21	R5339339
рН	8.37		0.10	рН		06-JAN-21	R5336839
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	1.91		0.020	mg/L		05-JAN-21	R5335120
Nitrate+Nitrite	1.91		0.020	IIIg/L		03 3AN 21	103333120
Nitrate and Nitrite (as N)	1.91		0.022	mg/L		06-JAN-21	
Nitrite in Water by IC	-						
Nitrite (as N)	<0.010		0.010	mg/L		05-JAN-21	R5335120
L2545155-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:45							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-JAN-21	R5334656
Orthophosphate-Dissolved (as P)	0.0093		0.0050	mg/L		05-JAN-21	R5334120
Coliform Bacteria - Fecal	4		1	CFU/100mL		05-JAN-21	R5335577
Phosphorus (P)-Total	0.0182		0.0050	mg/L		06-JAN-21	R5334854
Total Suspended Solids	<3.0		3.0	mg/L		07-JAN-21	R5339339

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2545155 CONTD.... PAGE 3 of 5 Version: FINAL

### ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2545155-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 04-JAN-21 @ 10:45							
Matrix: Water							
pH	8.44		0.10	pH		06-JAN-21	R5336839
NO2, NO3 and Sum of NO2/NO3				ľ			
Nitrate in Water by IC							
Nitrate (as N)	0.150		0.020	mg/L		05-JAN-21	R5335120
Nitrate+Nitrite	0.450		0.000			00 1411 04	
Nitrate and Nitrite (as N)	0.150		0.022	mg/L		06-JAN-21	
Nitrite in Water by IC Nitrite (as N)	<0.010		0.010	mg/L		05-JAN-21	R5335120
L2545155-5 ELK RIVER DOWNSTREAM	10.0.0		0.0.0	9-			110000120
Sampled By: Carter Barrett on 04-JAN-21 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		05-JAN-21	R5334656
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		05-JAN-21	R5334120
Coliform Bacteria - Fecal	1		1	CFU/100mL		05-JAN-21	R5335577
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		06-JAN-21	R5334854
Total Suspended Solids	<3.0		3.0	mg/L		07-JAN-21	R5339339
pH	8.43		0.10	pН		06-JAN-21	R5336839
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	1.89		0.020	mg/L		05-JAN-21	R5335120
Nitrate+Nitrite	1.00		0.020	mg/L		00 0/114 21	110000120
Nitrate and Nitrite (as N)	1.89		0.022	mg/L		06-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		05-JAN-21	R5335120

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

**FARUC - EMS WEEK 4** L2545155 CONTD....

Reference Information

PAGE 4 of 5 Version: FINAL

#### Sample Parameter Qualifier Key:

Qualifier Description Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

**DLHC** 

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

**BOD-BC-CL** Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Chemical Oxygen Demand (COD) Water APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL **APHA 9222D** Water Fecal Coliform Count-MF

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite **CALCULATION** 

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Total P in Water by Colour APHA 4500-P PHOSPHORUS Water

Diss. Orthophosphate in Water by Colour

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PO4-DO-COL-CL

PH-CI Water APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended

APHA 4500-P PHOSPHORUS

hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

**Total Suspended Solids** APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

**Laboratory Definition Code Laboratory Location** 

CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

**FARUC - EMS WEEK 4** L2545155 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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5ll Free: 1-800-668-9878 Fax: 403-291-0298 эв: 1-800-667-7645 Fax: 306-668-8383 PAGE

CON	IPANY;	FERNIE ALPINE F	RESORT UTILITIES CORPO	RATION	ATTN:	PATRICK MAJER	AN	ALYS	SIS F	REQU	JEST	ED:											
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FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: Patrick Majer

1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 12-JAN-21

Report Date: 19-JAN-21 08:07 (MT)

Version: F

FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2547302

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - WINTER EMS WEEK 5

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2547302 CONTD.... PAGE 2 of 5 Version: FINAL

### ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2547302-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:50							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	128	DLHC	75	mg/L		12-JAN-21	R5352198
Total Suspended Solids	145		3.0	mg/L		17-JAN-21	R5350981
pH	7.96		0.10	pН		12-JAN-21	R5345177
L2547302-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:50							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-JAN-21	R5350127
Biochemical Oxygen Demand	<2.0		2.0	mg/L		12-JAN-21	R5352198
Chemical Oxygen Demand	11		10	mg/L		13-JAN-21	R5345179
Orthophosphate-Dissolved (as P)	0.235	DLHC	0.025	mg/L		12-JAN-21	R5343776
Coliform Bacteria - Fecal	3		1	CFU/100mL		12-JAN-21	R5345085
Phosphorus (P)-Total	0.275		0.0050	mg/L		13-JAN-21	R5344606
Total Suspended Solids	<3.0		3.0	mg/L		17-JAN-21	R5350981
pH	7.74		0.10	pН		12-JAN-21	R5345177
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	43.5	DLHC	0.10	mg/L		12-JAN-21	R5344822
Nitrate+Nitrite	43.3	DENIO	0.10	IIIg/L		12 0/11 21	13344022
Nitrate and Nitrite (as N)	43.5		0.11	mg/L		13-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	< 0.050	DLHC	0.050	mg/L		12-JAN-21	R5344822
L2547302-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-JAN-21	R5350127
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		12-JAN-21	R5343776
Coliform Bacteria - Fecal	6		1	CFU/100mL		12-JAN-21	R5345085
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		13-JAN-21	R5344606
Total Suspended Solids	<3.0		3.0	mg/L		17-JAN-21	R5350981
pH	8.33		0.10	pН		12-JAN-21	R5345177
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC	2.00		0.000	ma/l		12 14 14	DE244922
Nitrate (as N) Nitrate+Nitrite	2.08		0.020	mg/L		12-JAN-21	R5344822
Nitrate+Nitrite Nitrate and Nitrite (as N)	2.08		0.022	mg/L		13-JAN-21	
Nitrite in Water by IC				<i>3-</i>			
Nitrite (as N)	<0.010		0.010	mg/L		12-JAN-21	R5344822
L2547302-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:35							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		16-JAN-21	R5350127
7 minoria, Total (do 14)		1 1	0.0050	mg/L		12-JAN-21	R5343776
Orthophosphate-Dissolved (as P)	0.0242		0.0000	9, =			
	0.0242 3		1	CFU/100mL		12-JAN-21	R5345085
Orthophosphate-Dissolved (as P)						12-JAN-21 13-JAN-21	

