



140, 5050 – 106<sup>th</sup> Avenue SE  
Calgary, Alberta  
T2C 5E9  
Tel: 1-403-238-9510  
*E-mail: [jana@iqwater.ca](mailto:jana@iqwater.ca)*

April 28<sup>th</sup>, 2025  
File No. W2020-019.2024

**FERNIE ALPINE RESORT UTILITIES CORPORATION**  
1505 17<sup>th</sup> Avenue SW  
Calgary, Alberta  
T2T 0E2

Attention: Mr. Patrick Majer

Dear Mr. Majer:

**Re: FERNIE ALPINE RESORT  
WASTEWATER TREATMENT PLANT  
2024 ANNUAL REPORT**

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Forwarded is a pdf copy of the 2024 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](mailto:jana@iqwater.ca).

Sincerely,

**IQWATER INC.**

A handwritten signature in blue ink, appearing to read "Jana Zverina", is written over a large, stylized blue circular mark.

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



***IQWater Inc.***



**2024 WASTEWATER TREATMENT PLANT  
ANNUAL REPORT**

**FERNIE ALPINE RESORT  
FERNIE, B.C.**

Prepared for:

**FERNIE ALPINE RESORT  
UTILITIES CORPORATION**  
1505-17<sup>th</sup> Avenue SW  
Calgary, Alberta  
T2T 0E2

Prepared by:

***IQWATER INC.***  
140, 5050 – 106<sup>th</sup> Avenue SE  
Calgary, Alberta  
T2C 5E9  
Tel: 1-403-238-9510  
*E-mail: [jana@iqwater.ca](mailto:jana@iqwater.ca)*

April 28<sup>th</sup>, 2025  
Report # W2020-019.2024



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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 2024 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. However, summer utilization of the treatment work is increasing with higher flows from June to August.

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

Plant effluent quality has been high during the year. There has been a clearly decreasing trend in ortho-phosphorus and total phosphorus levels since 2007 and notably between 2016 and 2023. All the results for total phosphorus were below the MSR discharge limits in 2024, however, there were seven (7) exceedances for ortho-phosphorus. FARUC began a monitoring and Clearpac dosing investigation in the winter of 2007 to reduce effluent phosphorous concentrations. The reduction program has shown significant improvement of phosphorus levels in plant effluent. This work will continue to maintain all the ortho and total phosphorus concentrations below the discharge limits.



## 2.0 REGISTRATION REQUIREMENTS

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

### 2.1 PARAMETERS

The following parameters are to be monitored:

pH	Field Sample
Temperature	Field Sample, measured in Celsius
Flow	Field Samples, measured as m <sup>3</sup> /d
BOD <sub>5</sub>	Five day biochemical oxygen demand, measured in mg/l
TSS	Total suspended solids or non-filterable residue, measured in mg/l
NH <sub>3</sub>	Ammonia concentration, expressed as nitrogen in mg/l
NO <sub>3</sub>	Nitrate concentration, expressed as nitrogen in mg/l
NO <sub>2</sub>	Nitrite concentration, expressed as nitrogen in mg/l
Total-P	Total phosphorous concentration, measured in mg/l
Ortho-P	Orthophosphate concentration, measured in mg/l
Fecal coliform	Bacterial concentration, measured as colony forming units per 100ml
Toxicity Bioassay	96 hour toxicity test, recorded as pass or fail

### 2.2 REGISTRATION LETTER OPERATING CONDITIONS

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

Table 1  
Effluent Limits

Parameter	Limit	Unit
Flow	1280	m <sup>3</sup> /d
BOD <sub>5</sub>	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 wastewater 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<sub>5</sub> 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 <sub>5</sub>	/	/	M/G	12	M/G, WS/G	25
TSS	WS/G	18	M/G	12	M/G, WS/G, D/C	25
NH <sub>3</sub> -N	WS/G	18	/	/	M/G, WS/G	25
NO <sub>3</sub> -N	WS/G	18	/	/	M/G, WS/G	25
NO <sub>2</sub> -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.



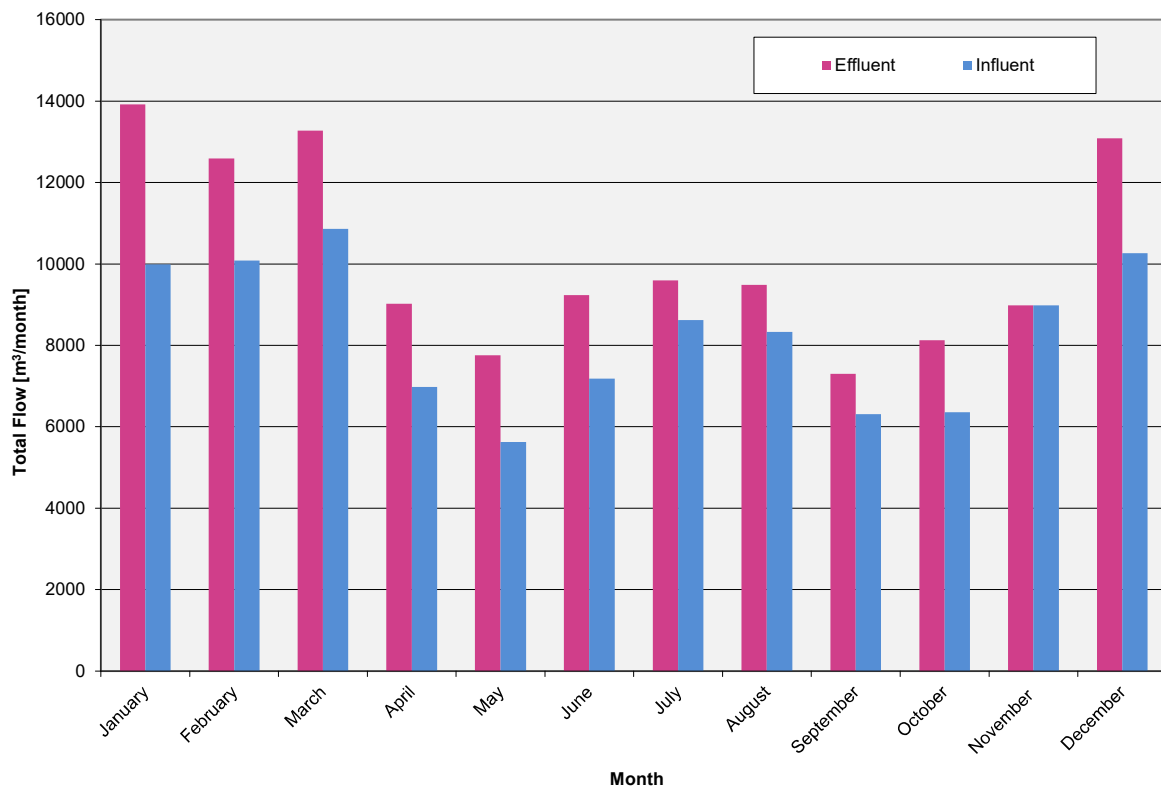
### 3.0 SEWAGE FLOW RECORDS

This section provides data and analysis regarding the plant influent and effluent flows and compares 2024 data to previous years.

Total effluent flow from the WWTP for all of 2024 was recorded from the effluent weir type flow meter as 122,359 m<sup>3</sup> and the average was 329 m<sup>3</sup> per day. The graph below shows the 2024 total effluent flow per each month vs total influent for the plant. The effluent flow follows very closely the influent.

Available monthly total effluent flow meter records for 2024 are provided in Figure 1a.

Figure 1a  
Effluent and Influent Flow Meter Monthly Flow Totals



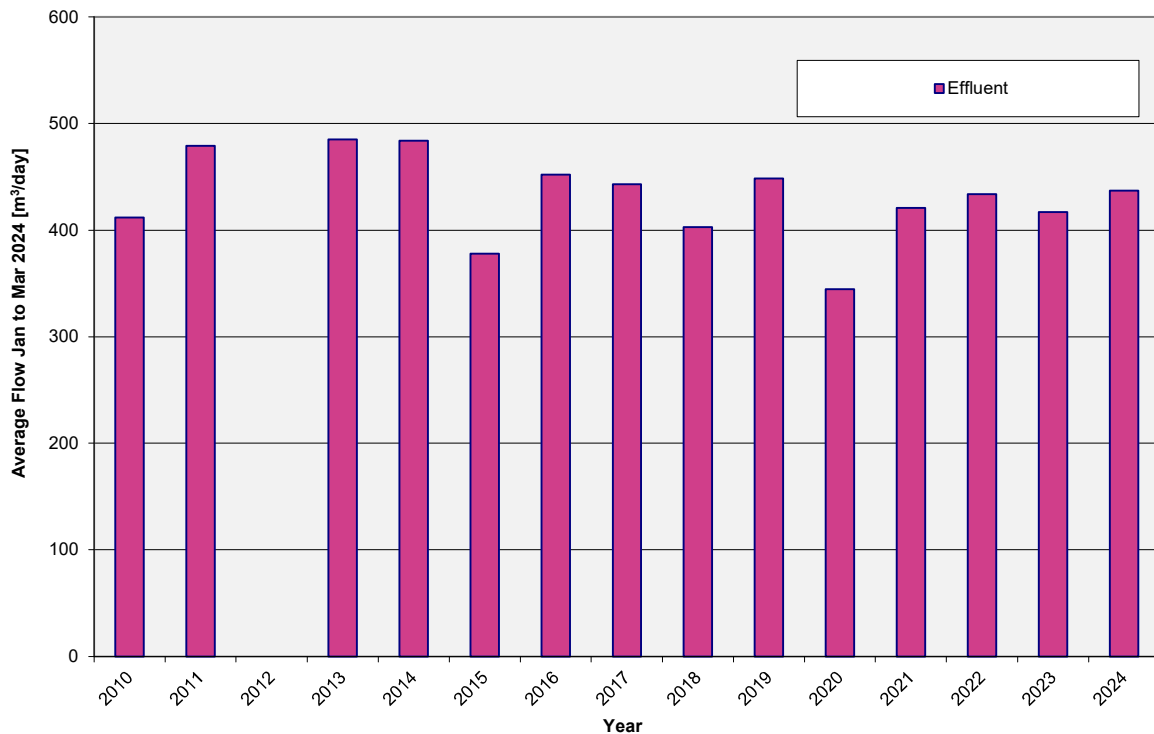
The ski resort historically operated with higher winter and late spring sewage flows (January to March) than during any other period. The average daily plant flow through January, February and March of 2024 was similar to the previous years at 434 m<sup>3</sup>/day. January to March average flow was at 417 m<sup>3</sup>/day in 2023, 434 m<sup>3</sup>/day in 2022 and 421 m<sup>3</sup>/day in 2021. The average flows varied between 344.6 and 485 m<sup>3</sup>/day between 2010 and 2024 with the lowest levels in 2020 likely due to a significant decrease in March due to Covid-19 restrictions.

It should be noted that the higher winter flows in 2024 were also recorded in December 2024 at 422 m<sup>3</sup>/day. During previous years high effluent flows extended into April, however, in 2024 the April flows were similar to the summer months. Although slightly higher, there was not a significant increase in the effluent flow in June, July and August.



The average effluent flows from January to March period are shown on a graph below for 2010 to 2024.

Figure 1b  
Average Daily Flow during Jan – Mar Period



Peak flow for the year reached 711 m³/day on December 30<sup>th</sup>, which was 44.5 % below the allowable daily limit of 1,280 m³/day.

Historical peak flows are as follows: 2023 (820 m³/day); 2022 (792 m³/day), 2021 (819 m³/day), 2020 (925 m³/day), 2019 (1043 m³/day), 2018 (687 m³/day), 2017 (1,095 m³/day), 2016 (844 m³/day), 2015 (1,058 m³/day), 2014 (1,036 m³/day), 2013 (1,181 m³/day), 2012 (811 m³/day), 2011 (989 m³/day) and 2010 (823 m³/day) and 2009 (1,178 m³/day).

Usually, the peak flow day occurred during the heavy ski season, which was to be expected. In 2021, the peak flow day occurred in November which likely corresponds with the beginning of the season after the Covid-19 slow down. In 2022 the peak flow was measured in March and in 2023 in December.



A summary of sewage flow for years 2003 through 2024 is provided in Table 3 and Figures 2 and 3:

Table 3  
2003 – 2024 Flow Comparisons

Year	Sewage Flow (m <sup>3</sup> /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) <sup>1</sup>	335	989 <sup>2</sup>	0
2012	62,509** ( 122,610) <sup>1</sup>	335	811 <sup>2</sup>	0
2013	121,982	335	1,181	0
2014	125,437	344	1,036	0
2015	90,931	250	1,058	0
2016	108,326	296	844	0
2017	108,695	296	1,095	0
2018	105,073	288	687	0
2019	105,748	290	1043	0
2020	101,640	274	925	0
2021	130,032	352	810	0
2022	114,701	311	792	0
2023	125,133	336	820	0
2024	122,359	329	711	0

\* not including part of Sept and all of Oct, Nov, and Dec 2011

\*\* not including all of Jan, Feb, part of Aug, and all of Sept, Oct, and Nov 2012

<sup>1</sup> (data) in brackets – estimate based on daily average

<sup>2</sup> the number does not reflect a true peak as all the data was not available during high flow months

### 2004 to 2012

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

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

Through 2008 total and average flow decreased somewhat from 2007, there were no instances where flow exceeded the 1,280 m<sup>3</sup>/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<sup>3</sup>/day down to 311 m<sup>3</sup>/day) and there were no instances where the flow exceeded the 1,280 m<sup>3</sup>/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<sup>3</sup>/day down to 287 m<sup>3</sup>/day) and there were no instances where the flow exceeded the 1,280 m<sup>3</sup>/day. The peak flow decreased from 2009 and is comparable to 2008.

The average flow for 2011 had increased slightly from 2010 (287 m<sup>3</sup>/day) and 2009 (311 m<sup>3</sup>/day) and there were no instances where the flow exceeded the 1,280 m<sup>3</sup>/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<sup>3</sup>/day) which had increased slightly from 2010 (287 m<sup>3</sup>/day) and 2009 (311 m<sup>3</sup>/day). There were no instances where the flow exceeded the registration limit of 1,280 m<sup>3</sup>/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<sup>3</sup>/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 2024**

In 2024 the average flow was 329 m<sup>3</sup>/day, which is similar to the previous years. Peak flow of 711 m<sup>3</sup>/day was recorded in December. There are no instances where the flow exceeded the plant maximum allowable flow and daily discharge of 1,280 m<sup>3</sup>/day.

Between 2013 and 2024 the average sewage flow showed a relatively steady trend. A decreasing trend in peak values between 2013 and 2021 with steady values between 2021 and 2024 is shown on graphs below.

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.

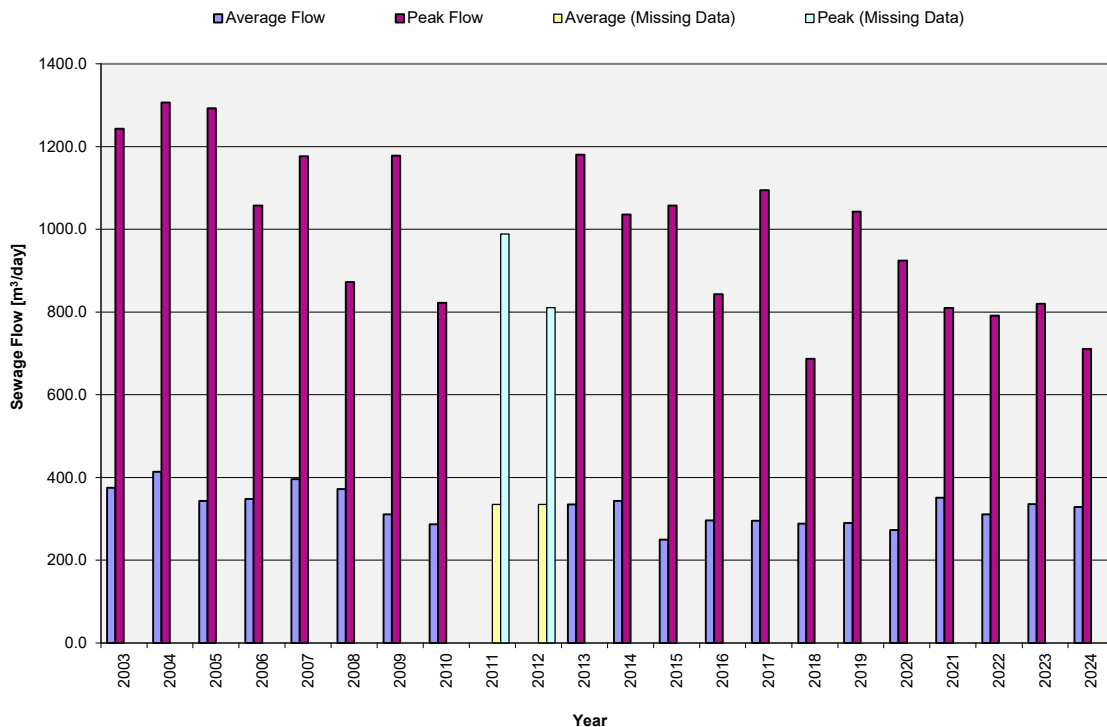
There were no instances where the flow exceeded the plant maximum allowable flow and daily discharge of 1,280 m<sup>3</sup>/day between 2013 and 2024. The peak flow in 2024 was slightly lower than those between 2019 and 2023 and similar to 2018. The peak flows were usually recorded in the months with the highest volumes i.e. January to April 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 (May to June and September to November). The lowest average and peak flows in 2024 were recorded in September, respectively, at 243 and 284 m<sup>3</sup>/day, respectively.

The approximately 100 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 2004.

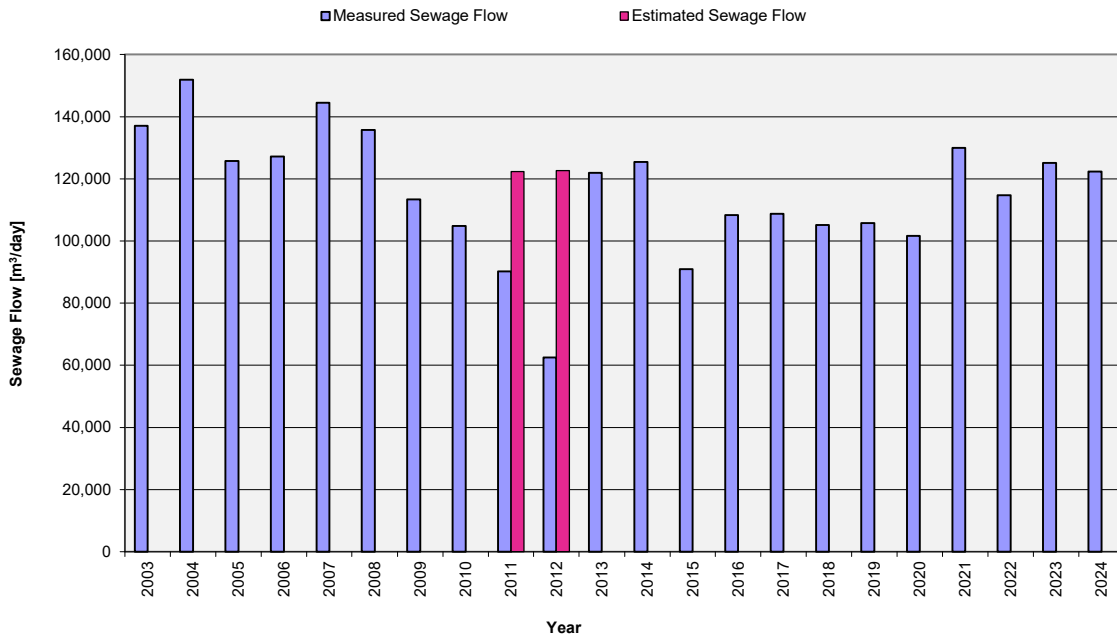
**Figure 2**  
Average and Peak Sewage Flow Comparison Graph



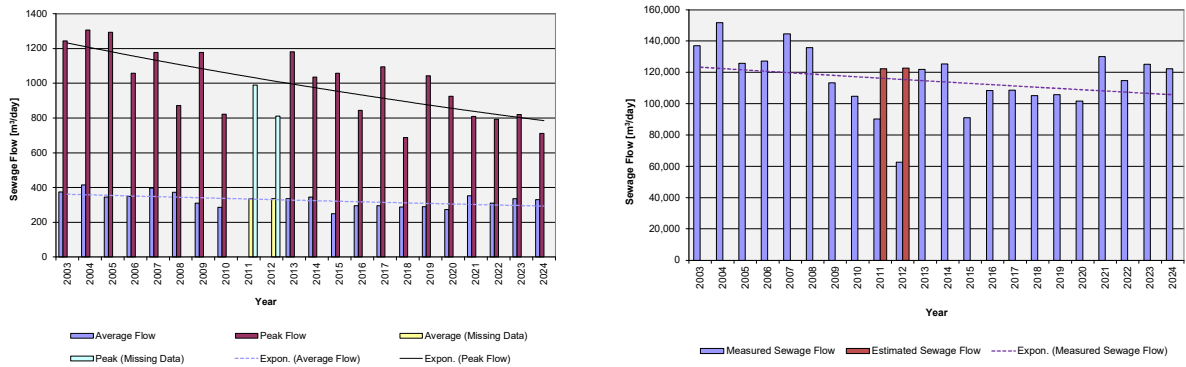
\* Note that the values for 2011 and 2012 may not be representative as some of the effluent flow data for these years are missing



**Figure 3**  
Total Sewage Flow Graph



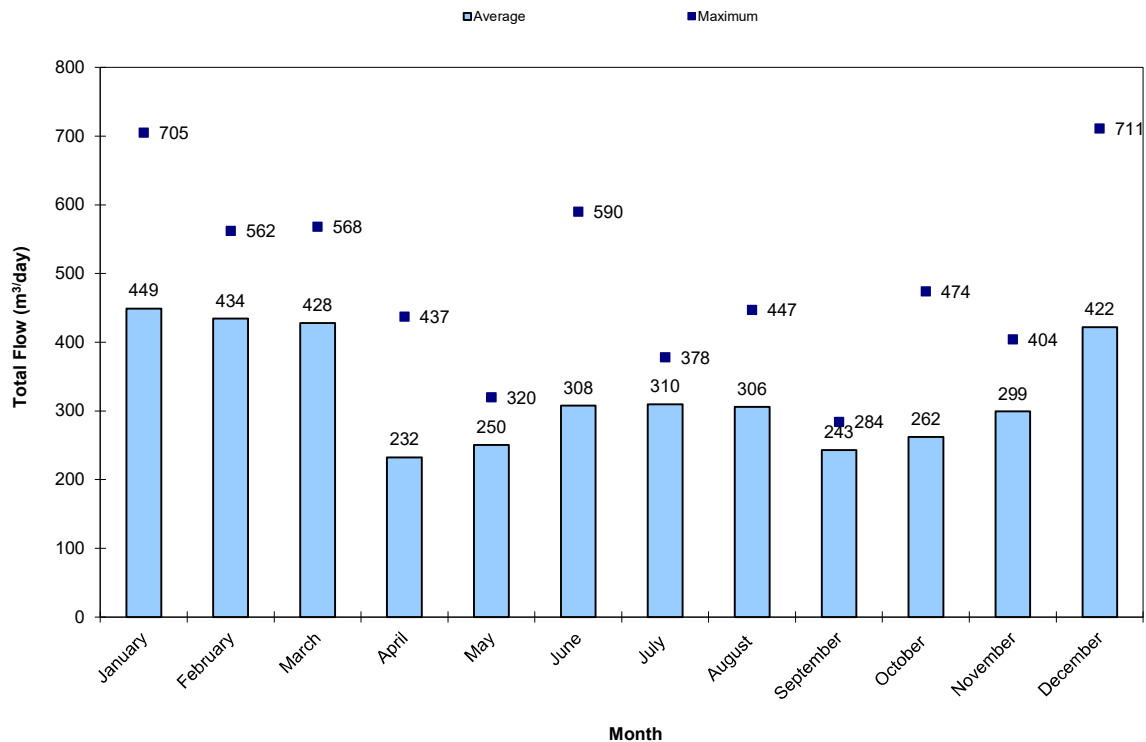
**Figure 3a and Figure 3b**  
Trendlines for Average, Peak, and Total Sewage Flow Graphs



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



**Figure 4**  
2024 Sewage Effluent Average and Peak Flows by Month

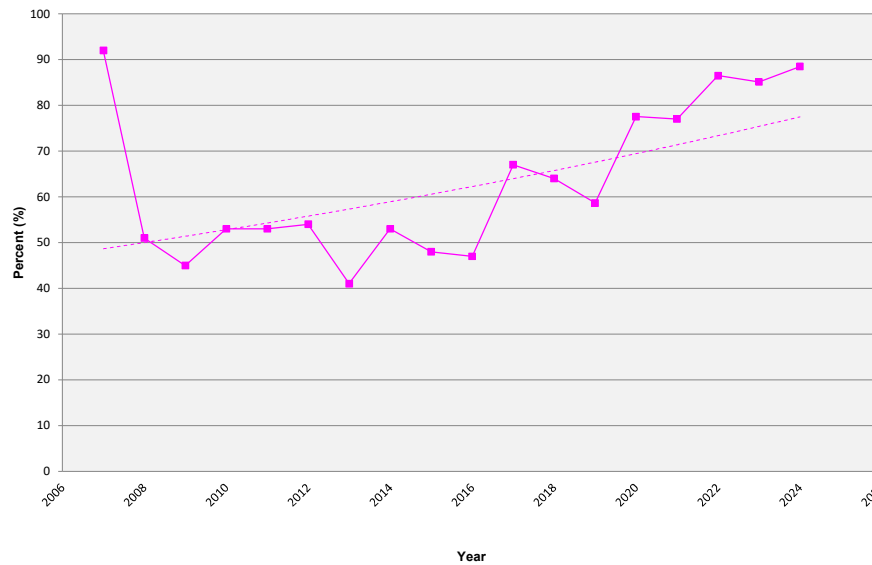


The Resort's ongoing program to reduce sewer infiltration is demonstrated by the reduction in return flow to the plant vs. total water usage. In 2007 the total sewage flow was equal to 92% of the total water production; however, this number may not be representative as the total water production values 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, 2019 and 2020 was 67%, 64%, 59% and 77%. The total sewage flow for 2021 was 77% which is the same as found in 2020. In 2022 the total sewage flow was 86.5 %, in 2023 it was 85.1% and in 2024 88.5%.

Note that in general, with the exception of 2007, there was relatively steady trend in % of return flow vs total water usage until 2017 and an increasing trend recorded between 2017 and 2024. The percent sewage flow vs the water production for each year since 2007 has been plotted in Figure 5 below.

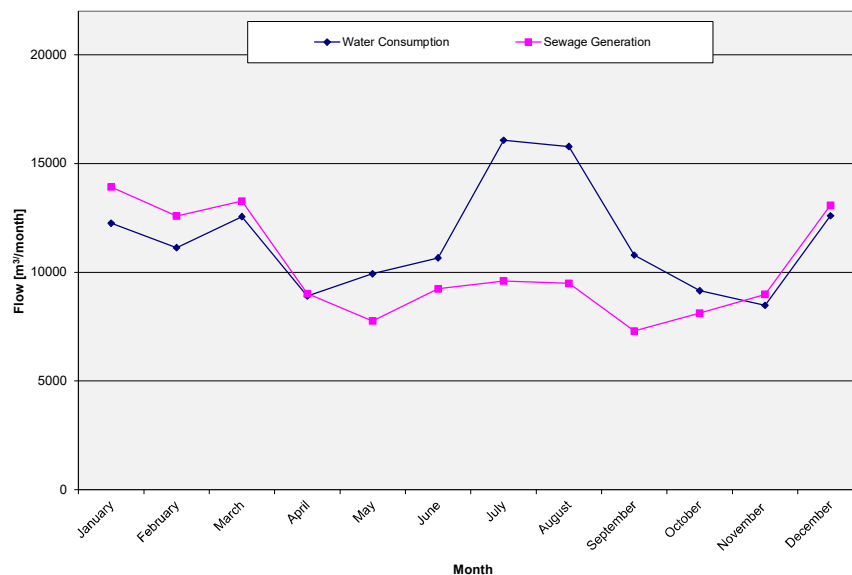


**Figure 5**  
Percent Sewage Flow vs Water Production



Monthly water use at the hill is compared to the amount of sewage received at the WWTP in Figure 6 for 2024.

**Figure 6**  
Water Consumption and Sewage Generation 2024



The impact of rainfall and snowmelt on sewage flow was relatively steady between 2007 and 2016 and decreased each year since 2017 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 2024 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<sup>3</sup>/day. Using the actual peak flow of 811 m<sup>3</sup>/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.

For the years between 2007 and 2023 the correction factors varied between 0.48 and 1.2 as shown below. In general, there is a decreasing trend for peak flow factors, which shows 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 to 2024 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<sup>3</sup>/day if the flow restriction measures prove sustainable. This was confirmed throughout the previous years. Phase 2 development may need a licence amendment to increase the maximum daily flow from 1280 m<sup>3</sup> to a maximum plant capacity of 1760 m<sup>3</sup>.

