IQWATER INC.
140, 5050 – 106th Avenue SE
Calgary, Alberta
T2C 5E9
Tel: 1-403-238-9510
E-mail: jana@iqwater.ca

April 25th, 2021
File No. W2020-019.2020

FERNIE ALPINE RESORT UTILITIES CORPORATION
1505 17th Avenue SW
Calgary, Alberta
T2T 0E2

Attention: Mr. Patrick Majer

Dear Mr. Majer:

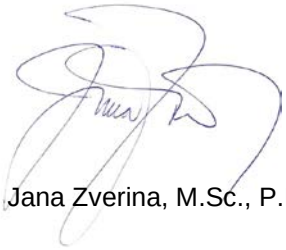
Re: FERNIE ALPINE RESORT
WASTEWATER TREATMENT PLANT
2020 ANNUAL REPORT

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
1505-17th Avenue SW
Calgary, Alberta
T2T 0E2

Prepared by:

IQWATER INC.
140, 5050 – 106th Avenue SE
Calgary, Alberta
T2C 5E9
Tel: 1-403-238-9510
E-mail: jana@iqwater.ca

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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_5, 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 ortho-phosphorus and total phosphorus levels during the last several years. All the results for ortho-phosphorus 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 30th, 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 m^3 /d
BOD_5	Five day biochemical oxygen demand, measured in mg/l
TSS	Total suspended solids or non-filterable residue, measured in mg/l
NH_3	Ammonia concentration, expressed as nitrogen in mg/l
NO_3	Nitrate concentration, expressed as nitrogen in mg/l
NO_2	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	m^3/d
BOD_5	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

*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.

Table 2
Sampling Location/Frequency/Type

Parameter	Location					
	Elk River	**QTY**	**Influent**	**QTY**	**Effluent**	**QTY**
pH	WS/G	18	/	/	M/G, WS/G	25
Temp	WS/G	18	/	/	/	/
Flow	/	/	D/C	n/a	D/C	n/a
BOD_5	/	/	M/G	12	M/G, WS/G	25
TSS	WS/G	18	M/G	12	M/G, WS/G, D/C	25
NH_3-N	WS/G	18	/	/	M/G, WS/G	25
NO_3-N	WS/G	18	/	/	M/G, WS/G	25
NO_2-N	WS/G	18	/	/	M/G, WS/G	25
Total-P	WS/G	18	/	/	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.

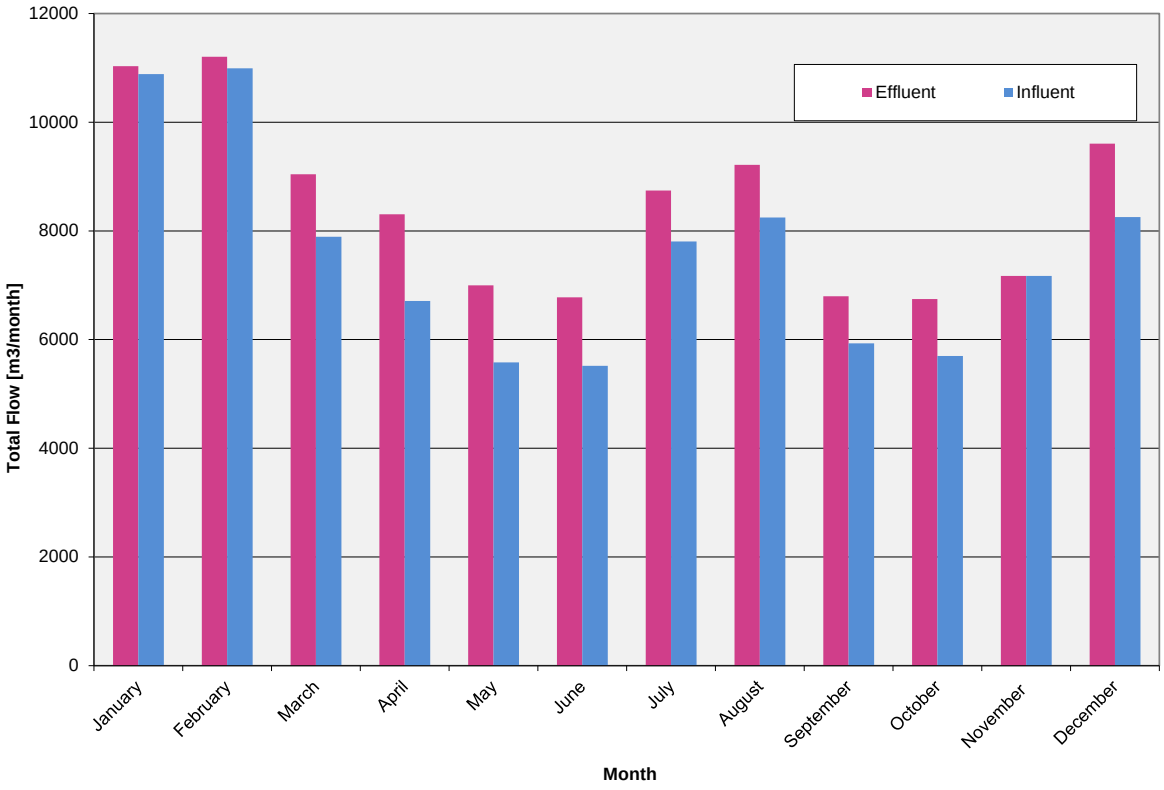
3.0 SEWAGE FLOW RECORDS

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 m^3 and the average was 273.5 m^3 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

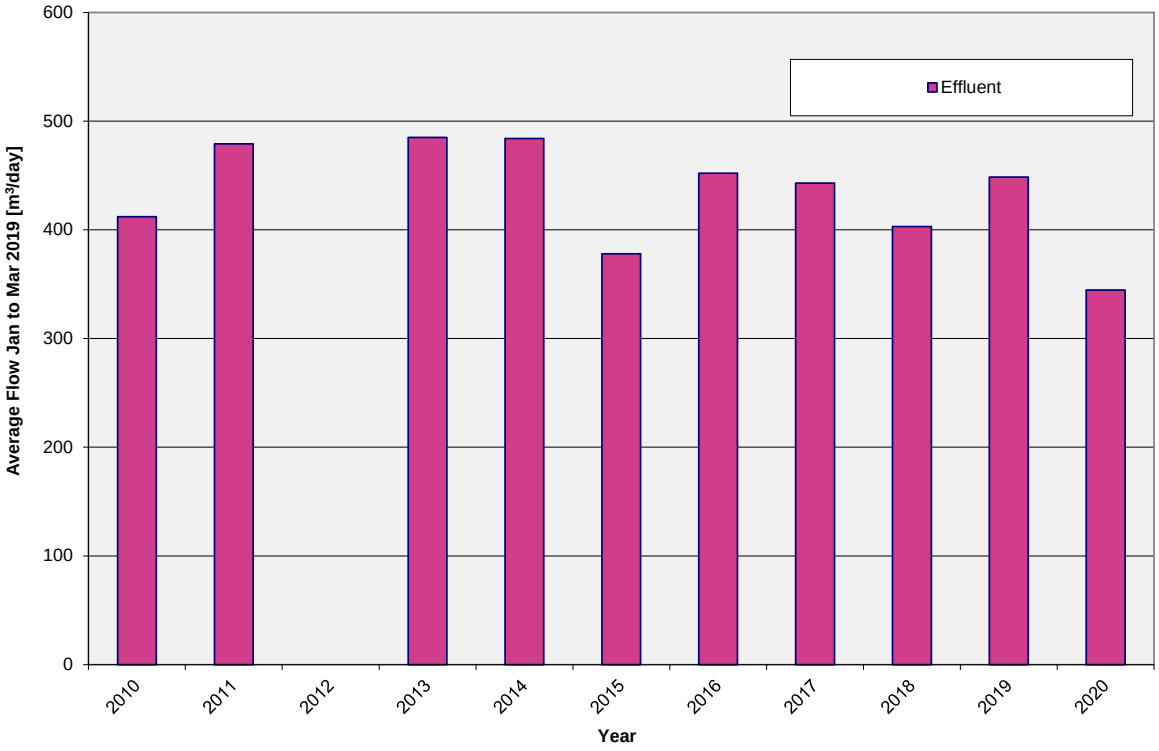


The ski resort operates with higher winter and late spring sewage flows (January to March) than during any other period. The average daily plant flow through January, February and March of 2020 was 344.6 m^3/day compared to the previous year's (2019) January to March average flow at 448.6 m^3/day.

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^3/day. The average daily flow was 443 m^3/day in 2017, 452 m^3/day in 2016, 378 m^3/day in 2015, 484 m^3/day in 2014, 485 m^3/day in 2013, the average daily flow could not be calculated in 2012 but it was 479 m^3/day for the same time period in 2011, compared to 412 m^3/day over the same period in 2010.

Figure 1b
Average Daily Flow during Jan – Mar Period



Peak flow for the year reached 925 m^3/day on February 2nd, 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:

Table 3
2003 – 2020 Flow Comparisons

Year	Sewage Flow (m^3/day)			Days Over Limit
	Total	Average	Peak	
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* (**122,275**)[1]	335	**989**[2]	0
2012	62,509** (**122,610**)[1]	335	**811**[2]	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
[1] (data) in brackets – estimate based on daily average
[2] 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 m^3/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 m^3/day down to 311 m^3/day) and there were no instances where the flow exceeded the 1,280 m^3/day. The peak flow increased from 2008 but is comparable to the other years.

The average flow for 2010 further decreased from 2009 (311 m^3/day down to 287 m^3/day) and there were no instances where the flow exceeded the 1,280 m^3/day. The peak flow decreased from 2009 and is comparable to 2008.

The average flow for 2011 had increased slightly from 2010 (287 m^3/day) and 2009 (311 m^3/day) and there were no instances where the flow exceeded the 1,280 m^3/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 m^3/day) which had increased slightly from 2010 (287 m^3/day) and 2009 (311 m^3/day). There were no instances where the flow exceeded the registration limit of 1,280 m^3/day; however, there was no data for January and February (two out of four peak months in a year). The peak flow of 811 m^3/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

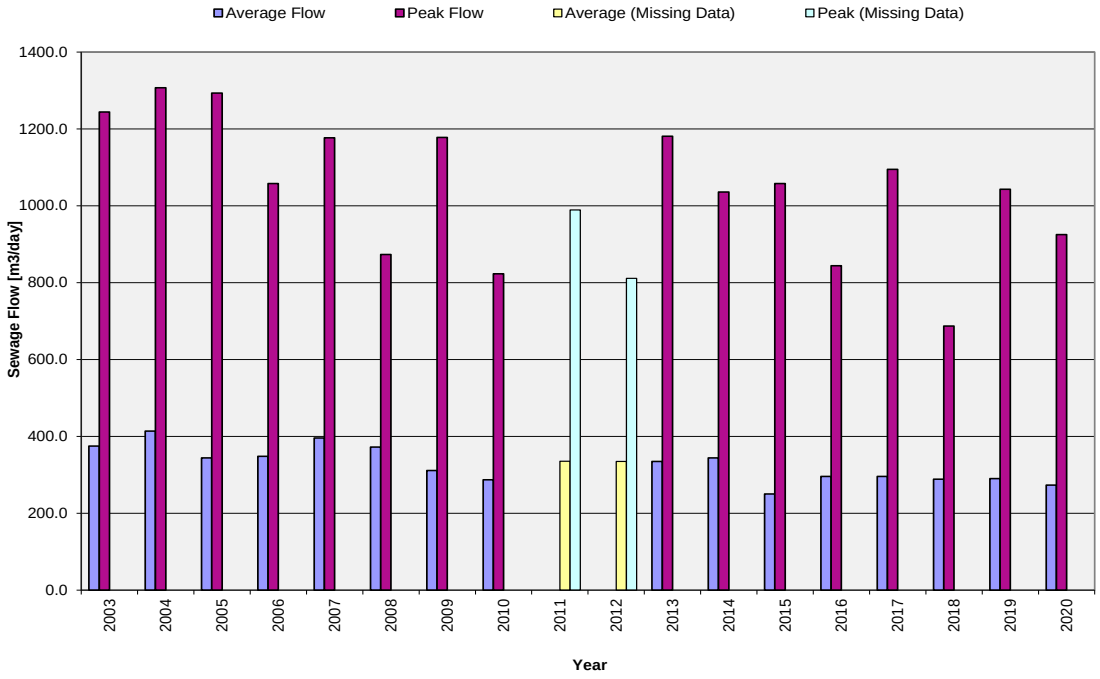
The average flow for 2020 was low and well below previous several years, which can likely be attributed to the Covid-19 restrictions implemented in March 2020. There are no instances where the flow exceeded the plant maximum allowable flow and daily discharge of 1,280 m^3/day. The peak flow is higher 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

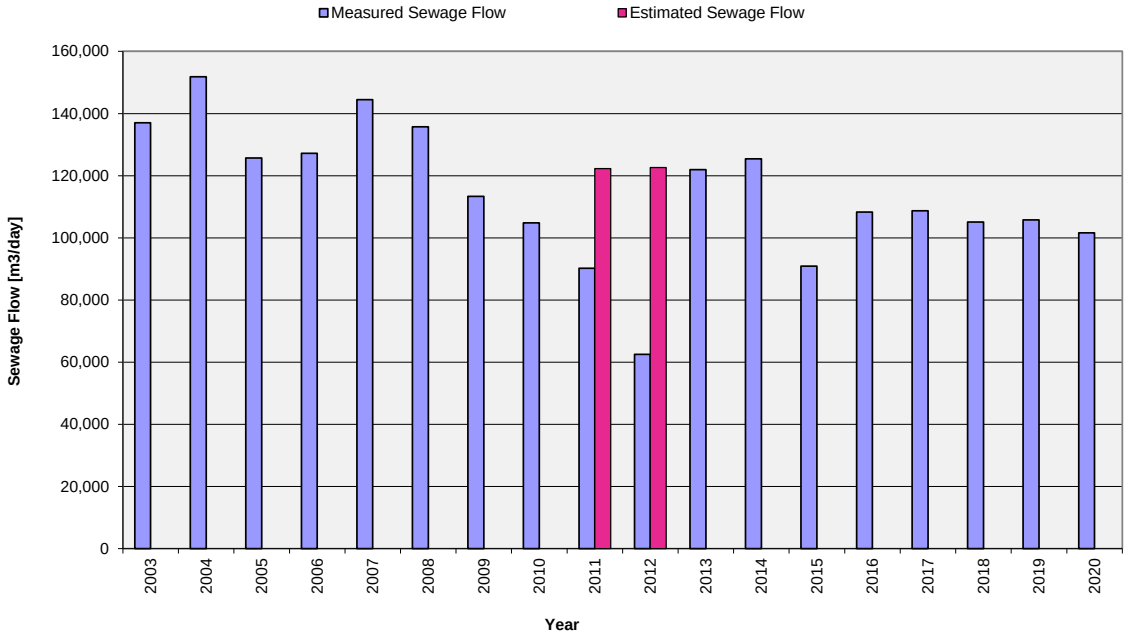
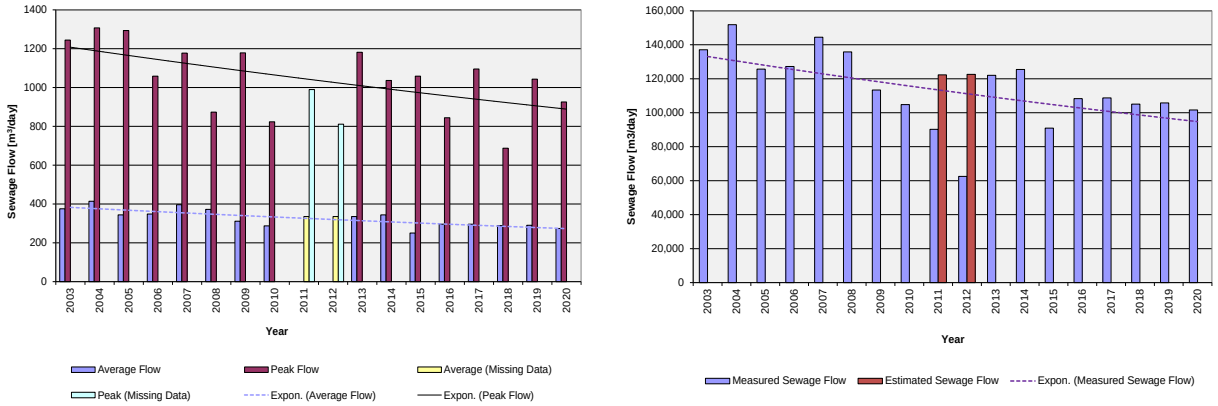
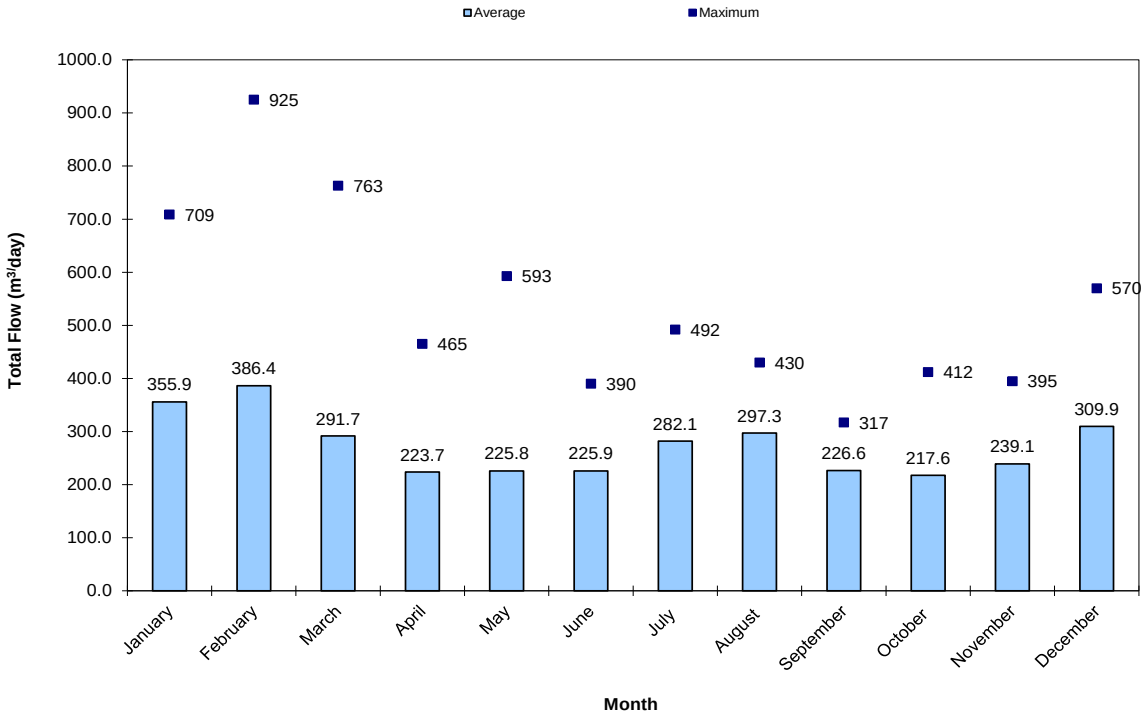


Figure 3a and Figure 3b
Trendlines for Average, Peak and Total Sewage Flow Graphs



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.