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2547302 CONTD.... PAGE 3 of 5 Version: FINAL

### ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2547302-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 11-JAN-21 @ 10:35							
Matrix: Water							
pH	8.25		0.10	pН		12-JAN-21	R5345177
NO2, NO3 and Sum of NO2/NO3				<b>'</b>			
Nitrate in Water by IC							
Nitrate (as N)	3.73		0.020	mg/L		12-JAN-21	R5344822
Nitrate+Nitrite	0.70		0.000			40 141 04	
Nitrate and Nitrite (as N)  Nitrite in Water by IC	3.73		0.022	mg/L		13-JAN-21	
Nitrite (as N)	<0.010		0.010	mg/L		12-JAN-21	R5344822
L2547302-5 ELK RIVER DOWNSTREAM	10.0.0		0.0.0				
Sampled By: Carter Barrett on 11-JAN-21 @ 10:40							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	0.248		0.050	mg/L		16-JAN-21	R5350127
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		12-JAN-21	R5343776
Coliform Bacteria - Fecal	11		1	CFU/100mL		12-JAN-21	R5345085
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		13-JAN-21	R5344606
Total Suspended Solids	<3.0		3.0	mg/L		17-JAN-21	R5350981
рН	8.33		0.10	pН		12-JAN-21	R5345177
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.08		0.020	mg/L		12-JAN-21	R5344822
Nitrate+Nitrite Nitrate and Nitrite (as N)	2.08		0.022	mg/L		13-JAN-21	
Nitrite in Water by IC	2.00		0.022	mg/L		10 0/11 21	
Nitrite (as N)	<0.010		0.010	mg/L		12-JAN-21	R5344822

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - WINTER EMS WEEK 5

**Reference Information** 

L2547302 CONTD....
PAGE 4 of 5
Version: FINAL

Sample Parameter Qualifier Key:

Qualifier Description

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

ALS Test Code Matrix Test Description Method Reference\*\*

BOD-BC-CL Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code Laboratory Location

CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

**FARUC - WINTER EMS WEEK 5** L2547302 CONTD....

**Reference Information** 

PAGE 5 of 5 Version: FINAL

#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

### **ALS Environmental**

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L 2547302-COFC

~: 604-253-6700

: 780-513-2191

780-437-2311 3 Fax: 403-291-0298 x: 306-668-8383

CHAIN OF CUSTUDY FORM PAGE SEND REPORT TO: OF ATTN PATRICK MAJER FERNIE ALPINE RESORT UTILITIES CORPORATION ANALYSIS REQUESTED: COMPANY 1505 - 17TH AVENUE SOUTH WEST ADDRESS POSTAL CODE T2T 0E2 PROV ALBERTA CALGARY CITY: SAMPLER: Carter Barrett 403 - 256 - 8473 FAX: 403 ~ 244 - 3774 TEL: (33058 FARUC - Winter EMS week 5 QUOTE NO: PROJECT NAME AND NO.: ALS CONTACT: Patryk Woyciak PO NO.: aid @skircr.com REPORT FORMAT: WO# 8005 DATE / TIME COLLECTED NOTES (sample specific Total SAMPLE IDENTIFICATION MATRIX comments, due dates, etc.) Ŧ YYYY-MM-DD TIME 9.206 10:50 X. WWTP Influent Routine 2021-01-11 Water X 9.200 10:50 Χ WWTP Influent BOD 2021-01-11 Water 10:50 2021-01-11 х × χ. WWTP Effluent Routine Water 10:50 4 Х WWTP Effluent BOD 2021-01-11 Water 10:50 WWTP Effluent Nutrients 5 2021-01-11 X Χ Water Х Х Х 10:50 WWTP Effluent Bacteriological 2021-01-11 Water х 1,0 ℃ 0:10 Elk River Upstream Routine 2021-01-11 Water X X 10% 10:30 Elk River Upstream Nutrients 🛚 🧩 2021-01-11 Х Х Water Х Х ONLY 10:30 1.00 Elk River Upstream Bacteriological 2021-01-11 Water-X. USE 1.48 2021-01-11 10:55 Water Х Х Elk River @ Outfall Routine 148 OR LAB Elk River @ Outfall Nutrients // 2021-01-11 10:35 Water X Х Х X. 10:35 2021-01-11 х Elk River @ Outfall Bacteriological Water 0 &9°C 2021-01-11 10 40 Water XÌ Х Elk River Downstream Routine 0.900 10:40 Water Elk River Downstream Nutrients 2021-01-11 Х Х х Х Х Elk River Downstream Bacteriological /5 2021-01-11 10-4 0.99 Water X. 116 and property and a second la gar . . 2021-01-11 RECEIVED/BY: SPECIFY DATE: DATE: DATE RELINQUISHED BY: TURN AROUND REQUIRED: 11:30 Carter Barrett TIME: TIME RECEIVED BY: SEND INVOICE TO: DATE: DATE RELINQUISHED BY: INVOICE FORMAT: TIME: TIME: SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO FOR LAB USE ONLY wastewater@skitemie.com Cooling Method? Sample Temperature: Cooler Seal Intact?