Phase 1 of the Timberlanding Development, all 27 lots have been sold. 1 home remains under construction (a double lot, with a large home being constructed) and 1 remaining lot is set to begin construction in the spring. This phase also includes 4 infill lots on Lower Timberline Crescent. Of these lots 2 are currently under construction, a single home is planned for the tow lots (double lot, large home). There is one lot remaining that we haven't received an application for as of yet. All lots have been included in the calculations for 2024 (Table 11).

Phase 2 Timberlanding development has been registered, which included 21 family lots and 2 multi-family lots with a density of max 110 units. 8 homes have been completed and have been connected to the system. There are currently 7 homes under construction and 5 homes with applications approved with anticipated start of construction this spring. Phase 2 has been included in the calculations for 2024 (Table 11).

Phase 3A of the Timberlanding development consists of 25 single family lots and one multi-family lot with a max density of 40 units. Construction of Phase 3A has been completed with plans for registration of the 25 single family lots in May of 2025. Lot 26, a multi-family lot was registered in April of 2025 with construction of a 40-unit multi-family complex to begin in May of 2025.



2024 WASTEWATER TREATMENT PLANT  
ANNUAL REPORT  
Fernie Alpine Resort  
Report #2020-019.2024  
April 28<sup>th</sup>, 2025

Based on the 2024 flow data, the plant has an unused capacity of 569 m<sup>3</sup>/day due to the flow saving measures. While the levels seem to have rebounded from the Covid-19 restrictions, this still needs to be closely monitored during 2025 and further considered when planning additional development. Even though the facility is currently not at risk of exceeding the daily discharge limit, in the fall of 2023 an application to MOE was made to increase the allowable daily discharge to 1760 m<sup>3</sup>. Timeline for the completion of the license amendment is fall of 2026.

**Table 4**  
Projected Peak Flows: 2007-2025

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

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

	2019	2020	2021	2022	2023	2024
Estimated Wastewater Flow (m <sup>3</sup> /day)	1344.5	1344.5	1344.5	1344.5	1344.5	1485.5
Actual and Corrected (m <sup>3</sup> /day)	1043 (a)	925 (a)	810 (a)	792 (a)	820 (a)	711 (a)

	2025
Estimated Wastewater Flow (m <sup>3</sup> /day)	1503.1*
Actual and Corrected (m <sup>3</sup> /day)	1127.3 (est)

\*Note that all lots for Timberlanding Phase 1, 2 and 3A are included in the Estimated Flow

- (a) actual peak flow
- (b) corrected daily peak flows by the averaged correction faction for 2007 to 2024 and correction factor

Year	Correction Factor
2007	1177/979.2
2008	873/979.9
2009	1178/1032.4
2010	823/1261.4
2011	989/1302.3
2012	811*/1302.3
2013	1181/1302.3
2014	1036/1302.3
2015	1058/1302.3
2016	844/1302.3
2017	1095/1302.3
2018	687/1337.6
2019	1043/1344.5
2020	925/1344.5
2021	711/1485.5
2022	792/1344.5
2023	820/1344.5
2024	711/1485.5
<b>AVERAGE</b>	<b>0.75</b>

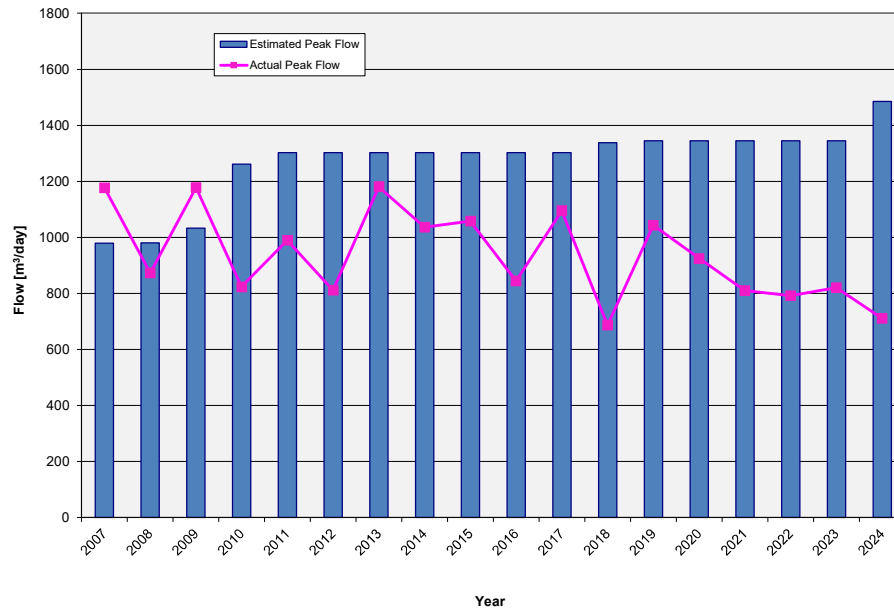
\*Since only two out of the four months with the historically highest peaks were recorded, this number may be underestimated.



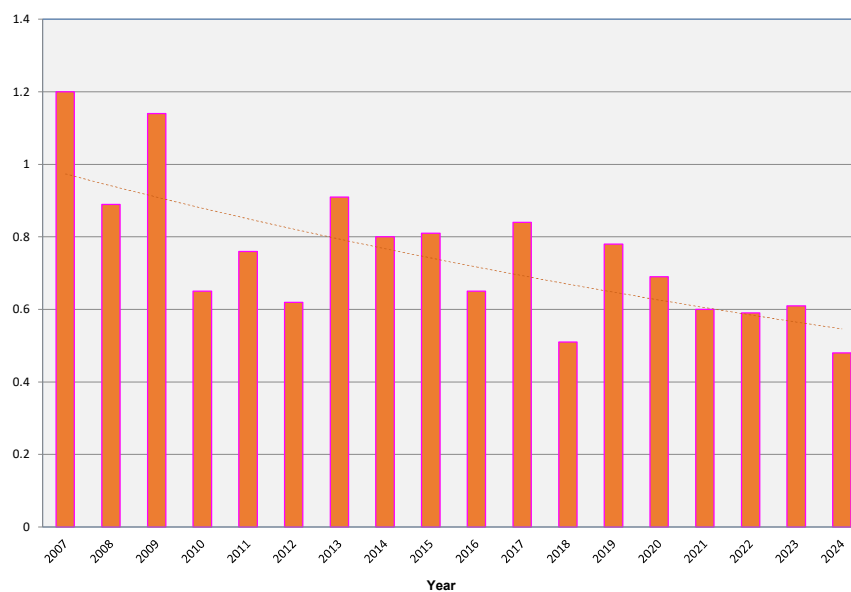
Note that based on the historical data and the above projections the actual flows based on Phase 1, 2 and 3A Timberlanding expansion should not exceed the permitted discharge of 1280 m<sup>3</sup>/d.

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

**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 2024. Table 5 provides a summary record of the Elk River test results between December 27th, 2023 and October 3rd, 2024.

Table 5  
2024 Elk River Sample Results

Sample Date (yyyy-mm-dd)	Ammonia-N			Ortho-P			Coliform - Fecal			Total P mg/L		
	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN
2023-12-27	0.0064	0.0050	0.0050	0.0017	0.0088	0.0010	5	4	4	0.0113	0.0170	0.0067
2024-01-03	0.0050	0.0050	0.0050	0.0010	0.0090	0.0010	1	8	1	0.0062	0.0223	0.0045
2024-01-10	0.0050	0.0050	0.0050	0.0010	0.0130	0.0010	2	3	1	0.0033	0.0184	0.0047
2024-01-24	0.0077	0.0103	0.0196	0.0042	0.0010	0.0077	21	3	5	0.0222	0.0245	0.0081
2024-01-31	0.0172	0.0050	0.0075	0.0060	0.0123	0.0026	8	3	9	0.0277	0.0290	0.0192
2024-02-07	0.0050	0.0050	0.0050	0.0078	0.0099	0.0016	8	1	5	0.0207	0.0178	0.0086
2024-03-27	0.0050	0.0050	0.0050	0.0010	0.0044	0.0010	2	3	1	0.0116	0.0077	0.0123
2024-04-02	0.0077	0.0050	0.0069	0.0010	0.0049	0.0010	1	3	1	0.0101	0.0139	0.0100
2024-04-10	0.0063	0.0050	0.0064	0.0120	0.0202	0.0019	10	4	7	0.0629	0.0472	0.0636
2023-04-17	0.0052	0.0050	0.0065	0.0013	0.0047	0.0016	5	1	3	0.0264	0.0214	0.0256
2024-04-24	0.0050	0.0050	0.0050	0.0010	0.0477	0.0010	1	1	5	0.0102	0.0611	0.0099
2024-05-01	0.0050	0.0050	0.0050	0.0010	0.0112	0.0010	18	5	10	0.0124	0.0222	0.0130
2024-08-28	0.0058	0.0168	0.0050	0.0010	0.1090	0.0012	227	56	241	0.0028	0.1270	0.0070
2024-09-04	0.0120	0.0439	0.0282	0.0010	0.0101	0.0010	114	14	98	0.0047	0.0178	0.0044
2024-09-12	0.0156	0.0169	0.0381	0.0010	0.0607	0.0010	86	9	110	0.0031	0.0643	0.0029
2024-09-18	0.0175	0.0091	0.0053	0.0010	0.0010	0.0010	53	15	62	0.0021	0.0960	0.0032
2024-09-25	0.0050	0.0105	0.0092	0.0010	0.1030	0.0010	8	1	6	0.0020	0.1060	0.0020
2024-10-03	0.0050	0.0322	0.0050	0.0010	0.1730	0.0010	2	7	4	0.0020	0.1780	0.0038
# Samples	18	18	18	18	18	18	18	18	18	18	18	18
Average	0.008	0.011	0.010	0.003	0.034	0.002	32	8	32	0.013	0.050	0.012
Maximum	0.018	0.044	0.038	0.012	0.173	0.008	227	56	241	0.063	0.178	0.064
Minimum	0.005	0.005	0.005	0.001	0.001	0.001	1	1	1	0.002	0.008	0.002

Sample Date (yyyy-mm-dd)	TSS			pH			N-NO <sub>3</sub>			N-NO <sub>2</sub>		
	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN	UP	IDZ	DN
2023-12-27	3.00	3.00	3.00	8.43	8.51	8.52	0.97	0.20	1.16	0.0025	0.0016	0.0029
2024-01-03	3.00	9.10	3.00	8.53	8.50	8.53	1.64	0.21	1.74	0.0022	0.0012	0.0024
2024-01-10	3.00	3.00	3.00	8.30	8.16	8.28	1.57	0.53	1.49	0.0025	0.0010	0.0022
2024-01-24	7.30	3.00	3.00	8.19	8.21	8.18	0.97	1.80	0.42	0.0015	0.0029	0.0010
2024-01-31	10.40	4.60	7.80	8.20	8.21	8.21	1.00	0.10	1.25	0.0022	0.0010	0.0028
2024-02-07	6.70	3.00	3.00	8.33	8.36	8.32	0.79	0.09	1.44	0.0018	0.0010	0.0029
2024-03-27	3.00	3.00	6.50	8.24	8.30	8.27	2.01	0.05	2.03	0.0045	0.0010	0.0044
2024-04-02	3.90	3.00	4.30	8.45	8.44	8.45	1.93	0.09	1.93	0.0046	0.0010	0.0043
2024-04-10	7.10	9.50	8.50	8.32	8.29	8.32	1.78	0.04	1.77	0.0031	0.0010	0.0029
2023-04-17	12.90	3.00	12.90	8.36	8.42	8.37	1.44	0.16	1.45	0.0016	0.0010	0.0017
2024-04-24	3.00	3.00	3.60	8.36	8.21	8.36	1.62	0.60	1.63	0.0015	0.0010	0.0015
2024-05-01	6.50	3.00	3.90	8.35	8.38	8.36	1.06	0.73	1.13	0.0011	0.0010	0.0011
2024-08-28	3.00	6.30	3.00	8.42	8.01	8.37	1.36	4.78	1.37	0.0190	0.0010	0.0023
2024-09-04	3.00	3.00	3.00	8.42	8.38	8.47	1.47	0.16	1.46	0.0021	0.0124	0.0034
2024-09-14	3.00	3.00	3.00	8.45	7.98	8.43	1.44	2.80	1.45	0.0018	0.0020	0.0014
2024-09-18	3.00	3.00	3.00	8.35	8.07	8.35	1.39	1.40	3.45	0.0022	0.0021	0.0025
2024-09-25	3.00	3.00	3.00	8.42	8.13	8.43	1.53	7.45	1.54	0.0024	0.0061	0.0025
2024-10-03	3.00	3.00	3.00	8.46	8.14	8.46	1.52	16.60	1.52	0.0015	0.0741	0.0017
# Samples	18	18	18	17	18	18	18	18	18	18	18	18
Average	4.88	3.97	4.47	8.36	8.26	8.37	1.42	2.10	1.57	0.003	0.006	0.002
Maximum	12.90	9.50	12.90	8.53	8.51	8.53	2.01	16.60	3.45	0.019	0.074	0.004
Minimum	3.00	3.00	3.00	8.19	7.98	8.18	0.79	0.04	0.42	0.001	0.001	0.001

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

UP – Upstream

IDZ – Initial Dilution Zone

DN – Downstream

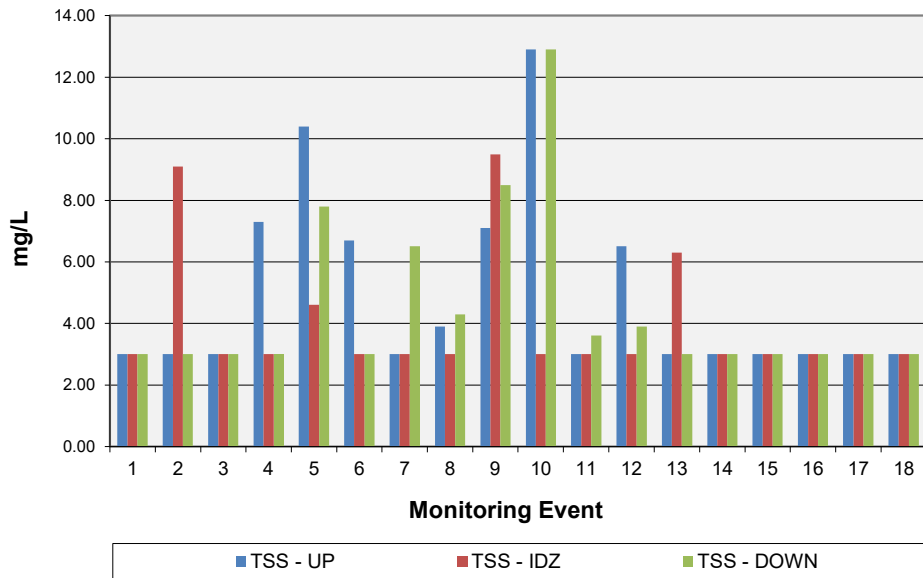


### TSS

Outfall results slightly exceeded the upstream (background) results on January 3<sup>rd</sup>, April 10<sup>th</sup> and August 28<sup>th</sup>, 2024.

Note that there were no changes larger than 5 mg/L between the upstream and downstream values due to the effluent discharge.

**Figure 8a**  
2024 TSS Results in the River Upstream, at the Outfall and Downstream



### Nitrate-N & Nitrite-N

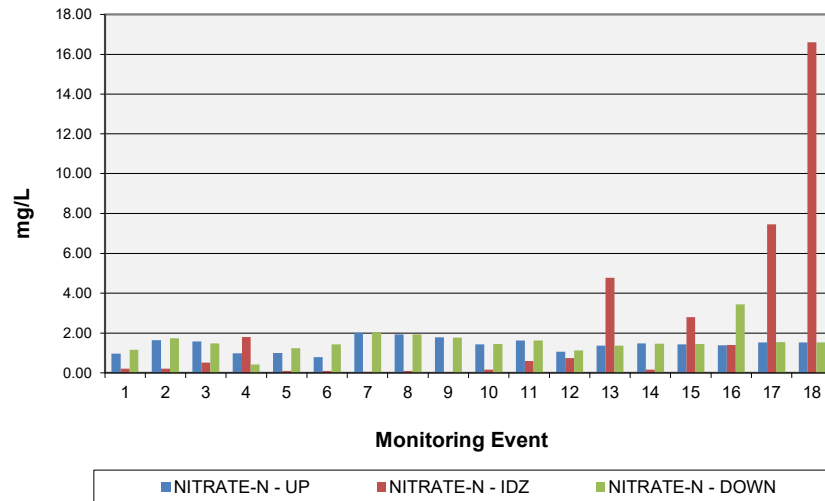
The highest levels of nitrate-n (16.6 mg/L) were observed at the outfall on October 3<sup>rd</sup>, 2024. The levels of nitrate-n up-stream were much lower on the same day at 1.52 mg/L with the levels downstream at the same level (1.52 mg/L). Elevated results at the outfall were also recorded on August 28<sup>th</sup> and September 25<sup>th</sup>, 2024, however, the levels downstream on those particular days were either similar to or marginally higher than the upstream levels (up to 0.01 mg/L).

Note that all the downstream results were very similar to or below the background levels and within the BC AWQG Long Term Chronic threshold at 3.0 mg/L with the exception of September 18, 2024 downstream reading of 3.5 mg/L (there was no Short Term exceedance at any time). It should be noted that the results at the outfall on that day were low at 1.40 mg/L and, therefore, the elevated downstream results were not due to the effluent release.

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



**Figure 8b**  
2024 Nitrate-N Results in the River Upstream, at the Outfall and Downstream

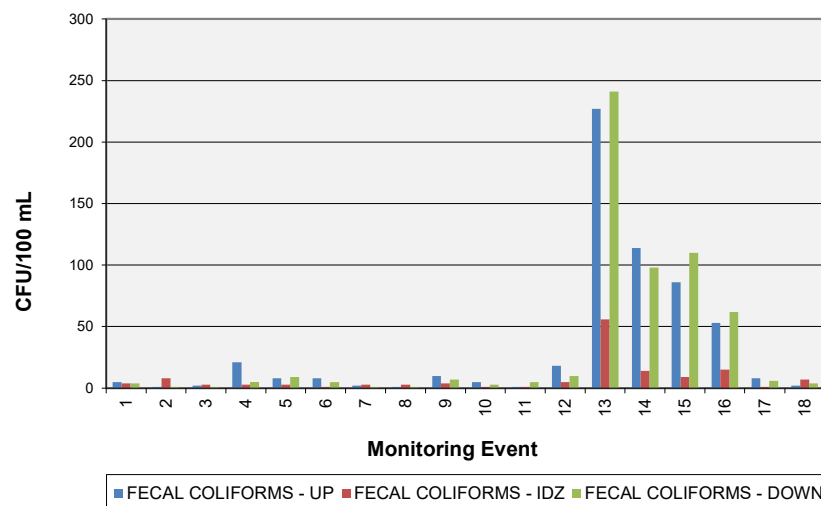


### **Fecal Coliform**

Although elevated downstream on several monitoring events, the results were very similar to the upstream values. The levels at the outfall exceeding the upstream concentrations more than 5 CFU/mL were recorded on January 3<sup>rd</sup> and October 3<sup>rd</sup>, 2024, however, the results downstream were similar to the upstream values on the same days.

The highest levels of fecal coliforms were measured at the outfall on August 28<sup>th</sup>, 2024 at 56 CFU/mL with the upstream results at 227 CFU/mL and downstream results at 241 CFU/mL. Values of the fecal coliform were also higher in the downstream on September 12<sup>th</sup> and 18<sup>th</sup> with similar values upstream and low outfall levels. It should be noted that the effluent levels were only 1 CFU/100 mL, therefore, the increase on the above mentioned three days is not likely due to the effluent release.

**Figure 8c**  
2024 Fecal Coliform Results in the River Upstream, at the Outfall, Downstream and Effluent





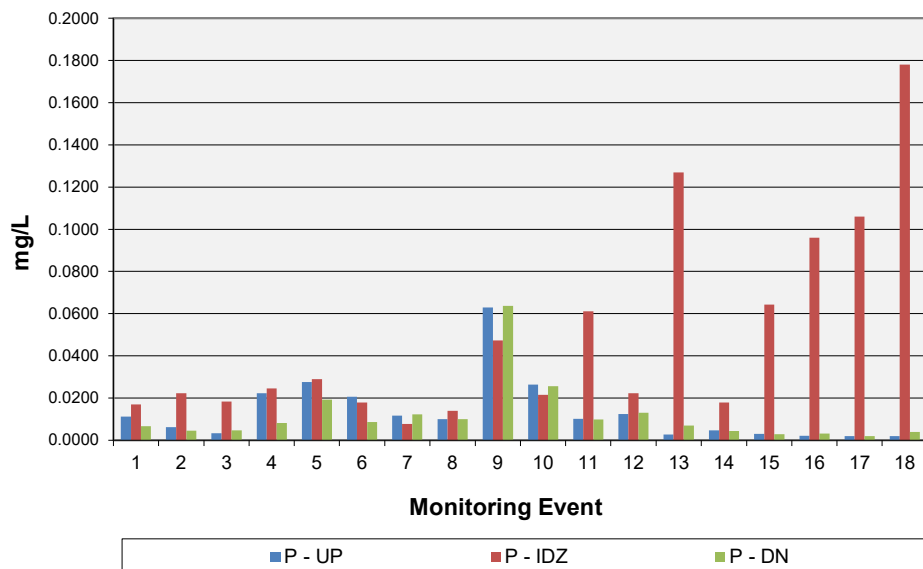
No significant changes were observed in **ammonia-n**, **pH** and **ortho-phosphorus** concentrations during any of the river sample periods. Majority of ammonia-n samples downstream were below their detection limits and/or well below the BC AWQG guideline). In general, ortho-phosphorus was highest in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

### **Phosphorus**

Although elevated at the outfall above the background values, the results downstream were in general within the background levels as shown on the graph below. The average upstream concentrations were 0.013 vs 0.012 mg/L downstream; the maximum concentrations upstream were recorded at 0.063 mg/L vs 0.064 mg/L downstream (and 0.047 mg/L at the outfall on the same day) on April 10, 2025. The highest outfall results were recorded at 0.178 mg/L vs 0.0020 mg/L upstream and 0.0038 mg/L downstream. There is no BC AWQG guideline for streams.

**Figure 8d**

2024 Phosphorus Results in the River Upstream, at the Outfall, Downstream and Effluent



**pH** results in the downstream samples followed closely those in the upstream with no guideline (6.5 – 9.0) exceedance. The upstream and downstream results averaged at 8.36 and 8.37, respectively, compared to the outfall average at 8.26.

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 does not appear to have any adverse effect on background nutrient concentrations in the Elk River.



## 6.0 OVERVIEW OF INFLUENT TEST RESULTS

This section provides data and analysis for the plant influent (raw sewage) samples taken during 2024.

Table 6 provides a summary record of the influent test results for the period of January 3<sup>rd</sup>, 2024 to December 18<sup>th</sup>, 2024.

Table 6  
2024 Influent Results

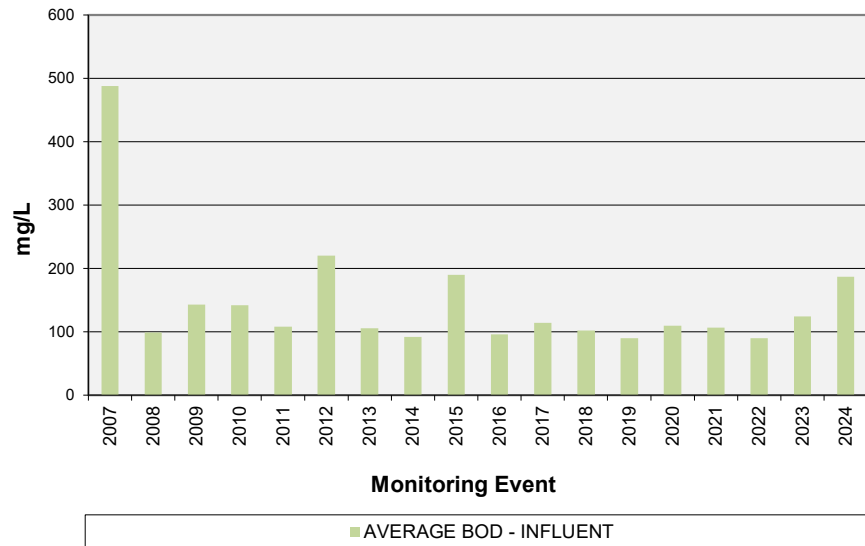
Date (yyyy/mm/dd)	2024 Influent Results Summary					
	Flow [m <sup>3</sup> /d]	Temp [degrees C]	pH	TSS [mg/L]	BOD [mg/L]	COD [mg/L]
2024-01-03	371	-6.0	8.48	507.0	434.0	-
2024-01-10	203	-10.0	8.23	160.0	108.0	-
2024-01-25	297	2.0	8.01	414.0	245.0	-
2024-01-31	329	0.0	8.54	193.0	136.0	-
2024-02-07	312	0.0	8.39	127.0	911.0	-
2024-03-28	320	0.0	8.72	364.0	298.0	-
2024-04-02	278	1.0	8.34	400.0	288.0	-
2024-04-10	230	-3.0	8.19	62.9	57.0	-
2024-04-17	208	-5.0	8.09	104.0	83.2	-
2024-04-24	200	3.0	7.96	107.0	108.0	-
2024-05-01	196	0.0	7.97	69.3	57.7	-
2024-06-12	190	7.0	8.15	79.2	72.6	-
2024-07-17	321	17.0	8.27	293.0	191.0	-
2024-08-28	190	5.0	8.05	191.0	120.0	-
2024-09-05	212	10.0	8.16	88.4	90.9	-
2024-09-12	197	10.0	8.03	104.0	82.2	-
2024-09-18	195	8.0	8.19	104.0	128.0	-
2024-09-25	208	8.0	8.12	324.0	155.0	-
2024-10-02	170	6.0	8.09	52.8	82.4	-
2024-11-26	211	1.0	8.03	110.0	71.4	-
2024-12-18	257	0.0	7.73	619.0	202.0	-
# Samples	21	21	21	21	21	0
Average	243	2.6	8.18	213.0	186.7	0
High	371	17.0	8.72	619.0	911.0	0
Low	170	-10.0	7.73	52.8	57.0	0

### **BOD**

Inlet BOD ranged from 57.0 mg/L to 911.0 mg/L with an average of 186.7 mg/L. The average influent sewage strength was measured at 124.2 mg/L in 2024, 90.1 mg/L in 2022, 106.6 mg/L in 2021, 109.6 mg/L in 2020, 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. For historical average BOD test results refer to the graph below.



**Table 6a**  
**2024 Influent Average BOD Results**



### **TSS**

TSS values ranged in the influent from 52.8 to 619.0 mg/L with an average of 213.0 mg/L compared to 2023 average at 128.1, 2022 average at 133.6 mg/L and 2021 average at 167.5 mg/L. The highest value was recorded in December; in January and April 2024 values of 507, 414 and 400 mg/L were tested. 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 2024.

A total of 391 (plant and laboratory including 1 sample for 2023 and 3 samples for 2025) effluent samples were collected and analyzed for TSS during 2024. The results for 25 samples (21 samples for 2024, 1 sample for 2023 and 3 samples for 2024) tested in an analytical laboratory for BOD<sub>5</sub>, ortho-phosphate, total phosphate, fecal coliforms between December 27<sup>th</sup>, 2023, and January 15<sup>th</sup>, 2025, are summarized in a table below. 4 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 2024.