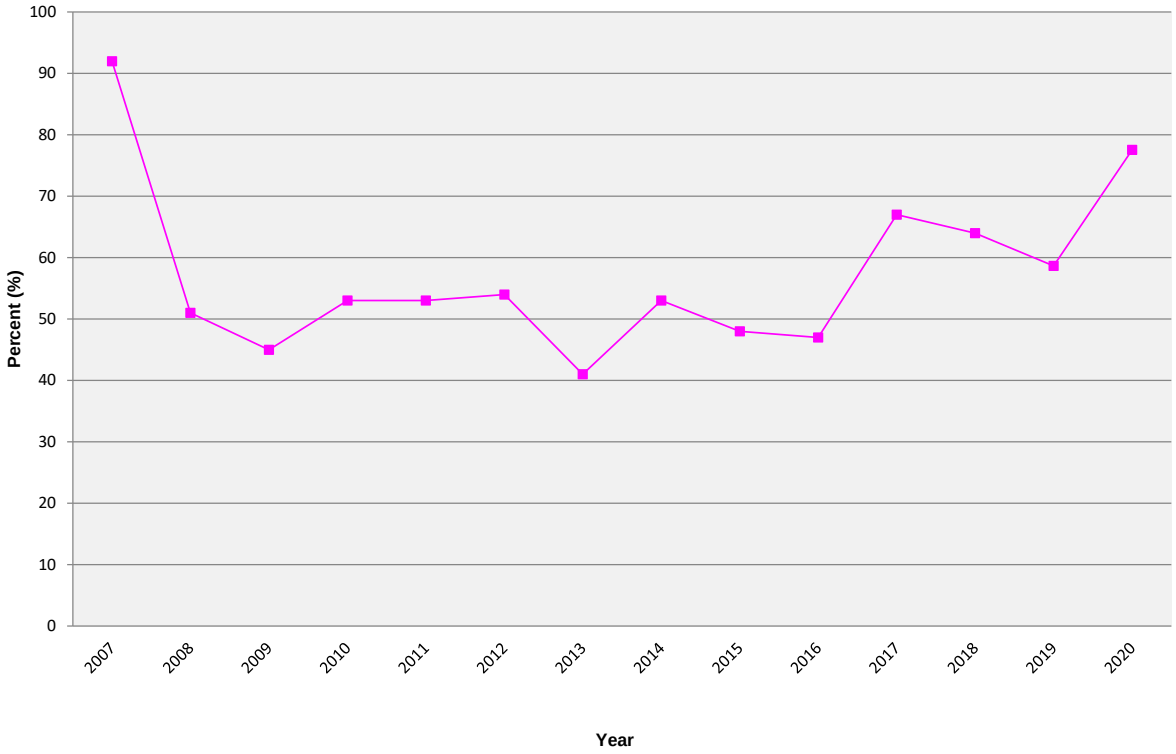
Figure 4
2020 Sewage Effluent Average and Peak Flows by Month



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.

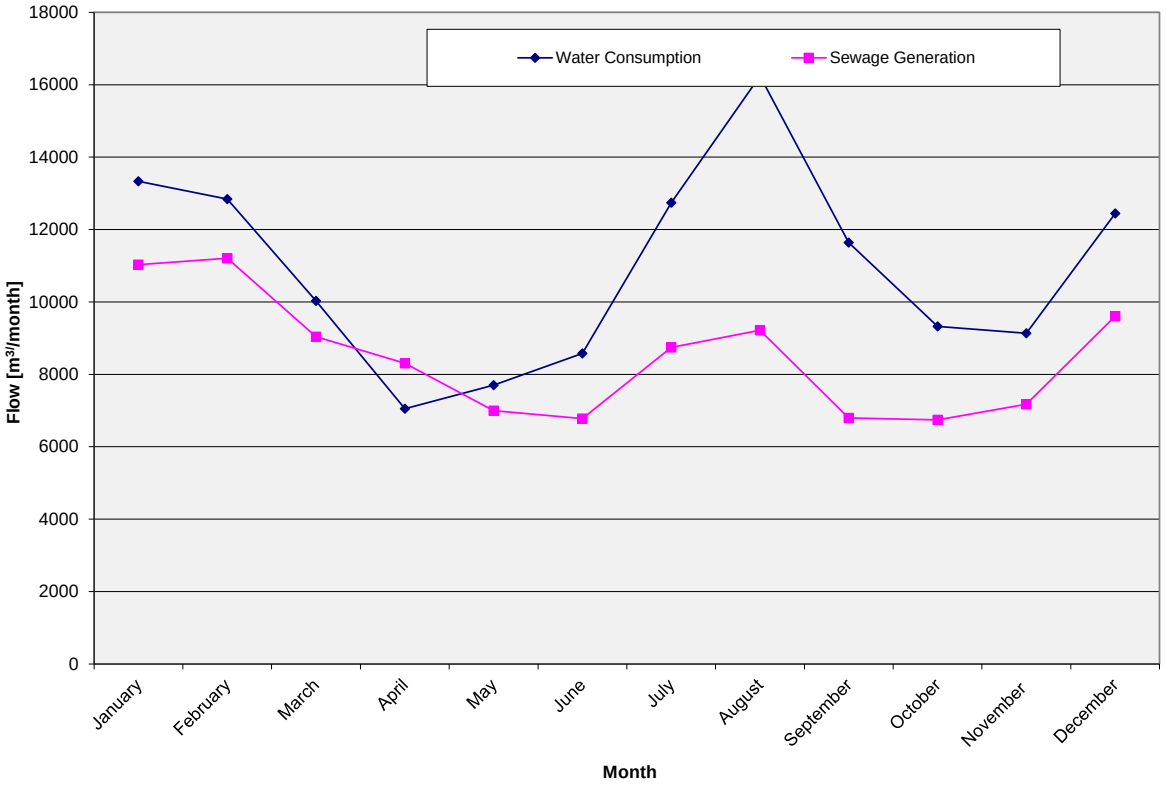
Note that in general, with the exception of 2007, there is relatively steady trend in % of return flow vs total water usage with the exception of 2017 and 2018. The percent sewage flow vs the water production for each year since 2007 has been plotted in Figure 5 below.

Figure 5
Percent Sewage Flow vs Water Production



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 m^3/day. Using the actual peak flow of 811 m^3/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 m^3/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 m^3 to a maximum plant capacity of 1760 m^3. 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 m^3/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.

Table 4
Projected Peak Flows: 2007-2020

	2007	**2008**	**2009**	**2010**	**2011**	**2012**
Estimated Wastewater Flow (m^3/day)	979.2	979.9	1032.4	1261.4	1302.3	1302.3
Actual and Corrected (m^3/day)	1177 (a)	873 (a)	1178(a)	823 (a)	989 (a)	811 (a)

	2013	**2014**	**2015**	**2016**	**2017**	**2018**
Estimated Wastewater Flow (m^3/day)	1302.3	1302.3	1302.3	1302.3	1302.3	1337.6
Actual and Corrected (m^3/day)	1181 (a)	1036 (a)	1058 (a)	844 (a)	1095 (a)	687 (a)

	2019	**2020**	**2021**
Estimated Wastewater Flow (m^3/day)	1344.5*	1344.5*	1344.5*
Actual and Corrected (m^3/day)	1043 (a)	925 (a)	1076 (b)

**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*
AVERAGE			***0.80***

*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^3/d.

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

Figure 7a
Estimated vs Actual Peak Flows (Historical)

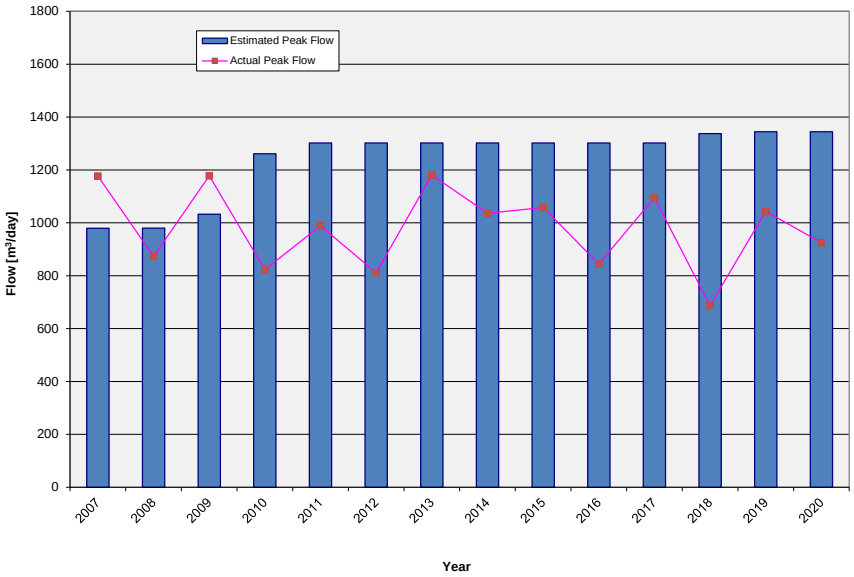
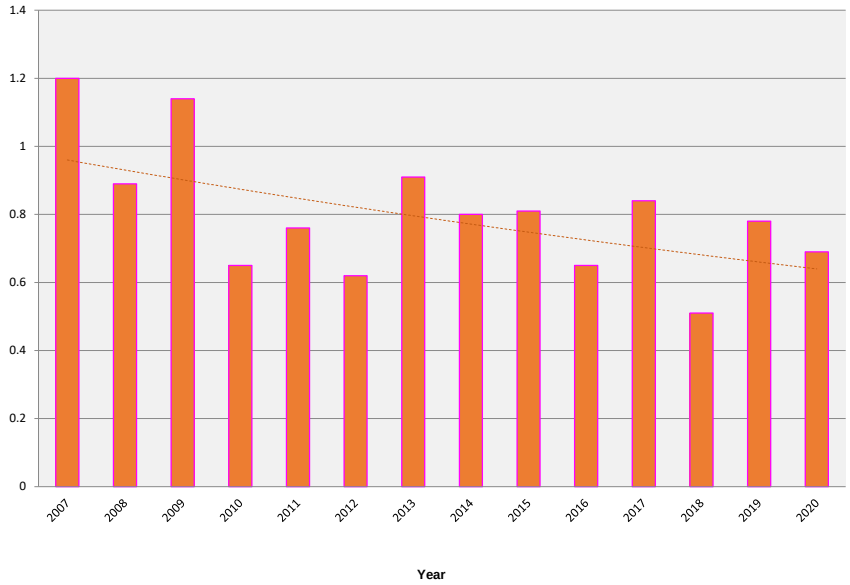


Figure 7b
Correction Factor and Trendline for Peak Flow (Historical)



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 23rd, 2019 to January 18th, 2021.

Table 5
2020 Elk River Sample Results

Sample Date	Ammonia-N			Ortho-P			Coliform - Fecal			Total P mg/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			pH			$N\text{-}NO_3$			$N\text{-}NO_2$		
(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

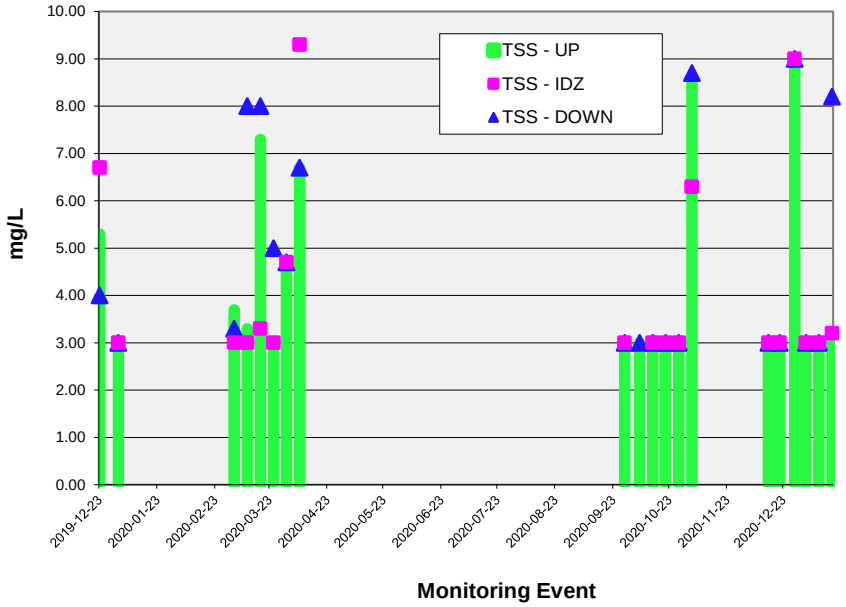
Light green squares show tests reported at less than the stated value, for calculations these are listed as equal to the value stated, ie. <0.05 is assumed to be 0.05
UP – Upstream
IDZ – Initial Dilution Zone
DN – Downstream

TSS

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

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

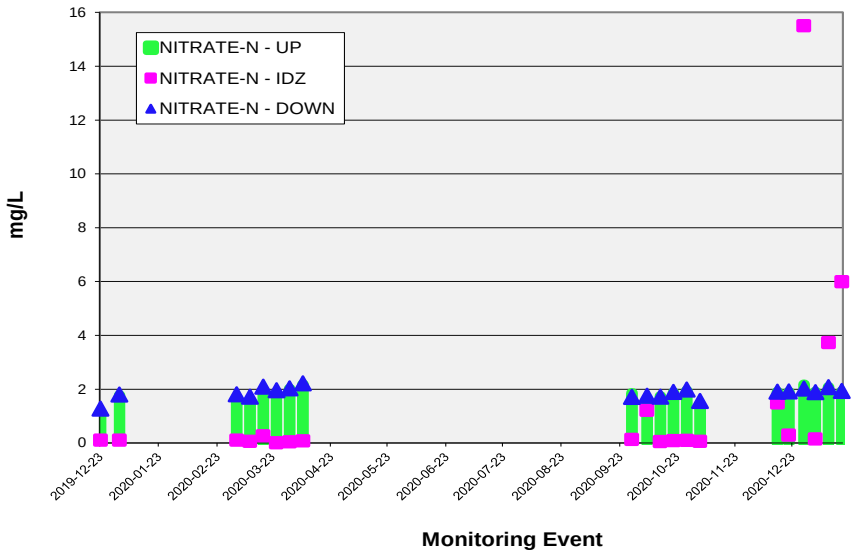


Nitrate-N & Nitrite-N

The highest levels of nitrate-n (15.5 mg/L) were observed at the outfall on December 29th, 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).

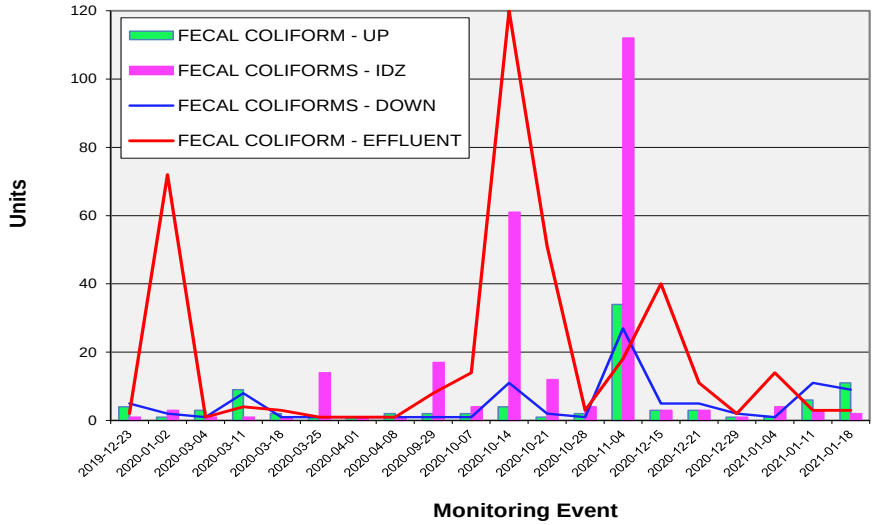
Figure 8b
2019 Nitrate-N Results in the River Upstream, at the Outfall and Downstream



Fecal Coliform

Elevated levels of coliforms were tested at the outfall on March 25th, September 29th, October 14th and November 4th, 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 14th, 2020, when the level in the river downstream was more than 5 CFU/100 mL above the background levels. On October 14th, 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 14th, 2020 effluent result at 120 instead of 1200 CFU/100 mL)



No significant changes were observed in **ammonia-n**, ***pH*** or ***phosphorus*** 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.

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 23rd, 2019 to January 18th, 2021.

Table 6
2020 Influent Results

Date	2020 Influent Results Summary					
	Flow	Temp	pH	TSS	BOD	COD
(yyyy/mm/dd)	m^3/d	C		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 18th, 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.

TSS

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 2nd, 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_5, 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

Date	2020 Effluent Results Summary											
	Flow	Temp	NH_3-N	BOD	COD	P-OP04	Coliforms Fecal	Total P	TSS	pH	NO_3-N	NO_2-N
(yyyy/mm/dd)	m^3/d	C	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	0.05	2.0	10	0.103	1	0.1	3	3.44	5.5	0.01
Limit	1280	N/A	N/A	45	N/A	0.5	200	1	45	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

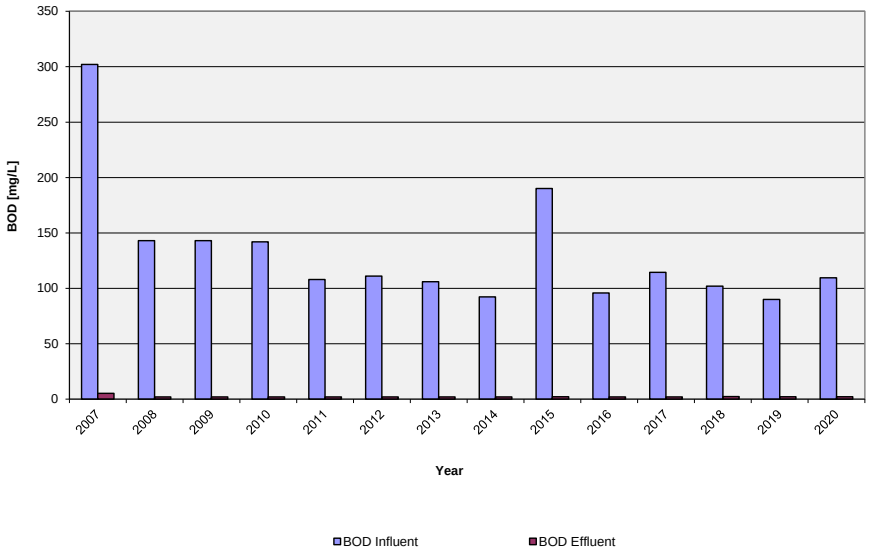
Notes: 1. Light green squares show tests reported at less than the stated value, for calculations these are listed as equal to the value stated, ie. <0.05 is assumed to be 0.05
2. Geometric mean is used for coliform results

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.