Icepacks

Frozen?

Yes \_\_\_No \_

\_Yes



FERNIE ALPINE RESORT UTILITIES

**CORPORATION** 

ATTN: Patrick Majer

1505 - 17TH AVENUE SW CALGARY AB T2T 0E2 Date Received: 19-JAN-21

Report Date: 25-JAN-21 15:00 (MT)

Version: FINAL

Client Phone: 800-258-7669

# Certificate of Analysis

Lab Work Order #: L2549356

Project P.O. #:

**NOT SUBMITTED** 

Job Reference:

FARUC - WINTER EMS WEEK 6

C of C Numbers: Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem. Account Manager

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L2549356 CONTD.... PAGE 2 of 5 Version: FINAL

### ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2549356-1 WWTP INFLUENT							
Sampled By: Carter Barrett on 18-JAN-21 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Biochemical Oxygen Demand	108	DLHC	75	mg/L		19-JAN-21	R5357178
Total Suspended Solids	217	DLHC	5.0	mg/L		24-JAN-21	R5357259
рН	8.05		0.10	рН		19-JAN-21	R5355666
L2549356-2 WWTP EFFLUENT							
Sampled By: Carter Barrett on 18-JAN-21 @ 10:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JAN-21	R5357157
Biochemical Oxygen Demand	<2.0		2.0	mg/L		19-JAN-21	R5357178
Chemical Oxygen Demand	15		10	mg/L		20-JAN-21	R5355831
Orthophosphate-Dissolved (as P)	0.183	DLHC	0.010	mg/L		19-JAN-21	R5354317
Coliform Bacteria - Fecal	3		1	CFU/100mL		19-JAN-21	R5355525
Phosphorus (P)-Total	0.257	DLHC	0.025	mg/L		20-JAN-21	R5355117
Total Suspended Solids	<3.0		3.0	mg/L		24-JAN-21	R5357259
pH	8.09		0.10	pН		19-JAN-21	R5355666
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	39.9	DLHC	0.10	mg/L		19-JAN-21	R5356914
Nitrate+Nitrite	39.9	DEITO	0.10	IIIg/L		19-3/(19-21	K3330914
Nitrate and Nitrite (as N)	39.9		0.11	mg/L		23-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLHC	0.050	mg/L		19-JAN-21	R5356914
L2549356-3 ELK RIVER UPSTREAM							
Sampled By: Carter Barrett on 18-JAN-21 @ 10:00							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JAN-21	R5357157
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		19-JAN-21	R5354317
Coliform Bacteria - Fecal	11		1	CFU/100mL		19-JAN-21	R5355525
Phosphorus (P)-Total	0.0057		0.0050	mg/L		20-JAN-21	R5355117
Total Suspended Solids	<3.0		3.0	mg/L		24-JAN-21	R5357259
pH	8.42		0.10	рН		19-JAN-21	R5355666
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	1.92		0.020	mg/L		19-JAN-21	R5356914
Nitrate+Nitrite	1.32		0.020	g/ L		10 0/314-21	1100000314
Nitrate and Nitrite (as N)	1.92		0.022	mg/L		23-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-JAN-21	R5356914
L2549356-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 18-JAN-21 @ 09:45							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JAN-21	R5357157
Orthophosphate-Dissolved (as P)	0.0414		0.0050	mg/L		19-JAN-21	R5354317
Coliform Bacteria - Fecal	2		1	CFU/100mL		19-JAN-21	R5355525
Phosphorus (P)-Total	0.0443		0.0050	mg/L		20-JAN-21	R5355117
Total Suspended Solids	3.2		3.0	mg/L		24-JAN-21	R5357259

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

L2549356 CONTD.... PAGE 3 of 5 Version: FINAL

### ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2549356-4 ELK RIVER OUTFALL							
Sampled By: Carter Barrett on 18-JAN-21 @ 09:45							
Matrix: Water							
pH	8.28		0.10	pН		19-JAN-21	R5355666
NO2, NO3 and Sum of NO2/NO3				'			
Nitrate in Water by IC							
Nitrate (as N)	5.99		0.020	mg/L		19-JAN-21	R5356914
Nitrate+Nitrite Nitrate and Nitrite (as N)	F 00		0.022	ma/l		23-JAN-21	
Nitrite in Water by IC	5.99		0.022	mg/L		23-JAIN-21	
Nitrite (as N)	<0.010		0.010	mg/L		19-JAN-21	R5356914
L2549356-5 ELK RIVER DOWNSTREAM							
Sampled By: Carter Barrett on 18-JAN-21 @ 09:30							
Matrix: Water							
Miscellaneous Parameters							
Ammonia, Total (as N)	<0.050		0.050	mg/L		24-JAN-21	R5357157
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		19-JAN-21	R5354317
Coliform Bacteria - Fecal	9		1	CFU/100mL		19-JAN-21	R5355525
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		20-JAN-21	R5355117
Total Suspended Solids	8.2		3.0	mg/L		24-JAN-21	R5357259
pH	8.39		0.10	pН		19-JAN-21	R5355666
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC Nitrate (as N)	1.93		0.020	mg/L		19-JAN-21	R5356914
Nitrate+Nitrite	1.55		0.020	IIIg/L		15 5/11 21	110000014
Nitrate and Nitrite (as N)	1.93		0.022	mg/L		23-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		19-JAN-21	R5356914

<sup>\*</sup> Refer to Referenced Information for Qualifiers (if any) and Methodology.