Table 7  
2024 Effluent Results\*

Date (yyyy/mm/dd)	2024 Effluent Results Summary											
	Flow m <sup>3</sup> /d	Temp deg C	NH <sub>3</sub> -N mg/L	BOD mg/L	COD mg/L	P-OP04 mg/L	Coliforms Fecal cfu/100ml	Total P mg/L	TSS mg/L	pH	NO <sub>3</sub> -N mg/L	NO <sub>2</sub> -N mg/L
2023-12-27	578	-4.0	0.018	2.0	-	0.458	600	0.490	3.0	8.23	28.4	1.310
2024-01-03	539	-6.0	0.010	2.0	-	0.203	44	0.263	3.0	8.24	12.9	0.002
2024-01-10	317	-10.0	0.075	2.0	-	0.235	1	0.291	5.9	7.79	29.9	0.005
2024-01-25	431	2.0	0.006	2.0	-	0.332	187	0.373	3.0	7.85	28.2	0.005
2024-01-31	411	0.0	0.007	2.0	-	0.183	1	0.212	3.0	7.84	23.0	0.037
2024-02-07	373	0.0	0.006	2.0	-	0.373	5	0.396	3.0	7.90	27.5	0.006
2023-03-28	378	0.0	0.006	2.0	-	0.765	4	0.748	3.0	7.81	45.8	0.010
2024-04-02	381	1.0	0.008	2.0	-	0.360	6	0.454	3.0	8.07	29.6	0.005
2024-04-10	258	-3.0	0.011	2.0	-	0.494	3	0.498	3.0	8.00	25.1	0.005
2024-04-17	263	-5.0	0.009	2.0	-	0.656	1	0.682	3.0	8.13	28.3	0.009
2024-04-24	257	3.0	0.070	2.0	-	0.701	1	0.732	3.0	8.01	23.4	0.011
2024-05-01	262	0.0	0.014	2.0	-	0.482	1	0.457	3.0	8.03	20.1	0.006
2024-06-12	245	7.0	0.008	2.0	-	0.615	1	0.619	3.0	8.39	22.9	0.008
2024-07-17	243	14.0	0.296	2.0	-	0.296	1	0.277	3.0	7.95	31.9	0.010
2024-08-28	235	5.0	0.029	2.0	-	0.672	1	0.750	3.0	7.95	34.1	0.015
2024-09-05	230	10.0	0.027	2.0	-	0.372	1	0.534	3.0	7.94	26.7	0.019
2024-09-12	214	10.0	0.032	2.0	-	0.305	1	0.330	3.0	7.94	32.3	0.019
2024-09-18	216	8.0	0.020	2.0	-	0.443	1	0.443	3.0	7.92	33.8	0.028
2024-09-25	250	8.0	0.019	2.0	-	0.460	1	0.466	3.0	8.03	27.9	0.023
2024-10-02	242	6.0	0.013	2.0	-	0.320	1	0.361	3.0	8.14	29.0	0.020
2024-11-26	307	1.0	0.010	2.0	-	0.400	1	0.407	3.0	8.32	15.8	0.009
2024-12-18	327	0.0	0.242	2.0	-	0.242	2	0.284	3.0	7.65	25.0	0.005
2025-01-02	-	-	20.800	2.0	-	0.585	39	0.619	3.0	7.93	13.2	1.830
2025-01-08	-	-	0.014	2.0	-	0.115	1	0.155	3.0	8.11	23.8	0.009
2025-01-15	-	-	0.011	2.0	-	0.548	7	0.564	3.0	7.87	34.1	0.006
# Samples	22	22	25	25	0	25	25	25	25	25	25	25
Average	316	2.1	0.870	2.0	-	0.425	36	0.456	3.1	8.00	26.9	0.136
High	578	14.0	20.800	2.0	-	0.765	600	0.750	5.9	8.39	45.8	1.830
Low	214	-10.0	0.006	2.0	-	0.115	1	0.155	3.0	7.65	12.9	0.002
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	7	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, i.e., <0.05 is assumed to be 0.05  
2. Geometric mean is used for coliform results

\* Due to the laboratory closure during December holidays several samples were missed at the end of December. A sample from the end of 2023 and samples from beginning of 2025 were added to capture the winter peak season.



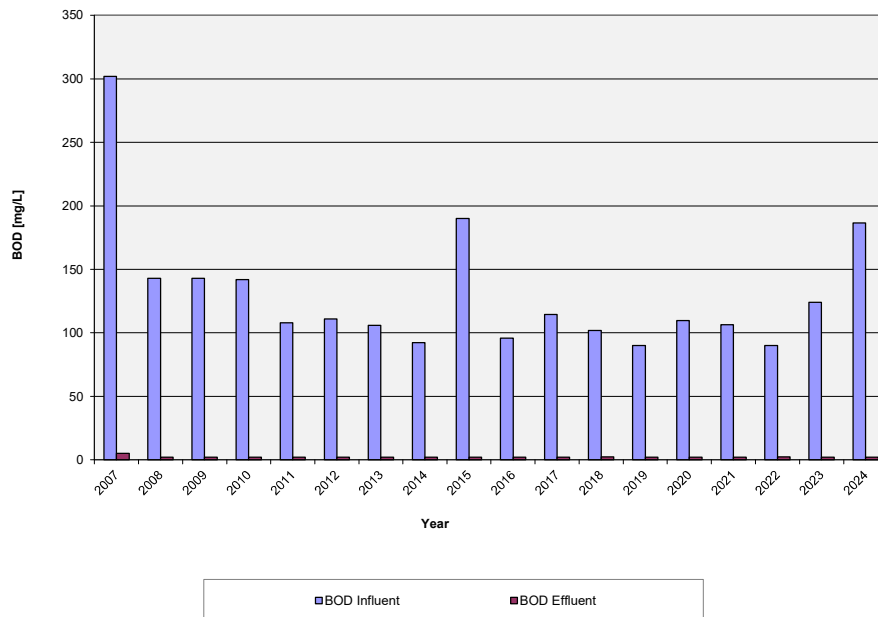
## 7.1 RESULTS ANALYSIS

### BOD

The average BOD in the effluent was 2.0 mg/L in 2024 as well as 2023 compared to 2.5 mg/L in 2022, which was lower compared to the previous years (all but two samples were below the detection limit).

Historically, the average BOD was 2.1 in 2021, 2020 and 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 were over the limit of 45 mg/L in the effluent.

**Figure 9**  
Historical BOD Test Results for Influent vs Effluent



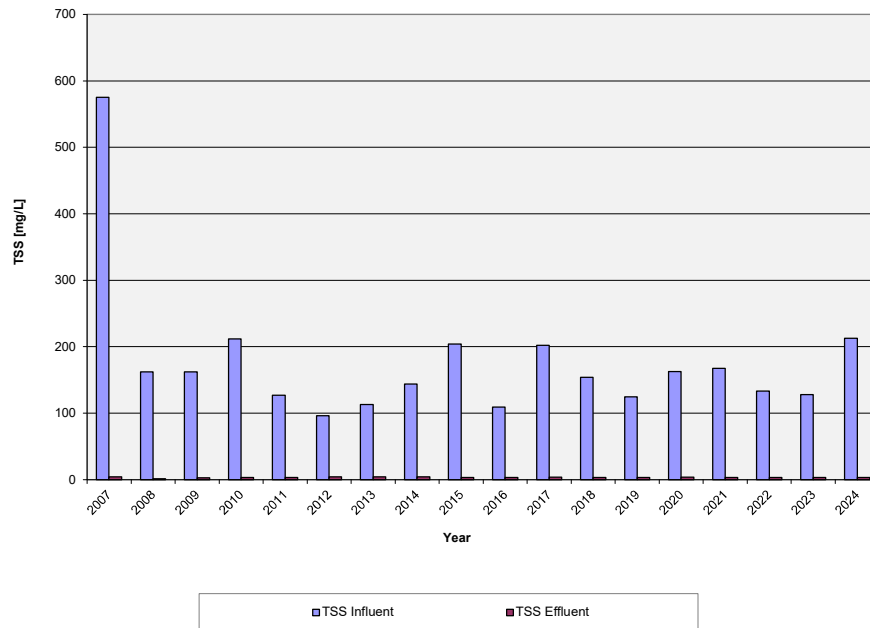
### TSS

Laboratory tests indicated that 24 out of 25 TSS samples in the effluent were below the laboratory detection at <3.0 mg/L, the average at 3.1 mg/L and the highest result was at 5.9 mg/L.

The plant measured TSS on a daily basis. The highest result measured at the plant was recorded on December 29<sup>th</sup>, 2024 at 1.82 mg/L and the lowest on June 27<sup>th</sup>, 2024 at 0.10 mg/L. Average TSS measured at the plant was at 0.3 mg/L (January 1 to December 31, 2024). 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<sub>5</sub> and TSS treatment with average removals of almost 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 the effluent (200 CFU/100 mL) throughout the year with the exception of one exceedance at 600 CFU/100 mL on December 27<sup>th</sup>, 2023.

Fecal coliform results averaged at 36 CFU/100 mL during the 25 monitoring events.

It should be noted that the Fecal Coliform levels in the Elk River outfall and downstream were low and below the upstream levels on December 27<sup>th</sup>, 2023. The levels of coliforms tested in the Elk River outfall and downstream were all low or below the irrigation guideline of 100 CFU/100 mg/L during majority of the monitoring events throughout the season with the exception of May 1<sup>st</sup>, 2024 at 241 CFU/100 mg/L and September 12<sup>th</sup>, 2024 at 110 CFU/100 mg/L downstream; it should be noted that the outfall results were low and the upstream results were high during both monitoring events.

### **Ammonia-n**

The majority of the effluent ammonia-n concentrations were below the 0.08 mg/L level with the exception of the highest result recorded on January 2<sup>nd</sup>, 2025, at 20.800 mg/L and two elevated readings at 0.296 and 0.242 mg/L in July and December 2024.

All the results in the river downstream were below 0.038 mg/L with the exception of three results. The results on December 27<sup>th</sup>, 2024 in the river downstream were elevated above the upstream (0.0174 vs 0.0074 mg/L) but were considered comparable despite of very high results in the effluent on that day.



### **Phosphorus**

Seven ortho-phosphorus discharge levels exceeded the discharge limit of 0.5 mg/L; all total phosphorus results were below the discharge limit of 1.0 mg/L in 2024.

The average ortho-phosphorus level was at 0.425 mg/L with a maximum of 0.765 mg/L recorded on March 28<sup>th</sup>, 2024. It should be noted that all downstream values on days with elevated concentrations in the effluent (when recorded) were similar to the background (upstream) levels indicating no major impact to the river.

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 very similar. 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 phosphorus removal.

### **Bioassay Toxicity Test**

As was the case in previous years, the bioassay toxicity tests in 2024 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
2024/02/14	Pass
2024/05/08	Pass
2024/09/18	Pass



## 7.2 COMPLIANCE SUMMARY

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

Table 9  
2023 MSR Parameter Compliance

Parameter	Unit	MSR Limit	No. of Samples	Average Value	Max. Value	Samples Over Limit
Flow	m <sup>3</sup> /day	1280	366	329	711	0
BOD <sub>5</sub>	mg/L	45	25 <sup>1</sup>	2.0	2.0	0
TSS	mg/L	45	381 <sup>1</sup>	3.1** (0.3)***	5.9**	0
Total Phosphorus	mg/L	1	25 <sup>1</sup>	0.46	0.75	0
Ortho Phosphate	mg/L	0.5	25 <sup>1</sup>	0.43	0.77	7
Fecal Coliforms*	CFU/100mL	200	25 <sup>1</sup>	36	600	1
96 hr LC <sub>50</sub> Bioassay	/	Non-toxic	3	/	/	0

\*Limit for recreational waters only, not included in FAR registration letter

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

\*\*\* Average or maximum value of daily measurements

<sup>1</sup> Although 25 laboratory tests were evaluated in 2024, one test from December 27<sup>th</sup>, 2023 and three tests from January 2<sup>nd</sup>, 8<sup>th</sup> and 15<sup>th</sup>, 2025 were included for winter periods

In 2024, all the samples for BOD, TSS and total phosphorus were below the MSR limits. Seven samples for ortho-phosphorus and one sample for fecal coliforms exceeded the limits.



## 8.0 SLUDGE PRODUCTION AND DISPOSAL

This section provides data regarding the disposal of bio-solids (sludge) from the treatment facility in 2024.

Operation of the 200 m<sup>3</sup> 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  
2024 Bagged Solids Data

<i>Month</i>	<i>Vol. Bagged (m<sup>3</sup>)</i>
<i>January</i>	<i>73.5</i>
<i>February</i>	<i>114.0</i>
<i>March</i>	<i>156.0</i>
<i>April</i>	<i>130.9</i>
<i>May</i>	<i>181.2</i>
<i>June</i>	<i>146.0</i>
<i>July</i>	<i>116.3</i>
<i>August</i>	<i>58.5</i>
<i>September</i>	<i>135.5</i>
<i>October</i>	<i>58.8</i>
<i>November</i>	<i>99.3</i>
<i>December</i>	<i>94.5</i>
<b>Total</b>	<b>1364.5</b>

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.

Also please note the utility has taken the action to update the method of solids disposal with the purchase of a centrifuge - HAUS Decanter Centrifuge DDE 3532 purchased from Archer Separation. Planned installation is Summer/Fall of 2024. The plan is to have it operational and in use for 2024/25 ski season.



## **9.0 BYPASS EVENTS**

This section provides information about bypass events in 2024.

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 through 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 2024.



## 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 i.e. clear well water will be used to spray down the clarifiers instead of potable water.

The utility has taken the action to update the method of solids disposal with the purchase of a centrifuge - HAUS Decanter Centrifuge DDE 3532 purchased from Archer Separation. Planned installation is spring of 2025. The plan is to have the unit operational and in use for 2025 summer season.



## 11.0 PHOSPHORUS REMOVAL

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

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

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

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

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

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

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

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

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

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

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



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

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

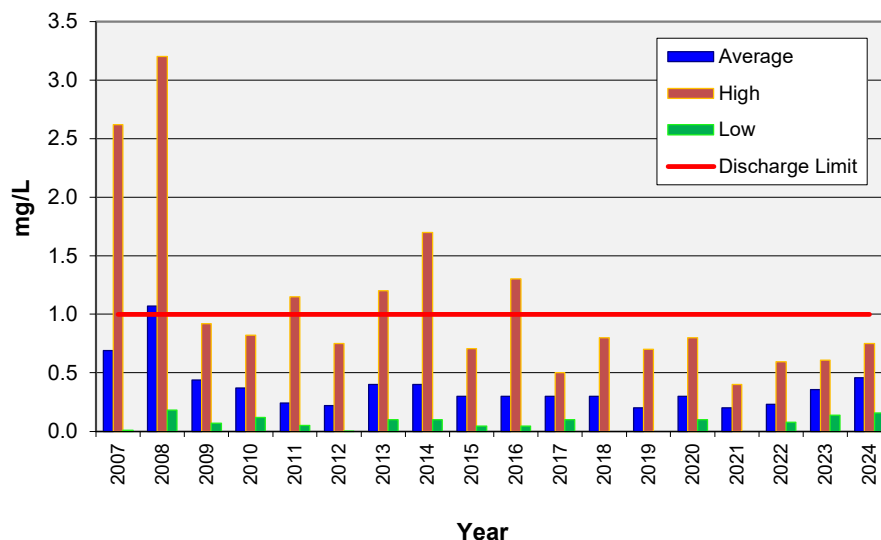
The average total phosphorus and ortho phosphorus for 2016 were similar to previous years. One sample exceeded the limit for ortho phosphorus and one for total phosphorus. The exceedance for ortho phosphorus was 18% December 28<sup>th</sup> and for total phosphorus was it 23% on December 28<sup>th</sup>.

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

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

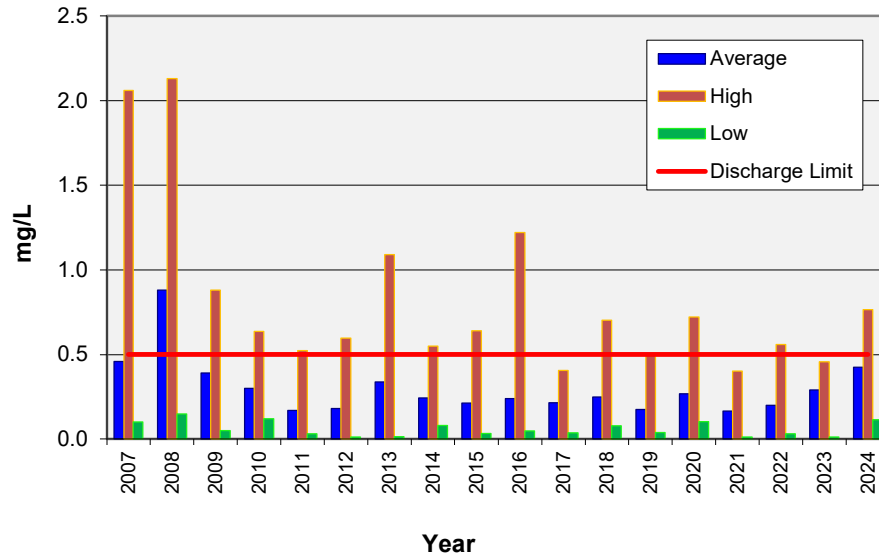
In 2019 and 2020 the results for total phosphorus remained low and mostly below the discharge limit of 1 mg/L with one ortho-phosphorus exceedance in 2019 and two exceedances in 2020. In 2021, all the results ortho- and total phosphorus were below the discharge limits. In 2022 there was one exceedance of ortho-phosphorus and no exceedance of total phosphorus. There were no exceedances for either ortho-phosphorus or phosphorus in 2023, however, there were seven exceedances recorded in 2024 for ortho-phosphorus.

Figure 11  
Total Phosphorus Levels 2007-2024

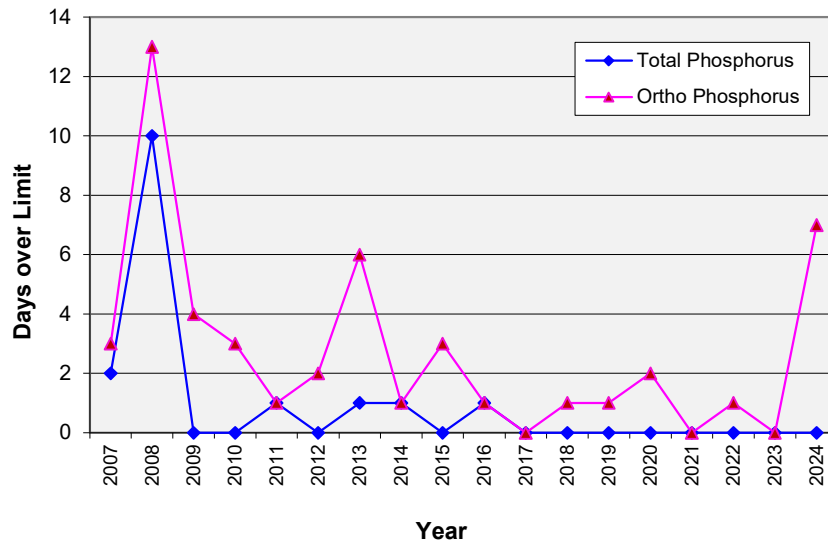




**Figure 12**  
Ortho Phosphorus Levels 2007-2024



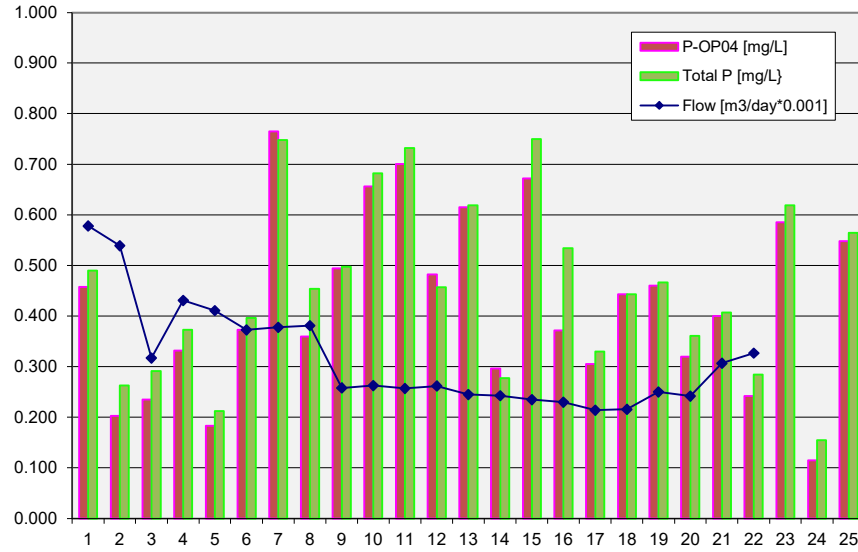
**Figure 13**  
Days over Limit 2007-2024



A graph showing the effluent flow vs phosphorus and ortho-phosphorus during each 2024 monitoring event is shown below.



Figure 14  
Total Flow and Phosphorus Levels





## 12.0 ASSESSMENT SUMMARY

In 2024 the effluent results for ortho-phosphorus during 7 monitoring events and Fecal Coliforms during 1 monitoring event did not conform to the discharge limits. However, based on the river sample results there does not appear to be any significant adverse impacts to the Elk River from the effluent discharged on the particular days with the above exceedances.

It should be noted that December 2023 and January 2025 results were added to the 2024 monitoring event due to lab closures and ineffective scheduling. The error has been identified and corrective actions have been implemented.

The plant has produced high quality effluent with **BOD<sub>5</sub>** normally below the regulated limit of 45 mg/l; all the laboratory test results were below the detection limit of 2 mg/L.

**TSS** results were less than laboratory detection limit for the majority samples tested and, therefore, below the MSR allowable limits of 45 mg/L. All daily samples from the plant were also low and well below the limits with the highest result at 1.82 mg/L.

### **Nitrogen**

Majority of ammonia-n results in the effluent were low and generally below 0.080 mg/L with three exceptions with values at 0.242, 0.296 and 20.800 mg/L. The results in the river downstream were similar to the upstream values on the corresponding days.

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 majority of the downstream results are either below the detection limits or well below the freshwater aquatic guideline.

Nitrate-n values vary between 12.9 and 45.8 mg/L in the effluent, these values are fairly typical for a municipal wastewater effluent and fairly consistent throughout the years. Nitrate-n values in the river are also similar to the background (upstream levels) and well within the freshwater aquatic guidelines with the exception of September 18<sup>th</sup>, 2024 downstream result of 3.5 mg/L. It should be noted that the results at the outfall on that day were low at 1.40 mg/L and, therefore, the elevated downstream results were not likely due to the effluent release.

Nitrite-n results in the effluent were very low with the results in the river downstream within the background (upstream) values and/or well below the freshwater aquatic guidelines.

### **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. However, in 2024 the ortho-phosphorus discharge levels in the effluent exceeded the limit of 0.5 mg/L during seven days; all total phosphorus results were below the discharge limit of 1.0 mg/L.

No significant changes were observed between the upstream and downstream results for phosphorus and ortho-phosphorus on the days with elevated effluent results.

### **Fecal Coliforms**

Generally, fecal coliforms in the effluent conformed to the applicable discharge levels throughout the year at 200 CFU/100 mL with the exception of one sample tested at 600 CFU/100 mL on December 27<sup>th</sup>, 2023. The levels in the river downstream were comparable to the upstream including December 27<sup>th</sup>, 2024.



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 was completed in the summer of 2021 by Urban Systems. FARUC is currently working with Urban Systems on solutions to the recommendations from their inspection and has filed a license review with MOE.

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), FARUC did not require an increase to permit discharge above the current limit of 1280 m<sup>3</sup>/day if the flow restriction measures were proven sustainable, which was documented over several recent years.

It should be noted that future phases of Timberlanding Development may need the licence amendment in place to accommodate the increase of the maximum daily flow from 1280 m<sup>3</sup> to 1760 m<sup>3</sup>.

Phase 1 of the Timberlanding Development, all 27 lots have been sold. 1 home remains under construction (a double lot, with a large home being constructed) and 1 remaining lot is set to begin construction in the spring. This phase also includes 4 infill lots on Lower Timberline Crescent. Of these lots 2 are currently under construction, a single home is planned for the tow lots (double lot, large home). There is one lot remaining that we haven't received an application for as of yet. All lots have been included in the calculations for 2024 (Table 11).

Phase 2 Timberlanding development has been registered, which included 21 family lots and 2 multi-family lots with a density of max 110 units. 8 homes have been completed and have been connected to the system. There are currently 7 homes under construction and 5 homes with applications approved with anticipated start of construction this spring. Phase 2 has been included in the calculations for 2024 (Table 11).

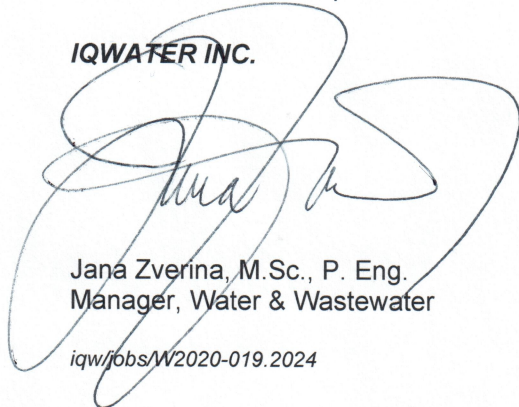
Phase 3A of the Timberlanding development consists of 25 single family lots and one multi-family lot with a max density of 40 units. Construction of Phase 3A has been completed with plans for registration of the 25 single family lots in May of 2025. Lot 26, a multi-family lot was registered in April of 2025 with construction of a 40-unit multi-family complex to begin in May of 2025.



### 13.0 AUTHORIZATION AND CLOSING

This report, titled *2024 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.**



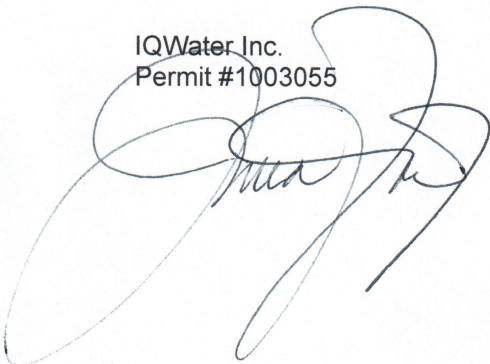
Jana Zverina, M.Sc., P. Eng.  
Manager, Water & Wastewater

iqw/jobs/W2020-019.2024



28/04/2025

IQWater Inc.  
Permit #1003055



28/04/2025



## 14.0 REFERENCES

American Public Health Association, American Water Works Association and Water Environment Federation. Standard Methods for the Examination of Water and Wastewater. 24<sup>th</sup> Edition

BC Environmental Management Act, Municipal Wastewater Regulation B.C. Reg. 87/2012, last Amended August 1<sup>st</sup>, 2024, by B.C. Reg. 178/2023 and includes amendments by B.C.Reg. 50/2024

BC Ministry of Health, Health Protection Branch, Sewerage System Standard Practice Manual, Version 3, September 2014

BC Public Health Act. Sewerage System Regulation. BC Reg. 326/2004, last amended March 30<sup>th</sup>, 2022

British Columbia Ministry of Environment and Climate Change Strategy. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary. Water Quality Guideline Series, WQG-20 (the most recent update March, 2025)

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. 2013

Health Canada.Guidelines for Canadian Drinking Water Quality. 2024



## 15.0 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 affecting 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 any 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.