Figure 9
Historical BOD Test Results for Influent vs Effluent

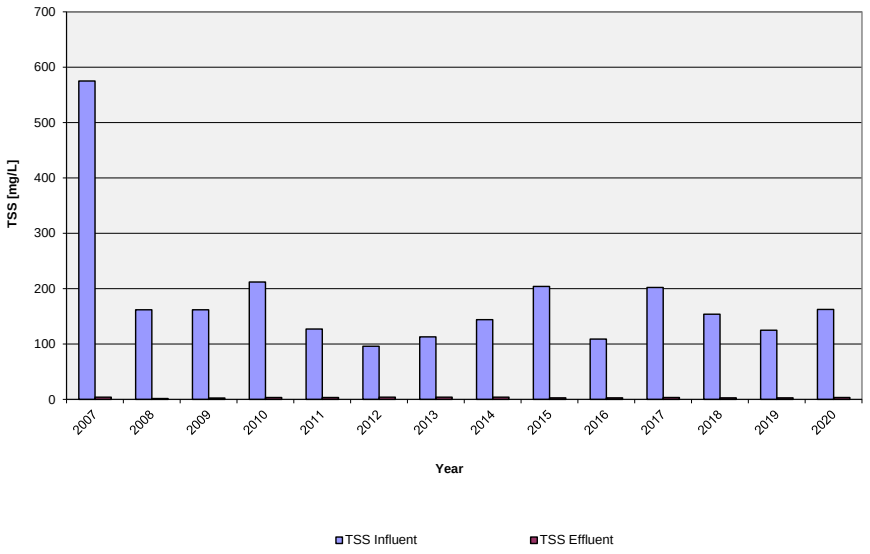


TSS

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 18th, 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



Based on the above results the plant provides excellent BOD_5 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 14th, 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 23rd, 2019 and January 18th, 2021 were well below the acceptable limit for all monitoring events with the exception of October 14th, 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.

Table 8
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 2nd, 2020 at 0.721 mg/L and very marginally on December 21st, 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.

Table 9
2020 MSR Parameter Compliance

Parameter	Unit	MSR Limit	No. of Samples	Average Value	Max. Value	Samples Over Limit
Flow	m^3/day	1280	365	273.5	925	0
BOD_5	mg/l	45	24[1]	2.1	3.4	0
TSS	mg/l	45	389	4** (1.5)***	9**	0
Total Phosphorous	mg/l	1	24[1]	0.3	0.78	0
Ortho Phosphate	mg/l	0.5	24[1]	0.266	0.721	2
Fecal Coliforms*	CFU/100ml	200	24[1]	61	1200	1
96 hr LC_{50} Bioassay	/	Non-toxic	3.0	/	/	0

* *Limit for recreational waters only, not included in FAR registration letter*
** *Laboratory tests only* (<3 considered at 3 mg/L)
*** *Average of daily measurements*
[1] *Only 24 laboratory tests done in 2020 instead of 25*

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.

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 m^3 aerated sludge digester allowed the plant to bag and landfill all of its bio-solids 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 (m^3)***
January	*162.2*
February	*127.4*
March	*155.0*
April	*141.8*
May	*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 14th, 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 5th and 16% on December 27th. 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 3rd, January 17th, January 23rd, February 26th, July 30th and December 26th. The exceedance for total phosphorus was observed on January 3rd.

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 21st. The exceedance for total phosphorus was observed on January 16th.

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 1st, 3% on January 7th and 19% on December 22nd.

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 28th and for total phosphorus was it 23% on December 28th.

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 21st 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.

Figure 11
Total Phosphorus Levels 2007-2020

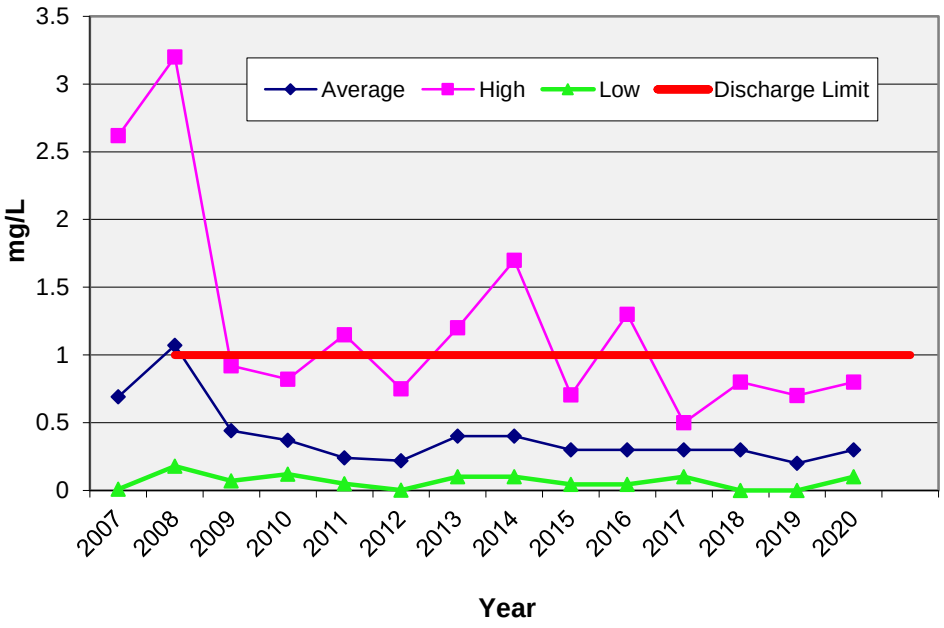
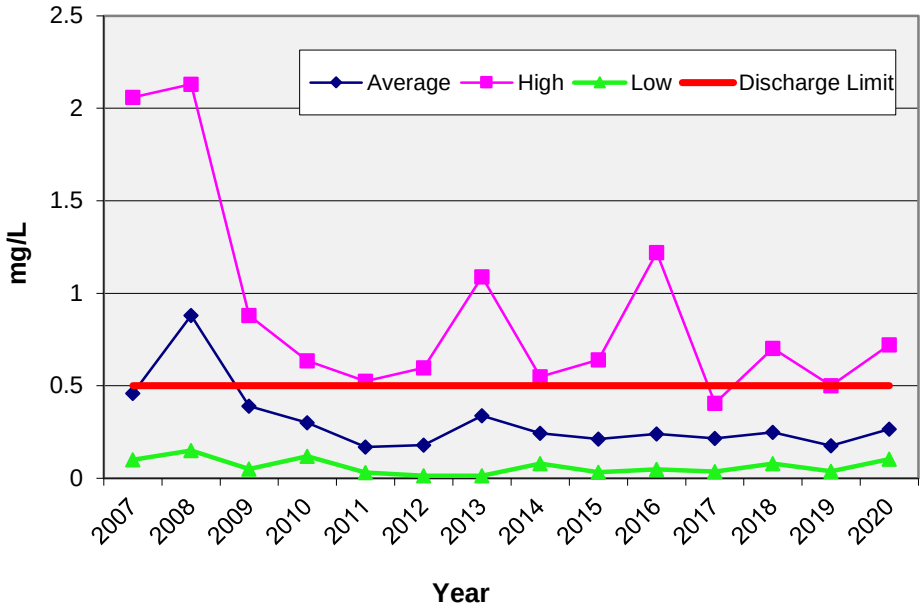
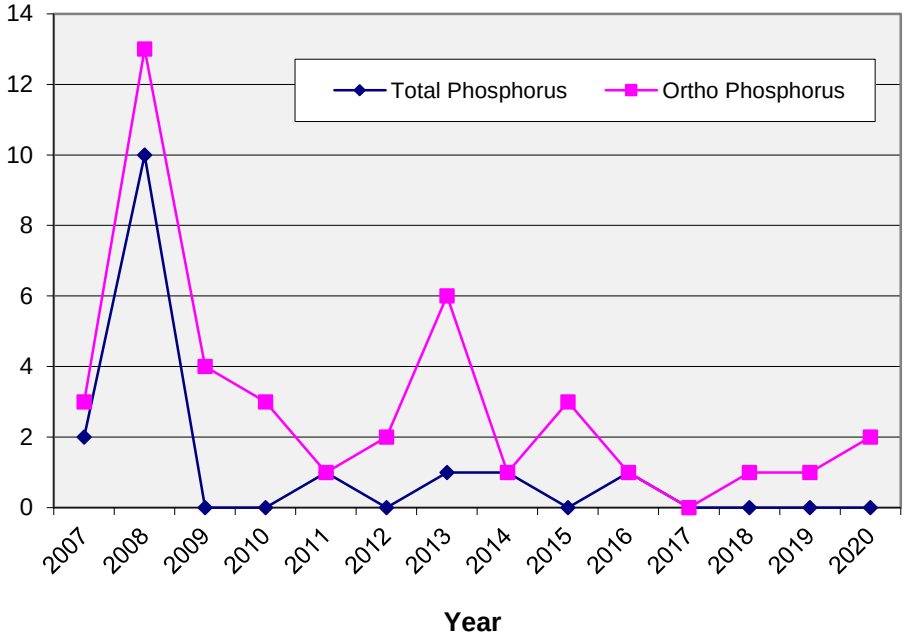


Figure 12
Ortho Phosphorus Levels 2007-2020

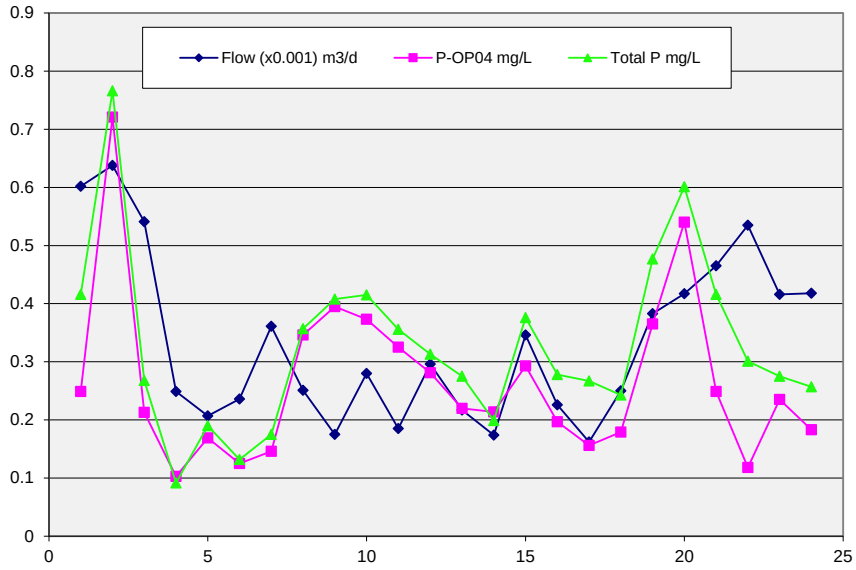


.Figure 13
Days over Limit 2007-2020



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 ***BOD_5*** normally below the regulated limit of 45 mg/l and for all but one instance (January 4th, 2021 at 3.4 mg/L), the results were less than 2 mg/L.

TSS 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 14th, 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 m^3. In order to utilize this capacity, a licence amendment to increase the maximum daily flow from 1280 m^3 to 1760 m^3 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

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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* (l/unit/day)	Units	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2021 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* (l/unit/day)	Units	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2021 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[1)]	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* (l/unit/day)	Units	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2021 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* (l/unit/day)	Population (each)	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2020 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* (l/m^2/day)	Area (m2)	2011 Generation (m3/day)	2012 Generation (m3/day)	2013 Generation (m3/day)	2014 Generation (m3/day)	2015 Generation (m3/day)	2016 Generation (m3/day)	2017 Generation (m3/day)	2018 Generation (m3/day)	2019 Generation (m3/day)	2020 Generation (m3/day)	2021 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**

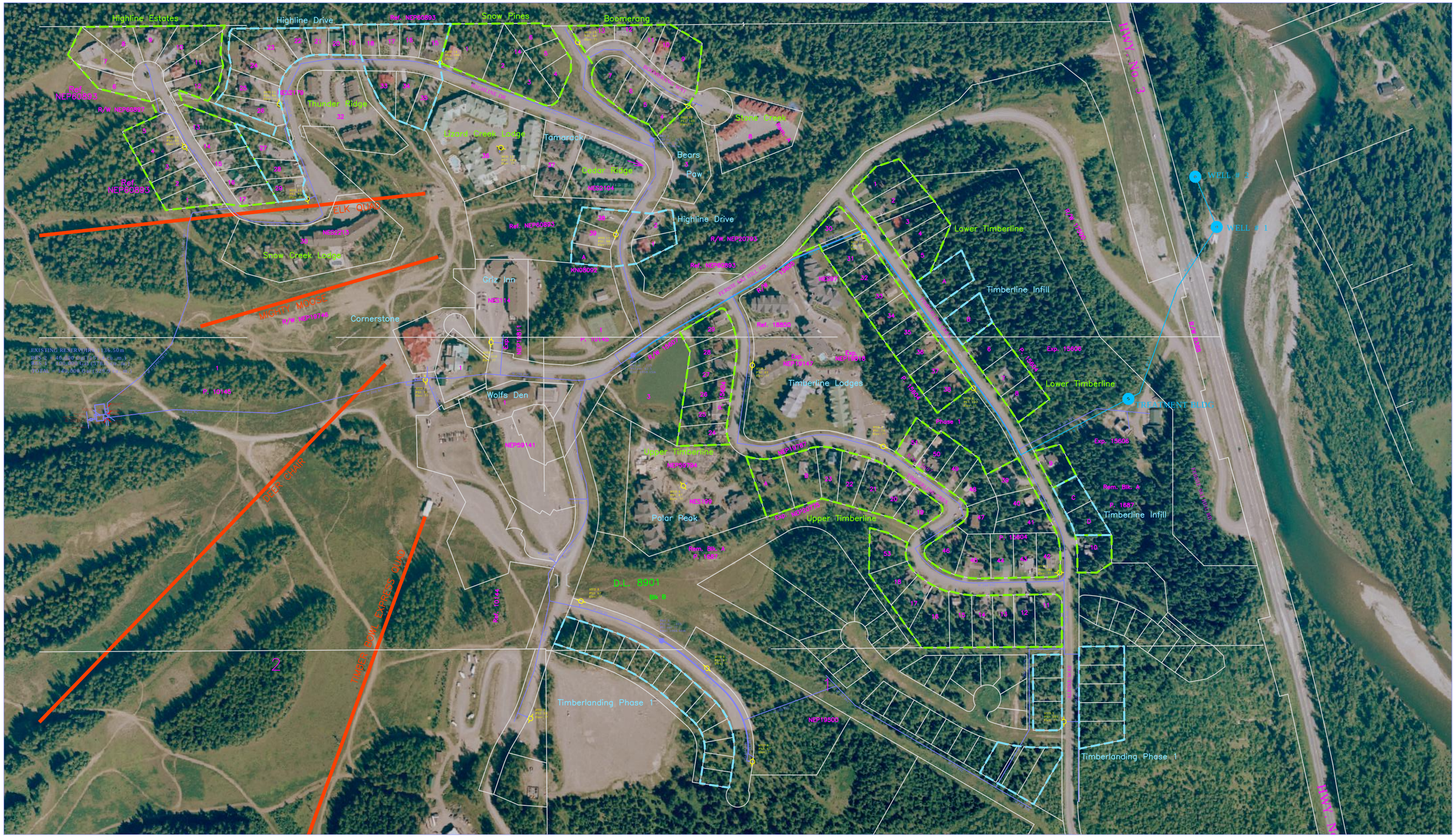
Daily Wastewater Flow (m3/day)*	1302.3	1302.3	1302.3	1302.3	1302.3	1302.3	1302.3	1337.6	1344.5	1344.5	1344.5
Corrected Daily Peak Flow Projections**	989 (actual)	811***(actual)	1181 (actual)	1036 (actual)	1058 (actual)	844 (actual)	1095 (actual)	687 (actual)	1043 (actual)	925 (actual)	1076 (projected)

*Estimated Wastewater flows from BC Health Act, Sewage Disposal Regulation

**Based on 2005 flow for peak day flows

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

1) 27 units added for Phase 1 Timberlanding in 2018



FERNIE ALPINE RESORT - EXISTING DEVELOPMENT

March 2021

Resorts of the Canadian Rockies Inc.

FERNIE ALPINE RESORT - FUTURE DEVELOPMENT 2021 - 2025

March 2021

Resorts of the Canadian Rockies Inc.

BRITISH COLUMBIA

Date: September 30, 2002 Our File: RS 17139

REGISTERED MAIL

Resorts of the Canadian Rockies Inc.
PO Box 997
Victoria, BC V8W 2S8

Resorts of the Canadian Rockies Inc.
1507 – 17th Avenue, SW
Calgary Alberta T2T 0E2

Dear Sir:

Re: Registration under the *Municipal Sewage Regulation* of the discharge to the Elk River from the Fernie Alpine Resort sewage treatment plant located at District Lot 8980, Kootenay District (Plan 1687) near Fernie British Columbia

This is to acknowledge your registration form under the *Municipal Sewage Regulation* (the *Regulation*) dated August 30, 2001, and received at this office on October 31, 2001, for the registration of the wastewater treatment plant owned and operated by Resorts of the Canadian Rockies Inc. at the Fernie Alpine Resort ski hill located near Fernie, British Columbia. Pursuant to Part 2, section 3 of the *Regulation*, the effective date of registration of this discharge is the date of this letter. The ministry file number for this discharge is RS 17139. Please indicate this number on all future correspondence regarding this discharge.

The initial registration fee is $148.55. Please submit to the Regional Manager (the *Manager*) a cheque payable to the Minister of Finance and Corporate Relations, for this amount by September 25, 2002. An annual registration fee will be determined according to the *Waste Management Permit Fees Regulation* and you will be receiving an annual invoice from the ministry for payment of this fee. Payment of all fees due is necessary to comply with the *Regulation*. Fees will be calculated using a maximum effluent flow of 1280 m^3/day, a maximum BOD_5 of 45 mg/L and a maximum TSS of 45 mg/L.

We wish to remind you that the discharger is responsible for compliance with the requirements of the *Regulation*, the registration, the *Waste 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. Contravention of any of the conditions of the *Regulation*, the registration and this letter is a violation of the *Act* and may result in prosecution.

Ministry of Water, Land and Air Protection | Kootenay Region | Mailing/Location Address: 401 - 333 Victoria Street Nelson BC V1L 4K3 | Telephone: 250 354-6333 Facsimile: 250 354-6332 PF Facsimile:250 354-6357

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

The *Regulation* and policy documents are available at :

http://wlepwww.gov.bc.ca/epd/epdpa/mpp/mphome.html

This letter 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 differences or omissions in this document then the *Act*, the regulations issued under the *Act* and the *Regulation* apply except where expressly noted in this letter.

Registration under the *Regulation* should not be construed as a representation that the authorized works are adequately designed or will satisfy 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 complies with the *Regulation* and this letter. Registration under the *Regulation* and this letter are without prejudice to any additional works that may be required or any additional requirements that may be specified by the *Manager*. The *Manager* may also issue Orders under the *Act*.

Registration under the *Regulation* does not authorise entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorised by the owner of such lands or works. The responsibility for obtaining such authority 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 third parties and comply with other applicable legislation that may be in force. The discharger must also obtain any necessary approvals from other agencies.

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 G, Cranbrook, British Columbia, V1C 7G5, (telephone: (250) 489-8570) or from our Regional Office located at #401 - 333 Victoria Street, Nelson, British Columbia, V1L 4K3. Plans, data and reports pertinent to the *Regulation*, registration and this letter are to be submitted to the *Manager* at the Sub-Regional office address at Cranbrook, British Columbia in the form required by the *Regulation* or 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 E102571.

Registration Reference Documents

This registration under the *Regulation* is based on the following documents:

1. The Fernie Alpine Resort Limited, Registration Form dated August 30, 2001 and received October 31, 2001.
2. Environmental Impact Study, Sewage Treatment Plant at Fernie Alpine Resort, prepared for Fernie Alpine Resort Ltd. by Highwood Environmental Management Limited dated April 2001.
3. Environmental Impact Study for Fernie Alpine Resort's Wastewater Discharge into the Elk River, Interim Report prepared by Conor Pacific Environmental Technologies Incorporated dated May 1, 2001.
4. Fernie Alpine Resort, Wastewater Treatment Plant, Guiding Document for Proposed Improvements 2001 prepared by Urban Systems dated May 2001.
5. Urban Systems drawings titled Fernie Alpine Resort Wastewater Treatment Plant Expansion dated August, 2001.