FARUC - WINTER EMS WEEK 6

L2549356 CONTD....

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### Reference Information

Sample Parameter Qualifier Key:

Qualifier Description

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Test Method References:** 

ALS Test Code Matrix Test Description Method Reference\*\*

BOD-BC-CL Water Biochemical Oxygen Demand (BOD) APHA 5210 B-5 day Incub.-O2 electrode

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

COD-T-COL-CL Water Chemical Oxygen Demand (COD) APHA 5220 D Colorimetry

Samples are analyzed using the closed reflux colourimetric method

FCC-MF-CL Water Fecal Coliform Count-MF APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

N2N3-CALC-CL Water Nitrate+Nitrite CALCULATION

NH3-F-CL Water Ammonia by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL Water Nitrite in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL Water Nitrate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-CL Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after

persulphate digestion of the sample.

PH-CL Water pH APHA 4500 H-Electrode

pH is determined in the laboratory using a pH electrode. All samples analyzed by this method for pH will have exceeded the 15 minute recommended

hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

PO4-DO-COL-CL Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined

colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code Laboratory Location

CL ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

**Chain of Custody Numbers:** 

**FARUC - WINTER EMS WEEK 6** L2549356 CONTD....

**Reference Information** 

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#### **Test Method References:**

**ALS Test Code** Matrix Method Reference\*\* **Test Description** 

#### **GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

### **ALS Environmental**

www.alsenviro.com

ANALYTICAL CHEMISTRY & TESTING SERVICES



Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700 Fort St. John BC, Box 256, 9831 - 98A Avenue, V Grand Prairie AB, 9595 - 111 Street, T8V 5W1, 1 Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9 Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Te Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E1 Saskatoon SK, 819 - 58th Street East, S7K 6X5,



L2549356-COFC

SEND REPO	RT TO:					CHAIN OF	CU														PAGE OF
COMPANY:	FERNIE	ALPINE RESORT	UTILITIES	CORPORATION	ATTN:	PATRICK MAJER	AN	ALY	SIS	REQ	UESI	ED:									
ADDRESS:	1505 -	7TH AVENUE SOL	JTH WEST													·					
CITY:	CALGA	RY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2					1									1	
TEL:	403 - 25	6 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett			ĺ		. 5		٠.				١.				
PROJECT NA	AME AND NO.:	FARUC - Win	ter EMS we	ek 6	QUOTE NO:	Q33058	] .														
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REPORT FO	RMAT:		<b> </b>	×	p najs @skiro	cr.com	Coliforms						-								
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1.		SAW EL IDENTI	10/11/011	YYYY-MM-DD	TIME	The street of th	Fecal	TSS	표	ě	Total	Ŧ	8	NO2-	8005	cop					comments, due dates, etc.)
	WWTP	Influent Routine /	<u> </u>	2021-01-1B	10:30	Water		Х	Х												10.7
1	WWTP	Influent BOD . 2		2021-01-18	(0∶300	Water			<u> </u>						X						10.7
	/ WWTP	Effluent Routine	3	2021-01-18	10:30	Water		X	X			s 1.				Х					Z. Z ``
2	( WWTP	Effluent BOD 2	4	2021-01-18	10:30	Water									X						11
	_ \ wwtp	Effluent Nutrients	5	2021-01-18	10:30	Water				X	Χ.	Х	X	X							( )
	\ wwtp	Effluent Bacteriolog	ical 6	2021-01-18	(0:30	Water	X														11
	Elk Rive	r Upstream Routine	· 7	2021-01-18	10:00	Water		Х	х	æ	,										0.5"
≥ 5	Elk Rive	r Upstream Nutrien	ts 8	2021-01-18	10:00	Water				Х	х	Х	x	х							1 (
	Elk Rive	r Upstream Bacteri	ological 9	2021-01-18	10:00	Water	X					,								- 1	LX
JSE .	Elk Rive	r @ Outfall Routine	10	2021-01-18	9:45	Water		X	×												L5"
<b>9</b> 4	Elk Rive	r @ Outfall Nutrient	ts //	2021-01-18	1;45	Water		. E		Х	Х	X	х	Х	:						•
FOR LAB USE	Elk Rive	r @ Outfall Bacterio	ological /	2021-01-18	9:45	Water	Х														in .
5	Elk Rive	r Downstream Rou	tine /3	2021-01-18	9:30	Water		х	Х		-				·						10'2'C
5	Elk Rive	r Downstream Nutr	ients /4	2021-01-18	1/30	Water				Х	х	Х	х	Х							٠,
	Elk Rive	r Downstream Bact	eriological/	2021-01-18	9:30	Water	X							A <sup>S</sup>							
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TÜRN AROU	ND REQUIRED	• <b>K</b>	<b>(</b> ф.	SPECIFY DATE	:	(surcharge may apply)				NQUIS er Bai	SHED	BY:	· ·		ATE:		021-0 ; <b>4</b>		RECE	IVÈD I	BY: DATE:
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# **Acute Toxicity Test Results**

Sample collected April 8, 2020

**Final Report** 

April 24, 2020

Submitted to: Fernie Alpine Resort

Calgary, AB



### **SAMPLE INFORMATION**

Samula ID/		Dates		Dossint
Sample ID/ Internal ID	Collected	Received	Rainbow trout test initiation	Receipt temperature
WASTEWATER /	0 Apr 20 at 1420b	0. Apr. 20 at 1020b	10 Apr 20 at 1245h	6.000
1920-1071	8-Apr-20 at 1430h	9-Apr-20 at 1030h	10-Apr-20 at 1345h	6.8°C

### **TEST TYPES**

• Rainbow trout 96-h LC50 test

### **RESULTS**

### **Toxicity test results**

Sample ID	Rainbow trout LC50 (% v/v)
WASTEWATER	>100

LC = Lethal Concentration

### QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	4.0 (3.5-4.4) g/L KCl <sup>1</sup>
Reference toxicant historical mean (2 SD Range)	3.5 (2.4-5.0) g/L KCl
Reference toxicant CV	11.9%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

<sup>&</sup>lt;sup>1</sup> Test date, March 18, 2020;

Reference: 1920-1071

LC = Lethal Concentration; CL = Confidence Limit



Report By:

Sara Thiessen, BSc

Reference: 1920-1071

Biologist

actily oce

Reviewed By: Jacklyn Poole, BSc Laboratory Supervisor

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.