# APPENDIX



Table 11.a - 2024-2025 Fernie Alpine Resort Actual and Estimated Sewage Generation (m3/day)

Existing Development	Flow* (l/unit/day)	Units	2024 Generation <sup>1</sup> (m <sup>3</sup> /day)	2025 Generation <sup>1</sup> (m <sup>3</sup> /day)
Griz Inn	1250	45	56.3	56.3
Wolf's Den	400	42	16.8	16.8
Cornerstone	1250	26	32.5	32.5
Timberline Condos	1050	58	60.9	60.9
Polar Peaks (4-Plex Units)	1250	24	30.0	30.0
Timberline Single Family & B&B	1400	51	71.4	71.4
	Subtotal	246	267.9	267.9

Infill Units	Flow* (l/unit/day)	Units	2024 Generation (m <sup>3</sup> /day)	2025 Generation (m <sup>3</sup> /day)
Timberline Infills	1050	141	148.1	148.1
Timberline Single Family	1400	2	2.8	2.8
Timberline Infills	1050	106	111.3	111.3
Highline Infill	1050	26	27.3	27.3
	Subtotal	275	289.5	289.5

Timberlandng Subdivision	Flow* (l/unit/day)	Units	2024 Generation (m <sup>3</sup> /day)	2025 Generation (m <sup>3</sup> /day)
Timberlandng Single Family (Phase 1)	1400	27	37.8	37.8
Timberlandng Single Family (Phase 2)	1400	21	29.4	29.4
Timberlandng Multifamily (Phase 2)	1050	110	115.5	115.5
Timberlandng Single Family (Phase 3A)	1400	25	35.0	35.0
Timberlandng Multifamily (Phase 3A)	1050	40	42.0	42.0
	Subtotal	223	259.7	259.7

Highline Subdivision	Flow* (l/unit/day)	Units	2024 Generation (m <sup>3</sup> /day)	2025 Generation (m <sup>3</sup> /day)
Single Family	1400	54	75.6	75.6
Duplexes	1400	10	14.0	14.0
Parcel 31-Condotel	400	61	24.4	24.4
Parcel 32-Duplex	1400	16	22.4	22.4
Parcel 36-Hotel	400	101	40.4	40.4
Parcel 37-Townhouses	1400	8	11.2	11.2
Parcel 38-Townhouses	1400	23	32.2	32.2
Parcel 3-Condominium	1050	12	12.6	12.6
Parcel 8-Condominium	1050	42	44.1	44.1
	Subtotal	327	276.9	276.9

Day Users	Flow* (l/unit/day)	Population (each)	2024 Generation (m <sup>3</sup> /day)	2025 Generation (m <sup>3</sup> /day)
Skiers	36	7000	252	252
	Subtotal	7000	252	252

Dining Facilites/Bars	Flow* (l/m <sup>2</sup> /day)	Area (m <sup>2</sup> )	2024 Generation (m <sup>3</sup> /day)	2025 Generation (m <sup>3</sup> /day)
Lizard Creek - Dining	97	54.7	5.3	5.3
Lizard Creek - Bar	145	40.4	5.9	5.9
Kelseys - Dining	97	204.4	19.8	19.8
Kelseys - Bar	145	65	9.4	9.4
Daylodge - Dining	97	358.6	34.8	34.8
Daylodge - Bar	145	260.7	37.8	37.8
Mean Bean	97	26.8	2.6	2.6
Gabrielles	97	133.8	13.0	13.0
Powder House Inn	97	232.2	22.5	22.5
Bears Den	97	62.4	6.1	6.1
	Subtotal	1439	157.2	157.2

Daily Wastewater Flow (m <sup>3</sup> /day)*	1503.1	1503.1
Corrected Daily Peak Flow Projections**	711 (actual)	1127 (estimate)

\*Estimated Wastewater flows from BC Health Act, Sewerage System Regulation - Residential ((based on projected number of occ  
\*\*Actual peak day flows for each year and estimate using the correction factor for the next year  
<sup>1</sup> Includes flows for Timberlandng Phase 3A



Table 11.b - 2011-2024 Fernie Alpine Resort Actual 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)	2022 Generation (m3/day)	2023 Generation (m3/day)	2024 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	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	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	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	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	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	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	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)	2022 Generation (m3/day)	2023 Generation (m3/day)	2024 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	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	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	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	46.0	46.0	46.0
Timberlanding Single Family	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	81.1	81.1	81.1
Timberlanding Multifamily (Phase 2)	1022	110	-	-	-	-	-	-	-	-	-	-	-	-	-	112.4
Timberlanding Single Family (Phase 2)	1363	21	-	-	-	-	-	-	-	-	-	-	-	-	-	28.6
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	26.6	26.6	26.6
	Subtotal	510.5	386.0	386.0	386.0	386.0	386.0	386.0	386.0	408.8	408.8	408.8	408.8	408.8	408.8	549.9

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)	2022 Generation (m3/day)	2023 Generation (m3/day)	2024 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	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	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	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	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	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	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	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	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	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	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)	2021 Generation (m3/day)	2022 Generation (m3/day)	2023 Generation (m3/day)	2024 Generation (m3/day)
Skiers	36	7000	252	252	252	252	252	252	252	252	252	252	252	252	252	252
	Subtotal	7000	252	252	252	252	252	252	252	252	252	252	252	252	252	252

Dining Facilites/Bars	Flow* (l/m²/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)	2022 Generation (m3/day)	2023 Generation (m3/day)	2024 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	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	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	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	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	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	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	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	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	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	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	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	1302.3	1302.3	1337.6	1344.5	1344.5	1344.5	1344.5	1344.5	1485.5
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)	810 (actual)	792 (actual)	820 (actual)	711 (actual)		

\*Estimated Wastewater flows from BC Health Act, Sewerage System Regulation - Residential and Non-residential Daily Flows

\*\*Based on peak day flows for each year

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











# January 2024 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)										Water Usage (m³)	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	River Pp				
1	1.17	1.14	1.05	1.01	0.93		0.86	0.94		1.00	495	0.137	0.148		
2	1.23	1.14	1.11	1.12	0.93	1.14	1.29		1.02		644	0.138	0.117		
3	1.26	1.10	0.68	0.95	1.02		1.34	0.82		0.93	394	0.134	0.173	< 1 / < 1	< 1 / < 1
4	1.34	1.16	1.04	0.94	1.05	1.05	1.37		1.01		677	0.133	0.177		
5	1.16	1.13	0.96	0.89	0.93		1.36	1.00		0.62	305	0.133	0.146		
6	1.07	1.09	1.23	0.98	0.91	1.06	1.35		1.03		579	0.134	0.114		
7	1.02	1.07	0.88	0.95	0.92		1.28	0.99		1.16	241	0.128	0.168		
8	1.09	1.02	1.18	0.95	0.87	0.97	1.28		0.94		267	0.130	0.177		
9	1.09	1.03	0.74	0.92	0.82		1.22	0.96		0.94	321	0.130	0.170		
10	1.14	1.02	0.68	0.92	0.92		1.17	0.96		0.98	253	0.128	0.175	< 1 / < 1	< 1 / < 1
11	0.84	0.97	1.03	0.93	0.93	0.97	1.20		0.95		412	0.127	0.133		
12	0.87	0.96	0.94	1.00	0.89		1.26	1.20		0.95	112	0.127	0.155		
13	0.46	0.83	1.27	0.92	0.95	1.10	Frozen		0.80		476	0.126	0.132		
14	0.37	0.72	0.96	0.93	0.90		0.76	0.78		0.76	386	0.127	0.257		
15	0.86	0.81	0.81	0.89	0.92	0.86	0.66		0.60		341	0.122	0.109		
16	1.19	0.85	0.84	0.93	0.93		0.75	0.74		1.13	270	0.125	0.196		
17	1.18	0.95	0.86	0.95	0.96	0.88	0.79		0.82		536	0.127	0.182	< 1 / < 1	< 1 / < 1
18	0.91	0.92	1.13	0.96	0.98		0.75	1.05		1.42	271	0.121	0.220		
19	1.05	1.00	0.81	0.97	0.86	1.07	0.97		0.88		338	0.122	0.114		
20	1.02	1.00	0.59	0.87	0.98		0.97	0.95		1.23	437	0.124	0.240		
21	0.98	1.02	1.02	1.31	0.94	1.02	1.00		0.98		707	0.125	0.194		
22	1.03	1.05	0.89	1.01	0.97		0.94	0.97		1.01	258	0.120	0.167		
23	1.01	1.02	0.53	0.97	0.96	0.94	0.88		0.93		372	0.295	0.170		
24	0.94	0.88	1.03	0.97	0.95		0.86	0.88		0.96	391	0.321	0.138	< 1 / < 1	< 1 / < 1
25	0.78	0.88	0.89	0.92	0.95	0.81	0.79		0.95		327	0.371	0.209		
26	0.88	0.87	1.15	1.06	0.86		0.81	0.82		0.87	331	0.238	0.154		
27	1.03	1.04	1.04	0.91	0.85	0.91	0.81		1.10		420	0.181	0.182		
28	0.89	0.96	0.80	0.93	0.90		0.88	0.87		0.78	517	1.158	0.196		
29	0.84	0.96	1.28	0.98	0.93	1.07	0.98		1.00		621	1.878	0.391		
30	0.75	0.92	1.30	0.87	0.88		0.92	1.03		0.66	229	0.856	0.234		
31	0.79	0.99	0.80	0.90	0.74		0.81	0.90		0.85	328	0.646	0.131	< 1 / < 1	< 1 / < 1
Average	0.98	0.98	0.95	0.96	0.92	0.99	1.01	0.93	0.93	0.96	395	0.283	0.176		
Median	1.02	1.00	0.96	0.95	0.93	1.00	0.96	0.95	0.95	0.95	372	0.130	0.170		
Total											12256			>1	>1



**February 2024 Water Report for Fernie Alpine Resort Utilities Corp.**

Day	Chlorine Residual (mg/L)										Water Usage (m <sup>3</sup> )	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	River Pp				
1	0.82	0.96	0.20	0.89	0.95	1.16	0.85		0.89		448	0.652	0.272		
2	0.76	1.06	1.52	1.05	0.85		0.95	0.85		0.75	336	0.574	0.138		
3	0.19	0.73	0.92	0.91	0.95	1.21	0.91		0.87		481	0.374	0.183		
4	1.31	0.82	0.89	1.10	0.92		0.95	0.65		1.01	275	0.316	0.239		
5	1.39	0.90	1.44	1.02	0.97	0.90	0.95		0.83		564	0.221	0.154		
6	1.12	1.03	0.82	0.94	0.90		0.93	0.94		0.97	99	0.193	0.120		
7	1.02	0.89	1.12	0.96	0.88	1.06	0.97		0.96		380	0.168	0.114	<1 / < 1	< 1 / < 1
8	0.94	0.95	1.05	0.99	0.87		0.84	0.86		1.12	237	0.153	0.233		
9	1.11	1.01	0.25	1.03	0.78	0.72	0.91	1.28			264	0.143	0.216		
10	1.36	0.90	0.13	0.78	0.82		0.84	0.78	0.88	0.65	467	0.134	0.386		
11	1.47	1.01	1.53	0.43	0.70	1.74	0.76		0.87		309	0.139	0.143		
12	1.37	1.04	0.24	0.56	0.81		0.53	0.48		0.45	504	0.128	0.153		
13	1.03	0.95	0.62	0.81	0.76	0.97	0.83		0.94		210	0.123	0.127		
14	0.87	0.94	0.52	0.70	0.81		0.69	0.91		0.88	235	0.118	0.140	<1 / < 1	< 1 / < 1
15	0.94	0.75	0.34	0.75	0.71	0.75	0.79		0.56		223	0.115	0.142		
16	1.06	0.82	0.68	0.70	0.75		0.71	0.59		0.59	466	0.117	0.114		
17	1.31	0.89	0.82	0.69	0.71	0.43	0.68		0.80		385	0.116	0.106		
18	1.39	0.94	1.15	0.74	0.72		0.91	0.86		0.67	473	0.115	0.109		
19	1.49	0.84	0.77	0.72	0.45	0.69	0.68		0.89		626	0.114	0.117		
20	1.64	1.08	0.30	0.63	0.62		0.82	0.62		0.71	450	0.113	0.121		
21	1.38	1.08	0.73	0.58	0.65		0.80	0.94		0.66	287	0.108	0.130	<1 / < 1	< 1 / < 1
22	1.19	1.09	0.52	0.67	0.66	0.76	0.80		0.86		467	0.122	0.122		
23	0.91	0.98	0.32	0.72	0.65		0.93	0.74		0.74	480	0.124	0.074		
24	1.13	0.93	1.06	0.71	0.69	0.74	0.89		0.67		492	0.120	0.085		
25	1.25	0.91	1.01	0.71	0.65		0.85	0.86		0.65	328	0.122	0.113		
26	1.22	0.97	1.02	0.69	0.67	0.81	0.84		0.88		469	0.646	0.129		
27	1.27	0.64	1.49	0.66	0.58		0.89	0.83		0.74	322	0.192	0.120		
28	1.47	0.84	1.04	0.53	0.77	1.20	0.88		0.84		398	0.151	0.165	<1 / < 1	< 1 / < 1
29	1.65	1.11	1.32	1.46	0.75		0.95	0.86		1.03	459	0.833	0.192		
30															
31															
Average	1.17	0.93	0.82	0.80	0.76	0.94	0.84	0.82	0.84	0.77	384	0.226	0.154		
Median	1.22	0.94	0.82	0.72	0.75	0.86	0.85	0.86	0.87	0.74	398	0.134	0.130		
Total											11134			>1	ok



### March 2024 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)										Water Usage (m <sup>3</sup> )	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	River Pp				
1	1.35	0.99	1.28	1.31	0.62		0.40	0.61		0.59	344	0.837	0.240		
2	1.61	1.07	1.41	0.78	0.80	1.14	0.99		1.03		534	0.297	0.150		
3	0.98	1.02	1.09	0.79	0.63		0.96	0.86		1.55	530	0.199	0.137		
4	0.66	0.93	0.40	0.72	0.93	0.95	0.92		0.95		465	0.180	0.151		
5	1.18	0.93	1.23	0.99	0.93		0.94	0.92		1.05	330	0.148	0.189		
6	1.76	1.08	0.52	0.96	0.80	0.48	0.82		0.88		320	0.130	0.109	< 1 / < 1	< 1 / < 1
7	1.65	1.13	1.30	0.83	0.97		0.61	1.04		0.81	353	0.122	0.154		
8	1.31	1.16	1.18	0.93	0.82	1.03	0.72		1.09		434	0.119	0.108		
9	1.29	1.18	1.26	0.91	0.89		0.95	1.06		1.13	418	0.113	0.109		
10	1.17	1.10	1.38	0.85	0.81	0.86	0.94		0.98		394	0.112	0.196		
11	1.01	1.10	3.56	1.03	0.87		0.93	1.03		0.97	514	0.129	0.164		
12	0.95	0.96	0.98	0.88	0.91	0.98	1.06		1.02		238	0.118	0.143		
13	0.84	0.97	1.21	1.02	0.85		1.02	0.93		1.30	511	0.122	0.144	< 1 / < 1	< 1 / < 1
14	0.81	0.92	0.75	0.86	0.72	0.87	0.84		0.86		194	0.121	0.132		
15	0.74	0.84	2.02	0.67	0.88		0.89	0.86		0.87	494	0.120	0.147		
16	0.81	0.78	1.80	0.86	0.80	0.78	0.82		0.80		244	0.135	0.119		
17	0.90	0.92	0.63	0.86	0.82		0.90	0.87		1.00	455	0.302	0.114		
18	0.48	0.76	0.69	0.97	0.88	1.12	0.91		0.86		474	0.556	0.119		
19	0.77	0.81	0.63	0.94	0.85		0.77	0.84		0.94	613	0.693	0.145		
20	0.68	0.80	0.70	0.81	1.00	1.03	0.70		0.91		217	0.636	0.124	< 1 / < 1	< 1 / < 1
21	0.60	0.73	0.95	0.84	0.83		0.73	1.07		0.93	333	0.702	0.068		
22	0.65	0.92	0.95	0.86	0.87	0.96	0.79		0.87		471	0.337	0.075		
23	0.82	0.88	0.69	1.37	0.89		0.85	0.81		0.77	396	0.200	0.129		
24	0.73	0.82	0.92	0.94	0.90	0.79	0.84		0.80		238	0.165	0.112		
25	0.53	0.81	0.81	0.87	1.41		0.80	0.81		0.48	437	0.150	0.109		
26	0.47	0.88	1.28	0.87	1.30	0.80	0.80		0.81		452	0.139	0.121		
27	0.48	0.85	0.92	0.76	0.84		0.56	0.79		0.88	499	0.126	0.104	< 1 / < 1	< 1 / < 1
28	0.62	0.78	1.00	0.88	0.99	1.00	0.71		1.22		345	0.124	0.333		
29	1.52	0.97	0.98	0.84	0.89		0.90	0.72		0.92	619	0.135	0.128		
30	6.72	1.18	1.04	0.88	0.81	0.77	0.75		1.03		469	0.137	0.134		
31	5.14	1.32	1.31	0.90	0.85		0.87	1.03		0.95	228	0.128	0.127		
Average	1.27	0.95	1.12	0.90	0.88	0.90	0.83	0.89	0.94	0.95	405	0.243	0.140		
Median	0.84	0.93	1.00	0.87	0.87	0.95	0.84	0.87	0.91	0.94	434	0.137	0.129		
Total											12563			>1	>1



**April 2024 Water Report for Fernie Alpine Resort Utilities Corp.**

Day	Chlorine Residual (mg/L)										Water Usage (m <sup>3</sup> )	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	River Pp				
1	3.15	1.40	1.01	0.88	0.95	0.89	1.19		1.11		451	0.135	0.126		
2	0.71	1.18	1.48	1.08	1.26		1.20	1.21		1.27	201	0.291	0.188	< 1 / < 1	< 1 / < 1
3	0.92	1.10	0.59	0.83	0.89	1.08	1.25		1.07		254	1.172	0.112		
4	0.89	1.03	1.32	0.81	0.88		1.15	1.01		0.91	398	0.734	0.143		
5	0.84	1.02	1.00	0.93	0.94	0.90	0.75		0.84		395	0.428	0.168		
6	0.84	0.99	1.13	0.52	1.27		0.97	0.89		0.80	225	0.309	0.132		
7	0.85	1.02	1.04	0.94	0.90	1.08	0.94		0.92		447	0.344	0.081		
8	0.82	1.01	1.54	0.89	1.15		0.87	1.32		0.95	249	0.319	0.138		
9	0.76	0.95	0.35	0.89	0.90	0.91	0.90		0.90		421	0.372	0.153		
10	0.77	0.88	0.99	0.86	0.97	0.87	0.47		0.87		188	0.365	0.136	< 1 / < 1	< 1 / < 1
11	0.77	0.88	1.58	1.22	0.91		0.75	0.81		0.87	414	0.395	0.158		
12	0.74	0.86	0.48	1.37	0.84	0.71	0.71		0.82		221	0.636	0.074		
13	0.68	0.99	1.53	0.96	0.84		0.78	0.86		1.03	366	1.589	0.117		
14	0.45	1.01	1.50	0.93	1.10	0.95	0.79		0.88		376	1.516	0.087		
15	0.73	0.95	0.87	1.00	0.86		0.88	0.94		0.85	365	0.975	0.334		
16	0.73	1.08	0.50	1.12	0.92	0.90	0.83		0.86		424	0.395	0.169		
17	0.71	1.08	0.63	0.86	1.10		0.92	0.76		1.07	192	0.480	0.126	< 1 / < 1	< 1 / < 1
18	0.67	0.97	1.40	1.30	0.85	0.88	0.89		0.86		414	0.217	0.122		
19	0.52	0.80	1.00	1.00	0.87		0.75	0.90		1.05	336	0.380	0.075		
20	0.70	0.89	0.76	1.01	0.93	0.85	0.90		0.85		219	0.172	0.142		
21	0.18	0.59	0.83	1.02	0.85		0.91	0.72		0.71	0	0.168	0.138		
22	0.72	0.52	0.66	0.64	0.73	0.43	0.66		0.43		0	0.163	0.121		
23	0.60	0.48	1.44	0.96	1.02		0.58	0.99		0.89	473	0.266	0.124		
24	0.52	0.62	1.55	0.86	0.89		0.43	0.87		0.67	427	0.236	0.155	< 1 / < 1	< 1 / < 1
25	1.38	0.78	0.51	0.88	0.87	0.53	0.62		0.62		0	0.163	0.177		
26	1.27	1.01	1.00	0.88	0.78		0.63	0.81		0.87	192	1.240	0.151		
27	1.29	1.05	0.49	1.07	0.86	0.67	0.77		0.85		432	0.347	0.118		
28	1.32	1.05	0.62	1.20	0.82		0.87	1.03		0.61	253	0.561	0.077		
29	1.25	1.07	1.41	0.94	0.78	0.83	0.92		0.86		374	0.236	0.140		
30	1.35	0.90	1.06	0.84	0.85		0.47	0.88		0.79	197	0.189	0.115		
31															
Average	0.90	0.94	1.01	0.96	0.93	0.83	0.83	0.93	0.85	0.89	297	0.493	0.137		
Median	0.77	0.99	1.00	0.94	0.89	0.88	0.85	0.89	0.86	0.87	351	0.356	0.134		
Total											8904			>1	>1



**May 2024 Water Report for Fernie Alpine Resort Utilities Corp.**

Day	Chlorine Residual (mg/L)										Water Usage (m <sup>3</sup> )	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	River Pp				
1	1.26	0.99	0.71	0.66	0.92	0.93	0.80		0.84		374	0.171	0.072	< 1 / < 1	< 1 / < 1
2	1.18	1.03	0.94	0.80	1.01		0.75	0.84		0.65	241	0.159	0.111		
3	1.01	0.78	1.91	1.20	0.80	0.74	0.84		0.84		410	0.159	0.131		
4	1.01	0.78	0.90	0.43	0.65		0.44	0.44		0.54	293	0.120	0.108		
5	1.12	0.99	1.11	0.90	0.85	0.94	1.05		0.85		433	0.140	0.122		
6	1.14	1.03	1.42	1.23	0.91		1.08	0.92		1.00	203	0.138	0.106		
7	1.17	1.00	0.77	0.84	1.14	1.02	0.65		0.92		192	0.151	0.107		
8	1.04	1.20	1.26	1.08	0.87		0.83	0.87		1.15	408	0.141	0.113	< 1 / < 1	< 1 / < 1
9	1.08	1.10	0.96	0.87	0.89	0.80	0.91		1.00		196	0.463	0.101		
10	1.06	1.07	1.06	0.99	0.90		0.93	0.90		1.15	214	0.122	0.154		
11	1.08	1.11	0.72	1.77	0.93	0.81	0.94		1.04		413	0.127	0.110		
12	1.06	1.18	1.62	1.00	0.99		0.97	1.02		1.14	389	0.133	0.106		
13	1.07	1.13	1.07	0.93	0.90	0.71	0.99		1.01		288	0.132	0.074		
14	1.17	1.04	1.00	1.58	0.93		0.99	0.98		1.31	400		0.105		
15	1.20	1.21	0.60	0.63	1.06		1.00	0.96		2.20	441	0.122	0.127	< 1 / < 1	< 1 / < 1
16	0.94	1.40	0.69	2.12	1.02	1.04	0.92		0.94		269	0.116	0.084		
17	0.94	1.06	0.91	1.00	1.01		0.95	0.87		0.90	567	0.122	0.198		
18	1.03	1.05	0.90	0.91	0.98	0.92	0.98		0.89		192	0.126	0.238		
19	1.00	1.04	1.19	0.93	0.93		0.90	0.80		0.60	410	0.117	0.113		
20	1.05	1.01	0.58	0.88	0.96	0.85	0.88		0.92		436	0.111	0.106		
21	1.01	1.02	0.69	0.87	0.91		0.92	0.92		0.85	462	0.105	0.089		
22	0.93	0.99	0.80	0.89	1.21	0.90	0.83		0.90		193	0.102	0.091	< 1 / < 1	< 1 / < 1
23	0.90	0.99	0.54	0.87	0.90		0.82	0.79		0.90	440	0.102	0.106		
24	0.99	1.01	1.05	0.95	0.94	0.84	0.85		0.92		276	0.175	0.079		
25	0.93	0.99	0.66	1.22	0.98		0.84	0.89		0.96	371	0.112	0.107		
26	0.93	0.95	0.90	0.80	0.96	0.94	0.88		0.86		428	0.577	0.132		
27	0.92	1.00	0.64	0.85	1.20		0.86	0.86		0.82	220	0.120	0.079		
28	0.93	0.92	1.43	1.41	0.88	0.79	0.92		0.84		273	0.105	0.064		
29	1.07	0.97	0.90	0.93	0.87		0.82	0.99		1.06	43	0.099	0.092		
30	0.96	0.89	1.12	0.65	0.90	0.75	0.80		0.82		176	0.097	0.129	< 1 / < 1	< 1 / < 1
31	0.98	0.99	1.19	0.93	0.91		0.87	0.86			280	0.094	0.096		
Average	1.04	1.03	0.98	1.00	0.95	0.87	0.88	0.87	0.91	1.02	320	0.152	0.111		
Median	1.03	1.01	0.91	0.93	0.93	0.85	0.88	0.88	0.90	0.96	293	0.122	0.106		
Total											9931			>1	>1



### June 2024 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)										Water Usage (m <sup>3</sup> )	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	River Pp				
1	0.96	1.08	0.95	0.84	0.83	0.70	0.75		0.75		276	0.091	0.087		
2	1.00	0.99	0.73	0.80	0.83		0.83	0.90		0.84	197	0.090	0.086		
3	0.86	0.94	1.44	0.10	0.87	0.85	0.83		1.33		165	4.908	0.228		
4	0.82	0.89	0.85	0.93	0.91		0.90	0.83		1.17	317	0.949	0.119		
5	0.74	0.91	1.09	0.85	0.85		0.83	0.82		0.92	308	0.647	0.839	< 1 / < 1	< 1 / < 1
6	0.74	0.89	0.71	0.82	0.85	0.83	0.83		0.89		501	0.293	0.110		
7	0.69	0.83	1.80	0.85	0.85		0.80	0.83		0.89	414	0.187	0.104		
8	0.75	0.91	0.68	0.87	0.89	0.80	0.80		1.06		190	0.144	0.164		
9	0.72	0.70	0.80	0.87	0.90		0.86	0.73		0.80	516	0.130	0.083		
10	0.62	0.72	1.89	0.85	0.95	0.87	0.89		0.84		349	0.444	0.106		
11	0.57	0.69	1.16	0.98	0.88		0.78	0.80		0.86	461	0.143	0.125		
12	0.58	0.86	2.02	0.86	0.84	0.12	0.79		0.84		448	0.155	0.110	< 1 / < 1	< 1 / < 1
13	1.93	0.93	0.72	0.85	0.87		0.85	0.84		0.87	208	0.101	0.102		
14	1.52	1.12	1.22	0.53	0.83	0.11	0.89		0.89		314	0.097	0.081		
15	1.12	1.10	1.01	0.84	0.75		0.86	0.86		0.68	256	0.100	0.102		
16	0.84	1.11	1.50	0.97	1.25	0.75	0.76		0.84		361	0.240	0.018		
17	0.71	0.94	1.24	0.75	0.87		0.96	0.93		0.77	183	0.131	0.126		
18	1.10	0.88	1.07	0.87	1.04	0.78	1.01		0.88		287	0.343	0.399		
19	1.02	0.89	1.00	0.92	0.92		0.94	0.79		0.87	263	0.160	0.182	< 1 / < 1	< 1 / < 1
20	1.03	0.86	0.77	1.25	0.86	0.96	0.86		0.60		447	0.113	0.126		
21	1.51	0.93	0.64	0.80	0.86		0.90	0.86		0.89	408	0.102	0.160		
22	1.55	1.04	0.67	0.95	0.88	0.93	0.70		0.83		492	0.098	0.177		
23	1.23	1.07	1.60	1.05	1.09		0.86	1.04		0.76	359	0.096	0.068		
24	1.07	1.09	1.05	0.85	0.79	0.91	0.97		1.06		260	0.097	0.168		
25	0.96	1.04	1.53	0.90	0.85		0.84	0.97		0.86	434	0.094	0.148		
26	0.84	0.98	0.57	0.87	1.10		0.95	0.80		0.96	461	0.091	0.065	< 1 / < 1	< 1 / < 1
27	0.90	0.95	0.72	0.95	0.94	0.99	0.91		0.86		506	0.089	0.065		
28	1.17	0.93	0.27	0.80	0.97		0.82	0.77		0.81	259	0.094	0.148		
29	1.22	0.92	0.54	1.05	0.83	1.00	0.83		1.19		513	0.083	0.130		
30	1.03	0.93	0.63	0.91	0.86		0.76	0.71		0.76	511	0.081	0.152		
31															
Average	0.99	0.94	1.03	0.86	0.90	0.76	0.85	0.84	0.92	0.86	355	0.346	0.153		
Median	0.96	0.93	0.98	0.87	0.87	0.84	0.85	0.83	0.87	0.86	354	0.108	0.122		
Total											10664			>1	>1



**July 2024 Water Report for Fernie Alpine Resort Utilities Corp.**

Day	Chlorine Residual (mg/L)										Water Usage (m³)	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>		River Pump			
1	0.98	0.91	0.73	0.81	0.98	0.83	0.87		0.88		329	0.104	0.108		
2	0.87	0.93	0.77	0.87	0.86		0.87	0.89		0.88	344	0.089	0.151		
3	0.73	0.89	0.74	0.81	1.05	0.79	0.85		0.85		192	0.090	0.155	< 1 / < 1	< 1 / < 1
4	0.77	0.88	0.77	0.91	0.84		0.81	0.78	0.78	1.05	412	0.086	0.146		
5	1.06	0.90	0.80	0.89	1.10	1.23	0.90		0.93		478	0.086	0.137		
6	1.22	0.90	0.57	0.87	0.92		0.85	0.69		0.96	494	0.085	0.131		
7	1.26	0.92	1.36	0.80	0.86	0.82	0.81		1.00		491	0.084	0.068		
8	1.32	0.92	1.70	0.80	0.91	0.96	0.86	0.94			357	0.086	0.070		
9	0.99	0.94	1.23	1.00	0.82		0.88		0.88	0.79	484	0.087	0.068		
10	0.97	0.92	1.67	0.88	0.88		0.87		0.88	0.98	611	0.085	0.065	< 1 / < 1	< 1 / < 1
11	0.79	0.99	1.54	0.96	0.83	0.87	0.87		0.99		540	0.090	0.062		
12	0.73	0.93	1.60	0.86	0.86		0.84	0.96		0.90	590	0.086	0.127		
13	0.67	0.89	0.60	0.80	0.66	0.76	0.80		0.60		558	0.091	0.124		
14	0.83	0.87	1.94	0.95	0.83		0.82	0.85		0.84	362	0.089	0.071		
15	0.97	0.86	1.12	0.90	0.88	1.04	0.75		0.90		765	0.087	0.071		
16	1.08	0.86	0.65	0.89	0.83		0.80	0.85		0.79	438	0.089	0.073		
17	1.09	0.77	0.91	0.82	0.79	0.85	0.83		0.89		657	0.091	0.073	< 1 / < 1	< 1 / < 1
18	1.04	0.89	0.89	0.81	0.87		0.77	0.81		0.91	335	0.088	0.191		
19	1.13	0.92	1.31	0.81	0.82	1.10	0.76		0.91		854	0.087	0.143		
20	0.86	0.90	1.03	0.82	0.83		0.71	0.82		0.85	428	0.090	0.086		
21	1.40	0.93	0.89	0.91	0.79	0.68	0.76		0.89		703	0.091	0.095		
22	1.13	0.97	1.63	0.94	0.88		0.82	0.88		0.81	403	0.090	0.121		
23	1.49	0.95	1.61	0.85	0.84	0.90	0.79		0.84		778	0.088	0.171		
24	1.76	0.91	1.02	1.01	0.86	0.98	0.80	0.90			407	0.089	0.078	< 1 / < 1	< 1 / < 1
25	1.78	0.99	1.59	0.80	0.80		0.79	0.86		0.92	505	0.089	0.089		
26	1.88	0.97	0.80	0.81	0.73	0.94	0.85		0.95		656	0.086	0.118		
27	1.76	1.00	0.81	0.80	0.79		0.92	0.91		0.74	494	0.084	0.138		
28	1.72	1.02	0.86	0.92	0.82	0.92	0.87		0.94		576	0.083	0.142		
29	1.81	1.05	0.96	0.83	0.82		0.86	0.94		0.76	497	0.083	0.148		
30	1.38	1.04	0.92	0.87	0.89	0.98	0.85		0.93		855	0.084	0.144		
31	1.00	1.06	0.76	0.84	0.78		0.82	0.96		0.92	477	0.082	0.086	< 1 / < 1	< 1 / < 1
Average	1.18	0.93	1.09	0.87	0.85	0.92	0.83	0.87	0.88	0.87	518	0.088	0.111		
Median	1.08	0.92	0.92	0.86	0.84	0.91	0.83	0.88	0.89	0.88	494	0.087	0.118		
Total											16070			>1	>1



**August 2024 Water Report for Fernie Alpine Resort Utilities Corp.**

Day	Chlorine Residual (mg/L)										Water Usage (m <sup>3</sup> )	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>		River Pp			
1	0.84	0.96	1.41	0.83	0.71	0.65	0.76		0.68		668	0.081	0.140		
2	0.68	0.90	1.20	0.81	0.83		0.97	0.97		0.99	675	0.083	0.133		
3	0.57	0.85	1.10	0.86	0.73	1.10	0.75		0.80		754	0.085	0.253		
4	0.97	0.81	0.74	0.81	0.74		0.77	0.74		0.69	707	0.084	0.145		
5	1.65	0.80	0.86	0.80	0.75	0.87	0.79		0.86		376	0.083	0.091		
6	4.94	0.90	2.05	0.83	0.94		0.76	0.88		0.83	671	0.079	0.084		
7	1.88	0.92	0.72	0.82	0.81		0.80	0.96		0.86	434	0.077	0.087	< 1 / < 1	< 1 / < 1
8	1.60	1.04	0.72	1.05	0.89	0.87	0.90		1.00		433	0.077	0.086		
9	1.48	1.07	0.64	0.87	0.80		0.88	0.87		0.94	598	0.077	0.139		
10	6.47	1.07	1.21	0.90	0.80	1.08	0.95				496	0.079			
11	7.16	1.03	2.20	0.91	0.91		0.94	0.97		0.92	568	0.079	0.077		
12	5.63	1.09	0.54	0.89	0.81	0.95	0.89		0.97		381	0.079	0.080		
13	6.18	1.18	0.82	0.89	1.04		0.94	1.01		0.77	601	0.077	0.163		
14	6.23	1.20	0.64	0.86	0.95	0.79	0.92		1.04		425	0.079	0.077	< 1 / < 1	< 1 / < 1
15	5.04	1.21	1.20	1.20	0.84		0.89	1.10		0.90	535	0.078	0.111		
16	4.14	1.17	0.57	0.84	0.89	0.98	0.95		0.92		630	0.080	0.151		
17	3.76	1.21	1.84	0.94	0.99		1.05	1.29		0.87	463	0.078	0.157		
18	1.56	1.20	0.74	0.88	0.86	0.83	1.03		0.77		488	0.076	0.143		
19	1.40	1.22	0.65	0.84	0.94		1.01	1.03		0.71	523	0.078	0.077		
20	1.07	1.17	1.17	0.98	0.93	1.02	0.94		0.98		547	0.079	0.074		
21	1.69	1.09	1.33	0.81	0.79			0.90		0.75	301	0.081	0.075	< 1 / < 1	< 1 / < 1
22	1.90	1.08	0.50	0.75	0.87	0.82	0.66		0.80		580	0.075	0.074		
23	1.84	1.07	1.57	0.83	0.83		0.83	0.77		0.70	563	0.074	0.155		
24	1.76	1.16	1.10	0.80	0.79	0.80	0.81		0.80		445	0.077	0.304		
25	1.74	1.01	0.71	0.75	0.85		0.67	0.89		0.75	568	0.078	0.110		
26	1.87	1.05	0.96	0.84	0.90	1.06	0.90		0.99		459	0.079	0.195		
27	1.63	0.98	1.25	0.80	0.78		0.85	0.84		0.92	229	0.074	0.090		
28	1.65	1.05	0.92	0.87	0.79	0.92	0.71		0.89		387	0.082	0.161	< 1 / < 1	< 1 / < 1
29	4.75	1.04	1.17	0.95	0.90		0.86	0.84		1.00	411	0.121	0.080		
30	5.63	1.07	0.72	0.76	0.80	0.89	0.88		0.96		510	0.073	0.144		
31	4.24	1.08	1.60	0.87	0.76		0.91	0.83		1.04	353	0.080	0.121		
Average	2.97	1.05	1.06	0.87	0.85	0.91	0.87	0.93	0.89	0.85	509	0.080	0.126		
Median	1.84	1.07	0.96	0.84	0.83	0.89	0.89	0.90	0.91	0.87	510	0.079	0.116		
Total											15779			#REF!	#REF!