Treatment Plant Works

The treatment plant works are one influent macerator and screen, two aeration flow equalization tanks, a separate equalization tank, two clarifiers, two three stage rotating biological contactors, two flocculation tanks with mixers and coagulant feed, two sand filters, a backwash water settling tank, UV disinfection units, one aerated biosolids (sludge) digestion tank, biosolids (sludge) dewatering equipment and a pipeline and outfall to the Elk River and related appurtenances approximately as shown on Urban Systems drawings titled Fernie Alpine Resort Wastewater Treatment Plant Expansion dated August, 2001 or on the attached Site Plan. The plant maximum daily flow and discharge to the environment is 1280 m^3/day. The effluent quality shall be BOD_5 of 45 mg/L, TSS of 45 mg/L, total phosphorus of 1.0 mg/L, ortho phosphate 0.5 mg/L and the effluent shall also pass a 96 hour LC50 bioassay test.

Primary Screenings and Dewatered Biosolids (Sludge) Disposal

Primary screenings and dewatered biosolids (sludge) from the treatment plant shall be disposed at the Crowsnest/Pincher Creek Landfill. The discharger shall submit confirmation of acceptance of the screenings and biosolids by the Crowsnest/Pincher Creek Landfill Authority on or before October 25, 2002. If primary screenings and dewatered biosolids (sludge) from the treatment plant are not disposed at the Crowsnest/Pincher Creek Landfill they must be disposed in accordance with an authorization issued under the *Act*, the Organic Matter Recycling Regulation or in a manner approved by the *Manager*.

Semi-solid Waste

The discharger shall not accept semi-solid wastes at the treatment plant. Semi-solid wastes means septic tank pumpage, holding tank solids or sludge 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 meet reliability Category I and confirm that multiple disinfection units have been installed. The confirmation shall be submitted on or before October 23, 2002.

Outfall Diffuser

The discharger shall install an outfall diffuser in accordance with Part 4, Section 3 and Schedule 7, Condition 4 of the *Regulation*. The diffuser shall be installed on or before August 31, 2005. The discharger must obtain all necessary approvals from other agencies prior to installing the diffuser.

Additional Works

The works are to be designed to allow for additional facilities in future to reduce effluent ammonia levels if ammonia levels in the Elk River exceed the current British Columbia Approved Water Quality Guidelines (Criteria) or if monitoring results indicate exceedance of the current Criteria for ammonia is imminent. Water quality Criteria apply at the edge of the initial dilution zone.

The works are also to be designed to allow for increased phosphorus removal if algae problems develop in the Elk River.

Operator Qualifications and Certification

The discharger shall ensure that the treatment plant is classified and the treatment plant operators certified in accordance with Part 6, Section 23 of the *Regulation*. Proof of treatment plant classification (copy of classification) and operator certification (copy of certification) shall be submitted to the *Manager* on or before October 23, 2002.

Monitoring

The discharger shall undertake monitoring in accordance with Part 7 and applicable conditions of Schedule 6 of the *Regulation* subject to the requirements as follows:

Sampling and Analysis

Sampling and analysis shall be in accordance with Part 7, Section 25 of the *Regulation*. Minimum detection limits for nutrients shall be:

Ammonia	5µg/L (Nitrate)
Nitrate	5 µg/L
Nitrite	2 µg/L
Total Phosphorus	3 µg/L
Orthophosphate	3 µg/L

These detection limits shall only apply to the analysis 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 note the requirement to submit data in accordance with the *Environmental Data Quality Assurance Regulation* as per Section 25 (3) of the *Regulation*.

Discharge Monitoring and Receiving Environment Monitoring

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

Sampling Location Frequency/Type

	Elk River[4] (At Sites UP, IDZ and DN)	Plant Influent[3]	Plant Effluent[3]
Parameter			
pH (field test)	WS/G		M/G and WS/G
temperature (field test)	WS/G		
flow		D/CON.	D/CON.
BOD_5[1]		M/G	M/G and WS/G
TSS[2]	WS/G	M/G	M/G and WS/G and D/CON.
ammonia (as nitrogen)	WS/G		M/G and WS/G
nitrate (as nitrogen)	WS/G		M/G and WS/G
nitrite (as nitrogen)	WS/G		M/G and WS/G
total phosphorus	WS/G		M/G and WS/G
	Elk River[4] (At Sites UP, IDZ and DN)	Plant Influent[3]	Plant Effluent[3]
orthophosphate	WS/G		M/G and WS/G
fecal coliforms	WS/G		M/G and WS/G
Toxicity			3Y/G

1. BOD_5 - means the total 5-day biochemical oxygen demand.
2. TSS - means total suspended solids or non-filterable residue.
3. Plant influent and effluent samples 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 correspond with peak flow days at the resort in a manner similar to plant influent/effluent sampling.

Sampling Location Frequency/Type

	Elk River[4] (At Sites UP, IDZ and DN)	Plant Influent[3]	Plant Effluent[3]
Parameter			
pH (field test)	WS/G		M/G and WS/G
temperature (field test)	WS/G		
flow		D/CON.	D/CON.
BOD_5[1]		M/G	M/G and WS/G
TSS[2]	WS/G	M/G	M/G and WS/G and D/CON.
ammonia (as nitrogen)	WS/G		M/G and WS/G
nitrate (as nitrogen)	WS/G		M/G and WS/G
nitrite (as nitrogen)	WS/G		M/G and WS/G
total phosphorus	WS/G		M/G and WS/G
	Elk River[4] (At Sites UP, IDZ and DN)	Plant Influent[3]	Plant Effluent[3]
orthophosphate	WS/G		M/G and WS/G
fecal coliforms	WS/G		M/G and WS/G
Toxicity			3Y/G

1. BOD_5 - means the total 5-day biochemical oxygen demand.
2. TSS - means total suspended solids or non-filterable residue.
3. Plant influent and effluent samples 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 correspond with peak flow days at the resort in a manner similar to plant influent/effluent sampling.

Sampling Frequency:

D - means daily.

M - means monthly.

WS – weekly seasonal (This means obtaining samples weekly for a six week period in the spring, in the fall and during the Christmas season at peak flow times and days. Peak flow days will be predicted on the basis of resort bookings. The commencement of the spring and fall sampling sessions depends on weather and hydrologic conditions. The spring sampling should begin early in the spring after ice-out when river flows are low and the fall sampling should begin when river flows are low and turbidity is low. Professional judgment should be used regarding the start times of the weekly sampling programs in the spring and fall. The Christmas sampling should begin in mid December and extend into January. During the six week sampling period the monthly sampling is not necessary.)

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

Sample Type:

G - means grab sample (Note: when obtaining samples of the influent and effluent the grab samples will be taken on peak flow days at peak flow times during the day. Peak days shall be predicted on the basis of bookings at the resort.)

CON, - means continuous using a data logger. (Note: Flow meters and TSS monitors shall be calibrated. The flow meter and TSS meter calibration frequency and procedures shall be contained in the operating plan.)

Monitoring for Plant Operation Purposes

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

Environmental Monitoring System (EMS) Numbers

The following are the EMS site numbers assigned to the monitoring sites listed above. These numbers are to be used when entering data directly into the Ministry EMS database in accordance with Part 7, Section 28 (2) of the *Regulation*. Monitoring data shall be submitted to the Ministry data base quarterly within 30 days of the end of each quarter.

Monitoring Program Changes

The *Manager* may modify the monitoring program from time to time. The annual report shall contain recommendations regarding changes (additions/deletions/modifications) 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, please contact our Cranbrook Sub-Regional Office at (250) 489-8540.

Yours truly,

Carl Johnson, P.Eng.
Assistant Regional Waste Manager

/lp

cc: Paul Bates, Resorts of the Canadian Rockies, Calgary
Toby Todaro, Resorts of the Canadian Rockies, Calgary
Peter Gigliotti, P.Eng. Urban Systems, Kelowna
Andrew Wells, Fernie Alpine Resort, Fernie
Andrew Brown, Fernie Alpine Resort, Fernie
Ken van Heyningen, Fernie Alpine Resort, Fernie
Gary Lawrence, MWLAP, Cranbrook

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

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	pH		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
pH	7.66		0.10	pH		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	pH		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
pH	8.20		0.10	pH		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
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		24-DEC-19	R4955084

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
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	R4956888
Nitrate (as N)	1.28		0.020	mg/L		24-DEC-19	R4957366
Nitrite (as N)	<0.010		0.010	mg/L		24-DEC-19	R4957366
Phosphorus (P)-Total	0.0143		0.0050	mg/L		27-DEC-19	R4955311
Total Suspended Solids	4.0		3.0	mg/L		30-DEC-19	R4958015
pH	8.20		0.10	pH		30-DEC-19	R4958137

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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-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.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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3-291-0299
Toll Free: 1-800-667-7645 Fax: 306-668-8383

L2400117-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL.:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Winter 2019 EMS wk #5			QUOTE NO:	
PO NO.:		ALS CONTACT:	patryk.wojciak@alsglobal.com		
REPORT FORMAT:	☒ H/ ☒ F MAI		pbaie@skircr.com		
	☐ F ☐ F ☒ P ☐ ( )				

ANALYSIS REQUESTED:

Ambient air - 2 oc

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					NOTES (sample specific comments, due dates, etc.)
	1	WWTP Influent Routine	1	2019 – 12 –23	14:00	Water		X	X												temp = 9.9 C
		WWTP Influent BOD	2	2019 – 12 –23	14:00	Water									X						temp = 9.9 C
	2																				
	2	WWTP Effluent Routine	3	2019 – 12 –23	14:15	Water		X	X							X					temp = C
		WWTP Effluent BOD	4	2019 – 12 –23	14:15	Water									X						temp = 11.6 C
		WWTP Effluent Nutrient	5	2019 – 12 –23	14:15	Water				X	X	X	X	X							temp = C
		WWTP Effluent Bacti	6	2019 – 12 –23	14:15	Water	X														temp = C
	3	Elkriver Upstream Routine	7	2019 – 12 –23	14:30	Water		X	X												temp = 2.2 C
		Elkriver Upstream Nutrient	8	2019 – 12 –23	14:30	Water				X	X	X	X	X							temp = C
		Elkriver Upstream Bacti	9	2019 – 12 –23	14:30	Water	X														temp = 2.2 C
	4	Elkriver Outfall Routine	10	2019 – 12 –23	14:45	Water		X	X												temp = 3.1 C
		Elkriver Outfall Nutrient	11	2019 – 12 –23	14:45	Water				X	X	X	X	X							temp = C
		Elkriver Outfall Bacti	12	2019 – 12 –23	14:45	Water	X														temp = 3.1 C
			13																		
	5	Elkriver downstream Routine	13	2019 – 12 –23	15:00	Water		X	X												temp = 2.3 C
		Elkriver downstream Nutrient	14	2019 – 12 –23	15:00	Water				X	X	X	X	X							temp = C
		Elkriver downstream Bacti	15	2019 – 12 –23	15:00	Water	X														temp = 2.3 C

TURN AROUND REQUIRED:	◉ R(ϕ R	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE: 2019– 12–23	RECEIVED BY:	DATE: 12/24	
SEND INVOICE TO:	☒ SA ☐ DIFFERE		Hungry Baytaluke	TIME: 5:00 pm		TIME: 9:20	
INVOICE FORMAT:	☐ HZ ☐ ☐		RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:	
				TIME:		TIME:	

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4552 OR E-MAIL TO wastewater@skifernie.com

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 6 °C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

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

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
pH	7.80		0.10	pH		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
pH	7.50		0.10	pH		03-JAN-20	R4958954
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
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							
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
pH	8.34		0.10	pH		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)	1.78		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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	pH		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							
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	8.33		0.10	pH		03-JAN-20	R4958954
NO2, NO3 and Sum of NO2/NO3							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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 Triur — 504-253-6700
Fort St. John BC, Box 25(— 780-513-2191
Grand Prairie AB, 9595 -
Fort McMurray AB, Bay 1 — 780-437-2311
Edmonton AB, 9936 - 67(— Fax: 403-291-0298
Calgary AB, Bay 7, 1313 - -
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-6370 — Fax: 306-668-6383

L2401750-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Bo Choroszewski
PROJECT NAME AND NO.:	F A R U C – Winter 2019/2020 EMS wk #8			QUOTE NO:	
PO NO.:		ALS CONTACT:	patryk.wojciak@alsglobal.com		
REPORT FORMAT:	☒ HARDMAIL ☐ FAX ☒ PDF		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine	2020 – 01 –02	15:10	Water		X	X								temp = 13.7 C
	WWTP Influent BOD	2020 – 01 –02	15:10	Water									X		temp = 13.7 C
2	WWTP Effluent Routine	2020 – 01 –02	15:15	Water		X	X							X	temp = 15.4 C
	WWTP Effluent BOD	2020 – 01 –02	15:15	Water									X		temp = 15.4 C
	WWTP Effluent Nutrient	2020 – 01 –02	15:15	Water				X	X	X	X	X			temp = 15.4 C
	WWTP Effluent Bacti	2020 – 01 –02	15:15	Water	X										temp = 15.4 C
3	Elkriver Upstream Routine	2020 – 01 –02	15:00	Water		X	X								temp = 1.0 C
	Elkriver Upstream Nutrient	2020 – 01 –02	15:00	Water				X	X	X	X	X			temp = 1.0 C
	Elkriver Upstream Bacti	2020 – 01 –02	15:00	Water	X										temp = 1.0 C
4	Elkriver Outfall Routine	2020 – 01 –02	14:50	Water		X	X								temp = 1.2 C
	Elkriver Outfall Nutrient	2020 – 01 –02	14:50	Water				X	X	X	X	X			temp = 1.2 C
	Elkriver Outfall Bacti	2020 – 01 –02	14:50	Water	X										temp = 1.2 C
5	Elkriver downstream Routine	2020 – 01 –02	14:35	Water		X	X								temp = 1.0 C
	Elkriver downstream Nutrient	2020 – 01 –02	14:35	Water				X	X	X	X	X			temp = 1.0 C
	Elkriver downstream Bacti	2020 – 01 –02	14:35	Water	X										temp = 1.0 C

FOR LAB USE ONLY

TURN AROUND REQUIRED: [illegible] SPECIFY DATE (surcharges apply)

RELINQUISHED BY:	DATE	2020- 01-02	RECEIVED BY:	DATE: 01/03
Bo Choroszewski	TIME:	15:45		TIME: 9:00
RELINQUISHED BY:	DATE		RECEIVED BY:	DATE:
	TIME			TIME:

FOR LAB USE ONLY

__Yes __No __N/A Frozen? __Yes __No Ice Packs? __Icepacks __Ice __None

5°C

G:\QUALITY\00_DOCUMENTS\10_AUTHORIZED\FORMS\[illegible]

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

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	pH		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	pH		12-MAR-20	R5024095
NO2, NO3 and Sum of NO2/NO3							
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							
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	9		1	CFU/100mL		12-MAR-20	R5025168
Phosphorus (P)-Total	<0.0050		0.0050	mg/L		13-MAR-20	R5024729
Total Suspended Solids	3.3		3.0	mg/L		17-MAR-20	R5029486
pH	8.23		0.10	pH		12-MAR-20	R5024095
NO2, NO3 and Sum of NO2/NO3							
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							
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		0.0050	mg/L		12-MAR-20	R5024127
Coliform Bacteria - Fecal	1		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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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 @ 14:45							
Matrix: Water							
pH	8.20		0.10	pH		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							
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 @ 15:00							
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	8.22		0.10	pH		12-MAR-20	R5024095
NO2, NO3 and Sum of NO2/NO3							
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							
Nitrite (as N)	<0.010		0.010	mg/L		12-MAR-20	R5024548

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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91-1586
9878 Fax: 780-437-2311
)0-668-9878 Fax: 403-291-0298
67-7645 Fax: 306-668-8383

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Spring 2020 EMS wk #2			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	patryk.wojciak@alsglobal.com		
REPORT FORMAT:	☒ HARDMAIL ☐ FAX ☒ PDF ☐ ( )		ptmajer@skircr.com		

ANALYSIS REQUESTED:

Ambient air -12 sc

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED YYYY-MM-DD	DATE / TIME COLLECTED TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
		WWTP Influent Routine	1	2020 – 3 – 11	14:00	Water		X	X								temp = 11.3 C
		WWTP Influent BOD	2	2020 – 3 – 11	14:00	Water									X		temp = 11.2 C
		WWTP Effluent Routine	3	2020 – 3 – 11	14:15	Water		X	X							X	temp = C
		WWTP Effluent BOD	4	2020 – 3 – 11	14:15	Water									X		temp = 13.1 C
		WWTP Effluent Nutrient	5	2020 – 3 – 11	14:15	Water				X	X	X	X	X			temp = 13.1 C
		WWTP Effluent Bacti	6	2020 – 3 – 11	14:15	Water	X										temp = 10.1 C
			7														
		Elkriver Upstream Routine		2020 – 3 – 11	14:30	Water		X	X								temp = C
		Elkriver Upstream Nutrient	8	2020 – 3 – 11	14:30	Water				X	X	X	X	X			temp = 0.9 C
		Elkriver Upstream Bacti	9	2020 – 3 – 11	14:30	Water	X										temp = 0.1 C
		Elkriver Outfall Routine	10	2020 – 3 – 11	14:45	Water		X	X								temp = C
		Elkriver Outfall Nutrient	11	2020 – 3 – 11	14:45	Water				X	X	X	X	X			temp = 0.8 C
		Elkriver Outfall Bacti	12	2020 – 3 – 11	14:45	Water	X										temp = 0.8 C
		Elkriver downstream Routine	13	2020 – 3 – 11	15:00	Water		X	X								temp = C
		Elkriver downstream Nutrient	14	2020 – 3 – 11	15:00	Water				X	X	X	X	X			temp = 0.7 C
		Elkriver downstream Bacti	15	2020 – 3 – 11	15:00	Water	X										temp = 0.7 C

TURN AROUND REQUIRED:	◉ REGULAR	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE: 2020 – 3 – 11	RECEIVED BY:	DATE: 3/12	
SEND INVOICE TO:	☒ SAME ☐		Hungry Baytaluke	TIME: 5:00 pm		TIME: 0850	
INVOICE FORMAT:	☐ HARD ☐	☐ DIFFERENT	RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:	
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com			TIME:		TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
✓ Yes ___ No ___ N/A	Frozen? ___ Yes ✗ No	✗ Icepacks ___ Ice ___ None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/Hungry's CoC for ALS full EMS.xls

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	7.81		0.10	pH		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	pH		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	8.28		0.10	pH		19-MAR-20	R5032912
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.95		0.020	mg/L		19-MAR-20	R5033069
Nitrate+Nitrite							
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							
Ammonia, Total (as N)	<0.050		0.050	mg/L		20-MAR-20	R5033279
Orthophosphate-Dissolved (as P)	0.0072		0.0050	mg/L		19-MAR-20	R5032901
Coliform Bacteria - Fecal	<1		1	CFU/100mL		19-MAR-20	R5033901
Phosphorus (P)-Total	0.0070		0.0050	mg/L		25-MAR-20	R5038171
Total Suspended Solids	3.3		3.0	mg/L		24-MAR-20	R5038826

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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							
pH	8.20		0.10	pH		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							
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	pH		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1585
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

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Spring 2020 EMS wk #3			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	patryk.wojciak@alsglobal.com		
REPORT FORMAT:	☒ HARDMAIL ☐ FAX ☒ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