**APPENDIX A – Summary of test conditions** 



# Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species Oncorhynchus mykiss

Organism source Fish hatchery
Organism age Juvenile
Test type Static
Test duration 96 hours

Test vessel 5 gallon glass aquariums

Test volume 10 - 20 L, depending on size of fish

Test solution depth Minimum 15 cm

Test concentrations Five concentrations, plus laboratory control

Test replicates 1 per treatment
Number of organisms 10 per replicate

Control/dilution water De-chlorinated City of Calgary tap water

Test solution renewal None Test temperature  $15 \pm 1^{\circ}$ C Feeding None

Light intensity 100 to 500 lux

Photoperiod 16 hours light/8 hours dark

Aeration 6.5 ±1 mL/min/L

pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion;

Test Measurements salinity measured at test initiation; evaluated for

survival daily

Test protocol Environment Canada (2000), EPS 1/RM/13, with 2007 &

2016 amendments

Statistical software None

Test endpoints 96-hour LC50
Test acceptability criteria for controls Survival  $\geq$  90%

Reference toxicant Potassium chloride (KCl)



**APPENDIX B – Toxicity test data** 



## **Trout Bench Sheet**

TRD	Client	FER 116	Reference	1920-1071		_ Chamber	5
						Sample Informa	ition
					Daily Data		
Da	ate	Time	Initial	Chem. Cart	Review	Initial pH:	7.7
2020/04/10		1345"	MUME	1	SC	Initial EC (µS/cm	105
				-			
		-		-	C		
			-				12
		OBOU			AW	- Salinity (ppt): -	
2020/04/14			14-7	as loaded with			
ration		Trote. , time	when the test w	as loaded with	11311	DO in mg/L (70	% - 100%
diusted to 6.5	+/- 1 mL/min/L	ves/no				saturation)**	
	-,		1 hour	1.5 hours	2 hours	1	ot 14°C
				1.5 110013	2 modis		
0%		4.7	3.				
						6.0 mg/L - 8.6 mg/L	at 16°C
and Biology						**corrected for altitu	de
CTL	6.25	12.5	25	50	100		
			pH (units) (ra	ange: 5.5-8.5)			
7.7_	7.7	7.7	7.7	7.8	7.9		
6.0	7.9	7.9	7.9	4.9	7.8		
			EC (u	S/cm)			
420	470	7 10		77/	1.77		
15/	7/0	3 10	1	412		+	
441	485	536	604	162	1100		
		DO (mg	/L) ( <b>70-100%</b> sa	aturation at te	st temp.)		
8.9	8.9	8.9	8.9	8.9	8.9		
BB	00	B.R	8.6	O.B	Q.R		
	0.0						
		V- V	emperature (°C	(range: 14-16			
14.	14	14	19	-	17		
15	15	13	5	15	15		
		Numb	er Alive (In brad	kets number s	tressed)		
10	10	10	10	10	10		
1.0	10	10	10	10	10		
-		(()		11.			
	10	LV	( ( )	12	1		
10	10	10	10	(()	10		
0	10	10	10	10	10		
					e control		
iem Data					Tost Organie	m Information	
	Weight				rest Organis	mormation	
(cm)	(g)				Batch	20200303TR	
9.6		المسائدة المسائدة	ib. (a (1):	m 2	Course	Com University	
00	Q. 7.			0.5	Toonice	Sam Livingston	
34	DISTU	(must be ≤0.5 g/	L)				
2,8	0-10				Tank #	6	
30		Mean Length	(cm):	3.60			
20		The conglit	(0.11).	- J W	Dave Held -4	15± 2°C	38
2.5							30
34		JLength Range	(cm): 2	4-40	(must be ≥14 c	days)	
30	0.5						
257		Mean Weight	(a):	05	Percent stock	mortality	0.06
7	-	1	19).				0.00
40		(Must be ≥0.3g)			(/ days pnor to	test, must be ≤2%)	
3.5	0.5	j		11 0-			
		Weight Range	e: (g):	2.4-0-1	Test Volume	(L)	16
	-						
	2020/04/10 2020/04/11 2020/04/13 2020/04/14	Date  2020/04/10  2020/04/11  2020/04/13  2020/04/14  Pration  djusted to 6.5 +/- 1 mL/min/Lee  0%  Practice  Practi	Date    Date	Date Time Initial  2020/04/10 2020/04/11 2020/04/12 2020/04/13 2020/04/14 Note: *; time when the test waration dijusted to 6.5 +/- 1 mL/min/L :	Date   Time   Initial   Chem. Cart	Date   Time	Date



**APPENDIX C** – Chain-of-custody form



Laboratories Ltd.