### September 2024 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)										Water Usage (m³)	Turbidity (NTU)		Independent Testing		
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		River Pp	Spring	River	T. Coliform	E. Coli
	CL₂	CL₂	CL₂	CL₂	CL₂	CL₂	CL₂	CL₂	CL₂	CL₂						
1	5.05	1.12	0.60	0.80	0.89	0.99	0.96		1.03		602	0.069	0.076			
2	3.98	1.25	0.84	0.90	0.89		0.96	0.88		1.04	740	0.083	0.135			
3	1.89	1.31	0.37	0.90	0.94	0.94	0.95		0.97		476	0.090	0.144			
4	1.85	1.28	0.97	0.89	0.86		0.90	0.81		0.92	197	0.083	0.205	< 1 / < 1	< 1 / < 1	
5	1.82	1.25	0.99	0.94	0.80	0.99	0.74		0.99		465	0.084	0.152			
6	1.74	1.22	0.85	0.88	0.97		0.87	0.55		0.74	526	0.081	0.142			
7	1.62	1.29	0.96	0.94	0.78	0.96	0.94		0.92		482	0.079	0.201			
8	1.58	1.16	0.60	0.79	0.94		0.95	0.95		0.89	386	0.064	0.077			
9	1.58	1.12	0.95	0.86	0.90	0.97	0.93		1.18		228	0.148	0.154			
10	1.51	1.11	1.05	0.88	0.87	0.72	0.93		0.97		313	0.064	0.085			
11	1.47	1.18	0.85	0.85	0.99		1.00	0.96		0.79	341	0.063	0.162			
12	1.45	1.08	2.04	0.93	0.86	0.92	0.93		1.01		438	0.064	0.177	< 1 / < 1	< 1 / < 1	
13	1.42	1.09	1.25	0.93	0.85		0.96	0.95		0.86	183	0.202	0.185			
14	1.27	1.07	1.01	0.87	0.81	0.99	0.96		1.16		393	0.065	0.158			
15	1.34	1.12	0.58	0.87	0.99		0.92	0.92		0.82	213	0.129	0.115			
16	1.23	1.01	0.92	0.85	0.95	0.92	1.02		0.81		216		0.179			
17	1.32	1.01	1.12	0.90	1.10		0.87	0.91		0.73	425		0.090			
18	1.24	0.99	0.81	0.84	0.83	0.95	1.02		0.85		325		0.187	< 1 / < 1	< 1 / < 1	
19	1.25	0.92	0.70	0.84	0.87		0.88	0.92		0.92	202		0.171			
20	1.24	0.90	0.84	0.82	0.80	0.86	0.80		0.67		427	0.090	0.181			
21	1.25	0.94	1.56	0.82	0.79		0.85	0.82		1.00	437	0.085	0.088			
22	1.27	0.93	0.70	0.83	0.91	0.89	0.87		0.88		302	0.491	0.089			
23	1.29	0.87	0.88	0.80	0.95		0.83	0.86		0.71	281	2.655	0.199			
24	1.20	0.88	0.45	0.80	0.80	0.91	0.81		1.06		443	5.145	0.179			
25	1.26	0.84	0.68	0.82	1.11		0.84	0.94		0.68	263	0.086	0.117	< 1 / < 1	< 1 / < 1	
26	1.19	0.82	0.73	0.80	0.83	0.81	0.83		0.79		343	0.353	0.190			
27	1.19	0.80	1.47	0.87	1.06		0.85	0.90		0.60	201	0.401	0.390			
28	1.14	0.81	0.62	0.75	0.88	0.94	0.88		0.86		422		0.235			
29	1.21	0.83	0.40	0.79	0.84		0.79	0.88		1.18	202	0.082	0.171			
30	1.22	0.86	0.73	0.75	0.81	0.88	0.84		0.87		311	0.107	0.114			
Average	1.60	1.04	0.88	0.85	0.90	0.92	0.90	0.88	0.94	0.85	359	0.435	0.158			
Median	1.31	1.04	0.85	0.85	0.88	0.93	0.89	0.91	0.95	0.84	342	0.085	0.160			
Total											10783			>1	>1	



### October 2024 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)										Water Usage (m <sup>3</sup> )	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	River Pp				
1	1.24	0.89	1.31	0.81	0.85		0.77	0.85		0.97	245	0.079	0.197		
2	1.21	0.97	1.02	0.78	0.86	1.06	0.81		0.82		427	0.078	0.185	< 1 / < 1	< 1 / < 1
3	1.21	0.88	2.81	0.80	0.81		0.80	0.81		0.79	390	0.082	0.092		
4	1.24	0.99	1.20	0.89	0.81	1.00	0.93		0.95		213	0.077	0.168		
5	1.12	1.00	0.44	0.90	0.87		0.90	0.86		0.91	418	0.187	0.178		
6	1.28	0.86	0.97	0.89	0.98	0.75	0.91		0.90		178	0.089	0.180		
7	1.46	0.99	1.85	0.87	0.85		0.85	0.89		0.93	400	0.086	0.177		
8	1.56	0.89	0.64	0.87		0.73	0.86		0.81		172	0.082	0.183		
9	1.67	0.86	0.71	0.84	0.80		0.88	1.10		0.90	303	0.081	0.103	< 1 / < 1	< 1 / < 1
10	1.86	0.96	0.90	0.90	0.78	0.78	0.82		0.76		265	0.081	0.182		
11	1.98	0.99	1.04	0.90	0.91		0.85				365	0.081	0.092		
12	3.08	1.19	1.40	0.81	0.93	0.80	0.84		0.85		420	0.081	0.174		
13	4.31	1.03	0.53	0.88	0.87		0.88	0.90		0.87	391	0.079	0.203		
14	4.67	1.03	1.31	0.81	0.88		0.85	0.85		0.86	174	0.083	0.193		
15	4.09	0.99	1.15	1.25	0.83	1.01	0.94		0.68		408	0.078	0.184		
16	3.77	1.01	1.10	0.84	0.80		0.94	0.94		0.89	276	0.078	0.129	< 1 / < 1	< 1 / < 1
17	3.90	1.10	0.41	0.80	0.81	0.91	0.95		0.91		342	0.089	0.118		
18	4.10	1.14	1.25	1.12	0.74		0.94	0.89		1.10	320	0.116	0.114		
19	3.59	1.14	1.25	0.89	0.77	0.98	0.90		0.99		202	Off (1.44)	0.195		
20	1.46	1.09	1.87	0.87	0.71		0.88	0.82		1.19	355	Off (0.94)	0.127		
21	1.36	1.10	1.37	0.97	0.66	0.91	1.00		0.91		234	0.150	0.217		
22	1.29	0.96	2.20	0.79	0.83		0.98	0.99		0.90	385	Off (1.262)	0.388		
23	1.38	1.09	0.79	0.80	1.02	1.11	1.01		1.00		192	0.245	0.179	< 1 / < 1	< 1 / < 1
24	1.31	1.04	1.16	0.83	0.89			0.91		1.03	185	0.175	0.098		
25	1.23	1.14	0.93	0.70	0.72	1.02	1.03		0.96		389	0.154	0.006		
26	1.15	1.15	0.87	0.80	0.68		1.00	0.85		0.84	180	0.143	0.022		
27	0.73	1.04	1.05	0.69	0.85	0.98	0.97		0.89		261	0.136	0.043		
28	0.58	1.02	0.71	0.84	0.79		0.99	0.96		0.99	315	Off (7.819)	0.191		
29	0.59	1.03	1.03	1.09	0.90	1.02	0.96		0.81		194	0.396	0.119		
30	0.56	1.02	0.78	0.78	0.82		0.95	0.81		0.97	376	0.179	0.012	< 1 / < 1	< 1 / < 1
31	0.42	0.98	1.01	0.72	0.98	1.05	0.96		0.96		172	0.150	0.015		
Average	1.92	1.02	1.13	0.86	0.83	0.94	0.91	0.90	0.88	0.94	295	0.124	0.144		
Median	1.36	1.02	1.04	0.84	0.83	0.98	0.92	0.89	0.90	0.91	303	0.086	0.174		
Total											9147			>1	>1



### November 2024 Water Report for Fernie Alpine Resort Utilities Corp.

Day	Chlorine Residual (mg/L)										Water Usage (m <sup>3</sup> )	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	River Pp				
1	0.44	0.94	0.47	0.98	0.93		-	0.87		1.00	214	0.169	0.114		
2	0.44	0.91	1.44	0.83	0.86	0.96	-		1.14		336	0.486	0.256		
3	0.44	0.87	0.66	0.85	0.79		-	0.81		1.05	180	60.186	0.138		
4	1.38	0.90	0.63	0.69	0.98	0.97	-		0.81		211	0.388	0.051		
5	0.98	0.92	1.41	0.70	0.85		-	0.80		0.80	236	0.199	0.034		
6	1.01	0.90	2.20	0.85	0.78		-	0.87		0.80	138	0.233	0.068	< 1 / < 1	< 1 / < 1
7	0.81	0.88	N/A	0.82	0.69	0.82	-		0.75		223	0.153	0.041		
8	0.84	0.90	0.66	0.95	1.05		-	0.75		0.96	10	0.126	0.486		
9	1.11	1.21	0.12	0.79	0.75	0.79	-		0.74		18	0.148	0.635		
10	1.08	1.17	2.20	0.73	1.13		-	0.78		1.05	313	2.24	0.272		
11	1.01	1.12	0.60	1.12	0.74	1.09	-		0.96		485	3.59	0.114		
12	0.92	1.05	1.46	1.12	0.82		-	1.05		1.15	359	3.855	0.281		
13	0.88	1.11	0.41	0.82	0.92	1.07	-		1.03		493	0.728	0.205	< 1 / < 1	< 1 / < 1
14	0.88	1.07	0.84	0.77	0.78		-	0.69		0.84	458	4.28	0.704		
15	0.85	1.04	1.10	0.75	0.83	0.98	-		0.91		503	1.467	0.481		
16	0.83	1.03	0.85	0.83	0.84		-	0.77		0.93	402	0.553	0.585		
17	0.90	0.96	1.41	0.91	0.90	0.88	-		0.83		258	0.374	0.128		
18	0.89	1.04	0.89	0.91	0.92		-	0.97		0.93	0	N/A	31.424		
19	0.84	1.25	0.92	0.86	0.93	1.03	-		0.86		399	0.860	0.294		
20	0.90	1.06	1.22	1.04	0.86		-	0.93		1.23	495	0.228	0.145	< 1 / < 1	< 1 / < 1
21	0.77	1.04	1.20	1.13	0.94	0.86	-		1.03		52	0.246	0.626		
22	0.80	0.98	0.76	1.04	0.86		-	0.93		0.94	3	0.228	0.183		
23	0.81	1.01	1.49	0.92	0.78	0.85	-		0.71		580	0.155	0.118		
24	0.78	1.02	1.43	1.05	0.88		-	0.91		1.03	335	0.197	0.093		
25	0.75	1.05	0.96	0.95	0.96	0.90	-		0.91		356	0.155	0.085		
26	0.68	0.99	0.88	1.04	0.92		-	0.92		1.01	303	0.158	0.083	< 1 / < 1	< 1 / < 1
27	0.68	0.95	1.10	0.91	0.81	1.03	-		0.81		265	0.184	0.229		
28	0.86	0.95	0.75	1.05	0.99		-	0.84		0.78	364	0.180	0.075		
29	1.02	0.89	0.42	1.01	0.80	0.91	-		0.90		0	0.190	0.305		
30	1.17	0.95	1.98	0.87	0.89		-	0.85		0.97	490	0.193	0.073		
31															
Average	0.86	1.01	1.05	0.91	0.87	0.94	#DIV/0!	0.86	0.89	0.97	283	2.833	1.278		
Median	0.86	1.00	0.92	0.91	0.86	0.94	#NUM!	0.86	0.88	0.97	308	0.228	0.164		
Total											8479			>1	>1



**December 2024 Water Report for Fernie Alpine Resort Utilities Corp.**

Day	Chlorine Residual (mg/L)										Water Usage (m <sup>3</sup> )	Turbidity (NTU)		Independent Testing	
	Reservoir 1	Reservoir 2	River Pump	WWTP	Shop	Tamarack	Boomerang	Lizard Cr	Snow Creek	Pantry		Spring	River	T. Coliform	E. Coli
	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	CL <sub>2</sub>	River Pp				
1	1.13	0.98	0.81	1.04	0.92	0.90	-		0.94		339	0.191	0.070		
2	1.15	0.99	1.32	1.04	0.89		-	0.98		1.11	300	0.191	0.069		
3	1.17	1.07	1.80	1.04	0.99	1.18	-		0.91		358	0.191	0.071	< 1 / < 1	< 1 / < 1
4	1.11	1.08	1.02	0.97	0.97		-	0.94		1.21	3	0.181	0.289		
5	1.05	1.02	0.89	1.00	0.83	0.96	-		0.93		279	0.183	0.264		
6	1.03	1.02	1.19	1.03	1.04		-	0.98		0.71	213	0.182	0.266		
7	0.95	1.06	0.62	0.96	0.88	0.96	-		0.92		217	0.176	0.072		
8	0.91	1.07	0.62	1.10	1.03		-	0.95		1.32	758	0.414	0.178		
9	0.81	1.07	0.27	1.05	0.90	1.21	-		0.92		367	0.213	0.109		
10	0.71	1.03	0.72	1.17	0.97		-	0.98		0.93	106	0.194	0.169		
11	0.72	1.03	1.40	1.18	0.91	1.20	-		0.92		334	0.189	0.082	< 1 / < 1	< 1 / < 1
12	1.04	1.01	0.53	1.15	0.88		-	0.81		1.08	164	0.190	0.252		
13	1.11	1.06	1.14	0.98	0.85	0.91	-		0.81		404	0.187	0.094		
14	1.48	1.10	1.27	0.96	0.89		-	1.02		1.00	420	0.186	0.079		
15	1.50	1.12	2.19	0.94	0.93	1.18	-		1.03		370	0.198	0.076		
16	1.50	1.42	1.93	1.19	0.95		-	1.09		1.39	400	0.190	0.076		
17	1.40	1.20	1.41	0.92	0.92	0.89	-		1.11		322	0.202	0.075		
18	1.23	1.19	0.78	0.88	1.15		-	1.14		1.14	452	0.202	0.084	< 1 / < 1	< 1 / < 1
19	1.35	1.28	0.48	0.99	1.03	1.07	-		1.04		373	0.970	0.199		
20	1.05	1.01	0.96	1.01	0.96		-	0.96		0.88	332	0.345	0.178		
21	0.81	1.15	0.76	1.01	0.93	1.07	-		1.01		402	0.524	0.111		
22	0.57	1.07	0.43	1.03	0.99		-	0.98		0.99	450	1.014	0.110		
23	0.62	1.04	1.38	0.96	0.98	1.22	-		0.93		432	0.394	0.109		
24	0.65	1.07	0.73	0.94	1.04		-	0.96		0.97	546	0.388	0.111		
25	0.83	1.07	0.67	0.97	0.95	0.89	-		0.98		446	1.018	0.106		
26	0.77	1.02	0.90	0.91	0.94		-	0.80		0.81	396	0.308	0.095		
27	0.65	1.05	1.36	1.06	0.97	0.91	-		0.98		695	0.204	0.112		
28	0.81	0.98	1.01	1.10	0.98		-	1.05		0.93	158	0.169	0.086		
29	0.91	0.99	1.40	1.01	0.98	0.93	-		0.96		930	0.165	0.102		
30	0.70	1.01	1.20	1.18	1.03		-	1.05		1.17	677	0.138	0.102		
31	0.92	1.05	1.97	1.23	1.12	0.92	-		1.43		956	0.131	0.107		
Average	0.99	1.07	1.07	1.03	0.96	1.03	#DIV/0!	0.98	0.99	1.04	406	0.304	0.126		
Median	0.95	1.06	1.01	1.01	0.96	0.96	#NUM!	0.98	0.95	1.00	373	0.191	0.106		
Total											12599			>1	>1



Fernie Alpine Resort Water Distribution 2024 Summary

Month	Chlorine Residual (mg/L)																		Water Usage (m³)			Turbidity (NTU)				Independent Testing			
	Reservoir 1 Cl₂		Reservoir 2 Cl₂		River Pump Cl₂		WWTP Cl₂		Shop Cl₂		Tamarack Cl₂		Boomerang Cl₂		Lizard Creek Cl₂		Snow Creek Cl₂		Pantry Cl₂		River Pp			Spring				River	
	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average	Median	Total	Average	Median	Average	Median	T. Coliform	E. Coli
Jan	0.98	1.02	0.98	1.00	0.95	0.96	0.96	0.95	0.92	0.93	0.99	1.00	1.01	0.96	0.93	0.95	0.93	0.95	0.96	0.95	395	372	12256	0.283	0.130	0.176	0.170	>1	>1
Feb	1.17	1.22	0.93	0.94	0.82	0.82	0.80	0.72	0.76	0.75	0.94	0.86	0.84	0.85	0.82	0.86	0.84	0.87	0.77	0.74	384	398	11134	0.226	0.134	0.154	0.130	>1	ok
Mar	1.27	0.84	0.95	0.93	1.12	1.00	0.90	0.87	0.88	0.87	0.90	0.95	0.83	0.84	0.89	0.87	0.94	0.91	0.95	0.94	405	434	12563	0.243	0.137	0.140	0.129	>1	>1
Apr	0.90	0.77	0.94	0.99	1.01	1.00	0.96	0.94	0.93	0.89	0.83	0.88	0.83	0.85	0.93	0.89	0.85	0.86	0.89	0.87	297	351	8904	0.493	0.356	0.137	0.134	>1	>1
May	1.04	1.03	1.03	1.01	0.98	0.91	1.00	0.93	0.95	0.93	0.87	0.85	0.88	0.88	0.87	0.88	0.91	0.90	1.02	0.96	320	293	9931	0.152	0.122	0.111	0.106	>1	>1
June	0.99	0.96	0.94	0.93	1.03	0.98	0.86	0.87	0.90	0.87	0.76	0.84	0.85	0.85	0.84	0.83	0.92	0.87	0.86	0.86	355	354	10664	0.346	0.108	0.153	0.122	>1	>1
July	1.18	1.08	0.93	0.92	1.09	0.92	0.87	0.86	0.85	0.84	0.92	0.91	0.83	0.83	0.87	0.88	0.88	0.89	0.87	0.88	518	494	16070	0.088	0.087	0.111	0.118	>1	>1
Aug	2.97	1.84	1.05	1.07	1.06	0.96	0.87	0.84	0.85	0.83	0.91	0.89	0.87	0.89	0.93	0.90	0.89	0.91	0.85	0.87	509	510	15779	0.080	0.079	0.126	0.116	#REF!	#REF!
Sept	1.60	1.31	1.04	1.04	0.88	0.85	0.85	0.85	0.90	0.88	0.92	0.93	0.90	0.89	0.88	0.91	0.94	0.95	0.85	0.84	359	342	10783	N/A	N/A	0.158	0.160	>1	>1
Oct	1.92	1.36	1.02	1.02	1.13	1.04	0.86	0.84	0.83	0.84	0.94	0.84	0.91	0.92	0.90	0.89	0.88	0.90	0.94	0.91	295	303	9147	0.124	0.086	0.144	0.174	>1	>1
Nov	0.86	0.86	1.01	1.00	1.05	0.92	0.91	0.91	0.87	0.86	0.94	0.94	#DIV/0!	#NUM!	0.86	0.86	0.89	0.88	0.97	0.97	283	308	8479	2.833	0.228	1.278	0.164	>1	>1
Dec	0.99	0.95	1.07	1.06	1.07	1.01	1.03	1.01	0.96	0.96	1.03	0.96	#DIV/0!	#NUM!	0.98	0.98	0.99	0.95	1.04	1.00	406	373	12599	0.304	0.191	0.126	0.106	>1	>1
Annual	1.32	1.03	0.99	1.00	1.02	0.96	0.91	0.87	0.88	0.87	0.91	0.90	#DIV/0!	#NUM!	0.89	0.88	0.90	0.90	0.91	0.90	377	363	138309	0.470	0.130	0.234	0.130	#REF!	#REF!



### January 2024 WWTP Monthly Report

Date	Weather	Temp. (°C)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	PO <sub>4</sub> (mg/L)	Alum/PAC (L/day)	P-OP04 (mg/L)	PAC L/day	Lab Result		
			1885418		1250978												TSS mg/L	BOD mg/L	Total P mg/L
01-Jan	Partly Cloudy	-4	1885927	509	1251413	435	1.190	1.6	6.4		10	42	1.36	13	0.44	63.7			
02-Jan	Cloudy	-6	1886304	377	1251947	534	0.692	3.9	7.4		10	44	0.68	11	0.22	53.9			
03-Jan	Cloudy	-6	1886675	371	1252486	539	0.466	7	9.6		10	46	0.79	8	0.26	39.2	3.0	2.0	0.263
04-Jan	Cloudy	-4	1887029	354	1252993	507	0.551	5.5	4.7		1	46	0.60	7	0.20	34.3			
05-Jan	Cloudy	-4	1887383	354	1253474	481	0.652	1.9	10.6		24	35	1.12	5	0.37	24.5			
06-Jan	Clear	-6	1887706	323	1253937	463	0.688	8.3	8.3		10	40	1.05	3	0.34	14.7			
07-Jan	Cloudy	-5	1888030	324	1254414	477	0.685	4.4	5.4		10	37	2.34	3	0.76	14.7			
08-Jan	Snow	-10	1888318	288	1254865	451	0.326	4.9	8.3		10	39	0.96	7	0.31	34.3			
09-Jan	Snow	-2	1888541	223	1255185	320	0.310	1.5	9.3		9	41	0.56	7	0.18	34.3			
10-Jan	Snow	-10	1888744	203	1255502	317	0.332	0	9.6		13	45	0.84	5	0.27	24.5	3.0	2.0	0.291
11-Jan	Snow	-19	1889005	261	1255895	393	0.425	0	7.5		2	49	0.92	3	0.30	14.7			
12-Jan	Clear	-29	1889153	148	1256189	294	0.385	0	9.1		17	52	0.95	2	0.31	9.8			
13-Jan	Clear	-37	1889346	193	1256536	347	0.560	0	7.0		23	55	1.60	2	0.52	9.8			
14-Jan	Cloudy	-24	1889527	181	1256862	326	0.336	0	7.7		25	60	0.70	3	0.23	14.7			
15-Jan	Clear	-28	1889737	210	1257190	328	0.377	0	8.1		27	62	1.01	3	0.33	14.7			
16-Jan	Cloudy	-18	1889966	229	1257569	379	0.372	0	8.4		33	66	0.99	2	0.32	9.8			
17-Jan	Snow	-12	1890270	304	1258048	479	0.514	0	7.7		22	69	1.41	3	0.46	14.7			
18-Jan	Clear	-22	1890579	309	1258503	455	0.572	0	9.1		8	72	1.02	3	0.33	14.7			
19-Jan	Cloudy	-21	1890804	225	1258839	336	0.571	0	10.9		12	77	0.81	2	0.26	9.8			
20-Jan	Partly Cloudy	-6	1891074	270	1259286	447	0.601	0	9.3		20	81	0.96	2	0.31	9.8			
21-Jan	Cloudy	-2	1891471	397	1259849	563	0.823	0	7.5		21	85	2.53	1	0.83	4.9			
22-Jan	Snow	-2	1891852	381	1260330	481	0.398	0	5.4		10	87	1.07	4	0.35	19.6			
23-Jan	Cloudy	0	1892211	359	1260797	467	0.437	0	4.2		4	69	0.83	5	0.27	24.5			
24-Jan	Cloudy	-1	1892536	325	1261211	414	0.434	4.3	6.8	125	8	70	1.06	4	0.35	19.6			
25-Jan	Cloudy	2	1892833	297	1261642	431	0.370	3.8	6.2		8	69	1.18	3	0.38	14.7	3.0	2.0	0.373
26-Jan	Partly Cloudy	2	1893148	315	1262060	418	0.277	3.4	1.0		16	71	1.58	3	0.52	14.7			
27-Jan	Cloudy	2	1893500	352	1262544	484	0.430	7.2	6.0		12	69	1.11	3	0.36	14.7			
28-Jan	Rain	3	1893982	482	1263169	625	0.435	4.0	5.3		9	68	1.70	3	0.55	14.7			
29-Jan	Rain	3	1894556	574	1263874	705	0.260	3.2	8.6		13	68	1.80	6	0.59	29.4			
30-Jan	Partly Cloudy	3	1895080	524	1264488	614	0.131	3.1	6.5		10	63	0.57	9	0.19	44.1			
31-Jan	Cloudy	0	1895409	329	1264899	411	0.156	5.5	2.4		3	64	0.63	5	0.21	24.5	3.0	2.0	0.212
Average		-8.5		322		449	0.48	2.4	7.2	125	13	59	1.12	5	0.37	22.1			
Median		-5.0		323		451	0.43	1.6	7.5	125	10	63	1.01	3	0.33	14.7			
Total				9991		13921	N/A	73.5	224.3	125	N/A	N/A	N/A	140	N/A	686.0			