L2429710-COFC

WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine	1	2020 – 3 – 18	14:00	Water		X	X								temp = 10.8 C
	WWTP Influent BOD	2	2020 – 3 – 18	14:00	Water									X		temp = C
	WWTP Effluent Routine	3	2020 – 3 – 18	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2020 – 3 – 18	14:15	Water									X		temp = 13.9 C
	WWTP Effluent Nutrient	5	2020 – 3 – 18	14:15	Water				X	X	X	X	X			temp = C
	WWTP Effluent Bacti	6	2020 – 3 – 18	14:15	Water	X										temp = C
	Elkriver Upstream Routine	7	2020 – 3 – 18	14:30	Water		X	X								temp = 0.9 C
	Elkriver Upstream Nutrient	8	2020 – 3 – 18	14:30	Water				X	X	X	X	X			temp = C
	Elkriver Upstream Bacti	9	2020 – 3 – 18	14:30	Water	X										temp = 0.1 C
	Elkriver Outfall Routine	10	2020 – 3 – 18	14:45	Water		X	X								temp = C
	Elkriver Outfall Nutrient	11	2020 – 3 – 18	14:45	Water				X	X	X	X	X			temp = 1.1 C
	Elkriver Outfall Bacti	12	2020 – 3 – 18	14:45	Water	X										temp = C
	Elkriver downstream Routine	13	2020 – 3 – 18	15:00	Water		X	X								temp = 0.8 C
	Elkriver downstream Nutrient	14	2020 – 3 – 18	15:00	Water				X	X	X	X	X			temp = C
	Elkriver downstream Bacti	15	2020 – 3 – 18	15:00	Water	X										temp = C

FOR LAB USE ONLY

TURN AROUND REQUIRED:	● ROUTINE	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY:	DATE: 2020 –3– 18	RECEIVED BY:	DATE: 3/19	
SEND INVOICE TO:	☒ SAMPLE RECEIPT		Hungry Baytaluke	TIME: 5:00 pm		TIME: 0850	
INVOICE FORMAT:	☐ HARDMAIL ☐ PDF ☐		RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:	
				TIME:		TIME:	

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ___°C	Cooling Method?
X Yes ___No ___N/A	Frozen? ___Yes X No	X Icepacks ___Ice ___None

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	7.86		0.10	pH		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	pH		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							
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	8.46		0.10	pH		05-MAR-20	R5018771
NO2, NO3 and Sum of NO2/NO3							
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							
Ammonia, Total (as N)	<0.050		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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2424482-4 WWTP OUTFALL							
Sampled By: Hungry Baytaluke on 04-MAR-20 @ 14:45							
Matrix: Water							
pH	8.45		0.10	pH		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							
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 @ 15:00							
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	<0.0050		0.0050	mg/L		07-MAR-20	R5019610
Total Suspended Solids	3.3		3.0	mg/L		11-MAR-20	R5022790
pH	8.45		0.10	pH		05-MAR-20	R5018771
NO2, NO3 and Sum of NO2/NO3							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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oll Free: 1-800-668-9878 Fax: 403-291-0298
ee: 1-800-667-7645 Fax: 306-668-8383

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 - 258 - 7669	FAX:	403 - 244 - 3774	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Spring 2020 EMS wk #1			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	patryk.wojciak@alsglobal.com		
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ EXCEL ☐ PDF ☐ ( )		pbaier@skircr.com		

ANALYSIS REQUESTED:

Ambient air temp - 10c

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	1	WWTP Influent Routine	1	2020 – 3 – 4	14:00	Water		X	X								temp = 11.4 C
	1	WWTP Influent BOD	2	2020 – 3 – 4	14:00	Water									X		temp = C
		WWTP Effluent Routine	3	2020 – 3 – 4	14:15	Water		X	X							X	temp = C
	2	WWTP Effluent BOD	4	2020 – 3 – 4	14:15	Water									X		temp = 13.4 C
	2	WWTP Effluent Nutrient	5	2020 – 3 – 4	14:15	Water				X	X	X	X	X			temp = C
		WWTP Effluent Bacti	6	2020 – 3 – 4	14:15	Water	X										temp = C
			7														
	3	Elkriver Upstream Routine	7	2020 – 3 – 4	14:30	Water		X	X								temp = C
	3	Elkriver Upstream Nutrient	8	2020 – 3 – 4	14:30	Water				X	X	X	X	X			temp = 4.3 C
		Elkriver Upstream Bacti	9	2020 – 3 – 4	14:30	Water	X										temp = C
			10														
	4	Elkriver Outfall Routine	10	2020 – 3 – 4	14:45	Water		X	X								temp = C
	4	Elkriver Outfall Nutrient	11	2020 – 3 – 4	14:45	Water				X	X	X	X	X			temp = C
		Elkriver Outfall Bacti	12	2020 – 3 – 4	14:45	Water	X										temp = 3.1 C
			13														
	5	Elkriver downstream Routine	13	2020 – 3 – 4	15:00	Water		X	X								temp = C
	5	Elkriver downstream Nutrient	14	2020 – 3 – 4	15:00	Water				X	X	X	X	X			temp = 4.2 C
		Elkriver downstream Bacti	15	2020 – 3 – 4	15:00	Water	X										temp = C

TURN AROUND REQUIRED:	◉ REGULAR	SPECIFY DATE:	(surcharge may apply)	RELINQUISHED BY:	DATE: 2020 – 3 – 4	RECEIVED BY:	DATE: 3/5
SEND INVOICE TO:	☒ SAME ☐ DIFFERENT			Hungry Baytaluke	TIME: 5:00 pm		TIME: 830
INVOICE FORMAT:	☐ HARDMAIL ☐ EMAIL ☐ EXCEL			RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
					TIME:		TIME:

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

G:\QUALITY\00_DOCUMENTS\10_AUTHORIZED\FORMS\Hungry's CoC for ALS full EMS.xls

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: F A R U C - SPRING 2020 EMS WK #4
C of C Numbers:
Legal Site Desc:

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2431720-1 WWTP INFLUENT							
Sampled By: HUNGRY BAYTALUKE on 25-MAR-20 @ 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	pH		27-MAR-20	R5042994
L2431720-2 WWTP EFFLUENT							
Sampled By: HUNGRY BAYTALUKE on 25-MAR-20 @ 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
pH	7.84		0.10	pH		27-MAR-20	R5042994
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	31.1	DLHC	0.10	mg/L		26-MAR-20	R5045186
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	31.1		0.11	mg/L		30-MAR-20	
Nitrite in Water by IC							
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 @ 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	pH		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							
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 @ 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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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							
pH	8.43		0.10	pH		27-MAR-20	R5042994
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.060		0.020	mg/L		26-MAR-20	R5045186
Nitrate+Nitrite							
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							
Ammonia, Total (as N)	<0.050		0.050	mg/L		27-MAR-20	R5042406
Orthophosphate-Dissolved (as P)	<0.0050		0.0050	mg/L		26-MAR-20	R5041231
Coliform Bacteria - Fecal	<1		1	CFU/100mL		26-MAR-20	R5042488
Phosphorus (P)-Total	0.0057		0.0050	mg/L		27-MAR-20	R5042175
Total Suspended Solids	5.0		3.0	mg/L		30-MAR-20	R5046068
pH	8.44		0.10	pH		27-MAR-20	R5042994
NO2, NO3 and Sum of NO2/NO3							
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							
Nitrite (as N)	<0.010		0.010	mg/L		26-MAR-20	R5045186

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 78
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5,
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel:

L2431720-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	1 - 800 – 254 - 7669	FAX:	403 - 228 – 1544	SAMPLER:	Hungry Baytaluke
PROJECT NAME AND NO.:	F A R U C – Spring 2020 EMS wk #4			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	patryk.wojciak@alsglobal.com		
REPORT FORMAT:	☒ HA ☒ EMAIL ☐ EXCEL ☐ PDF		ptmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	WWTP Influent Routine	1	2020 – 3 – 25	14:00	Water		X	X								temp = 8.3 C
	WWTP Influent BOD	2	2020 – 3 – 25	14:00	Water									X		temp = C
	WWTP Effluent Routine	3	2020 – 3 – 25	14:15	Water		X	X							X	temp = C
	WWTP Effluent BOD	4	2020 – 3 – 25	14:15	Water									X		temp = 11.2 C
	WWTP Effluent Nutrient	5	2020 – 3 – 25	14:15	Water				X	X	X	X	X			temp = C
	WWTP Effluent Bacti	6	2020 – 3 – 25	14:15	Water	X										temp = C
	Elkriver Upstream Routine	7	2020 – 3 – 25	14:30	Water		X	X								temp = 4.1 C
	Elkriver Upstream Nutrient	8	2020 – 3 – 25	14:30	Water				X	X	X	X	X			temp = C
	Elkriver Upstream Bacti	9	2020 – 3 – 25	14:30	Water	X										temp = C
	Elkriver Outfall Routine	10	2020 – 3 – 25	14:45	Water		X	X								temp = C
	Elkriver Outfall Nutrient	11	2020 – 3 – 25	14:45	Water				X	X	X	X	X			temp = C
	Elkriver Outfall Bacti	12	2020 – 3 – 25	14:45	Water	X										temp = C
	Elkriver downstream Routine	13	2020 – 3 – 25	15:00	Water		X	X								temp = 4.2 C
	Elkriver downstream Nutrient	14	2020 – 3 – 25	15:00	Water				X	X	X	X	X			temp = C
	Elkriver downstream Bacti	15	2020 – 3 – 25	15:00	Water	X										temp = 1.2 C

Ambient air -2°C

TURN AROUND REQUIRED:	◉ R (ϕ R	SPECIFY DATE:	(surcharge may apply)	RELINQUISHED BY:	DATE: 2020 –3– 25	RECEIVED BY:	DATE: 3/26
SEND INVOICE TO:	☒ SAME AS REPORT TO ☐			Hungry Baytaluke	TIME: 5:00 pm		TIME: 5:37
INVOICE FORMAT:	☐ HARD COPY ☐ ☐			RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
					TIME:		TIME:

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 5 °C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

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: F A R U C - SPRING 2020 EMS WK #5
C of C Numbers:
Legal Site Desc:

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	7.89		0.10	pH		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	pH		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							
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	pH		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							
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
Total Suspended Solids	4.7		3.0	mg/L		05-APR-20	R5051397

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		02-APR-20	R5050341
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.040		0.020	mg/L		02-APR-20	R5050548
Nitrate+Nitrite							
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)	<0.0050		0.0050	mg/L		02-APR-20	R5050388
Coliform Bacteria - Fecal	1		1	CFU/100mL		02-APR-20	R5051159
Phosphorus (P)-Total	0.0072		0.0050	mg/L		05-APR-20	R5051156
Total Suspended Solids	4.7		3.0	mg/L		05-APR-20	R5051397
pH	8.34		0.10	pH		02-APR-20	R5050341
NO2, NO3 and Sum of NO2/NO3							
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)	2.03		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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

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 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700
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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

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Bo Choroszewski
PROJECT NAME AND NO.:	FARUC- Spring EMS week 5			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARD COPY ☒ EMAIL ☐ FAX ☐ EDD ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

L2433712-COFC

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD				NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	WWTP Influent Routine 1	2020-04-01	13:30	Water		X	X											7.2°C
	WWTP Influent BOD 2	2020-04-01	13:30	Water									X					7.2°C
	WWTP Effluent Routine 3	2020-04-01	13:40	Water		X	X							X				10.8°C
	WWTP Effluent BOD 4	2020-04-01	13:40	Water									X					10.8°C
	WWTP Effluent Nutrients 5	2020-04-01	13:40	Water				X	X	X	X	X						10.8°C
	WWTP Effluent Bacteriological 6	2020-04-01	13:40	Water	X													10.8°C
	Elk River Upstream Routine 7	2020-04-01	14:00	Water		X	X											1.2°C
	Elk River Upstream Nutrients 8	2020-04-01	14:00	Water				X	X	X	X	X						1.2°C
	Elk River Upstream Bacteriological 9	2020-04-01	14:00	Water	X													1.2°C
	Elk River @ Outfall Routine 10	2020-04-01	14:10	Water		X	X											1.1°C
	Elk River @ Outfall Nutrients 11	2020-04-01	14:10	Water				X	X	X	X	X						1.1°C
	Elk River @ Outfall Bacteriological 12	2020-04-01	14:10	Water	X													1.1°C
	Elk River Downstream Routine 13	2020-04-01	13:50	Water		X	X											1.4°C
	Elk River Downstream Nutrients 14	2020-04-01	13:50	Water				X	X	X	X	X						1.4°C
	Elk River Downstream Bacteriological 15	2020-04-01	13:50	Water	X													1.4°C

TURN AROUND REQUIRED: ◉ ROUTINE SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT ☐ DIFFERENT

INVOICE FORMAT: ☐ EXCEL ☐ PDF ☐

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Bo Choroszewski	2020/04/01	DK	4/2
	TIME: 15:30		TIME: 1650
RELINQUISHED BY:	DATE: 2020-04-01	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
✓ Yes ___ No ___ N/A	Frozen? ___ Yes ✓ No	✓ Icepacks ___ Ice ___ None

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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	pH		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)	22.9		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
L2435773-3 ELK RIVER UPSTREAM							
Sampled By: Bo Choroszewski on 08-APR-20 @ 14:00							
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	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	8.31		0.10	pH		11-APR-20	R5055688
NO2, NO3 and Sum of NO2/NO3							
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	mg/L		10-APR-20	R5055716
L2435773-4 ELK RIVER @ OUTFALL							
Sampled By: 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)	<0.0050		0.0050	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	9.3		3.0	mg/L		15-APR-20	R5057517

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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							
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	0.0069		0.0050	mg/L		15-APR-20	R5057242
Total Suspended Solids	6.7		3.0	mg/L		15-APR-20	R5057517
pH	8.32		0.10	pH		11-APR-20	R5055688
NO2, NO3 and Sum of NO2/NO3							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

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 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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
Fort St. John BC, Box 256, 9
Grand Prairie AB, 9505 - 111
Fort McMurray AB, Bay 1, 2
Edmonton AB, 9936 - 67th A
Calgary AB, Bay 7, 1313 - 44
Saskatoon SK, 819 - 58th Stree
1-253-8700
0-513-2191
-437-2311
ax: 403-291-0298
306-668-8383

L2435773-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Bo Choroszewski
PROJECT NAME AND NO.:	FARUC- Spring EMS week 6			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARD ☒ EMAIL ☐ FAX ☐ EDD ☒ PDF		pmajer@skircr.com		

ANALYSIS REQUESTED:

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
		WWTP Influent Routine	1	2020-04-08	14:25	Water		X	X								8.0 °C
		WWTP Influent BOD	2	2020-04-08	14:25	Water									X		8.0 °C
		WWTP Effluent Routine	3	2020-04-08	14:35	Water		X	X							X	10.3 °C
		WWTP Effluent BOD	4	2020-04-08	14:35	Water									X		10.3 °C
		WWTP Effluent Nutrients	5	2020-04-08	14:35	Water				X	X	X	X	X			10.3 °C
		WWTP Effluent Bacteriological	6	2020-04-08	14:35	Water	X										10.3 °C
		Elk River Upstream Routine	7	2020-04-08	14:00	Water		X	X								5.2 °C
		Elk River Upstream Nutrients	8	2020-04-08	14:00	Water				X	X	X	X	X			5.2 °C
		Elk River Upstream Bacteriological	9	2020-04-08	14:00	Water	X										5.2 °C
		Elk River @ Outfall Routine	10	2020-04-08	13:40	Water		X	X								4.8 °C
		Elk River @ Outfall Nutrients	11	2020-04-08	13:40	Water				X	X	X	X	X			4.8 °C
		Elk River @ Outfall Bacteriological	12	2020-04-08	13:40	Water	X										4.8 °C
		Elk River Downstream Routine	13	2020-04-08	13:30	Water		X	X								6.7 °C
		Elk River Downstream Nutrients	14	2020-04-08	13:30	Water				X	X	X	X	X			6.7 °C
		Elk River Downstream Bacteriological	15	2020-04-08	13:30	Water	X										6.7 °C

TURN AROUND REQUIRED: ● R ☐ R SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME ☐ DIFFERENT

INVOICE FORMAT: ☐ HARD ☐ EMAIL ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Bo Choroszewski	2020-04-08 TIME: 17:00		TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

G:\QUALITY\00_DOCUMENTS\10_AUTHORIZED\FORMS\CoC for ALS EMS.xls

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	7.89		0.10	pH		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
pH	8.19		0.10	pH		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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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

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Bo Choroszewski
PROJECT NAME AND NO.:	Wastewater -May 2020 Monthly EMS			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Wojciak		
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ FAX ☒ PDF ☐		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED YYYY-MM-DD	DATE / TIME COLLECTED TIME	MATRIX	Fecal Coliforms ✓	TSS ✓	pH ✓	Ortho P ✓	Total P ✓	NH3-N ✓	NO3-N ✓	NO2-N ✓	BOD5 ✓	COD					NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine	1	2020-05-20	14:15	Water		X	X												11.4°C
	WWTP Influent BOD	2	2020-05-20	14:15	Water									X						11.1°C
	WWTP Effluent Routine	3	2020-05-20	14:30	Water		X	X												13.4°C
	WWTP Effluent BOD	4	2020-05-20	14:30	Water									X						13.4°C
	WWTP Effluent Nutrients	5	2020-05-20	14:30	Water				X	X	X	X	X							
	WWTP Effluent Bacteriological	6	2020-05-20	14:30	Water	X														

FOR LAB USE ONLY

L2449972-COFC

TURN AROUND REQUIRED: ◉ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS ABOVE ☐ DIFFERENT

INVOICE FORMAT: ☐ HARDMAIL ☐ EMAIL ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY: Carter Barrett	DATE: 2020/05/20 TIME: 16:10	RECEIVED BY:	DATE: TIME:
RELINQUISHED BY: BO CHOROSZEWSKI	DATE: 2020-05-20 TIME: 16:10	RECEIVED BY:	DATE: TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A	Sample Temperature: 2 °C Frozen? ___Yes ___No	Cooling Method? ___Icepacks ___Ice ___None

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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.			
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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	Wastewater -June 2020 Monthly EMS			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Wojciak		
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ FAX ☐ EXCEL ☐ ( )		pmajer@skircr.com		

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine	2020-06-17	14:15	Water		X	X												13.2°C
	WWTP Influent BOD	2020-06-17	14:15	Water									X						
2	WWTP Effluent Routine	2020-06-17	14:30	Water		X	X												13.0°C
	WWTP Effluent BOD	2020-06-17	14:30	Water									X						
	WWTP Effluent Nutrients	2020-06-17	14:30	Water				X	X	X	X	X							
	WWTP Effluent Bacteriological	2020-06-17	14:30	Water	X														

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ REGULAR SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT TO ☐ DIFFERENT

INVOICE FORMAT: ☐ HARDMAIL ☐ EMAIL ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	TIME: 16:45		TIME:
RELINQUISHED BY:	DATE: 2020-06-17	RECEIVED BY:	DATE:
CARTER BARRETT	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A

Sample Temperature: 11 °C

Frozen? ___Yes ___No

Cooling Method? ✓ Icepacks ___Ice ___None

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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	pH		18-JUL-20	R5157884
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	11.1		0.020	mg/L		16-JUL-20	R5157075
Nitrate+Nitrite							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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L2475128-COFC