# **Test Request / Chain of Custody**

#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1 Tel (403) 253-7121 Fax (403) 252-9363

Reporting and Billing Information Client: FARUC Sample: Fer 116								s on back eatments	
Client / Operation: FERNIE ALPINE RESORT UTILITIES CORPORATION						TR D			
Contact: PATRICK MAJER						LC 50			Sample
Report Address: 1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2									Rec
Billing Address: 150									eived
Tel 1 - Quote/PO/Job 17 - S -	<u>403 - 861 - 8730</u> 30	Fax 1 - 403 - 244 - 377	· ′4						Received intact (y / n)
Rush: 50% surcharge; 100% s	Sampled By / Date / Time	Location	Method	Type		otes: S =			e treatments
WASTEWATER	Bo/ April 8 / 20 / 14:30	Fernie Alpine Resort		Effluent	1 [	×			
020104/09									
Monitroulin									
		<del></del>					l l		
ex201 pails									
x201 poils N68/N62 Accord Good Condition	in								
N68/1462	n .								
1x201 pails N65/N62 1465 Good Condition	en								
N68/1462	Date / Time	Received B	y (HQ)		Date / 1	Time			



**END OF REPORT** 



# **Acute Toxicity Test Results**

Sample collected October 14, 2020

**Final Report** 

November 2, 2020

Submitted to: Fernie Alpine Resort

Calgary, AB



### **SAMPLE INFORMATION**

Samula ID/		Dosaint			
Sample ID/ Internal ID	Collected	Received	Receipt temperature		
WASTEWATER/	14-Oct-20 at 1430h	15-Oct-20 at 1200h	17-Oct-20 at 1345h	9.6°C	
2021-0320	14-Oct-20 at 1430ff	15-OCt-20 at 1200ff	17-Oct-20 at 1345ff		

### **TEST TYPES**

• Rainbow trout 96-h LC50 test

### **RESULTS**

### **Toxicity test results**

Sample ID	Rainbow trout LC50 (% v/v)			
WASTEWATER	>100			

LC = Lethal Concentration

### QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	3.2 (3.0-3.5) g/L KCl <sup>1</sup>
Reference toxicant historical mean (2 SD Range)	3.5 (2.6-4.6) g/L KCl
Reference toxicant CV	9.6%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

<sup>&</sup>lt;sup>1</sup> Test date, October 5, 2020

Reference: 2021-0320

LC = Lethal Concentration; CL = Confidence Limit



Michael Ulrubleshi

Report By:

Michael Wrubleski, BSc

Biologist

Reviewed By: Kayla Knol, Bsc

Senior Biologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.



**APPENDIX A – Summary of test conditions** 



# Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species Oncorhynchus mykiss

Organism source Fish hatchery
Organism age Juvenile
Test type Static
Test duration 96 hours

Test vessel 5 gallon glass aquariums

Test volume 10 - 20 L, depending on size of fish

Test solution depth Minimum 15 cm

Test concentrations Five concentrations, plus laboratory control

Test replicates 1 per treatment
Number of organisms 10 per replicate

Control/dilution water De-chlorinated City of Calgary tap water

Test solution renewal None
Test temperature  $15 \pm 1^{\circ}$ C
Feeding None

Light intensity 100 to 500 lux

Photoperiod 16 hours light/8 hours dark

Aeration  $6.5 \pm 1 \text{ mL/min/L}$ 

pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion;

Test Measurements salinity measured at test initiation; evaluated for

survival daily

Test protocol Environment Canada (2000), EPS 1/RM/13, with 2007 &

2016 amendments

Statistical software None

Test endpoints 96-hour LC50
Test acceptability criteria for controls Survival  $\geq$  90%

Reference toxicant Potassium chloride (KCl)



**APPENDIX B – Toxicity test data** 



## **Trout Bench Sheet**

Method	TRD	Client	FER 116	Reference	2021-0320		Chamber	5	
Test Log							Sample Infor	mation	
						Daily Data			
Day	Da	te	Time	Initia	Chem. Cart	Review	Initial pH:	7.8	
0	10/17/2020		1345 *	MWIX	1	ST	Initial EC (µS/d		
1	10/18/2020		10975	TE.	~	Y	Initial DO (mg	/L): 3.8	
2	10/19/2020		0010	MF		Y	Initial Temp (*		
3	10/20/2020		oqui	AW	-	I	Salinity (ppt):	D	
4	10/21/2020		0850	TP		ST		-	
Sample Pre	-Aeration		Note: *; time	when the test w	as loaded with		DO in mg/L (		
Aeration rate	e adjusted to 6.5 +	/- 1 mL/min/	L : yes/no				saturation)**		
Preaeration time		0.5 hours	1 hour	1.5 hours	2 hours	6.2 mg/L - 8,9 mg	g/Lat 14°C		
O(mg/L) of	f 100%		8.8				6.1 mg/L - 8.8 mg/L at 15°C		
							6.0 mg/L - 86 mg	g/L at 16°C	
Test Chemis	stry and Biology						**corrected for a	ltitude	
Conc.	CTL	6.25	12.5	25	50	100		1	
				. A h # Pa . h #					
Day 0	8.11	8.1	8.1	2.0	rige: 5.5-8.5)	29		T	
Day 4	7.9	7.0	- 8.0	8.0	8.1	81			
, .		-	N. C.						
_	11.00				5/cm)				
Day 0	435	457	481	509	281	707			
Day 4	450	455	478	507	5.76	701			
			DO form	// /70 1009/	sturntles at to	-A daman \			
D= 0	2017	10 4	DO (Ing.	(E) (70-100% S	aturation at te		1	<b>—</b>	
Day 0	8.5	7.1	5.7	7 5	8.3	8.8	+		
Day 4	8.4	84	8.5	¥.5	8.5	5.6			
			-	and a series of the series of	. fee-and 4.4.6°	r <sub>ame</sub>			
		10	1 1	emperature ( c	(range: 14-16			1	
Day 0	15	15	15	5	13				
Day 4	15	15	15	15	15	15			
			Numb	or Alive (In bra	kets number st	Inneend?			
David	10	10			10	10	1	T	
Day 0		10	10	10		10	-		
Day 1	10	10	10	10	10	16		1	
Day 2		0	10	10	10	10			
Day 3	)0	ID	1 LD	10	NO.	10			
Day 4	10	10	10	117	q	10			
			10% mortality avior is consider			e control			
		e noteu, ben	avior is consider	eu to be norma	21				
-	janism Data					Test Organi	sm information	1	
Control	Length	Weight					202220		
Fish	(cm)	(g)				Batch	20200820TR	_	
1	31	0.4	Loading Densi	ity (a/1):	0.2	Source	Troutlodge		
2	3.4	0.5	(must be ≤0.5 g/L		-	Jource	Houtloage	_	
			- (must be so.5 g/t	-)		T6.4			
3	35	0.6	-1		2 .	Tank #	9	_	
4	3.0	0.4	Mean Length (	(cm):	3.1			21	
5	3.1	0.4			7 6 7 2	Days Held at		36	
6	2.8	0.2	Length Range	(cm):	28-35	(must be ≥14	days)		
7	2.0	0.3			4			_	
8	3.0	_0.3	Mean Weight	(g):	C.4	Percent stoc	k mortality	0	
9	31	83	(Must be ≥0 3g)			(7 days prior to test, must be ≤2%)			
10	3.4	0,5	7						
		017	Weight Range	: (g):	0.2-06	Test Volume	(L)	18	
omments	ī								
			10				0.000	12.7	
		Reviewed By	: 1A3			Date Reviewe	d: MODIC	SILL	