### February 2024 WWTP Monthly Report

Date	Weather	Temp. (°C)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	PO <sub>4</sub> (mg/L)	Alum/PAC (l/d)	P-OPO4 (mg/L)	PAC L/day	Lab Result		
																	TSS mg/L	BOD mg/L	Total P mg/L
			1895409		1264899														
01-Feb	Clear	0	1895715	306	1265241	342	0.199	4.9	6.1		7	63	0.59	2	0.19	9.8			
02-Feb	Cloudy	0	1896027	312	1265614	373	0.178	5.5	5.8		10	63	0.54	3	0.18	14.7			
03-Feb	Rain	1	1896343	316	1266058	444	0.250	4.8	2.6		11	64	1.84	1	0.60	4.9			
04-Feb	Cloudy	-2	1896815	472	1266620	562	0.319	6.2	6.3	130	2	63	2.49	2	0.81	9.8			
05-Feb	Cloudy	-5	1897172	357	1267061	441	0.141	1.9	7.7		5	60	0.83	6	0.27	29.4			
06-Feb	Snow	-2	1897504	332	1267497	436	0.195	4.6	6.7		7	63	1.20	4	0.39	19.6			
07-Feb	Cloudy	-5	1897797	293	1267905	408	0.200	5.5	6.9		11	63	1.28	3	0.42	14.7	3.0	2.0	0.396
08-Feb	Snow	-1	1898126	329	1268383	478	0.419	5.0	5.6		7	64	0.94	4	0.31	19.6			
09-Feb	Snow	-6	1898395	269	1268794	411	0.243	5.3	6.4		9	64	0.77	2	0.25	9.8			
10-Feb	Partly Cloudy	-11	1898758	363	1269285	491	0.277	4.9	7.0		13	64	1.58	3	0.52	14.7			
11-Feb	Cloudy	-3	1899096	338	1269761	476	0.277	4.0	8.1		18	65	1.58	3	0.52	14.7			
12-Feb	Partly Cloudy	-4	1899484	388	1270258	497	0.312	4.0	8.1		1	67	1.56	5	0.51	24.5			
13-Feb	Cloudy	-5	1899773	289	1270605	347	0.236	1.3	6.6		1	67	1.30	5	0.42	24.5			
14-Feb	Clear	-14	1900045	272	1270922	317	0.252	4.7	7.0		10	59	0.77	3	0.25	14.7			
15-Feb	Clear	-15	1900317	272	1271259	337	0.364	6.0	5.4		10	60	1.08	2	0.35	9.8			
16-Feb	Clear	-15	1900595	278	1271569	310	0.375	0.3	6.3		10	60	0.97	2	0.32	9.8			
17-Feb	Clear	-14	1900919	324	1271992	423	0.372	4.6	5.0		15	61	2.05	2	0.67	9.8			
18-Feb	Partly Cloudy	-10	1901315	396	1272506	514	0.625	1.0	7.0		22	62	2.29	3	0.75	14.7			
19-Feb	Cloudy	-6	1901721	406	1272990	484	0.468	2.9	7.5		24	65	1.76	6	0.57	29.4			
20-Feb	Partly Cloudy	1	1902135	414	1273451	461	0.294	1.6	6.5		19	67	1.04	8	0.34	39.2			
21-Feb	Cloudy	-1	1902542	407	1273912	461	0.254	1.6	7.9		13	69	1.11	8	0.36	39.2			
22-Feb	Cloudy	-1	1902915	373	1274376	464	0.236	3.9	5.5	140	6	72	0.92	7	0.30	34.3			
23-Feb	Cloudy	-1	1903299	384	1274830	454	1.200	2.6	6.6		6	72	0.97	4	0.32	19.6			
24-Feb	Cloudy	3	1903671	372	1275267	437	0.292	0	7.2		12	74	2.31	3	0.75	14.7			
25-Feb	Cloudy	5	1904047	376	1275719	452	0.234	8.5	7.1		13	77	1.59	6	0.52	29.4			
26-Feb	Partly Cloudy	0	1904511	464	1276257	538	0.205	5.8	6.1		9	77	1.45	6	0.47	29.4			
27-Feb	Cloudy	-13	1904829	318	1276660	403	0.148	5.6	6.5		14	76	0.96	4	0.31	19.6			
28-Feb	Snow	-6	1905172	343	1277049	389	0.193	1.6	8.3		8	77	1.47	3	0.48	14.7			
29-Feb	Rain	0	1905494	322	1277490	441	0.214	5.4	4.4		4	81	1.74	2	0.57	9.8			
Average		-4.5		348		434	0.31	3.9	6.5	135	10	67	1.34	4	0.44	18.9			
Median		-3.0		338		441	0.25	4.6	6.6	135	10	64	1.28	3	0.42	14.7			
Total				10085		12591		114.0	188.2	270						548.8			



### March 2024 WWTP Monthly Report

Date	Weather	Temp. (°c)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	PO <sub>4</sub> (mg/L)	Alum/PAC (l/d)	P-OPO <sub>4</sub> (mg/L)	PAC L/day	Lab Results		
																	TSS mg/L	BOD mg/L	Total P mg/L
			1905494		1277490														
01-Mar	Cloudy	-2	1905984	490	1278058	568	0.248	6.4	7.4		20	81	0.89	3	0.29	14.7			
02-Mar	Cloudy	-6	1906448	464	1278616	558	0.256	5.3	7.0		1	81	1.46	2	0.48	9.8			
03-Mar	Cloudy	-11	1906853	405	1279143	527	0.237	5.8	5.7		9	81	2.18	2	0.71	9.8			
04-Mar	Snow	-10	1907247	394	1279561	418	0.212	3.2	7.7		1	80	2.38	3	0.78	14.7			
05-Mar	Partly Cloudy	-9	1907536	289	1279912	351	0.142	2.7	5.8		5	83	1.46	4	0.48	19.6			
06-Mar	Sunny	-13	1907803	267	1280221	309	0.145	4.2	17.6		1	84	0.96	3	0.31	14.7			
07-Mar	Sunny	-15	1908017	214	1280532	311	0.146	6.6	5.2	90	1	90	1.18	4	0.38	19.6			
08-Mar	Cloudy	-8	1908250	233	1280805	273	0.165	5.3	5.6		18	90	0.79	3	0.26	14.7			
09-Mar	Sunny	-2	1908549	299	1281139	334	0.250	5.7	6.1		1	90	1.15	2	0.38	9.8			
10-Mar	Cloudy	3	1908988	439	1281634	495	0.576	3.8	5.7		1	89	2.69	2	0.88	9.8			
11-Mar	Snow	-2	1909344	356	1282086	452	0.197	2.2	4.5		17	70	1.76	4	0.57	19.6			
12-Mar	Snow	-1	1909708	364	1282511	425	0.184	4.0	8.3		12	72	1.60	4	0.52	19.6			
13-Mar	Cloudy	-1	1910065	357	1282933	422	0.181	5.7	7.8		14	73	0.88	4	0.29	19.6			
14-Mar	Sunny	0	1910425	360	1283351	418	0.199	4.8	5.8		9	74	1.08	2	0.35	9.8			
15-Mar	Sunny	1	1910749	324	1283769	418	0.208	2.9	7.9		1	74	1.86	1	0.61	4.9			
16-Mar	Sunny	-3	1911087	338	1284185	416	0.248	6.4	6.9		15	75	2.08	3	0.68	14.7			
17-Mar	Sunny	-1	1911519	432	1284708	523	0.298	4.7	7.6		3	76	2.58	3	0.84	14.7			
18-Mar	Sunny	0	1911878	359	1285208	500	0.177	5.0	8.6		4	77	1.87	5	0.61	24.5			
19-Mar	Sunny	1	1912219	341	1285632	424	1.50	6.0	5.5		17	79	1.03	5	0.34	24.5			
20-Mar	Sunny	2	1912570	351	1286090	458	0.232	5.9	6.3		8	80	0.67	3	0.22	14.7			
21-Mar	Snow	-4	1912863	293	1286534	444	0.601	5.7	8.0		10	80	0.47	1	0.15	4.9			
22-Mar	Cloudy	-4	1913147	284	1286878	344	0.418	5.3	7.2		8	80	1.42	1	0.46	4.9			
23-Mar	Cloudy	-2	1913440	293	1287122	244	0.214	9.1	20.8		13	81	0.94	2	0.31	9.8			
24-Mar	Cloudy	-9	1913776	336	1287622	500	0.224	7.0	17.2		7	85	1.65	2	0.54	9.8			
25-Mar	Partly Cloudy	-14	1914137	361	1288045	423	0.248	6.7	6.6		3	90	1.90	2	0.62	9.8			
26-Mar	Partly Cloudy	-5	1914455	318	1288429	384	0.231	5.1	19.2		1	89	1.67	2	0.54	9.8			
27-Mar	Snow/rain	-1	1914811	356	1288885	456	0.249	4.9	7.0		1	73	2.52	3	0.82	14.7			
28-Mar	Snow/rain	0	1915131	320	1289263	378	0.204	5.6	8.3		7	73	1.18	4	0.38	19.6	3.0	2.0	0.748
29-Mar	Snow	-2	1915471	340	1289702	439	0.197	5.4	19.0		25	76	1.22	2	0.40	9.8			
30-Mar	Partly Cloudy	-2	1915975	504	1290261	559	0.220	2.9	4.9		4	82	1.98	4	0.65	19.6			
31-Mar	Sunny	0	1916355	380	1290763	502	0.198	1.7	6.4		1	83	1.19	4	0.39	19.6			
Average		-3.9		350		428	0.28	5.0	8.6	90	8	80	1.51	3	0.49	14.1			
Median		-2.0		351		424	0.22	5.3	7.0	90	7	80	1.46	3	0.48	14.7			
Total				10861		13273		156.0	267.6	90						436.1			



### April 2024 WWTP Monthly Report

Date	Weather	Temp. (°C)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	PO <sub>4</sub> (mg/L)	Alum/PAC (L/d)	P-OPO4 (mg/L)	PAC L/day	Lab Result		
																	TSS mg/L	BOD mg/L	Total P mg/L
			1916355		1290763														
01-Apr	Sunny	0	1916691	336	1291200	437	0.158	1.1	6.5		1	85	1.83	4	0.60	19.6			
02-Apr	Sunny	1	1916969	278	1291581	381	0.134	3.6	6.2		1	87	1.31	3	0.43	14.7	3.0	2.0	0.454
03-Apr	Cloudy	5	1917240	271	1291943	362	0.150	4.2	2.7		7	83	0.98	3	0.32	14.7			
04-Apr	Cloudy	1	1917548	308	1292345	402	0.193	3.7	5.3		13	69	0.80	3	0.26	14.7			
05-Apr	Snow	-2	1917880	332	1292755	410	0.293	3.6	4.9		1	75	1.74	2	0.57	9.8			
06-Apr	Cloudy	1	1918174	294	1293107	352	0.222	3.4	6.6		2	76	1.07	2	0.35	9.8			
07-Apr	Cloudy	3	1918466	292	1293477	370	0.259	2.1	6.2		1	77	2.16	2	0.70	9.8			
08-Apr	Cloudy	-1	1918729	263	1293816	339	0.182	4.3	7.1		1	79	1.23	4	0.40	19.6			
09-Apr	Cloudy	1	1918936	207	1294127	311	0.225	3.5	7.8	60	5	80	0.71	2	0.23	9.8			
10-Apr	Sunny	-3	1919166	230	1294385	258	0.243	6.3	9.0		3	82	1.56	1	0.51	4.9	3.0	2.0	0.498
11-Apr	Sunny	2	1919397	231	1294704	319	0.215	4.8	5.7		3	83	1.20	2	0.39	9.8			
12-Apr	Cloudy	4	1919567	170	1294960	256	0.238	6.0	22.7		5	85	0.90	1	0.29	4.9			
13-Apr	Sunny	1	1919754	187	1295204	244	0.242	6.0	7.4		5	89	1.90	1	0.62	4.9			
14-Apr	Sunny	4	1920075	321	1295581	377	0.310	4.6	7.8		1	91	2.27	1	0.74	4.9			
15-Apr	Partly Cloudy	4	1920303	228	1295877	296	0.248	4.1	6.9		1	92	2.18	2	0.71	9.8			
16-Apr	Partly Cloudy	0	1920561	258	1296190	313	0.239	5.4	6.6	144	1	77	1.92	2	0.63	9.8			
17-Apr	Cloudy	-5	1920769	208	1296453	263	0.268	6.4	6.2		11	77	1.97	1	0.64	4.9	3.0	2.0	0.682
18-Apr	Snow	-1	1921078	309	1296733	280	0.283	8.8	8.5	156	3	77	1.21	2	0.39	9.8			
19-Apr	Sunny	0	1921208	130	1296996	263	0.351	5.5	5.9		1	76	1.30	2	0.42	9.8			
20-Apr	Sunny	-5	1921350	142	1297231	235	0.319	1.1	0.7		1	77	1.88	1	0.61	4.9			
21-Apr	Cloudy	5	1921518	168	1297431	200	0.243	6.5	8.8		2	76	1.04	2	0.34	9.8			
22-Apr	Sunny	1	1921674	156	1297648	217	0.254	3.1	7.8		11	77	1.11	1	0.36	4.9			
23-Apr	Sunny	0	1921845	171	1297872	224	0.292	3.2	8.0		12	80	1.34	1	0.44	4.9			
24-Apr	Sunny	3	1922045	200	1298129	257	0.303	6.3	7.5		1	82	1.23	1	0.40	4.9	3.0	2.0	0.732
25-Apr	Cloudy	3	1922214	169	1298389	260	0.199	5.0	7.8		10	82	1.19	1	0.39	4.9			
26-Apr	Rain	4	1922374	160	1298595	206	0.191	7.6	7.5		15	83	0.52	2	0.17	9.8			
27-Apr	Cloudy	3	1922627	253	1298906	311	0.275	7.6	6.1		1	84	1.39	1	0.45	4.9			
28-Apr	Rain	3	1922787	160	1299121	215	0.271	3.1	7.9		22	66	2.25	1	0.73	4.9			
29-Apr	Rain	2	1923098	311	1299493	372	0.319	0	7.6		15	70	1.63	1	0.53	4.9			
30-Apr	Cloudy	-1	1923329	231	1299780	287	0.241	0	7.9		7	73	1.73	2	0.56	9.8			
Average		1.1		232		301	0.25	4.4	7.3	120	5	80	1.45	2	0.47	8.8			
Median		1.0		231		292	0.24	4.3	7.3	144	3	80	1.33	2	0.43	9.8			
Total				6974		9017		130.9	217.6	360						264.6			



May 2024 WWTB Monthly Report																			
Date	Weather	Temp. (°C)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	PO <sub>4</sub> (mg/L)	Alum/PAC (cm/day)	P-OPO4 (mg/L)	PAC L/day	Lab Result		
																	TSS mg/L	BOD mg/L	Total P mg/L
			1923329		1299780														
01-May	cloud	0	1923525	196	1300042	262	0.235	2.7	6.6		1	76	1.51	1	0.49	4.9	3.0	2.0	0.482
02-May	cloud	1	1923654	129	1300242	200	0.205	6	3.8		15	77	1.06	2	0.35	9.8			
03-May	cloud	0	1923848	194	1300548	306	0.237	5.5	5.5		9	77	1.26	1	0.41	4.9			
04-May	sun	2	1924041	193	1300826	278	0.203	5	6.3		5	77	1.19	1	0.39	4.9			
05-May	sun	1	1924182	141	1301030	204	0.202	4.6	5.8		12	77	1.00	1	0.33	4.9			
06-May	rain	3	1924369	187	1301276	246	0.251	7.2	6.8		1	77	1.75	1	0.57	4.9			
07-May	cloud	2	1924512	143	1301481	205	0.216	4.2	6.2	160	1	77	1.52	2	0.50	9.8			
08-May	cloud	5	1924641	129	1301667	186	0.189	7	7.2		5	78	1.57	1	0.51	4.9			
09-May	sun	5	1924794	153	1301899	232	0.197	3.7	6.2		5	78	0.97	1	0.32	4.9			
10-May	sun	8	1924952	158	1302105	206	0.185	7.5	4.0		5	79	0.88	1	0.29	4.9			
11-May	sun	10	1925098	146	1302319	214	0.175	5.4	8.0		9	78	1.08	0	0.35	0.0			
12-May	sun	10	1925299	201	1302581	262	0.202	6.9	6.6		1	78	2.36	1	0.77	4.9			
13-May	sun	9	1925472	173	1302810	229	0.145	3.7	0.3		1	78	1.58	1	0.52	4.9			
14-May	sun	7	1925707	235	1303109	299	0.227	7.2	6.2		1	57	2.13	1	0.69	4.9			
15-May	sun	7	1925855	148	1303329	220	0.153	7.8	5.6		10	57	1.72	2	0.56	9.8			
16-May	cloud	9	1926026	171	1303593	264	0.155	6.1	4.5		10	56	0.94	2	0.31	9.8			
17-May	sun	10	1926247	221	1303841	248	0.265	6	5.2		10	54	1.56	1	0.51	4.9			
18-May	sun	8	1926462	215	1304151	310	0.209	3.6	7.8		1	54	1.23	1	0.40	4.9			
19-May	cloud	2	1926702	240	1304465	314	0.180	2.1	5.6		1	56	1.58	1	0.52	4.9			
20-May	sun/cloud	0	1926936	234	1304785	320	0.203	5.8	6.1		1	57	1.85	1	0.60	4.9			
21-May	sun/cloud	3	1927123	187	1305049	264	0.201	3.4	6.6	150	1	58	1.64	2	0.53	9.8			
22-May	sun	4	1927254	131	1305241	192	0.171	6.1	4.8		1	59	1.02	1	0.33	4.9			
23-May	sun	5	1927420	166	1305461	220	0.225	1.9	5.0		1	57	0.97	1	0.32	4.9			
24-May	cloud	5	1927601	181	1305715	254	0.206	3.9	3.5		1	60	0.84	2	0.27	9.8			
25-May	cloud	6	1927775	174	1305927	212	0.159	18.3	5.7		1	55	1.76	1	0.57	4.9			
26-May	sun/cloud	8	1927981	206	1306241	314	0.166	17.5	6.9		10	49	2.06	1	0.67	4.9			
27-May	sun/cloud	4	1928208	227	1306553	312	0.132	3.8	5.7		2	46	1.83	2	0.60	9.8			
28-May	sun/cloud	7	1928413	205	1306819	266	0.148	3.9	8.1	150	1	36	1.32	2	0.43	9.8			
29-May	cloud	5	1928587	174	1307053	234	0.145	3.9	7.2	156	1	37	0.78	1	0.25	4.9			
30-May	sun	7	1928760	173	1307302	249	0.131	4.1	5.8		1	37	0.86	1	0.28	4.9			
31-May	sun	9	1928958	198	1307537	235	0.193	6.4	5.1		1	37	0.75	2	0.24	9.8			
Average		5.2		182		250	0.19	5.8	5.8	154	4	62	1.37	1	0.45	6.2			
Median		5.0		181		248	0.20	5.4	5.8	153	1	58	1.32	1	0.43	4.9			
Total				5629		7757		181.2	178.7	616						191.1			



### June 2024 WWTP Monthly Report

Date	Weather	Temp. (°C)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	PO <sub>4</sub> (mg/L)	Alum/PAC (cm/day)	P-OPO4 (mg/L)	PAC L/day	Lab Result			
																	TSS mg/L	BOD mg/L	Total P mg/L	
			1928958		1307537															
01-Jun	cloudy	8	1929141	183	1307810	273	0.247	4.4	5.4		1	38	1.12	1	0.37	4.9				
02-Jun	sun/clouds	8	1929277	136	1308005	195	0.124	1.2	7.3		1	39	1.67	1	0.54	4.9				
03-Jun	rain	9	1929533	256	1308325	320	0.152	4.6	6.2		7	42	2.41	1	0.79	4.9				
04-Jun	cloudy	3	1929951	418	1308915	590	0.215	5.9	5.4		35	43	1.95	1	0.64	4.9				
05-Jun	sunny	4	1930369	418	1309434	519	0.198	8.2	9.9		21	31	1.03	2	0.34	9.8				
06-Jun	sunny	7	1930706	337	1309832	398	0.150	4.5	14.1		1	32	0.83	1	0.27	4.9				
07-Jun	sunny	8	1930912	206	1310116	284	0.122	5.9	4.0		1	33	1.03	1	0.34	4.9				
08-Jun	sunny	6	1931107	195	1310353	237	0.114	0.8	4.4		1	34	1.19	1	0.39	4.9				
09-Jun	sun/clouds	8	1931362	255	1310675	322	0.125	6.3	6.7		1	34	1.70	1	0.55	4.9				
10-Jun	sunny	12	1931600	238	1311005	330	0.140	3	5.8		10	39	1.43	1	0.47	4.9				
11-Jun	sunny	12	1931792	192	1311249	244	0.143	2.4	6.6		10	41	1.45	1	0.47	4.9				
12-Jun	sunny	7	1931982	190	1311494	245	0.612	4.1	5.1		10	37	1.01	2	0.33	9.8	3.0	2.0	0.619	
13-Jun	sunny	7	1932169	187	1311735	241	0.141	6.7	5.9		1	37	1.18	1	0.38	4.9				
14-Jun	sunny	7	1932363	194	1311985	250	0.640	2.9	4.5		1	37	1.13	2	0.37	9.8				
15-Jun	cloudy	8	1932588	225	1312257	272	0.457	3.4	4.8		1	37	1.10	1	0.36	4.9				
16-Jun	rain	5	1932959	371	1312691	434	0.549	5.6	6.4		0	29	1.27	1	0.41	4.9				
17-Jun	cloudy	2	1933186	227	1313016	325	0.204	5.1	6.9		0	29	1.80	1	0.59	4.9				
18-Jun	cloudy	2	1933449	263	1313397	381	0.198	5.7	7.3		1	30	1.23	1	0.40	4.9				
19-Jun	cloudy	5	1933729	280	1313758	361	0.157	4.3	8.3		0	30	0.83	1	0.27	4.9				
20-Jun	sunny	8	1933990	261	1314068	310	0.159	5.2	7.1		1	32	1.39	1	0.45	4.9				
21-Jun	sunny	10	1934224	234	1314329	261	0.137	7.4	7.5		1	31	1.13	1	0.37	4.9				
22-Jun	sunny	10	1934377	153	1314596	267	0.141	8.2	7.5		1	31	2.57	1	0.84	4.9				
23-Jun	sunny	13	1934589	212	1314860	264	0.138	4.9	6.4		1	30	2.46	2	0.80	9.8				
24-Jun	sunny	11	1934796	207	1315116	256	0.136	4.5	8.2		1	22	2.75	2	0.90	9.8				
25-Jun	sunny	8	1934990	194	1315362	246	0.111	7.9	8.2		1	25	1.85	2	0.60	9.8				
26-Jun	sunny	12	1935179	189	1315606	244	0.102	1.7	6.3		10	24	1.70	2	0.55	9.8				
27-Jun	rain	8	1935416	237	1315869	263	0.099	5	6.8		1	27	0.95	4	0.31	19.6				
28-Jun	sunny	12	1935614	198	1316156	287	0.646	6.1	6.5		1	27	1.05	2	0.34	9.8				
29-Jun	sunny	12	1935911	297	1316492	336	0.125	3.7	4.0		1	27	0.92	2	0.30	9.8				
30-Jun	rain	12	1936137	226	1316771	279	0.130	6.4	7.0		1	28	1.63	2	0.53	9.8				
Average		8.1		239		308	0.22	4.9	6.7	#DIV/0!	4	33	1.46	1	0.48	7.0				
Median		8.0		226		276	0.14	5.0	6.6	#NUM!	1	32	1.25	1	0.41	4.9				
Total				7179		9234		146.0	200.5	0						210.7				



July 2024 WWTP Monthly Report																				
	Weather	Temp. (°c)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	PO₄ (mg/L)	Alum/PAC (cm/day)	P-OP04 (mg/L)	PAC L/day	Lab Result			
			1936137		1316771													TSS mg/L	BOD mg/L	Total P mg/L
01-Jul	rain	9	1936541	404	1317149	378	0.147	6.2	7.4		1	28	1.95	2	0.64	9.8				
02-Jul	cloud	10	1936710	169	1317288	139	0.159	4.9	8.2		1	28	1.93	2	0.63	9.8				
03-Jul	cloud	9	1936930	220	1317649	361	0.151	8.4	5.8		1	29	1.84	2	0.60	9.8				
04-Jul	sun	10	1937152	222	1317903	254	0.131	6.4	2.1		1	27	0.97	2	0.32	9.8				
05-Jul	sun	15	1937406	254	1318193	290	0.403	7.8	5.6		1	24	0.92	1	0.30	4.9				
06-Jul	sun	15	1937667	261	1318473	280	0.182	4.2	7.1		1	24	1.10	2	0.36	9.8				
07-Jul	sun	17	1937988	321	1318849	376	0.215	4.2	7.0		2	24	1.65	2	0.54	9.8				
08-Jul	sun	15	1938200	212	1319091	242	0.274	6.4	7.3		1	27	2.22	2	0.72	9.8				
09-Jul	sun	17	1938489	289	1319400	309	0.210	7.8	8.8	160	1	26	1.47	3	0.48	14.7				
10-Jul	sun	15	1938761	272	1319727	327	0.171	4.6	6.2		1	27	1.56	3	0.51	14.7				
11-Jul	sun	17	1939041	280	1320018	291	0.159	6.1	6.6	160	1	25	0.67	4	0.22	19.6				
12-Jul	sun	15	1939401	360	1320388	370	0.371	5.6	7.8		1	28	1.08	3	0.35	14.7				
13-Jul	sun	15	1939653	252	1320713	325	0.407	6.6	7.0		1	27	1.06	3	0.35	14.7				
14-Jul	sun	18	1939920	267	1321020	307	0.471	5.6	0.0		0	33	2.75	2	0.90	9.8				
15-Jul	sun	18	1940213	293	1321290	270	0.283	2	7.6		1	22	1.71	3	0.56	14.7				
16-Jul	sun	14	1940453	240	1321533	243	0.206	0	8.8		1	25	2.01	3	0.66	14.7				
17-Jul	sun	15	1940724	271	1321865	332	0.167	0	8.6		1	27	1.10	5	0.36	24.5	3.0	2.0	0.277	
18-Jul	cloud	14	1941025	301	1322209	344	0.163	1.4	0.0		1	23	1.21	4	0.39	19.6				
19-Jul	sun	16	1941303	278	1322541	332	0.162	0	3.3		1	29	0.66	4	0.22	19.6				
20-Jul	sun	17	1941605	302	1322892	351	0.209	0	6.6		1	30	1.01	2	0.33	9.8				
21-Jul	sun	19	1941921	316	1323227	335	0.306	0	8.0		1	31	1.39	3	0.45	14.7				
22-Jul	sun	19	1942218	297	1323550	323	0.309	0	8.6		1	33	1.46	3	0.48	14.7				
23-Jul	sun	18	1942470	252	1323859	309	0.220	5.3	6.3		0	35	1.01	4	0.33	19.6				
24-Jul	sun	15	1942771	301	1324191	332	0.246	4.2	7.5		1	23	1.25	4	0.41	19.6				
25-Jul	cloud	16	1943049	278	1324494	303	0.186	3.3	0.0		1	24	1.37	3	0.45	14.7				
26-Jul	sun	9	1943308	259	1324796	302	0.133	2	4.3		0	22	1.31	3	0.43	14.7				
27-Jul	cloud	11	1943581	273	1325112	316	0.166	2.9	3.3		0	23	0.45	2	0.15	9.8				
28-Jul	sun	15	1943902	321	1325451	339	0.197	3.2	6.0		10	22	1.67	1	0.54	4.9				
29-Jul	sun	11	1944181	279	1325752	301	0.175	5.5	6.5		1	23	1.67	3	0.54	14.7				
30-Jul	cloud	14	1944484	303	1326083	331	0.171	0	7.6		4	25	1.62	3	0.53	14.7				
31-Jul	sun	15	1944762	278	1326367	284	0.141	1.7	6.0	179	0	28	1.85	2	0.60	9.8				
Average		14.6		278		310	0.22	3.8	6.0	166	1	27	1.42	3	0.46	13.4				
Median		15.0		278		316	0.19	4.2	6.6	160	1	27	1.39	3	0.45	14.7				
Total				8625		9596		116.3	185.9	499						416.5				