CHAIN OF CUSTODY FORM

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COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	Wastewater -June 2020 Monthly EMS			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Wojciak		
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ FAX ☐ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine	2020-07-15	14:00	Water		X	X												15.2°C
1	WWTP Influent BOD	2020-07-15	14:00	Water									X						
2	WWTP Effluent Routine	2020-07-15	14:10	Water		X	X												
2	WWTP Effluent BOD	2020-07-15	~~14:00~~ 14:10 C.B	Water									X						16.7°C
2	WWTP Effluent Nutrients	2020-07-15	14:10	Water				X	X	X	X	X							
2	WWTP Effluent Bacteriological	2020-07-15	14:10	Water	X														

FOR LAB USE ONLY

TURN AROUND REQUIRED:	◉ ROUTINE	SPECIFY DATE:	(surcharge may apply)	RELINQUISHED BY: Carter Barrett	DATE: 2020-07-15 TIME: 16:30
SEND INVOICE TO:	☐ SAME AS REPORT			RELINQUISHED BY: CARTER BARRETT	DATE: TIME:
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF			RECEIVED BY:	DATE: TIME:
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com			RECEIVED BY:	DATE: TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A	Sample Temperature: ____°C Frozen? ___Yes ___No	Cooling Method? ___Icepacks ✓Ice ___None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/CoC for ALS Plant EMS.xls

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

L2475128-COFC

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. PLEASE complete and sign this Declaration for EVERY 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 FOR LAB USE ONLY ALS SAMPLE #	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED Y M D 24 Hour Time	INDIVIDUAL SAMPLE DECLARATION (Please select yes or no from drop down menu) Sample Subject to BC DW Protection Act?[1]	Boil Water Advisory in Effect?
			Yes	No
			Yes	No
			Yes	No
			Yes	No
			Yes	No
			Yes	No
			Yes	No
			Yes	No

[1] **Samples are subject to the *BC Drinking Water Protection Act* only if the water supply system serves more than one single-family dwelling.** *Please contact your regional health officer if you are unsure whether this applies to your sample(s).*

Carter Barrett
Name (*Please print*)

Operator
Title

Carter Barrett
Signature

July 15, 2020
Date

TURN OVER TO COMPLETE

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Grandhaven, BC 10345A Dogwood Street, V1J 6W7, Canada Tel: 1 250 261 5517 Toll Free: 1800 668 9878 Fax: 1 250 261 5587

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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
pH	8.37		0.10	pH		16-AUG-20	R5189915
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	15.8		0.020	mg/L		13-AUG-20	R5189702
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	15.8		0.022	mg/L		15-AUG-20	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		13-AUG-20	R5189702

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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Ed : 1-800-668-9878 Fax: 780-437-2311
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SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	Wastewater -August 2020 Monthly EMS			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Wojciak		
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ FAX ☐ EXCEL ☒ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	DATE / TIME COLLECTED TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine 4	2020-08-12	14:20	Water		X	X								17.4°C
1	WWTP Influent BOD 5	2020-08-12	14:20	Water									X		
2	WWTP Effluent Routine 6	2020-08-12	14:50	Water		X	X								18.4°C
2	WWTP Effluent BOD 7	2020-08-12	14:50	Water									X		
2	WWTP Effluent Nutrients 8	2020-08-12	14:30	Water				X	X	X	X	X			
2	WWTP Effluent Bacteriological 9	2020-08-12	14:30	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED:	◉ REGULAR	SPECIFY DATE: _____ (surcharge may apply)	RELINQUISHED BY: Carter Barrett	DATE: 2020-08-12 TIME:	RECEIVED BY:	DATE: 08/13 TIME: 8:45
SEND INVOICE TO:	☐ SAME AS REPORT		RELINQUISHED BY:	DATE: TIME:	RECEIVED BY:	DATE: TIME:
INVOICE FORMAT:	☐ EXCEL ☐ PDF ☐					

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

L2488032-COFC

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. PLEASE complete and sign this Declaration for EVERY 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 FOR LAB USE ONLY ALS SAMPLE #	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED Y	M	D	24 Hour Time	INDIVIDUAL SAMPLE DECLARATION (Please select yes or no from drop down menu) Sample Subject to BC DW Protection Act?[1]	Boil Water Advisory in Effect?
						Yes	No
						Yes	No
						Yes	No
						Yes	No
						Yes	No
						Yes	No
						Yes	No
						Yes	No

[1] **Samples are subject to the *BC Drinking Water Protection Act* only if the water supply system serves more than one single-family dwelling.** *Please contact your regional health officer if you are unsure whether this applies to your sample(s).*

Carter Barrett
Name (*Please print*)

Operator
Title

Carter Barrett
Signature

Aug 12, 2020
Date

TURN OVER TO COMPLETE

ALS CANADA LTD. www.alsenviro.com
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

L2488032-COFC

COLIFORM SAMPLE DECLARATION FORM (Page 2 of 2)

C. Please complete this section ONLY if samples are Drinking Water Sample(s).

Company, Water System Name or Name of Home Owner: FERNIE ALPINE RESORT UTILITIES CORP.			
Address: 1505-17th AVE SW CALGARY	**Phone No:** (403) 256 8473	**Fax No:** (403) 244 3774	**After Hours/Emergency No:** (403) 861 8730
Water Supplier[2]: PATRICK MAJER	**Phone No:** (403) 256 8473	**Fax No:** (403) 244 3774	**After Hours/Emergency No:** (403) 861 8730
Sampler/Submitter[3]: Carter Barrett	**Phone No:** (306) 861-7001	**Fax No:** ( )	carter.barrett1@gmail.com

[2] Person to whom results should be sent.
[3] Sampler or submitter of samples if different than Water Supplier.

D. Please complete this section ONLY if samples are subject to regulation under the Drinking Water Protection Act.

Health Authority Region and/or Service Area[4]: INTERIOR HEALTH			
Drinking Water Officer Name: DAN BYRON	**Phone No:** (250) 420 2240	**Fax No:** ( )	**After Hours/Emergency No:** (250) 421 3471
Medical Health Officer Name:	**Phone No:** ( )	**Fax No:** ( )	**After Hours/Emergency No:** (866) 457 5648

[4] There are five B.C. Health Authority Regions and 16 associated Health Service Delivery Areas:

1. **Northern:** Northwest, Northeast and Northern Interior
2. **Interior:** East Kootenay, Kootenay/Boundary, Okanagan and Thompson/Cariboo
3. **Vancouver Island:** North Vancouver Island, Central Vancouver Island and South Vancouver Island
4. **Vancouver Coastal:** North Shore / Coast Garibaldi, Vancouver and Richmond
5. **Fraser:** Fraser North, Fraser South and Fraser East

E. This section for lab use only.

Received By:	Date:	Time: ____:____ AM PM
Sample Temperature Upon Receipt:	**COOLING METHOD:** ICEPACKS ☐ ICE ☐ NONE ☐	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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
pH	8.35		0.10	pH		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							
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	8.50		0.10	pH		02-OCT-20	R5244118
NO2, NO3 and Sum of NO2/NO3							
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
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		0.0050	mg/L		30-SEP-20	R5242968
Coliform Bacteria - Fecal	17		1	CFU/100mL		30-SEP-20	R5243812
Phosphorus (P)-Total	0.0284		0.0050	mg/L		05-OCT-20	R5245759
Total Suspended Solids	<3.0		3.0	mg/L		03-OCT-20	R5245297

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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							
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	0.0097		0.0050	mg/L		05-OCT-20	R5245759
Total Suspended Solids	<3.0		3.0	mg/L		03-OCT-20	R5245297
pH	8.48		0.10	pH		02-OCT-20	R5244118
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.71		0.020	mg/L		30-SEP-20	R5243180
Nitrate+Nitrite							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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878 Fax: 780-513-2191
-1586
78 Fax: 780-437-2311
668-9878 Fax: 403-291-0298
7645 Fax: 306-668-8383

L2510107-COFC

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 258 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Bo Choroszewski	
PROJECT NAME AND NO.:	FARUC- Spring EMS week 6		QUOTE NO:	Q33058	
PO NO.:		ALS CONTACT: Patryk Woyciak		pmajor@skircr.com	
REPORT FORMAT:	☒ HARD COPY ☒ EMAIL ☐ FAX ☐ PDF				

ANALYSIS REQUESTED:

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	1K	WWTP Influent Routine 1	2020-09-29	14:00	Water		X	X								14.9°C
	1K	WWTP Influent BOD 2	2020-09-29	14:00	Water									X		
	2	WWTP Effluent Routine 3	2020-09-29	15:15	Water		X	X							X	15.5°C
	2	WWTP Effluent BOD 4	2020-09-29	15:15	Water									X		
	2	WWTP Effluent Nutrients 5	2020-09-29	15:15	Water				X	X	X	X	X			
	2	WWTP Effluent Bacteriological 6	2020-09-29	15:15	Water	X										
	3	Elk River Upstream Routine 7	2020-09-29	15:00	Water		X	X								10.4°C
	3	Elk River Upstream Nutrients 8	2020-09-29	15:00	Water				X	X	X	X	X			
	3	Elk River Upstream Bacteriological 9	2020-09-29	15:00	Water	X										
	4	Elk River @ Outfall Routine 10	2020-09-29	14:50	Water		X	X								11.2°C
	4	Elk River @ Outfall Nutrients 11	2020-09-29	14:50	Water				X	X	X	X	X			
	4	Elk River @ Outfall Bacteriological 12	2020-09-29	14:50	Water	X										
	5	Elk River Downstream Routine 13	2020-09-29	14:40	Water		X	X								10.8°C
	5	Elk River Downstream Nutrients 14	2020-09-29	14:40	Water				X	X	X	X	X			
	5	Elk River Downstream Bacteriological 15	2020-09-29	14:40	Water	X										

TURN AROUND REQUIRED: ◉ REGULAR SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME ☐ DIFFERENT

INVOICE FORMAT: ☐ HARD COPY ☐ EMAIL ☐ FAX ☐ PDF

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	TIME: 16:15		TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: ____°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

FERNIE ALPINE RESORT UTILITIES CORPORATION
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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	8.22		0.10	pH		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
pH	8.32		0.10	pH		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	pH		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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							
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							
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	1		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	pH		13-OCT-20	R5253860
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.76		0.020	mg/L		08-OCT-20	R5252355
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.76		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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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: 800-665-0243 Fax: 604-253-6700
Fort St. J: Fax: 250-261-5587
Grand Pr 00-668-9878 Fax: 780-513-2191
Fort McM 780-791-1586
Edmonto)-668-9878 Fax: 780-437-2311
Calgary J e: 1-800-668-9878 Fax: 403-291-0298
Saskatoo 800-667-7645 Fax: 306-668-8383

L2514050-COFC

SEND REPORT TO: — SEE BACK OF COC FORM — PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC- Spring EMS week 6			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARD COPY ☒ EMAIL ☐ FAX ☐ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine 1	2020-10-07	13:50	Water		X	X								
1	WWTP Influent BOD 2	2020-10-07	13:50	Water									X		
2	WWTP Effluent Routine 3	2020-10-07	14:00	Water		X	X							X	
2	WWTP Effluent BOD 4	2020-10-07	14:00	Water									X		
2	WWTP Effluent Nutrients 5	2020-10-07	14:00	Water				X	X	X	X	X			
2	WWTP Effluent Bacteriological 6	2020-10-07	14:00	Water	X										
3	Elk River Upstream Routine 7	2020-10-07	15:25	Water		X	X								
3	Elk River Upstream Nutrients 8	2020-10-07	15:25	Water				X	X	X	X	X			
3	Elk River Upstream Bacteriological 9	2020-10-07	15:25	Water	X										
4	Elk River @ Outfall Routine 10	2020-10-07	15:10	Water		X	X								
4	Elk River @ Outfall Nutrients 11	2020-10-07	15:10	Water				X	X	X	X	X			
4	Elk River @ Outfall Bacteriological 12	2020-10-07	15:10	Water	X										
5	Elk River Downstream Routine 13	2020-10-07	15:00	Water		X	X								
5	Elk River Downstream Nutrients 14	2020-10-07	15:00	Water				X	X	X	X	X			
5	Elk River Downstream Bacteriological 15	2020-10-07	15:00	Water	X										

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ REGULAR SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT

INVOICE FORMAT: ☐ HARD COPY ☐ PDF ☐

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	Oct 7, 2020		
	TIME: 16:20		TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	7.99		0.10	pH		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
pH	8.44		0.10	pH		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	pH		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		17-OCT-20	R5257580
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	0.046		0.020	mg/L		15-OCT-20	R5257198
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	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							
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
pH	8.46		0.10	pH		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

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 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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e: 1-800-668-9878 Fax: 780-437-2311
Toll Free: 1-800-668-9878 Fax: 403-291-0298
ree: 1-800-667-7645 Fax: 306-668-8383

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Fall EMS week 3			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARD ☒ EMAIL ☐ FAX ☐ FAX ☒ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	1	WWTP Influent Routine 1	2020-07-14	14:05	Water		X	X								13.1°C
		WWTP Influent BOD 2	2020-07-14	14:05	Water									X		
	2	WWTP Effluent Routine 3	2020-07-14	14:15	Water		X	X							X	14.8°C
		WWTP Effluent BOD 4	2020-07-14	14:15	Water									X		
		WWTP Effluent Nutrients 5	2020-07-14	14:15	Water				X	X	X	X	X			
		WWTP Effluent Bacteriological 6	2020-07-14	14:15	Water	X										
	3	Elk River Upstream Routine 7	2020-07-14	15:55	Water		X	X								7.3°C
		Elk River Upstream Nutrients 8	2020-07-14	15:55	Water				X	X	X	X	X			
		Elk River Upstream Bacteriological 9	2020-07-14	15:55	Water	X										
	4	Elk River @ Outfall Routine 10	2020-07-14	15:45	Water		X	X								
		Elk River @ Outfall Nutrients 11	2020-07-14	15:45	Water				X	X	X	X	X			7.1°C
		Elk River @ Outfall Bacteriological 12	2020-07-14	15:45	Water	X										
	5	Elk River Downstream Routine 13	2020-07-14	15:35	Water		X	X								7.1°C
		Elk River Downstream Nutrients 14	2020-07-14	15:35	Water				X	X	X	X	X			
		Elk River Downstream Bacteriological 15	2020-07-14	15:35	Water	X										
				35												

TURN AROUND REQUIRED: ◉ ROUTINE SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT ☐ DIFFERENT

INVOICE FORMAT: ☐ HARD ☐ FAX ☐ EMAIL

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	Oct 14, 2020		10/15
	TIME: 16:45		TIME: 0802
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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	pH		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							
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	pH		23-OCT-20	R5266696
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	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							
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
Phosphorus (P)-Total	0.0152		0.0050	mg/L		26-OCT-20	R5268849
Total Suspended Solids	<3.0		3.0	mg/L		27-OCT-20	R5270297

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		23-OCT-20	R5266696
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	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							
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)	<0.0050		0.0050	mg/L		22-OCT-20	R5265546
Coliform Bacteria - Fecal	2		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	pH		23-OCT-20	R5266696
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.90		0.020	mg/L		23-OCT-20	R5269524
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.90		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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

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 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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L2520141-COFC

L2520141

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Fall EMS week 4			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARD ☒ EMAIL ☐ FAX ☐ PDF		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	WWTP Influent Routine 1	2020-07-21	13:20	Water		X	X								12.3°C
	WWTP Influent BOD 2	2020-07-21	13:20	Water									X		
	WWTP Effluent Routine 3	2020-07-21	13:30	Water		X	X							X	13.5°C
	WWTP Effluent BOD 4	2020-07-21	13:30	Water									X		
	WWTP Effluent Nutrients 5	2020-07-21	13:30	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological 6	2020-07-21	13:30	Water	X										
	Elk River Upstream Routine 7	2020-07-21	14:10	Water		X	X								4.5°C
	Elk River Upstream Nutrients 8	2020-07-21	14:10	Water				X	X	X	X	X			
	Elk River Upstream Bacteriological 9	2020-07-21	14:10	Water	X										
	Elk River @ Outfall Routine 10	2020-07-21	14:20	Water		X	X								4.5°C
	Elk River @ Outfall Nutrients 11	2020-07-21	14:20	Water				X	X	X	X	X			
	Elk River @ Outfall Bacteriological 12	2020-07-21	14:20	Water	X										
	Elk River Downstream Routine 13	2020-07-21	13:45	Water		X	X								3.5°C
	Elk River Downstream Nutrients 14	2020-07-21	13:45	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological 15	2020-07-21	13:45	Water	X										

TURN AROUND REQUIRED:	◉ REGULAR SPECIFY DATE: (surcharge may apply)
SEND INVOICE TO:	☐ SAME AS REPORT ☐ DIFFERENT
INVOICE FORMAT:	☐ HARD ☐ PDF ☐
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	TIME: 15:15		TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A	Sample Temperature: 5 °C Frozen? ___Yes ___No	Cooling Method? ___Icepacks ___Ice ___None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/CoC for ALS EMS.xls

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	7.96		0.10	pH		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
pH	8.34		0.10	pH		30-OCT-20	R5272286
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
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							
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
pH	8.43		0.10	pH		30-OCT-20	R5272286
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
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							
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
pH	8.40		0.10	pH		30-OCT-20	R5272286
NO2, NO3 and Sum of NO2/NO3							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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							
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
pH	8.44		0.10	pH		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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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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

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Fall EMS week 5			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARD COPY ☒ EMAIL ☐ FAX ☐ FAX ☒ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

L2523074-COFC

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	DATE / TIME COLLECTED TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD			NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	WWTP Influent Routine 1	2020-07-28	16:00	Water		X	X										12.9°C
	WWTP Influent BOD 2	2020-07-28	16:00	Water									X				
	WWTP Effluent Routine 3	2020-07-28	16:10	Water		X	X							X			13.9°C
	WWTP Effluent BOD 4	2020-07-28	16:10	Water									X				
	WWTP Effluent Nutrients 5	2020-07-28	16:10	Water				X	X	X	X	X					
	WWTP Effluent Bacteriological 6	2020-07-28	16:10	Water	X												
	Elk River Upstream Routine 7	2020-07-28	14:25	Water		X	X										3.0°C
	Elk River Upstream Nutrients 8	2020-07-28	14:25	Water				X	X	X	X	X					
	Elk River Upstream Bacteriological 9	2020-07-28	14:25	Water	X												
	Elk River @ Outfall Routine 10	2020-07-28	14:15	Water		X	X										
	Elk River @ Outfall Nutrients 11	2020-07-28	14:15	Water				X	X	X	X	X					3.0°C
	Elk River @ Outfall Bacteriological 12	2020-07-28	14:15	Water	X												
	Elk River Downstream Routine 13	2020-07-28	14:00	Water		X	X										2.9°C
	Elk River Downstream Nutrients 14	2020-07-28	14:00	Water				X	X	X	X	X					
	Elk River Downstream Bacteriological 15	2020-07-28	14:00	Water	X												

TURN AROUND REQUIRED: ◉ REGULAR SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT

INVOICE FORMAT: ☐ HARD COPY ☐ EMAIL ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	Oct 28, 2020	RECEIVED BY:	DATE:	10/29
Carter Barrett	TIME:			TIME:	8:00
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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
pH	8.35		0.10	pH		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							
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	8.39		0.10	pH		07-NOV-20	R5282234
NO2, NO3 and Sum of NO2/NO3							
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	pH		07-NOV-20	R5282234
NO2, NO3 and Sum of NO2/NO3							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2526154-4 ELKRIVER OUTFALL							
Sampled By: Hungry Baytaluke on 04-NOV-20 @ 14:45							
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 @ 15:00							
Matrix: Water							
Miscellaneous Parameters							
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	8.41		0.10	pH		07-NOV-20	R5282234
NO2, NO3 and Sum of NO2/NO3							
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.56		0.022	mg/L		10-NOV-20	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