**APPENDIX C** – Chain-of-custody form

# **HydroQual**

Laboratories Ltd.

## **Test Request / Chain of Custody**

#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1 Tel (403) 253-7121 Fax (403) 252-9363

Reporting and Billing Ir	nformation Client:	FARUC Sample:	101110					(codes o th 5 trea	rR-D
Client / Operation: FERNIE ALPINE RESORT UTILITIES CORPORATION						D			
Contact: PATRIC	CK MAJER				LC	50			Sample
Report Address: 15	05 - 17TH AVENUE S.W. CALC	GARY, ALBERTA T2T 0E	2						
Billing Address: 15	05 - 17TH AVENUE S.W. CALC	GARY, ALBERTA T2T 0E	2						Received
Tel 1	- 403 - 861 - 8730	Fax 1 - 403 - 244 - 377	7.4						intact (y / n)
Quote/PO/Job 17 - S		1 - 400 - 244 - 011	4						(y / n
Rush: 50% surcharge; 100% Sample ID	6 surcharge (evenings and weekends)  Sampled By / Date / Time	Location	Method	Туре			_	itment, D =	
WASTEWATER	Carter/ Oct 14 / 20 / 14:30	Fernie Alpine Resort	Grab	Effluent	x	Т чрр.	- Contact	JOX BO.	
2021-0320									
2:00 Desp off									
Eazol poils									
NoS/Nob Bood Condition									
9.6°C									
	Date / Time	Received E	By (HQ)		ate / Time	e			
Relinquished By	Carter Barrett Oct 14/ 20 @ 15:00								

Revised by KS on 2002/12/09

Form: F2000020 v 3.0

Edited by Foxit Reader
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**END OF REPORT** 



## **Acute Toxicity Test Results**

Sample collected January 11, 2021

**Final Report** 

January 25, 2021

Submitted to: Fernie Alpine Resort

Fernie, BC



### **SAMPLE INFORMATION**

Cample ID/		Dossint		
Sample ID/ Internal ID	Collected	Received	Rainbow trout test initiation	Receipt temperature
WASTEWATER /	11-Jan-21 at	12-Jan-21 at	13-Jan-21 at	7.296
2021-0859	1130h	0950h	1420h	7.3°C

### **TEST TYPES**

• Rainbow trout 96-h LC50 test

### **RESULTS**

### **Toxicity test results**

Sample ID	Rainbow trout LC50 (% v/v)
WASTEWATER	>100

LC = Lethal Concentration

### QA/QC

QA/QC summary	Rainbow trout					
Reference toxicant LC50 (95% CL)	3.9 (3.6-4.3) g/L KCl <sup>1</sup>					
Reference toxicant historical mean (2 SD Range)	3.6 (2.8-4.6) g/L KCI					
Reference toxicant CV	8.2%					
Organism health history	Acceptable					
Protocol deviations	None					
Water quality range deviations	None					
Control performance	Acceptable					
Test performance	Valid					

<sup>&</sup>lt;sup>1</sup> Test date, December 21, 2020

Reference: 2021-0859

LC = Lethal Concentration; CL = Confidence Limit



Report By:

Biologist

Shae Cole, BSc

Reference: 2021-0859

Reviewed By:

Reviewed By: Kayla Knol, BSc Senior Biologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.