August 2024 WWTP Monthly Report																			
Date	Weather	Temp. (°C)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO <sub>4</sub> (mg/L)	Alum/PAC (cm/d)	P-OPO4 (mg/L)	PAC L/day	Lab Result		
																	TSS mg/L	BOD mg/L	Total P mg/L
			1944762		1326367														
01-Aug	sun	16	1944982	220	1326658	291	0.136	3.1	2.4		0	28	0.48	3	0.16	14.7			
02-Aug	sun	18	1945365	383	1327017	359	0.157	2.7			1	28	0.95	3	0.31	14.7			
03-Aug	sun	18	1945590	225	1327353	336	0.222	3.4			15	26	0.79	2	0.26	9.8			
04-Aug	cloud	18	1946135	545	1327800	447	0.401	3	6.7		0	25	1.85	2	0.60	9.8			
05-Aug	cloud	15	1946319	184	1328183	383	0.579		4.5		1	25	0.96	2	0.31	9.8			
06-Aug	sun	13	1946607	288	1328488	305	0.575	2.7	6.3		0	26	2.39	2	0.78	9.8			
07-Aug	sun	15	1947180	573	1328823	335	0.354	4.1	7.6		0	27	1.67	3	0.54	14.7			
08-Aug	sun	15	1947527	347	1329152	329	0.238	5.2	4.7		0	27	0.84	3	0.27	14.7			
09-Aug	sun	15	1947667	140	1329448	296	0.188	2.4			1	27	1.18	4	0.38	19.6			
10-Aug					1329701	253	0.646						0.89	2	0.29	9.8			
11-Aug	sun	12	1948006	339	1330067	366	0.646	2.5	7.6		1	18	2.39	2	0.78	9.8			
12-Aug	cloud	13	1948241	235	1330357	290	0.654	2.4	8.0		1	21	1.93	2	0.63	9.8			
13-Aug	cloud	11	1948498	257	1330650	293	0.263	2.9	6.0		0	23	1.37	4	0.45	19.6			
14-Aug	sun	12	1948786	288	1330968	318	0.200	1.9	7.0		6	24	1.02	3	0.33	14.7			
15-Aug	sun	12	1948967	181	1331173	205	0.213		4.5		27	24	1.06	4	0.35	19.6			
16-Aug	rain	12	1949360	393	1331581	408	0.260	6.1	3.9		2	29	1.01	3	0.33	14.7			
17-Aug	sun	14	1949587	227	1331857	276	0.183	5.4	4.4		2	28	0.99	4	0.32	19.6			
18-Aug	sun	25	1949918	331	1332225	368	0.200	1.4	3.2		1	26	2.19	3	0.71	14.7			
19-Aug	sun	13	1950113	195	1332438	213	0.159	1.3	7.6		2	27	1.73	3	0.56	14.7			
20-Aug	sun	12	1950359	246	1332720	282	0.157		7.2		1	29	1.56	3	0.51	14.7			
21-Aug	cloud	10	1950601	242	1333007	287	0.130				1	32	1.19	3	0.39	14.7			
22-Aug	sun	12	1950902	301	1333263	256	0.123		4.0		3	31	0.44	4	0.14	19.6			
23-Aug	sun	12	1951089	187	1333533	270	0.127		10.1		2	33	0.96	3	0.31	14.7			
24-Aug	cloud	10	1951314	225	1333819	286	0.163		9.7		11	35	0.93	2	0.30	9.8			
25-Aug	cloud	12	1951701	387	1334197	378	0.166				7	36	1.16	3	0.38	14.7			
26-Aug	sun	10	1951888	187	1334458	261	0.164		15.4		3	38	1.00	2	0.33	9.8			
27-Aug	sun/cloud	11	1952130	242	1334727	269	0.202		8.8		2	40	2.43	2	0.79	9.8			
28-Aug	rain	5	1952320	190	1334962	235	0.204		5.3		1	42	1.46	2	0.48	9.8	3.0	2.0	0.750
29-Aug	cloud	6	1952561	241	1335227	265	0.230	3.5	2.7		3	33	1.03	3	0.34	14.7			
30-Aug	sun	9	1952801	240	1335533	306	0.238	2.9	4.3		3	32	1.26	2	0.41	9.8			
31-Aug	sun	10	1953094	293	1335854	321	0.195	1.6	2.9		3	33	1.47	2	0.48	9.8			
Average		12.9		278		306	0.27	3.1	6.2	#DIV/0!	3	29	1.31	3	0.43	13.4			
Median		12.0		242		293	0.20	2.9	6.0	#NUM!	2	28	1.16	3	0.38	14.7			
Total				8332		9487		58.5	154.8	0				85		416.5			

Fall EMS Week 1



### September 2024 WWTP Monthly Report

Date	Weather	Temp. (°C)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO <sub>4</sub> (mg/L)	Alum/PAC (cm/d)	P-OPO <sub>4</sub> (mg/L)	PAC L/day	Lab Result		
																	TSS mg/L	BOD mg/L	Total P mg/L
			1953094		1335854														
01-Sep	sun	13	1953424	330	1336207	353	0.205	2.5	7.2		6	33	2.25	3	0.73	14.7			
02-Sep	sun/cloud	13	1953743	319	1336569	362	0.173	1.8	7.7		12	34	2.70	3	0.88	14.7			
03-Sep	sun/cloud	12	1954018	275	1336892	323	0.444	2.6	8.1		0	37	1.86	3	0.61	14.7			
04-Sep	sun	10	1954317	299	1337217	325	0.574	2.1	8.1		1	39	1.30	4	0.42	19.6	3.0	2.0	0.534
05-Sep	sun	10	1954529	212	1337447	230	0.283	4.9	5.4		10	41	0.30	4	0.10	19.6			
06-Sep	sun	10	1954759	230	1337674	227	0.135	4.7	3.8		1	40	1.39	3	0.45	14.7			
07-Sep	sun	10	1954982	223	1337929	255	0.258	5.5	4.8		1	40	1.65	2	0.54	9.8			
08-Sep	sun	12	1955200	218	1338189	260	0.146	4.7	5.6		1	33	2.48	2	0.81	9.8			
09-Sep	sun/cloud	13	1955393	193	1338416	227	0.209	4	7.1		1	33	2.20	4	0.72	19.6			
10-Sep	sun/cloud	12	1955596	203	1338639	223	0.121	3.6	6.5	160	1	35	1.60	3	0.52	14.7			
11-Sep	sun/cloud	8	1955778	182	1338849	210	0.130	1.8	4.1		2	36	1.18	3	0.38	14.7	3.0	2.0	0.330
12-Sep	cloud	10	1955975	197	1339063	214	0.197	4.8	8.8		2	38	1.24	3	0.40	14.7			
13-Sep	cloud	10	1956161	186	1339271	208	0.130	6.7	7.6		2	38	1.19	2	0.39	9.8			
14-Sep	rain	8	1956448	287	1339527	256	0.162	6.6	2.5		4	39	1.18	3	0.38	14.7			
15-Sep	cloud	7	1956561	113	1339758	231	0.143	1.8	1.7		3	38	2.01	2	0.66	9.8			
16-Sep	sun/cloud	7	1956754	193	1339985	227	0.162	4.5	10.3		2	38	0.74	2	0.24	9.8			
17-Sep	sun/cloud	9	1956915	161	1340192	207	0.140	5	5.0		1	38	0.15	2	0.05	9.8			
18-Sep	cloud	8	1957110	195	1340408	216	0.173	5.4	5.3		1	27	1.60	2	0.52	9.8	3.0	2.0	0.433
19-Sep	sun	9	1957323	213	1340656	248	0.119	5	3.8		7	26	1.20	3	0.39	14.7			
20-Sep	cloud	8	1957561	238	1340869	213	0.200	4.4			4	24	0.95	2	0.31	9.8			
21-Sep	sun	4	1957701	140	1341088	219	0.176	5.7	3.6		6	22	1.23	2	0.40	9.8			
22-Sep	cloud	6	1957911	210	1341339	251	0.362	5.5	7.2		3	23	1.54	2	0.50	9.8			
23-Sep	sun/cloud	7	1958097	186	1341558	219	0.261	5.8	7.6		2	23	1.95	2	0.64	9.8			
24-Sep	sun	9	1958287	190	1341842	284	0.402	3.4	7.5		1	24	1.86	2	0.61	9.8			
25-Sep	sun	8	1958495	208	1342092	250	0.200	4.9	7.5		2	25	1.55	3	0.51	14.7	3.0	2.0	0.466
26-Sep	rain	10	1958719	224	1342327	235	0.323	4	8.1		2	29	1.18	3	0.38	14.7			
27-Sep	sun/cloud	10	1958876	157	1342492	165	0.228	6.7	5.5		2	29	1.24	3	0.40	14.7			
28-Sep	sun/cloud	7	1959034	158	1342697	205	0.488	5.7	2.3		11	28	1.27	2	0.41	9.8			
29-Sep	sun/cloud	8	1959236	202	1342935	238	0.205	6.3	7.5		5	26	1.78	2	0.58	9.8			
30-Sep	sun/cloud	0	1959404	168	1343150	215	0.148	5.1	6.6		1	27	1.57	3	0.51	14.7			
Average		8.9		210		243	0.23	4.5	6.1	160	3	32	1.48	3	0.48	12.9			
Median		9.0		203		229	0.20	4.9	6.6	160	2	33	1.47	3	0.48	14.7			
Total				6310		7296		135.5	176.8	160						9.8			

Fall EMS Week 2

Fall EMS Week 3

Fall EMS Week 4

Fall EMS Week 5



October 2024 WWTP Monthly Report																			
Date	Weather	Temp. (°c)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO <sub>4</sub> (mg/L)	Alum/PAC (cm/d)	P-OP04 (mg/L)	PAC L/day	Lab Result		
																	TSS mg/L	BOD mg/L	Total P mg/L
			1959404		1343150														
01-Oct	sun/cloud	4	1959582	178	1343395	245	0.137	1.2	22.3		2	21	1.05	3	0.34	14.7			
02-Oct	sun/cloud	6	1959752	170	1343637	242	0.234	4	25.2		2	41	0.89	2	0.29	9.8	3.0	2.0	0.361
03-Oct	clear	2	1959932	180	1343876	239	0.133	3	6.4		6	27	1.12	2	0.37	9.8			
04-Oct	clear	4	1960118	186	1344156	280	0.300	0	0.0		2	44	1.72	2	0.56	9.8			
05-Oct	cloud	8	1960390	272	1344507	351	0.262	0	7.3		2	44	1.40	3	0.46	14.7			
06-Oct	clear	3	1960551	161	1344794	287	0.313	0	6.5		2	44	1.67	2	0.54	9.8			
07-Oct	clear	5	1960716	165	1344988	194	0.120	0	6.6		0	30	1.24	3	0.40	14.7			
08-Oct	clear	5	1960887	171	1345260	272	0.216	4.2	5.1		1	33	1.16	3	0.38	14.7			
09-Oct	cloud	7	1961056	169	1345479	219	0.108	4.3	6.5		10	25	1.15	2	0.38	9.8			
10-Oct	clear	4	1961202	146	1345660	181	0.222	0	3.9		1	27	1.24	2	0.40	9.8			
11-Oct	clear	1	1961359	157	1345852	192	0.132	1.4	4.9		1	28	1.33	2	0.43	9.8			
12-Oct	clear	2	1961546	187	1346048	196	0.360	4.5	6.1		5	30	1.71	2	0.56	9.8			
13-Oct	clear	2	1961773	227	1346338	290	0.218	5.7	2.9		5	32	1.88	2	0.61	9.8			
14-Oct	clear	6	1961950	177	1346602	264	0.241	2.3	5.6		1	30	1.06	2	0.35	9.8			
15-Oct	cloud	7	1962137	187	1346806	204	0.671	0	6.7		5	36	0.94	2	0.31	9.8			
16-Oct	rain	8	1962357	220	1347107	301	0.816	2.1	5.6		3	40	1.57	2	0.51	9.8			
17-Oct	cloud	0	1962653	296	1347489	382	0.393	4.9	5.9		9	35	1.11	2	0.36	9.8			
18-Oct	clear	-1	1962881	228	1347756	267	0.440	4.4	6.2		2	35	1.22	2	0.40	9.8			
19-Oct	rain	4	1963088	207	1348019	263	0.232	3.7	4.9		5	36	1.06	2	0.35	9.8			
20-Oct	rain	7	1963327	239	1348304	285	0.519	4.4	4.1		5	28	1.5	2	0.49	9.8			
21-Oct	rain	8	1963522	195	1348537	233	0.157	1.9	7.4		6	28	1.21	2	0.39	9.8			
22-Oct	sun/cloud	1	1963917	395	1349011	474	0.478	3.4	6.7		11	30	1.41	2	0.46	9.8			
23-Oct	cloud	1	1964150	233	1349299	288	0.141	3.4	7.6		4	32	0.91	2	0.30	9.8			
24-Oct	cloud	-2	1964334	184	1349529	230	0.197	0	7.0		2	32	0.47	2	0.15	9.8			
25-Oct	clear	0	1964517	183	1349748	219	0.129	0	6.2		1	37	0.78	2	0.25	9.8			
26-Oct	cloud	1	1964695	178	1349990	242	0.205	0	2.0		2	40	1.83	2	0.60	9.8			
27-Oct	cloud	6	1964862	167	1350191	201	0.131	0	6.7		2	41	0.89	2	0.29	9.8			
28-Oct	rain	0	1965094	232	1350481	290	0.384	0	6.7		3	43	1.47	2	0.48	9.8			
29-Oct	cloud	-1	1965367	273	1350792	311	0.167	0	8.6		1	39	1.17	2	0.38	9.8			
30-Oct	sun/cloud	-1	1965552	185	1351037	245	0.281	0	9.0		1	41	1.34	1	0.44	4.9			
31-Oct	clear	-1	1965763	211	1351273	236	0.123	0	10.1		0	44	0.63	2	0.21	9.8			
Average		3.1		205		262	0.27	1.9	7.1	#DIV/0!	3	35	1.23	2	0.40	10.3			
Median		3.0		186		245	0.22	1.4	6.5	#NUM!	2	35	1.21	2	0.39	9.8			
Total				6359		8123		58.8	220.7	0				65		-49.0			

Fall EMS Week 6



### November 2024 WWTP Monthly Report

Date	Weather	Temp. (°C)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO <sub>4</sub> (mg/L)	Alum/PAC (cm/d)	P-OPO4 (mg/L)	PAC L/day	Lab Result		
																	TSS mg/L	BOD mg/L	Total P mg/L
			1965763	1351273															
01-Nov	Cloudy	0	1965944	181	1351518	245	0.169	0.0	11.5		2	48	1.49	2	0.49	9.8			
02-Nov	Snow	1	1966098	154	1351729	211	0.109	0.0	5.9		2	50	1.14	1	0.37	4.9			
03-Nov	Cloudy	0	1966421	323	1352110	381	0.403	0.0	7.3		3	44	1.16	2	0.38	9.8			
04-Nov	Cloudy	-2	1966629	208	1352370	260	0.121	4.2	7.7		1	47	1.36	1	0.44	4.9			
05-Nov	Cloudy	-2	1966883	254	1352669	299	0.110	1.6	7.8		2	47	1.35	2	0.44	9.8			
06-Nov	Cloudy	-3	1967119	236	1352963	294	0.262	1.2	8.3		5	50	1.46	2	0.48	9.8			
07-Nov	Cloudy	-1	1967283	164	1353190	227	0.126	4.3	5.5		2	58	1.01	1	0.33	4.9			
08-Nov	Sunny	0	1967545	262	1353438	248	0.235	5.7	5.4		9	44	1.02	2	0.33	9.8			
09-Nov	Sunny	-2	1967756	211	1353670	232	0.182	3.9	5.2		3	34	1.09	1	0.36	4.9			
10-Nov	Cloudy	1	1968025	269	1353953	283	0.324	3.2	3.2		5	36	1.37	2	0.45	9.8			
11-Nov	Cloudy	1	1968201	176	1354232	279	0.135	4.8	6.9		1	36	1.26	1	0.41	4.9			
12-Nov	Cloudy	0	1968467	266	1354565	333	0.449	3.8	6.3		9	37	1.71	2	0.56	9.8			
13-Nov	Cloudy	0	1968740	273	1354915	350	0.117	6.7	6.4		0	38	1.24	1	0.40	4.9			
14-Nov	Rain	0	1968977	237	1355217	302	0.259	3.6	5.4		5	38	1.34	2	0.44	9.8			
15-Nov	Sunny	0	1969293	316	1355621	404	0.115	6.1	7.2		10	39	1.46	1	0.48	4.9			
16-Nov	Sunny	0	1969514	221	1355916	295	0.213	6.4	4.9		4	40	0.93	1	0.30	4.9			
17-Nov	Snow	-1	1969701	187	1356238	322	0.092	5.7	6.0		17	39	0.93	2	0.30	9.8			
18-Nov	Snow	-4	1969967	266	1356597	359	0.296	3.4	6.0		10	40	1.01	1	0.33	4.9			
19-Nov	Snow	-7	1970222	255	1356965	368	0.110	2.7	6.5		3	33	0.87	1	0.28	4.9			
20-Nov	Cloudy	-7	1970424	202	1357210	245	0.277	4.4	6.4		5	35	0.51	1	0.17	4.9			
21-Nov	Snow	-3	1970627	203	1357514	304	0.117	0.0	4.5		5	36	0.44	0.5	0.14	2.5			
22-Nov	Snow	-4	1970812	185	1357794	280	0.202	0.0	5.3		8	37	0.55	0.5	0.18	2.5			
23-Nov	Snow	-6	1971047	235	1358127	333	0.151	3.8	5.9		4	39	1.45	1	0.47	4.9			
24-Nov	Cloudy	-9	1971252	205	1358449	322	0.225	3.2	5.2		2	41	1.45	1	0.47	4.9			
25-Nov	Snow	-5	1971453	201	1358746	297	0.125	3.4	6.7	130	5	41	1.33	1	0.43	4.9			
26-Nov	Partly Cloudy	1	1971664	211	1359053	307	0.228	4.0	6.2		3	43	1.27	1	0.41	4.9			
27-Nov	Cloudy	-7	1971851	187	1359320	267	0.124	2.1	7.5		5	45	1.17	0.5	0.38	2.5			
28-Nov	Partly Cloudy	-7	1972056	205	1359631	311	0.198	2.8	6.3		3	46	0.65	0.5	0.21	2.5	<3.0	<2.0	0.407
29-Nov	Snow	-4	1972234	178	1359901	270	0.123	4.0	8.8		8	47	1.55	1	0.51	4.9			
30-Nov	Partly Cloudy	-2	1972475	241	1360253	352	0.263	4.3	6.5		16	49	1.53	1	0.50	4.9			
Average	N/A	-2.4		224		299	0.20	3.3	6.4	130	5	42	1.17	1	0.38	6.0			
Median	N/A	-2.0		211		298	0.18	3.7	6.3	130	5	41	1.25	1	0.41	4.9			
Total	N/A	N/A		6712		8980	N/A	99.3	192.7	130	N/A	N/A	N/A	37	N/A	-568.4			



December 2024 WWTP Monthly Report																			
Date	Weather	Temp. (°C)	Total Influent Flow (m³)	Daily Influent flow (m³)	Total Effluent Flow	Effluent Flow (m³)	TSS (mg/L)	Solids Bagged (m³)	Wasting (m³)	Bags Rem'd	EQ Tank % Full	SD Tank % Full	Total PO₄ (mg/L)	Alum/PAC (cm/d)	P-OPO₄ (mg/L)	PAC L/day	Lab Result		
																	TSS mg/L	BOD mg/L	Total P mg/L
			1972475	1360253															
01-Dec	Partly Cloudy	-4	1972777	302	1360649	396	0.252	5.0	5.6		12	49	0.61	1	0.20	4.9			
02-Dec	Partly Cloudy	-3	1973043	266	1361027	378	0.348	0.0	5.8		6	51	1.34	1.5	0.44	7.4			
03-Dec	Cloudy	-6	1973265	222	1361343	316	0.158	0.9	7.2		3	41	1.03	1.5	0.34	7.4			
04-Dec	Partly Cloudy	-6	1973446	181	1361634	291	0.217	1.5	6.7	140	8	44	1.21	2	0.39	9.8			
05-Dec	Partly Cloudy	-5	1973627	181	1361842	208	0.135	0.0	7.8	150	16	49	1.03	1	0.34	4.9			
06-Dec	Partly Cloudy	-6	1973802	175	1362149	307	0.212	3.8	6.7		23	49	1.53	1	0.50	4.9			
07-Dec	Snow	-4	1973994	192	1362434	285	0.150	2.9	4.5		25	51	1.57	1.5	0.51	7.4			
08-Dec	Cloudy	-5	1974353	359	1362945	511	0.736	2.2	5.4		26	52	1.26	1.5	0.41	7.4			
09-Dec	Sunny	-7	1974738	385	1363411	466	0.340	2.1	7.9		7	42	2.02	2	0.66	9.8			
10-Dec	Cloudy	-7	1974979	241	1363786	375	0.384	1.9	2.1		2	45	0.76	2	0.25	9.8			
11-Dec	Cloudy	-6	1975207	228	1364111	325	0.151	4.6	7.1	135	3	45	1.20	2	0.39	9.8			
12-Dec	Cloudy	-6	1975378	171	1364292	181	0.260	4.7	5.8		16	46	0.36	1	0.12	4.9			
13-Dec	Cloudy	-6	1975626	248	1364638	346	0.255	5.6	6.9		10	46	0.86	2	0.28	9.8			
14-Dec	Cloudy	-1	1975903	277	1365021	383	0.271	7.7	7.1		1	47	1.89	1	0.62	4.9			
15-Dec	Cloudy	-3	1976177	274	1365423	402	0.159	5.8	7.1		12	47	0.58	4	0.19	19.6			
16-Dec	Partly Cloudy	-7	1976546	369	1365902	479	0.458	5.8	6.0		1	39	0.92	4	0.30	19.6			
17-Dec	Cloudy	-7	1976775	229	1366231	329	0.158	3.3	7.5		7	38	0.52	4	0.17	19.6			
18-Dec	Snow/Rain	0	1977032	257	1366558	327	0.355	4.5	6.5		13	41	0.78	3	0.25	14.7			
19-Dec	Sunny	-2	1977422	390	1367064	506	0.328	5.2	7.0		11	42	1.39	2	0.45	9.8	<3.0	<2.0	0.284
20-Dec	Cloudy	-4	1977744	322	1367476	412	0.426	6.0	8.0		9	42	1.28	2	0.42	9.8			
21-Dec	Sunny	-2	1978042	298	1367848	372	0.181	6.9	6.5		15	44	0.87	2	0.28	9.8			
22-Dec	Partly Cloudy	-1	1978459	417	1368329	481	1.140	4.4	7.2		17	44	1.54	2	0.50	9.8			
23-Dec	Cloudy	-2	1978859	400	1368815	486	0.479	3.3	6.3		6	44	1.92	3	0.63	14.7			
24-Dec	Cloudy	-1	1979317	458	1369320	505	0.289	5.6	8.0		8	35	1.49	4	0.49	19.6			
25-Dec	Cloudy	-3	1979715	398	1369779	459	0.285	0.8	6.4		14	36	1.53	4	0.50	19.6			
26-Dec	Snow	-3	1980222	507	1370397	618	0.437	0.0	5.9		4	39	1.47	5	0.48	24.5			
27-Dec	Cloudy	-3	1980550	328	1370828	431	0.425	0.0	6.9		10	41	1.09	4	0.36	19.6			
28-Dec	Snow	-1	1981007	457	1371318	490	0.843	0.0	7.6		22	44	1.57	4	0.51	19.6			
29-Dec	Cloudy	2	1981553	546	1372001	683	1.810	0.0	8.5		19	47	1.80	5	0.59	24.5			
30-Dec	Cloudy	1	1982161	608	1372712	711	0.914	0.0	7.9		15	51	1.82	6	0.59	29.4			
31-Dec	Cloudy	-6	1982737	576	1373337	625	0.773	0.0	7.0		10	54	1.73	7	0.56	34.3			
Average		-3.7		331		422	0.43	3.0	6.7	142	11	45	1.26	3	0.41	13.6			
Median		-4.0		302		402	0.33	3.3	6.9	140	10	44	1.28	2	0.42	9.8			
Total				10262		13084		94.5	206.9	425				86		421.4			



	2024 Fernie Alpine Resort Wastewater Treatment Plant Summary																											
	Temperature		Influent flow			Effluent Flow			TSS		Volume Bagged			Volume Wasted			Amount of Bags Removed			EQ Tank % Full		SD Tank % Full		Total PO4 (mg/L)		Alum/ PAC usage (L)		
	Average	Median	Average	Median	Total	Average	Median	Total	Average	Median	Average	Median	Total	Average	Median	Total	Average	Median	Total	Average	Median	Average	Median	Average	Median	Average	Median	Total
January	-8.5	-5.0	322	322	9991	449	451	13921	0.5	0.4	2.4	1.6	73.5	7.2	7.5	224.3	125.0	125.0	125	13	31	59	63	1.12	1.01	4.5	3.0	1516
February	-4.5	-3.0	348	338	10085	434	441	12591	0.3	0.3	3.9	4.6	114.0	6.5	6.6	188.2	135.0	135.0	270	10	37	67	64	1.34	1.28	3.9	3.0	1656
March	-3.9	-2.0	350	351	10861	428	424	13273	0.3	0.2	5.0	5.3	156.0	8.6	7.0	267.6	90.0	90.0	90	8	38	80	80	1.51	1.46	2.9	3.0	1248
Q1	-5.6	-3.0	340	338	30937	437	441	39785	0.4	0.3	3.8	4.6	343.5	7.5	7.0	680.1	116.7	125.0	485	10	37	69	64	1.32	1.28	3.7	3.0	4420
April	1.1	1.0	232	231	6974	232	292	9017	0.2	0.8	4.4	4.3	130.9	7.3	7.3	217.6	120.0	144.0	360	31	29	80	80	1.45	1.33	8.8	14.7	657
May	5.2	5.0	182	181	5629	250	248	7757	0.2	1.4	5.8	5.4	181.2	5.8	5.8	178.7	154.0	153.0	616	21	21	62	58	1.37	1.32	6.2	9.8	478
June	8.1	8.0	239	226	7179	308	276	9234	0.2	0.9	4.9	5.0	146.0	6.7	6.6	200.5	#DIV/0!	#NUM!	0	22	21	33	1	1.46	1.25	7.0	4.9	456
Q2	4.8	5.0	218	226	19782	263	276	26008	0.2	0.9	5.0	5.0	458.1	6.6	6.6	596.8	#DIV/0!	#NUM!	976	25	21	58	58	1.43	1.32	7.3	9.8	1590
July	14.6	15.0	278	278	8625	310	278	9596	0.2	0.2	3.8	4.2	116.3	6.0	6.6	185.9	166.3	160.0	499	1	1	27	27	1.42	1.39	13.4	14.7	417
August	12.9	12.0	278	242	8332	306	293	9487	0.3	0.2	3.1	2.9	58.5	6.2	6.0	154.8	#DIV/0!	#NUM!	0	3	2	29	28	1.31	1.16	13.4	14.7	417
September	8.9	9.0	210	203	6310	243	229	7296	0.2	0.2	4.5	4.9	135.5	6.1	6.6	176.8	160.0	160.0	160	3	2	32	33	1.48	1.47	12.9	14.7	10
Q3	12.1	12.0	255	242	23267	286	278	26379	0.2	0.2	3.8	4.2	310.3	6.1	6.6	517.5	#DIV/0!	#NUM!	659	3	2	29	28	1.40	1.39	13.3	14.7	843
October	3.1	3.0	205	186	6359	262	245	8123	0.3	0.2	1.9	1.4	58.8	7.1	6.5	220.7	#DIV/0!	#NUM!	0	3	2	35	35	1.23	1.21	10.3	2.0	65
November	-2.4	-2.0	224	211	8980	299	298	8980	0.2	0.2	3.3	3.7	99.3	6.4	6.3	192.7	130.0	130.0	130	5	5	42	41	1.17	1.25	6.0	1.0	37
December	-3.7	-4.0	331	302	10262	422	402	13084	0.4	0.3	3.0	3.3	94.5	6.7	6.9	206.9	141.7	140.0	425	11	10	45	44	1.26	1.28	13.6	2.0	86
Q4	-1.0	-2.0	253	211	25601	328	298	30187	0.3	0.2	2.8	3.3	252.6	6.7	6.5	620.3	#DIV/0!	#NUM!	555	7	5	40	41	1.22	1.25	10.0	2.0	188
Annual	2.6	2.0	267	236	99587	329	292	122359	0.3	0.2	3.8	4.2	1364.5	6.7	6.6	2414.7	#DIV/0!	#NUM!	2675	11	16	49	42	1.3	1.3	8.6	4.0	7041





Date: September 30, 2002

Our File: RE 17139

**REGISTERED MAIL**

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

Resorts of the Canadian Rockies Inc.  
1507 - 17<sup>th</sup> 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 RE 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<sup>3</sup>/day, a maximum BOD<sub>5</sub> 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 - 883 Victoria Street  
Nelson BC V1L 4K9

Telephone: 250 354-8333  
Facsimile: 250 354-8332  
PP Facsimile: 250 354-8367



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://wlapwww.gov.bc.ca/epd/epdpa/mpp/msrhome.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 authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized 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 H102571.



### 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<sup>3</sup>/day. The effluent quality shall be BOD<sub>5</sub> 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 25, 2002.

**Outfall Diffuser**

The discharger shall install an outfall diffuser in accordance with Part 4, Section 5 and Schedule 7, Condition 4 of the *Regulation*. The diffuser shall be installed on or before August 31, 2003. 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.