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 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-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:

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

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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 7
Fort St. John BC, Box
Grand Prairie AB, 959
Fort McMurray AB, Bi
Edmonton AB, 9936 -
Calgary AB, Bay 7, 13
Saskatoon SK, 819 -

Fax: 604-253-6700
87
Fax: 780-513-2191

ax: 780-437-2311
9878 Fax: 403-291-0298
Fax: 306-668-8383

L2526154-COFC

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH Avenue South East				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	1 - 800 – 254 - 7669	FAX: 403 - 228 – 1544	SAMPLER:	Hungry Baytaluke	
PROJECT NAME AND NO.:	F A R U C – Fall 2020 EMS wk #6		QUOTE NO:	Q33058	
PO NO.:		ALS CONTACT:	patryk.wojciak@alsglobal.com		
REPORT FORMAT:	☒ HA ☒ EMAIL ☐ F ☐ F ☒ PDF ☐		pmajer@skircr.com		

ANALYSIS REQUESTED:

	WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	1	WWTP Influent Routine	1	2020 –11– 4	14:00	Water		X	X												temp = 11.1 C
	1	WWTP Influent BOD	2	2020 –11– 4	14:00	Water									X						temp = C
	2	WWTP Effluent Routine	3	2020 –11– 4	14:15	Water		X	X							X					temp = C
	2	WWTP Effluent BOD	4	2020 –11– 4	14:15	Water									X						temp = 12.8 C
	2	WWTP Effluent Nutrient	5	2020 –11– 4	14:15	Water				X	X	X	X	X							temp = C
	2	WWTP Effluent Bacti	6	2020 –11– 4	14:15	Water	X														temp = C
	3	Elkriver Upstream Routine	7	2020 –11– 4	14:30	Water		X	X												temp = C
	3	Elkriver Upstream Nutrient	8	2020 –11– 4	14:30	Water				X	X	X	X	X							temp = 6.0 C
	3	Elkriver Upstream Bacti	9	2020 –11– 4	14:30	Water	X														temp = C
	4	Elkriver Outfall Routine	10	2020 –11– 4	14:45	Water		X	X												temp = C
	4	Elkriver Outfall Nutrient	11	2020 –11– 4	14:45	Water				X	X	X	X	X							temp = 6.2 C
	4	Elkriver Outfall Bacti	12	2020 –11– 4	14:45	Water	X														temp = C
	5	Elkriver downstream Routine	13	2020 –11– 4	15:00	Water		X	X												temp = C
	5	Elkriver downstream Nutrient	14	2020 –11– 4	15:00	Water				X	X	X	X	X							temp = 6.1 C
	5	Elkriver downstream Bacti	15	2020 –11– 4	15:00	Water	X														temp = C

Ambient air temp -6°C
Heavy rainfall
River Turbid

TURN AROUND REQUIRED: ◉ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☒ SAME AS REPORT ☐

INVOICE FORMAT: ☐ HARD ☐

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Hungry Baytaluke	TIME: 5:00 pm		TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/Hungry's CoC for ALS full EMS.xls

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	7.63		0.10	pH		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	pH		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							
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	8.32		0.10	pH		21-DEC-20	R5321499
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	1.90		0.020	mg/L		16-DEC-20	R5319733
Nitrate+Nitrite							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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							
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	<0.0050		0.0050	mg/L		23-DEC-20	R5322219
Total Suspended Solids	<3.0		3.0	mg/L		22-DEC-20	R5321856
pH	8.32		0.10	pH		21-DEC-20	R5321499
NO2, NO3 and Sum of NO2/NO3							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

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 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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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: 1-800-6
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Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-6
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-66
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-

L2540938-COFC

938

CHAIN OF CUSTODY FORM

PAGE OF

SEND REPORT TO:

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Bo Choroszewski
PROJECT NAME AND NO.:	FARUC – Winter EMS week 1			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARD COPY ☒ EMAIL ☐ FAX ☐ EDD ☒ PDF ☐		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	WWTP Influent Routine 1	2020-12-15	10:45	Water		X	X												10.2 °C
	WWTP Influent BOD 2	2020-12-15	10:45	Water									X						10.2 °C
	WWTP Effluent Routine 3	2020-12-15	10:30	Water		X	X							X					10.8 °C
	WWTP Effluent BOD 4	2020-12-15	10:30	Water									X						10.8 °C
	WWTP Effluent Nutrients 5	2020-12-15	10:30	Water				X	X	X	X	X							10.8 °C
	WWTP Effluent Bacteriological 6	2020-12-15	10:30	Water	X														10.8 °C
	Elk River Upstream Routine 7	2020-12-15	10:55	Water		X	X												0.1 °C
	Elk River Upstream Nutrients 8	2020-12-15	10:55	Water				X	X	X	X	X							0.1 °C
	Elk River Upstream Bacteriological 9	2020-12-15	10:55	Water	X														0.1 °C
	Elk River @ Outfall Routine 10	2020-12-15	10:50	Water		X	X												0.3 °C
	Elk River @ Outfall Nutrients 11	2020-12-15	10:50	Water				X	X	X	X	X							0.3 °C
	Elk River @ Outfall Bacteriological 12	2020-12-15	10:50	Water	X														0.3 °C
	Elk River Downstream Routine 13	2020-12-15	11:00	Water		X	X												0.1 °C
	Elk River Downstream Nutrients 14	2020-12-15	11:00	Water				X	X	X	X	X							0.1 °C
	Elk River Downstream Bacteriological 15	2020-12-15	11:00	Water	X														0.1 °C

TURN AROUND REQUIRED: ◉ R / ☐ R SPECIFY DATE: (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT

INVOICE FORMAT: ☐ HARD COPY ☐

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	TIME: 4 PM BC		TIME:
RELINQUISHED BY:	DATE: 2020/12/15	RECEIVED BY:	DATE:
Bo Choroszewski	TIME: 11:45		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 5 °C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	7.57		0.10	pH		30-DEC-20	R5329397
L2543012-2 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	pH		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							
Nitrate and Nitrite (as N)	34.5		0.11	mg/L		23-DEC-20	
Nitrite in Water by IC							
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	pH		30-DEC-20	R5329397
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	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							
Nitrite (as N)	<0.010		0.010	mg/L		22-DEC-20	R5321798
L2543012-4 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
Total Suspended Solids	<3.0		3.0	mg/L		28-DEC-20	R5326276

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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 @ 10:50							
Matrix: WATER							
pH	8.37		0.10	pH		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							
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 @ 10:40							
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	8.40		0.10	pH		30-DEC-20	R5329397
NO2, NO3 and Sum of NO2/NO3							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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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

CHAIN OF CUSTODY FORM

SEND REPORT TO: PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Carter Barrett	
PROJECT NAME AND NO.:	FARUC – Winter EMS week 2		QUOTE NO:		
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARDMAIL ☐ FAX ☒ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

L2543012-COFC

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	WWTP Influent Routine 1	2020-12-21	11:25	Water		X	X								16.6°C
	WWTP Influent BOD 2	2020-12-21	11:25	Water									X		
	WWTP Effluent Routine 3	2020-12-21	11:20	Water		X	X							X	17.4°C
	WWTP Effluent BOD 4	2020-12-21	11:20	Water									X		
	WWTP Effluent Nutrients 5	2020-12-21	11:20	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological 6	2020-12-21	11:20	Water	X										
	Elk River Upstream Routine 7	2020-12-21	~~10:40~~ 55	Water		X	X								1.6°C
	Elk River Upstream Nutrients 8	2020-12-21	~~10:40~~ 55	Water				X	X	X	X	X			
	Elk River Upstream Bacteriological 9	2020-12-21	~~10:46~~ 55	Water	X										
	Elk River @ Outfall Routine 10	2020-12-21	10:50	Water		X	X								
	Elk River @ Outfall Nutrients 11	2020-12-21	10:50	Water				X	X	X	X	X			1.7°C
	Elk River @ Outfall Bacteriological 12	2020-12-21	10:50	Water	X										
	Elk River Downstream Routine 13	2020-12-21	10:40	Water		X	X								1.8°C
	Elk River Downstream Nutrients 14	2020-12-21	10:46	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological 15	2020-12-21	10:40	Water	X										

TURN AROUND REQUIRED: ◉ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT ☐ DIFFERENT

INVOICE FORMAT: ☐ HARDMAIL ☐ FAX ☐ PDF ☐ ( )

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	TIME: 11:55		TIME: 10:55
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 3 °C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

L2543012-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. PLEASE complete and sign this Declaration for EVERY 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 FOR LAB USE ONLY ALS SAMPLE #	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED Y	M	D	24 Hour Time	INDIVIDUAL SAMPLE DECLARATION (Please select yes or no from drop down menu) Sample Subject to BC DW Protection Act?[1]	Boil Water Advisory in Effect?
	Pantry Store	20	12	21		(Yes)	(No)
						Yes	No
						Yes	No
						Yes	No
						Yes	No
						Yes	No
						Yes	No
						Yes	No

[1] Samples are subject to the *BC Drinking Water Protection Act* only if the water supply system serves more than one single-family dwelling. *Please contact your regional health officer if you are unsure whether this applies to your sample(s).*

Carter Barrett
Name (*Please print*)

Operator
Title

Carter Barrett
Signature

Dec 21, 2020
Date

TURN OVER TO COMPLETE

L2543012-COFC

COLIFORM SAMPLE DECLARATION FORM (Page 2 of 2)

C. Please complete this section ONLY if samples are Drinking Water Sample(s).

Company, Water System Name or Name of Home Owner:
FERNIE ALPINE RESORT UTILITIES CORP.

Address:	Phone No:	Fax No:	After Hours/Emergency No:
1505-17th AVE SW CALGARY	(403) 256 8473	(403) 244 3774	(403) 861 8730
Water Supplier[2]: PATRICK MAJER	**Phone No:** (403) 256 8473	**Fax No:** (403) 244 3774	**After Hours/Emergency No:** (403) 861 8730
Sampler/Submitter[3]: Carter Barrett	**Phone No:** (306) 861-7001	**Fax No:** ( )	carter.barrett@ajmd.com

[2] Person to whom results should be sent.
[3] Sampler or submitter of samples if different than Water Supplier.

D. Please complete this section ONLY if samples are subject to regulation under the Drinking Water Protection Act.

Health Authority Region and/or Service Area[4]:
INTERIOR HEALTH

Drinking Water Officer Name:	Phone No:	Fax No:	After Hours/Emergency No:
DAN BYRON	(250) 420 2240	( )	(250) 421 3471
Medical Health Officer Name:	**Phone No:** ( )	**Fax No:** ( )	**After Hours/Emergency No:** (866) 457 5648

[4] There are five B.C. Health Authority Regions and 16 associated Health Service Delivery Areas:

1. **Northern:** Northwest, Northeast and Northern Interior
2. **Interior:** East Kootenay, Kootenay/Boundary, Okanagan and Thompson/Cariboo
3. **Vancouver Island:** North Vancouver Island, Central Vancouver Island and South Vancouver Island
4. **Vancouver Coastal:** North Shore / Coast Garibaldi, Vancouver and Richmond
5. **Fraser:** Fraser North, Fraser South and Fraser East

E. This section for lab use only.

Received By:	Date:	Time: AM / PM
Sample Temperature Upon Receipt:	**COOLING METHOD:** ICEPACKS ☐ ICE ☐ NONE ☐	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

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
pH	8.07		0.10	pH		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	pH		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							
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	pH		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							
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
Orthophosphate-Dissolved (as P)	0.0980		0.0050	mg/L		30-DEC-20	R5328644
Coliform Bacteria - Fecal	1		1	CFU/100mL		30-DEC-20	R5330177
Phosphorus (P)-Total	0.154	DLHC	0.010	mg/L		31-DEC-20	R5329005
Total Suspended Solids	<9.0		9.0	mg/L		05-JAN-21	R5334757

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

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	pH		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							
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	<0.0050		0.0050	mg/L		31-DEC-20	R5329005
Total Suspended Solids	<9.0		9.0	mg/L		05-JAN-21	R5334757
pH	8.40		0.10	pH		31-DEC-20	R5330144
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	2.02		0.020	mg/L		30-DEC-20	R5328878
Nitrate+Nitrite							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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, 198
Fort St. John BC, 8
Grand Prairie AB, 9
Fort McMurray AB,
Edmonton AB, 993
Calgary AB, Bay 7,
Saskatoon SK, 619

) Fax: 604-253-6700
587
Fax: 780-513-2191
36
Fax: 780-437-2311
-9878 Fax: 403-291-0298
5 Fax: 306-668-8383

L2544268-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Winter EMS week 3			QUOTE NO:	
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARD ☒ EMAIL ☐ FAX ☐ EDD ☒ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
	WWTP Influent Routine 1	2020-12-29	11:00	Water		X	X								12.2 °C
	WWTP Influent BOD 2	2020-12-29	11:00	Water									X		12.2 °C
	WWTP Effluent Routine 3	2020-12-29	10:50	Water		X	X							X	12.9 °C
	WWTP Effluent BOD 4	2020-12-29	10:50	Water									X		12.9 °C
	WWTP Effluent Nutrients 5	2020-12-29	10:50	Water				X	X	X	X	X			12.9 °C
	WWTP Effluent Bacteriological 6	2020-12-29	10:50	Water	X										12.9 °C
	Elk River Upstream Routine 7	2020-12-29	11:05	Water		X	X								12.9 °C
	Elk River Upstream Nutrients 8	2020-12-29	11:05	Water				X	X	X	X	X			0.4 °C
	Elk River Upstream Bacteriological 9	2020-12-29	~~11:10~~ 11:05	Water	X										0.4 °C
	Elk River @ Outfall Routine 10	2020-12-29	11:10	Water		X	X								0.4 °C
	Elk River @ Outfall Nutrients 11	2020-12-29	11:10	Water				X	X	X	X	X			4.7 °C
	Elk River @ Outfall Bacteriological 12	2020-12-29	11:10	Water	X										4.7 °C
	Elk River Downstream Routine 13	2020-12-29	11:15	Water		X	X								4.7 °C
	Elk River Downstream Nutrients 14	2020-12-29	11:15	Water				X	X	X	X	X			0.5 °C
	Elk River Downstream Bacteriological 15	2020-12-29	11:15	Water	X										0.5 °C

FOR LAB USE ONLY

TURN AROUND REQUIRED: ◉ ROUTINE SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME ☐ DIFFERENT

INVOICE FORMAT: ☐ HARD ☐ EMAIL ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	TIME: 11:30		TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature:	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

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

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
pH	7.86		0.10	pH		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
pH	8.16		0.10	pH		06-JAN-21	R5336839
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	28.6	DLHC	0.10	mg/L		05-JAN-21	R5335120
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	28.6		0.11	mg/L		06-JAN-21	
Nitrite in Water by IC							
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
pH	8.37		0.10	pH		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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							
Nitrate in Water by IC							
Nitrate (as N)	0.150		0.020	mg/L		05-JAN-21	R5335120
Nitrate+Nitrite							
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							
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	pH		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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www.alsenviro.com

L2545155-COFC

Var e: 1-800-665-0243 Fax: 604-253-6700
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Gr e: 1-800-668-9878 Fax: 780-513-2191
Fo Fax: 780-791-1586
Ed : 1-800-668-9878 Fax: 780-437-2311
Ca oll Free: 1-800-668-9878 Fax: 403-291-0298
Sa ge: 1-800-667-7645 Fax: 306-668-8383

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Winter EMS week 4			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ FAX ☐ PDF ☐ ( )		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY															
1	WWTP Influent Routine 1	2021-01-04	10:10	Water		X	X								
	WWTP Influent BOD 2	2021-01-04	10:10	Water									X		
2	WWTP Effluent Routine 3	2021-01-04	10:15	Water		X	X							X	
	WWTP Effluent BOD 4	2021-01-04	10:15	Water									X		
	WWTP Effluent Nutrients 5	2021-01-04	10:15	Water				X	X	X	X	X			
	WWTP Effluent Bacteriological 6	2021-01-04	10:15	Water	X										
3	Elk River Upstream Routine 7	2021-01-04	10:~~30~~50	Water		X	X								
	Elk River Upstream Nutrients 8	2021-01-04	10:~~30~~50	Water				X	X	X	X	X			
	Elk River Upstream Bacteriological 9	2021-01-04	10:~~30~~50	Water	X										
4	Elk River @ Outfall Routine 10	2021-01-04	10:45	Water		X	X								
	Elk River @ Outfall Nutrients 11	2021-01-04	10:45	Water				X	X	X	X	X			
	Elk River @ Outfall Bacteriological 12	2021-01-04	10:45	Water	X										
5	Elk River Downstream Routine 13	2021-01-04	10:30	Water		X	X								
	Elk River Downstream Nutrients 14	2021-01-04	10:30	Water				X	X	X	X	X			
	Elk River Downstream Bacteriological 15	2021-01-04	10:30	Water	X										

TURN AROUND REQUIRED:	◉ REGULAR	SPECIFY DATE:	(surcharge may apply)		
SEND INVOICE TO:	☐ SAME AS DIFFERENT				
INVOICE FORMAT:	☐ HARDCOPY ☐ PDF ☐				
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com				

RELINQUISHED BY:	DATE: 2021-01-04	RECEIVED BY:	DATE: 1/5		
Carter Barrett	TIME: 12:00		TIME: 8:25		
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:		
	TIME:		TIME:		

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A	Sample Temperature: 6 °C Frozen? ___Yes ___No	Cooling Method? ___Icepacks ___Ice ___None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/CoC for ALS EMS.xls

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: 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

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	pH		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	pH		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							
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	pH		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							
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
Orthophosphate-Dissolved (as P)	0.0242		0.0050	mg/L		12-JAN-21	R5343776
Coliform Bacteria - Fecal	3		1	CFU/100mL		12-JAN-21	R5345085
Phosphorus (P)-Total	0.0294		0.0050	mg/L		13-JAN-21	R5344606
Total Suspended Solids	<3.0		3.0	mg/L		17-JAN-21	R5350981

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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	pH		12-JAN-21	R5345177
NO2, NO3 and Sum of NO2/NO3							
Nitrate in Water by IC							
Nitrate (as N)	3.73		0.020	mg/L		12-JAN-21	R5344822
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	3.73		0.022	mg/L		13-JAN-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		12-JAN-21	R5344822
L2547302-5 ELK RIVER DOWNSTREAM							
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
pH	8.33		0.10	pH		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							
Nitrite (as N)	<0.010		0.010	mg/L		12-JAN-21	R5344822

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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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: 604-253-6700
: 780-513-2191
780-437-2311
3 Fax: 403-291-0298
x: 306-668-8383

L2547302-COFC

SEND REPORT TO:

CHAIN OF CUSTODY FORM

PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV: ALBERTA	POSTAL CODE:	T2T 0E2	
TEL:	403 - 256 - 8473	FAX: 403 - 244 - 3774	SAMPLER:	Carter Barrett	
PROJECT NAME AND NO.:	FARUC – Winter EMS week 5		QUOTE NO:	Q33058	
PO NO.:		ALS CONTACT: Patryk Woyciak			
REPORT FORMAT:	☒ HARDMAIL ☒ EMAIL ☐ FAX ☐ EXCEL	pmajer@skircr.com			

ANALYSIS REQUESTED:

	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD				NOTES (sample specific comments, due dates, etc.)
FOR LAB USE ONLY	1	WWTP Influent Routine 1	2021-01-11	10:50	Water		X	X											9.2°C
		WWTP Influent BOD 2	2021-01-11	10:50	Water									X					9.2°C
	2	WWTP Effluent Routine 3	2021-01-11	10:50	Water		X	X							X				12.8°C
		WWTP Effluent BOD 4	2021-01-11	10:50	Water									X					12.8°C
		WWTP Effluent Nutrients 5	2021-01-11	10:50	Water				X	X	X	X	X						12.8°C
		WWTP Effluent Bacteriological 6	2021-01-11	10:50	Water	X													12.8°C
	3	Elk River Upstream Routine 7	2021-01-11	10:30	Water		X	X											1.0 °C
		Elk River Upstream Nutrients 8	2021-01-11	10:30	Water				X	X	X	X	X						1.0°C
		Elk River Upstream Bacteriological 9	2021-01-11	10:30	Water	X													1.0°C
	4	Elk River @ Outfall Routine 10	2021-01-11	10:55	Water		X	X											1.4°C
		Elk River @ Outfall Nutrients 11	2021-01-11	10:35	Water				X	X	X	X	X						1.4°C
		Elk River @ Outfall Bacteriological 12	2021-01-11	10:35	Water	X													1.4°C
	5	Elk River Downstream Routine 13	2021-01-11	10:40	Water		X	X											0.9°C
		Elk River Downstream Nutrients 14	2021-01-11	10:40	Water				X	X	X	X	X						0.9°C
		Elk River Downstream Bacteriological 15	2021-01-11	10:40	Water	X													0.9°C

TURN AROUND REQUIRED: ◉ REGULAR SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT ☐ DIFFERENT

INVOICE FORMAT: ☐ HARDMAIL ☐ EMAIL ☐ FAX

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	2021-01-11	RECEIVED BY:	DATE:
Carter Barrett	TIME:	11:30		TIME:
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:
	TIME:			TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A

Sample Temperature: ___°C Frozen? ___Yes ___No

Cooling Method? ___Icepacks ___Ice ___None

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

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
pH	8.05		0.10	pH		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	pH		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							
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	pH		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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	pH		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)	5.99		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
L2549356-5 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	pH		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							
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

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

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, V
Grand Prairie AB, 9595 - 111 Street, T8V 5W1,
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, T2E
Saskatoon SK, 819 - 58th Street East, S7K 6X5,

L2549356-COFC

SEND REPORT TO: **CHAIN OF CU** PAGE OF

COMPANY:	FERNIE ALPINE RESORT UTILITIES CORPORATION			ATTN:	PATRICK MAJER
ADDRESS:	1505 - 17TH AVENUE SOUTH WEST				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Carter Barrett
PROJECT NAME AND NO.:	FARUC – Winter EMS week 6			QUOTE NO:	Q33058
PO NO.:		ALS CONTACT:	Patryk Woyciak		
REPORT FORMAT:	☒ HA ☒ EMAIL ☐ EXCEL ☒ PDF		pmajer@skircr.com		

ANALYSIS REQUESTED:

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)
1	WWTP Influent Routine 1	2021-01-18	10:30	Water		X	X								10.7 °C
1	WWTP Influent BOD 2	2021-01-18	10:30	Water									X		10.7
2	WWTP Effluent Routine 3	2021-01-18	10:30	Water		X	X							X	12.2 °C
2	WWTP Effluent BOD 4	2021-01-18	10:30	Water									X		"
2	WWTP Effluent Nutrients 5	2021-01-18	10:30	Water				X	X	X	X	X			"
2	WWTP Effluent Bacteriological 6	2021-01-18	10:30	Water	X										"
3	Elk River Upstream Routine 7	2021-01-18	10:00	Water		X	X								0.5 °C
3	Elk River Upstream Nutrients 8	2021-01-18	10:00	Water				X	X	X	X	X			"
3	Elk River Upstream Bacteriological 9	2021-01-18	10:00	Water	X										"
4	Elk River @ Outfall Routine 10	2021-01-18	9:45	Water		X	X								1.5 °C
4	Elk River @ Outfall Nutrients 11	2021-01-18	9:45	Water				X	X	X	X	X			"
4	Elk River @ Outfall Bacteriological 12	2021-01-18	9:45	Water	X										"
5	Elk River Downstream Routine 13	2021-01-18	9:30	Water		X	X								0.5 °C
5	Elk River Downstream Nutrients 14	2021-01-18	9:30	Water				X	X	X	X	X			"
5	Elk River Downstream Bacteriological 15	2021-01-18	9:30	Water	X										"

FOR LAB USE ONLY

- water temp. (°C)

TURN AROUND REQUIRED: ◉ RUSH SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS ABOVE

INVOICE FORMAT: ☐ HARD COPY ☐ EMAIL ☐ EXCEL

SPECIAL INSTRUCTIONS: PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
Carter Barrett	TIME: 11:45		TIME:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ___Yes ___No ___N/A

Sample Temperature: ___°C

Frozen? ___Yes ___No

Cooling Method? ___Icepacks ___Ice ___None

G:/QUALITY/00_DOCUMENTS/10_AUTHORIZED/FORMS/CoC for ALS EMS.xls

Acute Toxicity Test Results

Sample collected April 8, 2020

Final Report

April 24, 2020

Submitted to: **Fernie Alpine Resort**
Calgary, AB

#4, 6125 12 Street SE, Calgary, AB T2H 2K1

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates			Receipt temperature
	Collected	Received	Rainbow trout test initiation	
WASTEWATER / 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[1]
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

[1] Test date, March 18, 2020;

LC = Lethal Concentration; CL = Confidence Limit

Report By:
Sara Thiessen, BSc
Biologist

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 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ±1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; 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 ≥ 90%
Reference toxicant	Potassium chloride (KCl)

APPENDIX B – Toxicity test data

NAUTILUS ENVIRONMENTAL

Trout Bench Sheet

Method TRD Client FER 116 Reference 1920-1071 Chamber 5

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	2020/04/10	1345 *	MW/MF	1	SC
1	2020/04/11	0915	SC	-	MF
2	2020/04/12	0910	KL	-	ST
3	2020/04/13	0830	KL	-	AW
4	2020/04/14	0920	AW/KL	1	ST

Note: * ; time when the test was loaded with fish

Sample Information

Initial pH: 7.7
Initial EC (µS/cm): 1057
Initial DO (mg/L): 9.6
Initial Temp (°C): 13
Salinity (ppt): 1

Sample Pre-Aeration

Aeration rate adjusted to 6.5 +/- 1 mL/min/L : yes/no

Preaeration time	0.5 hours	1 hour	1.5 hours	2 hours
DO(mg/L) of 100%	9.3	8.9		

DO in mg/L (70% - 100% saturation)**
6.2 mg/L - 8.9 mg/L at 14°C
6.1 mg/L - 8.8 mg/L at 15°C
6.0 mg/L - 8.6 mg/L at 16°C
**corrected for altitude

Test Chemistry and Biology

Conc.	CTL	6.25	12.5	25	50	100		
pH (units) (range: **5.5-8.5**)								
Day 0	7.7	7.7	7.7	7.7	7.8	7.9		
Day 4	8.0	7.9	7.9	7.9	7.9	7.8		
EC (uS/cm)								
Day 0	427	470	518	584	736	1073		
Day 4	441	485	536	609	762	1100		
DO (mg/L) (**70-100% saturation at test temp.**)								
Day 0	8.9	8.9	8.9	8.9	8.9	8.9		
Day 4	8.8	8.8	8.8	8.8	8.8	8.8		
Temperature (°C) (range: **14-16°C**)								
Day 0	14	14	14	14	14	14		
Day 4	15	15	15	15	15	15		
Number Alive (In brackets number stressed)								
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	10	10	10	10	10	10		
Day 4	10	10	10	10	10	10		

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
Unless otherwise noted, behavior is considered to be normal

Control Organism Data

Control Fish	Length (cm)	Weight (g)
1	3.5	0.5
2	3.4	0.4
3	3.8	0.6
4	3.8	0.6
5	3.9	0.6
6	3.4	0.6
7	3.6	0.5
8	3.7	0.4
9	4.0	0.7
10	3.5	0.5

Loading Density (g/L): 0.3 (must be ≤0.5 g/L)
Mean Length (cm): 3.6
Length Range (cm): 3.4-4.0
Mean Weight (g): 0.5 (Must be ≥0.3g)
Weight Range: (g): 0.4-0.7

Test Organism Information

Batch 20200303TR
Source Sam Livingston
Tank # 6
Days Held at 15± 2°C 38 (must be ≥14 days)
Percent stock mortality 0.06 (7 days prior to test, must be ≤2%)
Test Volume (L) 16

Comments :

Reviewed By: JP Date Reviewed: 2020/04/14

APPENDIX C – Chain-of-custody form

HydroQual
Laboratories Ltd.

#3, 6125 12th Street SE
Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121
Fax (403) 252-9363

Test Request / Chain of Custody

Reporting and Billing Information Client: FARUC Sample: Fer 116

Client / Operation:	FERNIE ALPINE RESORT UTILITIES CORPORATION
Contact:	PATRICK MAJER
Report Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Billing Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Tel: 1 - 403 - 861 - 8730	Fax: 1 - 403 - 244 - 3774
Quote/PO/Job: 17 - S - 30	

Rush: 50% surcharge; 100% surcharge (evenings and weekends)

Tests Requested (codes on back)
(example: trout with 5 treatments, TR-D)

TR - D						Sample Received intact (y / n)
LC 50						

Notes: S = single treatment, D = multiple treatments

Sample ID	Sampled By / Date / Time	Location	Method	Type	Check appropriate box below
WASTEWATER 1920-1071 2CC 04/09 10:30 Manitoulin OC 2x20L pails N65/N62 ~~Good~~ Good condition 6.6°C	Bo/ April 8 / 20 / 14:30	Fernie Alpine Resort	Grab	Effluent	x

Relinquished By	Date / Time	Received By (HQ)	Date / Time
Bo Choroszewski	April 8/ 20 @ 17:00		

END OF REPORT

Acute Toxicity Test Results

Sample collected October 14, 2020

Final Report

November 2, 2020

Submitted to: **Fernie Alpine Resort**
Calgary, AB

#4, 6125 12 Street SE, Calgary, AB T2H 2K1

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates			Receipt temperature
	Collected	Received	Rainbow trout test initiation	
WASTEWATER/ 2021-0320	14-Oct-20 at 1430h	15-Oct-20 at 1200h	17-Oct-20 at 1345h	9.6°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)	3.2 (3.0-3.5) g/L KCl[1]
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

[1] Test date, October 5, 2020

LC = Lethal Concentration; CL = Confidence Limit

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 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; 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 ≥ 90%
Reference toxicant	Potassium chloride (KCl)

APPENDIX B – Toxicity test data

NAUTILUS ENVIRONMENTAL

Trout Bench Sheet

Method TRD Client FER 116 Reference 2021-0320 Chamber 5

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	10/17/2020	1345 *	MW/SL	1	ST
1	10/18/2020	0925	LE	-	KW
2	10/19/2020	0910	MF	-	KW
3	10/20/2020	0900	AW	-	LE
4	10/21/2020	0850	LE	1	ST

Note: * ; time when the test was loaded with fish

Sample Information

Initial pH: 7.8
Initial EC (µS/cm): 486
Initial DO (mg/L): 8.8
Initial Temp (°C): 18
Salinity (ppt): 0

Sample Pre-Aeration

Aeration rate adjusted to 6.5 +/- 1 mL/min/L : (yes) no

Preaeration time	0.5 hours	1 hour	1.5 hours	2 hours
DO(mg/L) of 100%	8.8			

DO in mg/L (70% - 100% saturation)**
6.2 mg/L - 8.9 mg/L at 14°C
6.1 mg/L - 8.8 mg/L at 15°C
6.0 mg/L - 8.6 mg/L at 16°C
**corrected for altitude

Test Chemistry and Biology

Conc.	CTL	6.25	12.5	25	50	100		
pH (units) (range: 5.5-8.5)								
Day 0	8.1	8.1	8.1	8.0	8.0	7.9		
Day 4	7.9	7.9	8.0	8.0	8.1	8.1		
EC (uS/cm)								
Day 0	435	457	481	509	581	707		
Day 4	450	455	478	507	576	701		
DO (mg/L) (70-100% saturation at test temp.)								
Day 0	8.8	8.4	8.8	8.8	8.8	8.8		
Day 4	8.4	8.4	8.5	8.5	8.5	8.6		
Temperature (°C) (range: 14-16°C)								
Day 0	15	15	15	15	15	15		
Day 4	15	15	15	15	15	15		
Number Alive (In brackets number stressed)								
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	10	10	10	10	10	10		
Day 4	10	10	10	10	9	10		

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
Unless otherwise noted, behavior is considered to be normal

Control Organism Data

Control Fish	Length (cm)	Weight (g)
1	3.1	0.4
2	3.4	0.5
3	3.5	0.6
4	3.0	0.4
5	3.1	0.4
6	2.8	0.2
7	2.9	0.3
8	3.0	0.3
9	3.1	0.3
10	3.4	0.5

Loading Density (g/L): 0.2 (must be ≤0.5 g/L)
Mean Length (cm): 3.1
Length Range (cm): 2.8-3.5
Mean Weight (g): 0.4 (Must be ≥0.3g)
Weight Range: (g): 0.2-0.6

Test Organism Information

Batch 20200820TR
Source Troutlodge
Tank # 9
Days Held at 15± 2°C (must be ≥14 days): 36
Percent stock mortality (7 days prior to test, must be ≤2%): 0
Test Volume (L): 18

Comments :

Reviewed By: LO Date Reviewed: 2020/10/22

APPENDIX C – Chain-of-custody form

HydroQual

Laboratories Ltd.

#3, 6125 12th Street SE
Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121
Fax (403) 252-9363

Test Request / Chain of Custody

Reporting and Billing Information — Client: FARUC — Sample: Fer 116

Client / Operation:	FERNIE ALPINE RESORT UTILITIES CORPORATION
Contact:	PATRICK MAJER
Report Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Billing Address:	1505 - 17TH AVENUE S.W. CALGARY, ALBERTA T2T 0E2
Tel: 1 - 403 - 861 - 8730	Fax: 1 - 403 - 244 - 3774
Quote/PO/Job: 17 - S - 30	

Rush: 50% surcharge; 100% surcharge (evenings and weekends)

Tests Requested (codes on back)
(example: trout with 5 treatments, TR-D)

TR - D						Sample Received intact (y / n)
LC 50						

Notes: S = single treatment, D = multiple treatments

Sample ID	Sampled By / Date / Time	Location	Method	Type	Check appropriate box below
WASTEWATER	Carter/ Oct 14 / 20 / 14:30	Fernie Alpine Resort	Grab	Effluent	x
2021-0320 2020/10/15 12:00 Drop off SC 2x20L pails NaS/NPB Good Condition 9.6°C					

Relinquished By	Date / Time	Received By (HQ)	Date / Time
Carter Barrett	Oct 14/ 20 @ 15:00		

END OF REPORT

Acute Toxicity Test Results

Sample collected January 11, 2021

Final Report

January 25, 2021

Submitted to: **Fernie Alpine Resort**
Fernie, BC

#4, 6125 12 Street SE, Calgary, AB T2H 2K1

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates			Receipt temperature
	Collected	Received	Rainbow trout test initiation	
WASTEWATER / 2021-0859	11-Jan-21 at 1130h	12-Jan-21 at 0950h	13-Jan-21 at 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[1]
Reference toxicant historical mean (2 SD Range)	3.6 (2.8-4.6) g/L KCl
Reference toxicant CV	8.2%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date, December 21, 2020
LC = Lethal Concentration; CL = Confidence Limit

Report By:
Shae Cole, 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 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; 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 ≥ 90%
Reference toxicant	Potassium chloride (KCl)

APPENDIX B – Toxicity test data

NAUTILUS ENVIRONMENTAL

Trout Bench Sheet

Method: TRD | Client: FER 116 | Reference: 2021-0859 | Chamber: 9

Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	1/13/2021	1420 *	MW / MF	1	MF
1	1/14/2021	0800	MW	-	MF
2	1/15/2021	1010	AW	-	MF
3	1/16/2021	0945	SC	-	MF
4	1/17/2021	0850	SH LC	1	MW

Note: *; time when the test was loaded with fish

Sample Information

Initial pH: 7.6
Initial EC (µS/cm): 479
Initial DO (mg/L): 8.6
Initial Temp (°C): 17
Salinity (ppt): 0

Sample Pre-Aeration

Aeration rate adjusted to 6.5 +/- 1 mL/min/L: **yes/no**

	0.5 hours	1 hour	1.5 hours	2 hours
Preaeration time				
DO(mg/L) of 100%	8.9			

DO in mg/L (70% - 100% saturation)**
6.2 mg/L - 8.9 mg/L at 14°C
6.1 mg/L - 8.8 mg/L at 15°C
6.0 mg/L - 8.6 mg/L at 16°C
**corrected for altitude

Test Chemistry and Biology

Conc.	CTL	6.25	12.5	25	50	100		
pH (units) (range: 5.5-8.5)								
Day 0	7.5	7.6	7.6	7.5	7.5	7.4		
Day 4	7.8	7.8	7.8	7.8	7.7	7.6		
EC (uS/cm)								
Day 0	496	535	574	641	803	1100		
Day 4	491	583	576	644	810	1101		
DO (mg/L) (70-100% saturation at test temp.)								
Day 0	8.9	8.9	8.9	8.9	8.9	8.9		
Day 4	8.5	8.5	8.5	8.5	8.4	8.3		
Temperature (°C) (range: 14-16°C)								
Day 0	14	14	14	14	14	14		
Day 4	15	15	15	15	16	15		
Number Alive (In brackets number stressed)								
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	10	10	10	10	10	10		
Day 4	10	10	10	10	10	10		

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
Unless otherwise noted, behavior is considered to be normal

Control Organism Data

Control Fish	Length (cm)	Weight (g)
1	3.0	0.3
2	3.0	0.3
3	3.2	0.4
4	3.0	0.3
5	3.3	0.4
6	3.2	0.3
7	3.2	0.3
8	3.0	0.3
9	3.0	0.3
10	3.0	0.3

Loading Density (g/L): 0.2 (must be ≤0.5 g/L)
Mean Length (cm): 3.1
Length Range (cm): 3.0-3.3
Mean Weight (g): 0.3 (Must be ≥0.3g)
Weight Range: (g): 0.3-0.4

Test Organism Information

Batch: 20201114TR
Source: Troutlodge
Tank #: 2
Days Held at 15± 2°C: 37 (must be ≥14 days)
Percent stock mortality: 0 (7 days prior to test, must be ≤2%)
Test Volume (L): 18

Comments :

Reviewed By: LO Date Reviewed: 2021/01/18

APPENDIX C – Chain-of-custody form

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Quote/PO/Job	

Rush: 50% surcharge; 100% surcharge (evenings and weekends)

Tests Requested (codes on back)
(example: trout with 5 treatments, TR-D)

TR - D						Sample Received intact (y / n)
LC 50						

Notes: S = single treatment, D = multiple treatments

Sample ID	Sampled By / Date / Time	Location	Method	Type	Check appropriate box below
WASTEWATER	Carter/ Jan 11, 2021 / 11:30	Fernie Alpine Resort	Grab	Effluent	x
7.3°C					
2021/01/12 0950					
AWJC good condition					
MS/MSD 2x 20L pail					
2021-0859					

Relinquished By	Date / Time	Received By (HQ)	Date / Time
Carter Barrett	Jan 11/21 @ 11:30		

END OF REPORT