**APPENDIX A – Summary of test conditions** 



## Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species Oncorhynchus mykiss

Organism source Fish hatchery
Organism age Juvenile
Test type Static
Test duration 96 hours

Test vessel 5 gallon glass aquariums

Test volume 10 - 20 L, depending on size of fish

Test solution depth Minimum 15 cm

Test concentrations Five concentrations, plus laboratory control

Test replicates 1 per treatment
Number of organisms 10 per replicate

Control/dilution water De-chlorinated City of Calgary tap water

Test solution renewal None
Test temperature  $15 \pm 1^{\circ}$ C
Feeding None

Light intensity 100 to 500 lux

Photoperiod 16 hours light/8 hours dark

Aeration  $6.5 \pm 1 \text{ mL/min/L}$ 

pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion;

Test Measurements salinity measured at test initiation; evaluated for

survival daily

Test protocol Environment Canada (2000), EPS 1/RM/13, with 2007 &

2016 amendments

Statistical software None

Test endpoints 96-hour LC50
Test acceptability criteria for controls Survival  $\geq$  90%

Reference toxicant Potassium chloride (KCI)



APPENDIX B – Toxicity test data



## **Trout Bench Sheet**

Method	TRD	Client	FER 116	Reference	2021-0859		_ Chamber	9		
Test Lon							f			
Test Log	T		_		-	Daily Data	Sample Inform	nation		
Day	Da	ate	Time	Initial	Chem. Cart	Review	Initial pH:	7.6		
0	1/13/2021		1400	MW/MF	1	1/4	Initial EC (µS/ci			
1	1/14/2021		0800	MM	-	ME	Initial DO (mg/			
2	1/15/2021		LIGIN	AN-	10-	MF	Initial Temp (*C			
3	1/16/2021		094K	11	1	MAF	Salinity (ppt):	D		
4	1/17/2021		CASO	SHILL	1	'Min	- 7 " " "			
Preaeration ti DO(mg/L) of	adjusted to 6.5 - ime 100%	+/- 1 mL/min/		the test when the test with th	was loaded with	2 hours	DO in mg/L (7 saturation)** 6.2 mg/L - 8.9 mg/ 6.1 mg/L - 8.8 mg/ 6.0 mg/L - 8.6 mg/L	/Lat 14°C /Lat 15°C		
	try and Biology						**corrected for alt	itude		
Conc.	CTL	6.25	12.5	25	50	100				
D= 0	-	~ [	1-1	pH (units) (r	ange: 5.5-8,5)	-711				
Day 0 Day 4	7.5	2.6	76	7	(2)	4.7	+			
Day 4	7.8	4,8	1 48	1.0	<b>**</b>	7.5	1			
				EC (i	uS/cm)					
Day 0	ual	575	157U	1 but	803	1/00				
Day 4	usi	223	52/	Luc	DIR	1001				
,		202	J		3112					
			DO (mg	/L) (70-100% s	aturation at te	st temp.)				
Day 0	8.9	8.9	29	8.9	8.9	8.9				
Day 4	8.5	815	7.5	2.5	814	7.3				
•							•			
			T	emperature (°C	) (range: 14-16	(C)				
Day 0	14	14	114	lu	14	14				
Day 4	15	5	IS	15	16	13				
			_							
					ckets number st					
Day 0	10	10	10	10	10	10				
Day 1	10	10	10	10	10	10				
Day 2	10	10	10	10	10	10				
Day 3	(g)	10	10	6	10	(,0				
Day 4	Validity Critery	(0	100	1.0	10	1.0				
			avior is consider		d behavior in th	e control				
	Onless Otherwi	se noteu, ben	avior is consider	rea to be norm	al					
Control Orga	nism Data			-		Test Organia	sm Information			
Control	Length	Weight				l est organi				
Fish	(cm)	(g)				Batch	20201114TR			
		(3)						•		
1	3.0	13	Loading Densi	ity (g/L):	0.7.	Source	Troutlodge			
2	3.0	83	(must be ≤0,5 g/L					•		
3	3.2	K.A	1		0.1	Tank #	2			
4	30	0.3	Mean Length	(cm):	3.1			-		
5	3.3	DA				Days Held at	15± 2°C	37		
6	3.2	8.3	Length Range	(cm):	30-3.3	(must be ≥14	days)			
7	3.2	83				1				
8	20	0.3	Mean Weight (g):		0.3	Percent stoc	k mortality	0		
9	3.0	0.3	(Must be ≥0,3g)			(7 days prior to	test, must be ≤2%)			
10	3.0	0.3			0 7 c A					
			Weight Range	: (g):	0.3-64	Test Volume	(L)	18		
Comments :										
		poster 15	10				d: 2021	0110		
		Reviewed By	N		_	Date Reviewe		VILLO		



**APPENDIX C** – Chain-of-custody form



Laboratories Ltd.

# Test Request / Chain of Custody

#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1 Tel (403) 253-7121 Fax (403) 252-9363

Reporting and Billin	ng Information Client:	FARUC Sample:	Fer 116		Tests (exar	Requ	ested out wi	(codes	on ba	ck) nts, TR	-D)	
Client / Operation: FERNIE ALPINE RESORT UTILITIES CORPORATION									[		Sar	
Contact: PATRICK MAJER						50				}	nple l	
Report Address: 1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2											Recei	
Billing Address:	1505 - 17TH AVENUE S.W. CALG	ARY, ALBERTA T2T 0E	2								ved in	
Tel	1 - 403 - 861 - 8730	Fax 1 - 403 - 244 - 377	'4								Sample Received intact (y / n)	
Quote/PO/Job			_								/ n)	
Rush: 50% surcharge; 1	00% surcharge (evenings and weekends)				Notes	. S = si	nole trea	atment	) = muli	tiple trea	atments	
Sample ID	Sampled By / Date / Time	Location	Method	Type		Notes: S = single treatment, D = multiple treatmer Check appropriate box below						
WASTEWATER	Carter/ Jan 11, 2021 / 11:30	Fernie Alpine Resort	Grab	Effluent	X							
7.30												
2031/01/13												
goed evolving												
Dx 202 pail					] [							
2021-0859												
Relinquished By	Date / Time	Received E	By (HQ)		Date / Tim	е						
Carter Barrett	Jan 11/21 @ 11:30											

File: F2000020.xls / test request Form: F2000020 v 3.0

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**END OF REPORT**