} check the flow

**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 22 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 25, 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	5 µg/L	(1 ppm)
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 <sup>4</sup> ( At Sites UP, IDZ and DN)	Plant Influent <sup>3</sup>	Plant Effluent <sup>3</sup>
Parameter			
pH (field test)	WS/G		M/G and WS/G
temperature (field test)	WS/G		
flow		D/CON.	D/CON.
BOD <sub>5</sub> <sup>1</sup>		M/G	M/G and WS/G
TSS <sup>2</sup>	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 <sup>4</sup> ( At Sites UP, IDZ and DN)	Plant Influent <sup>3</sup>	Plant Effluent <sup>3</sup>
orthophosphate	WS/G		M/G and WS/G
fecal coliforms	WS/G		M/G and WS/G
Toxicity			3Y/G

1. BOD<sub>5</sub> - 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 <sup>4</sup> ( At Sites UP, IDZ and DN)	Plant Influent <sup>3</sup>	Plant Effluent <sup>3</sup>
Parameter			
pH (field test)	WS/G		M/G and WS/G
temperature (field test)	WS/G		
flow		D/CON.	D/CON.
BOD <sub>5</sub> <sup>1</sup>		M/G	M/G and WS/G
TSS <sup>2</sup>	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 <sup>4</sup> ( At Sites UP, IDZ and DN)	Plant Influent <sup>3</sup>	Plant Effluent <sup>3</sup>
orthophosphate	WS/G		M/G and WS/G
fecal coliforms	WS/G		M/G and WS/G
Toxicity			3Y/G

1. BOD<sub>5</sub> - 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 BMS 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.



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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 Walls, Fernie Alpine Resort, Fernie  
Andrew Brown, Fernie Alpine Resort, Fernie  
Ken van Heyningen, Fernie Alpine Resort, Fernie  
Gary Lawrence, MWLAP, Cranbrook



## CERTIFICATE OF ANALYSIS

Work Order	: CG2400104	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 2 - WWTP samples	Date Samples Received	: 04-Jan-2024 08:40
PO	: ----	Date Analysis Commenced	: 04-Jan-2024
C-O-C number	: ----	Issue Date	: 09-Jan-2024 16:19
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Eunice Cura	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
PHA	pH adjusted before analysis.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)					Client sampling date / time	03-Jan-2024 09:45	03-Jan-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2400104-001	CG2400104-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.48	8.24	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	507 <sup>DLHC</sup>	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0096	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	12.9	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0020	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.203	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.263	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	12.9	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	44	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	434 <sup>PHA</sup>	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2400104</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 2 - WWTP samples	Date Samples Received	: 04-Jan-2024 08:40
PO	: ----	Issue Date	: 09-Jan-2024 16:19
C-O-C number	: ----		
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	03-Jan-2024	----	----	----		04-Jan-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	03-Jan-2024	----	----	----		04-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	03-Jan-2024	04-Jan-2024	28 days	1 days	✓	04-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	03-Jan-2024	04-Jan-2024	3 days	1 days	✓	04-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	03-Jan-2024	04-Jan-2024	3 days	1 days	✓	04-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	03-Jan-2024	04-Jan-2024	3 days	1 days	✓	04-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	03-Jan-2024	05-Jan-2024	28 days	2 days	✓	05-Jan-2024	28 days	2 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	03-Jan-2024	----	----	----		04-Jan-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	03-Jan-2024	04-Jan-2024	0.25 hrs	25 hrs	✖ EHTR-FM	04-Jan-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	03-Jan-2024	04-Jan-2024	0.25 hrs	26 hrs	✖ EHTR-FM	04-Jan-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	03-Jan-2024	----	----	----		05-Jan-2024	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	03-Jan-2024	----	----	----		05-Jan-2024	7 days	2 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1294062	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1294570	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1294411	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1294236	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1294237	1	19	5.2	5.0	✓
pH by Meter	E108	1294109	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1295252	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1294058	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	1295162	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1294062	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1294570	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1294411	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1294236	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1294237	1	19	5.2	5.0	✓
pH by Meter	E108	1294109	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1294058	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	1295162	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1294062	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1294570	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1294411	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1294236	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1294237	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1295252	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1294058	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	1295162	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1294062	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1294411	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1294236	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1294237	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1294058	1	4	25.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2400104  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC Winter EMS Wk 2 - WWTP samples



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2400104</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 2 - WWTP samples	Date Samples Received	: 04-Jan-2024 08:40
PO	: ----	Date Analysis Commenced	: 04-Jan-2024
C-O-C number	: ----	Issue Date	: 09-Jan-2024 16:19
Sampler	: Nicholas Cormier 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Eunice Cura	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1294109)											
CG2400083-001	Anonymous	pH	----	E108	0.10	pH units	8.33	8.36	0.359%	4%	----
Physical Tests (QC Lot: 1295162)											
CG2400104-001	WWTP Influent	Solids, total suspended [TSS]	----	E160	7.5	mg/L	507	526	3.68%	20%	----
Anions and Nutrients (QC Lot: 1294058)											
CG2400104-002	WWTP Effluent	Phosphorus, total	7723-14-0	E372-U	0.0100	mg/L	0.263	0.260	1.25%	20%	----
Anions and Nutrients (QC Lot: 1294062)											
CG2400100-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1294236)											
CG2400100-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.265	0.271	2.24%	20%	----
Anions and Nutrients (QC Lot: 1294237)											
CG2400100-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1294411)											
CG2400071-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1295252)											
CG2400104-002	WWTP Effluent	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	44	35	22.8%	65%	----
Aggregate Organics (QC Lot: 1294570)											
CG2400101-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1295162)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1294058)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1294062)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1294236)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1294237)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1294411)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Microbiological Tests (QCLot: 1295252)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1294570)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1294109)									
pH	----	E108	----	pH units	7 pH units	102	98.0	102	----
Physical Tests (QCLot: 1295162)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1294058)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.2	80.0	120	----
Anions and Nutrients (QCLot: 1294062)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.6	85.0	115	----
Anions and Nutrients (QCLot: 1294236)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 1294237)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1294411)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Aggregate Organics (QCLot: 1294570)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	95.6	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1294058)										
SK2400020-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1294062)										
CG2400100-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1294236)										
CG2400102-009	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.71 mg/L	2.5 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 1294237)										
CG2400102-009	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.544 mg/L	0.5 mg/L	109	75.0	125	----
Anions and Nutrients (QCLot: 1294411)										
CG2400071-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0514 mg/L	0.05 mg/L	103	70.0	130	----





SEND REPORT TO:

**CHAIN OF CUSTODY FORM**

PAGE 1 OF 1

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	ANALYSIS REQUESTED:													
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST																	
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2														
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Nicholas Corman														
PROJECT NAME AND NO.:		FARUC Winter EMS Wk 2 - WWTP samples		QUOTE NO.:															
PO NO.:		ALS CONTACT:		Ptryk Wojciak															
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input type="checkbox"/> OTHER:				Fecal Coliforms TSS   pH   Ortho P   Total P   NH3-N   NO3-N   NO2-N   BOD5   COD NOTES (sample specific comments, due dates, etc.)													
WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED		MATRIX														
			YYYY-MM-DD	TIME															
FOR LAB USE ONLY	1	WWTP Influent Routine	2024-01-03	9:45	Water		X	X											
		WWTP Influent BOD	2024-01-03	9:45	Water									X					
		WWTP Effluent Routine	2024-01-03	9:55	Water		X	X											
	2	WWTP Effluent BOD	2024-01-03	9:55	Water									X					
		WWTP Effluent Nutrients	2024-01-03	9:55	Water				X	X	X	X	X						
		WWTP Effluent Bacteriological	2024-01-03	9:55	Water	X													
					Environmental Division Calgary Work Order Reference <b>CG2400104</b>  Telephone : +1 403 407 1800														
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH   SPECIFY DATE: _____ (surcharge may apply)				RELINQUISHED BY:		DATE:	Jan 03 2024	RECEIVED BY:		DATE:	01/04/24						
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)				Nicholas Corman		TIME:	12:15	NC		TIME:	08:40						
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX						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: 4.6°C		Cooling Method?										
					X Yes   No   N/A		Frozen? Yes   X No		X Icepacks   Ice   None										



CERTIFICATE OF ANALYSIS

Work Order	: CG2400105	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 2 - river samples	Date Samples Received	: 04-Jan-2024 08:40
PO	: ----	Date Analysis Commenced	: 04-Jan-2024
C-O-C number	: ----	Issue Date	: 09-Jan-2024 13:34
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Eunice Cura	Lab Assistant	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	Elk River Upstream	Elk River @ IDZ	Elk River Downstream	----	----
(Matrix: Water)										
Client sampling date / time					03-Jan-2024 10:15	03-Jan-2024 10:30	03-Jan-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2400105-001	CG2400105-002	CG2400105-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.53	8.50	8.53	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	9.1	<3.0	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.64	0.213	1.74	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0022	0.0012	0.0024	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0090	<0.0010	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0062	0.0223	0.0045	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.64	0.214	1.74	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	1	8	<1	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2400105</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 2 - river samples	Date Samples Received	: 04-Jan-2024 08:40
PO	: ----	Issue Date	: 09-Jan-2024 13:34
C-O-C number	: ----		
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River @ IDZ	E298	03-Jan-2024	04-Jan-2024	28 days	1 days	✓	04-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Downstream	E298	03-Jan-2024	04-Jan-2024	28 days	1 days	✓	04-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Upstream	E298	03-Jan-2024	04-Jan-2024	28 days	1 days	✓	04-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River @ IDZ	E378-U	03-Jan-2024	05-Jan-2024	3 days	2 days	✓	05-Jan-2024	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Downstream	E378-U	03-Jan-2024	05-Jan-2024	3 days	2 days	✓	05-Jan-2024	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Upstream	E378-U	03-Jan-2024	05-Jan-2024	3 days	2 days	✓	05-Jan-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO3-L	03-Jan-2024	04-Jan-2024	3 days	1 days	✓	04-Jan-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO3-L	03-Jan-2024	04-Jan-2024	3 days	1 days	✓	04-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO3-L	03-Jan-2024	04-Jan-2024	3 days	1 days	✓	04-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO2-L	03-Jan-2024	04-Jan-2024	3 days	1 days	✓	04-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO2-L	03-Jan-2024	04-Jan-2024	3 days	1 days	✓	04-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO2-L	03-Jan-2024	04-Jan-2024	3 days	1 days	✓	04-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River @ IDZ	E372-U	03-Jan-2024	05-Jan-2024	28 days	2 days	✓	05-Jan-2024	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Downstream	E372-U	03-Jan-2024	05-Jan-2024	28 days	2 days	✓	05-Jan-2024	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Upstream	E372-U	03-Jan-2024	05-Jan-2024	28 days	2 days	✓	05-Jan-2024	28 days	2 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River @ IDZ	E012.FC	03-Jan-2024	----	----	----		04-Jan-2024	30 hrs	25 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Downstream	E012.FC	03-Jan-2024	----	----	----		04-Jan-2024	30 hrs	25 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Upstream	E012.FC	03-Jan-2024	----	----	----		04-Jan-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River @ IDZ	E108	03-Jan-2024	04-Jan-2024	0.25 hrs	25 hrs	✖ EHTR-FM	04-Jan-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Downstream	E108	03-Jan-2024	04-Jan-2024	0.25 hrs	25 hrs	✖ EHTR-FM	04-Jan-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Upstream	E108	03-Jan-2024	04-Jan-2024	0.25 hrs	25 hrs	✖ EHTR-FM	04-Jan-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River @ IDZ	E160	03-Jan-2024	----	----	----		05-Jan-2024	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Downstream	E160	03-Jan-2024	----	----	----		05-Jan-2024	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Upstream	E160	03-Jan-2024	----	----	----		05-Jan-2024	7 days	2 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1294062	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1294978	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1294236	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1294237	1	19	5.2	5.0	✓
pH by Meter	E108	1294109	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1295252	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1294180	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1295162	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1294062	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1294978	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1294236	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1294237	1	19	5.2	5.0	✓
pH by Meter	E108	1294109	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1294180	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1295162	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1294062	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1294978	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1294236	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1294237	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1295252	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1294180	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1295162	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1294062	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1294978	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1294236	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1294237	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1294180	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2400105  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC Winter EMS Wk 2 - river samples



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2400105</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 2 - river samples	Date Samples Received	: 04-Jan-2024 08:40
PO	: ----	Date Analysis Commenced	: 04-Jan-2024
C-O-C number	: ----	Issue Date	: 09-Jan-2024 13:34
Sampler	: Nicholas Cormier 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Eunice Cura	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1294109)											
CG2400083-001	Anonymous	pH	----	E108	0.10	pH units	8.33	8.36	0.359%	4%	----
Physical Tests (QC Lot: 1295162)											
CG2400104-001	Anonymous	Solids, total suspended [TSS]	----	E160	7.5	mg/L	507	526	3.68%	20%	----
Anions and Nutrients (QC Lot: 1294062)											
CG2400100-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1294180)											
CG2400005-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0094	0.0091	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1294236)											
CG2400100-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.265	0.271	2.24%	20%	----
Anions and Nutrients (QC Lot: 1294237)											
CG2400100-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1294978)											
CG2400100-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1295252)											
CG2400104-002	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	44	35	22.8%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1295162)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1294062)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1294180)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1294236)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1294237)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1294978)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Microbiological Tests (QCLot: 1295252)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1294109)									
pH	----	E108	----	pH units	7 pH units	102	98.0	102	----
Physical Tests (QCLot: 1295162)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1294062)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.6	85.0	115	----
Anions and Nutrients (QCLot: 1294180)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	96.2	80.0	120	----
Anions and Nutrients (QCLot: 1294236)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 1294237)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1294978)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	98.7	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1294062)										
CG2400100-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1294180)										
CG2400105-001	Elk River Upstream	Phosphorus, total	7723-14-0	E372-U	0.0584 mg/L	0.05 mg/L	117	70.0	130	----
Anions and Nutrients (QCLot: 1294236)										
CG2400102-009	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.71 mg/L	2.5 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 1294237)										
CG2400102-009	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.544 mg/L	0.5 mg/L	109	75.0	125	----
Anions and Nutrients (QCLot: 1294978)										
CG2400100-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0510 mg/L	0.05 mg/L	102	70.0	130	----



## CHAIN OF CUSTODY FORM

PAGE 1 OF

FOR LAB USE ONLY



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2400372**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC WINTER EMS WK 3 - WWTP SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NC  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 11-Jan-2024 08:35  
**Date Analysis Commenced** : 11-Jan-2024  
**Issue Date** : 16-Jan-2024 14:53

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP INFLUENT	WWTP EFFLUENT	----	----	----
(Matrix: Water)										
					Client sampling date / time	10-Jan-2024 09:45	10-Jan-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2400372-001	CG2400372-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.23	7.79	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	160	5.9	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0075	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	29.9	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	<0.0050 <sup>DLDS</sup>	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.235	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.291	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	29.9	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	<1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	108	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2400372</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 3 - WWTP SAMPLES	Date Samples Received	: 11-Jan-2024 08:35
PO	: ----	Issue Date	: 16-Jan-2024 14:53
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP EFFLUENT	E550	10-Jan-2024	----	----	----		11-Jan-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP INFLUENT	E550	10-Jan-2024	----	----	----		11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E298	10-Jan-2024	11-Jan-2024	28 days	1 days	✓	11-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP EFFLUENT	E378-U	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO3-L	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO2-L	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E372-U	10-Jan-2024	12-Jan-2024	28 days	2 days	✓	12-Jan-2024	28 days	2 days	✓



Page : 4 of 7  
 Work Order : CG2400372  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC WINTER EMS WK 3 - WWTP SAMPLES



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT	E012.FC	10-Jan-2024	----	----	----		11-Jan-2024	30 hrs	26 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP EFFLUENT	E108	10-Jan-2024	11-Jan-2024	0.25 hrs	30 hrs	✖ EHTR-FM	11-Jan-2024	0.25 hrs	30 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP INFLUENT	E108	10-Jan-2024	11-Jan-2024	0.25 hrs	30 hrs	✖ EHTR-FM	11-Jan-2024	0.25 hrs	30 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT	E160	10-Jan-2024	----	----	----		12-Jan-2024	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP INFLUENT	E160	10-Jan-2024	----	----	----		12-Jan-2024	7 days	2 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1300184	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1300604	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1300220	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1300389	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1300388	1	14	7.1	5.0	✓
pH by Meter	E108	1300441	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1301273	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1300298	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1300211	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1300184	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1300604	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1300220	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1300389	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1300388	1	14	7.1	5.0	✓
pH by Meter	E108	1300441	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1300298	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1300211	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1300184	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1300604	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1300220	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1300389	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1300388	1	14	7.1	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1301273	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1300298	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1300211	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1300184	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1300220	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1300389	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1300388	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1300298	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2400372  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC WINTER EMS WK 3 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2400372</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 3 - WWTP SAMPLES	Date Samples Received	: 11-Jan-2024 08:35
PO	: ----	Date Analysis Commenced	: 11-Jan-2024
C-O-C number	: ----	Issue Date	: 16-Jan-2024 14:53
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1300211)											
CG2400300-001	Anonymous	Solids, total suspended [TSS]	----	E160	7.5	mg/L	659	730	10.3%	20%	----
Physical Tests (QC Lot: 1300441)											
CG2312901-013	Anonymous	pH	----	E108	0.10	pH units	5.77	5.77	0.00%	4%	----
Anions and Nutrients (QC Lot: 1300184)											
CG2400352-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	1.25	mg/L	13.0	12.8	1.04%	20%	----
Anions and Nutrients (QC Lot: 1300220)											
CG2400331-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1300298)											
CG2400372-002	WWTP EFFLUENT	Phosphorus, total	7723-14-0	E372-U	0.0100	mg/L	0.291	0.293	0.641%	20%	----
Anions and Nutrients (QC Lot: 1300388)											
CG2400383-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0022	0.0022	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1300389)											
CG2400383-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.257	0.256	0.663%	20%	----
Microbiological Tests (QC Lot: 1301273)											
CG2400375-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	2	1	1	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1300604)											
CG2400363-002	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1300211)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1300184)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1300220)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1300298)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1300388)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1300389)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1301273)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1300604)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1300211)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	93.7	85.0	115	----
Physical Tests (QCLot: 1300441)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 1300184)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.4	85.0	115	----
Anions and Nutrients (QCLot: 1300220)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	95.8	80.0	120	----
Anions and Nutrients (QCLot: 1300298)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	94.7	80.0	120	----
Anions and Nutrients (QCLot: 1300388)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1300389)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.8	90.0	110	----
Aggregate Organics (QCLot: 1300604)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	87.8	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1300184)										
CG2400353-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1300220)										
CG2400331-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0479 mg/L	0.05 mg/L	95.7	70.0	130	----
Anions and Nutrients (QCLot: 1300298)										
CG2400373-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0496 mg/L	0.05 mg/L	99.2	70.0	130	----
Anions and Nutrients (QCLot: 1300388)										
CG2400383-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.529 mg/L	0.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1300389)										
CG2400383-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.60 mg/L	2.5 mg/L	104	75.0	125	----





**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: 780-791-1596  
**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-  
**Saskatoon SK**, 819 - 58th Street East, S7K 6X5, Tel: 306-688-8370 Toll Free: 1-800-667-7645 Fax: 306-688-8383


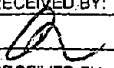
Environmental Division  
Calgary  
Work Order Reference  
**CG2400372**



~~\*\*\*\*\*~~Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

SEND REPORT TO:		COMPANY: FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN: PATRICK MAJER		ANALYSIS REQUESTED:																					
ADDRESS: 1505 - 17TH AVENUE SOUTH WEST		CITY: CALGARY		PROV: ALBERTA		POSTAL CODE: T2T 0E2		TEL: 403 - 256 - 8473		FAX: 403 - 244 - 3774		SAMPLER: Nicholas Corman															
PROJECT NAME AND NO.: FARUC Winter EMS Wk 3 - WWTP samples		QUOTE NO:																Telephone: 403 407 1800									
PO NO.:		ALS CONTACT: Patryk Wojciak																									
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com																									
<input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:																											
WO#		SAMPLE IDENTIFICATION		DATE / TIME COLLECTED		MATRIX																NOTES (sample specific comments, due dates, etc)					
				YYYY-MM-DD TIME																							
FOR LAB USE ONLY		WWTP Influent Routine		2024-01-10 9:45		Water																					
		WWTP Influent BOD		2024-01-10 9:45		Water																					
		WWTP Effluent Routine		2024-01-10 9:55		Water																					
		WWTP Effluent BOD		2024-01-10 9:55		Water																					
		WWTP Effluent Nutrients		2024-01-10 9:55		Water																					
		WWTP Effluent Bacteriological		2024-01-10 9:55		Water																					
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH SPECIFY DATE: (surcharge may apply)		RELINQUISHED BY: Nicholas Corman		DATE: Jan 10 2024		RECEIVED BY: 		DATE: 01/11/24																	
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)		RELINQUISHED BY:		DATE:		RECEIVED BY:		DATE:																	
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX				TIME: 12:15				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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		Sample Temperature: 35°C		Cooling Method? <input type="checkbox"/> Icepacks <input type="checkbox"/> Ice <input type="checkbox"/> None																	

Environmental Division

Calgary

Work Order Reference  
**CG2400372**



CERTIFICATE OF ANALYSIS

Work Order	: CG2400375	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 3 - River Samples	Date Samples Received	: 11-Jan-2024 08:35
PO	: ----	Date Analysis Commenced	: 11-Jan-2024
C-O-C number	: ----	Issue Date	: 16-Jan-2024 14:56
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	ELK RIVER UPSTREAM	ELK RIVER @ IDZ	ELK RIVER DOWNSTREAM	----	----
(Matrix: Water)										
Client sampling date / time					10-Jan-2024 10:15	10-Jan-2024 10:30	10-Jan-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2400375-001	CG2400375-002	CG2400375-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.30	8.16	8.28	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.57	0.525	1.49	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0025	<0.0010	0.0022	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0130	<0.0010	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0033	0.0184	0.0047	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.57	0.525	1.49	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	2	3	1	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2400375</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 3 - River Samples	Date Samples Received	: 11-Jan-2024 08:35
PO	: ----	Issue Date	: 16-Jan-2024 14:56
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E298	10-Jan-2024	11-Jan-2024	28 days	1 days	✓	11-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	10-Jan-2024	11-Jan-2024	28 days	1 days	✓	11-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	10-Jan-2024	11-Jan-2024	28 days	1 days	✓	11-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER @ IDZ	E378-U	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER DOWNSTREAM	E378-U	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER UPSTREAM	E378-U	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO3-L	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO2-L	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO2-L	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO2-L	10-Jan-2024	11-Jan-2024	3 days	1 days	✓	11-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E372-U	10-Jan-2024	12-Jan-2024	28 days	2 days	✓	12-Jan-2024	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E372-U	10-Jan-2024	12-Jan-2024	28 days	2 days	✓	12-Jan-2024	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E372-U	10-Jan-2024	12-Jan-2024	28 days	2 days	✓	12-Jan-2024	28 days	2 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER @ IDZ	E012.FC	10-Jan-2024	----	----	----		11-Jan-2024	30 hrs	26 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER DOWNSTREAM	E012.FC	10-Jan-2024	----	----	----		11-Jan-2024	30 hrs	26 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	10-Jan-2024	----	----	----		11-Jan-2024	30 hrs	26 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER @ IDZ	E108	10-Jan-2024	11-Jan-2024	0.25 hrs	29 hrs	✖ EHTR-FM	11-Jan-2024	0.25 hrs	29 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	10-Jan-2024	11-Jan-2024	0.25 hrs	29 hrs	✖ EHTR-FM	11-Jan-2024	0.25 hrs	29 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	10-Jan-2024	11-Jan-2024	0.25 hrs	29 hrs	✖ EHTR-FM	11-Jan-2024	0.25 hrs	29 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ IDZ	E160	10-Jan-2024	----	----	----		12-Jan-2024	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160	10-Jan-2024	----	----	----		12-Jan-2024	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160	10-Jan-2024	----	----	----		12-Jan-2024	7 days	2 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1300184	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1300220	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1300389	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1300388	1	14	7.1	5.0	✓
pH by Meter	E108	1300441	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1301273	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1300299	2	30	6.6	5.0	✓
TSS by Gravimetry	E160	1300211	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1300184	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1300220	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1300389	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1300388	1	14	7.1	5.0	✓
pH by Meter	E108	1300441	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1300299	2	30	6.6	5.0	✓
TSS by Gravimetry	E160	1300211	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1300184	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1300220	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1300389	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1300388	1	14	7.1	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1301273	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1300299	2	30	6.6	5.0	✓
TSS by Gravimetry	E160	1300211	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1300184	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1300220	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1300389	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1300388	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1300299	2	30	6.6	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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Work Order : CG2400375  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC Winter EMS Wk 3 - River Samples



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2400375</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 3 - River Samples	Date Samples Received	: 11-Jan-2024 08:35
PO	: ----	Date Analysis Commenced	: 11-Jan-2024
C-O-C number	: ----	Issue Date	: 16-Jan-2024 14:55
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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 Work Order : CG2400375  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC Winter EMS Wk 3 - River Samples



## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 1300211)</b>											
CG2400300-001	Anonymous	Solids, total suspended [TSS]	----	E160	7.5	mg/L	659	730	10.3%	20%	----
<b>Physical Tests (QC Lot: 1300441)</b>											
CG2312901-013	Anonymous	pH	----	E108	0.10	pH units	5.77	5.77	0.00%	4%	----
<b>Anions and Nutrients (QC Lot: 1300184)</b>											
CG2400352-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	1.25	mg/L	13.0	12.8	1.04%	20%	----
<b>Anions and Nutrients (QC Lot: 1300220)</b>											
CG2400331-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1300298)</b>											
CG2400372-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0100	mg/L	0.291	0.293	0.641%	20%	----
<b>Anions and Nutrients (QC Lot: 1300299)</b>											
CG2400375-003	ELK RIVER DOWNSTREAM	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0047	0.0052	0.0005	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1300388)</b>											
CG2400383-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0022	0.0022	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1300389)</b>											
CG2400383-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.257	0.256	0.663%	20%	----
<b>Microbiological Tests (QC Lot: 1301273)</b>											
CG2400375-001	ELK RIVER UPSTREAM	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	2	1	1	Diff <2x LOR	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1300211)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1300184)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1300220)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1300298)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1300299)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1300388)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1300389)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1301273)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1300211)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	93.7	85.0	115	----
Physical Tests (QCLot: 1300441)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 1300184)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.4	85.0	115	----
Anions and Nutrients (QCLot: 1300220)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	95.8	80.0	120	----
Anions and Nutrients (QCLot: 1300298)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	94.7	80.0	120	----
Anions and Nutrients (QCLot: 1300299)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.1	80.0	120	----
Anions and Nutrients (QCLot: 1300388)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1300389)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.8	90.0	110	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1300184)										
CG2400353-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1300220)										
CG2400331-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0479 mg/L	0.05 mg/L	95.7	70.0	130	----
Anions and Nutrients (QCLot: 1300298)										
CG2400373-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0496 mg/L	0.05 mg/L	99.2	70.0	130	----
Anions and Nutrients (QCLot: 1300299)										
CG2400383-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0487 mg/L	0.05 mg/L	97.5	70.0	130	----
Anions and Nutrients (QCLot: 1300388)										
CG2400383-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.529 mg/L	0.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1300389)										
CG2400383-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.60 mg/L	2.5 mg/L	104	75.0	125	----





**CHAIN OF CUSTODY FORM**

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:	Nicholas Corman
PROJECT NAME AND NO.:	FARUC Winter EMS Wk 2 - river samples			QUOTE NO.:	
PO NO.:		ALS CONTACT:	Ptryk Wojciak		
REPORT FORMAT:	<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmaier@skircr.com <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> OTHER:				

ANALYSIS REQUESTED:

	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD
Elk River Upstream Routine		X	X							
Elk River Upstream Nutrients				X	X	X	X	X		
Elk River Upstream Bacteriological	X									
Elk River @ IDZ Routine		X	X							
Elk River @ IDZ Nutrients				X	X	X	X	X		
Elk River @ IDZ Bacteriological	X									
Elk River Downstream Routine		X	X							
Elk River Downstream Nutrients				X	X	X	X	X		
Elk River Downstream Bacteriological	X									



Telephone : +1 403 407 1800

NOTES (sample spe  
comments, due dates:

FOR LAB USE ONLY

TURN AROUND REQUIRED:	<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH SPECIFY DATE: _____ (surcharge may apply)
SEND INVOICE TO:	<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)
INVOICE FORMAT:	<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	Jan 10 2024	RECEIVED BY:	DATE:
Nicholas Corman	TIME:	12:15	<i>[Signature]</i>	TIME:
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:
	TIME:			TIME:

FOR LAB USE ONLY	
Cooler Seal Intact?	Sample Temperature?
Yes No N/A	Frozen? Yes No
Cooling Method?	Icepacks Ice None

Environmental Division  
Calgary  
Work Order Reference  
**CG2400375**



CERTIFICATE OF ANALYSIS

Work Order	: CG2400924	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 4 - WWTP SAMPLES	Date Samples Received	: 25-Jan-2024 10:00
PO	: ----	Date Analysis Commenced	: 25-Jan-2024
C-O-C number	: ----	Issue Date	: 31-Jan-2024 12:01
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
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).





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP INFLUENT	WWTP EFFLUENT	----	----	----
(Matrix: Water)										
Client sampling date / time					25-Jan-2024 00:00	25-Jan-2024 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2400924-001	CG2400924-002	-----	-----	-----	-----
					Result	Result	----	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.01	7.85	----	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	414 <sup>DLHC</sup>	<3.0	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0059	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	28.2	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	<0.0050 <sup>DLDS</sup>	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.332	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.373	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	28.2	----	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	187	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	245	<2.0	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2400924</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 4 - WWTP SAMPLES	Date Samples Received	: 25-Jan-2024 10:00
PO	: ----	Issue Date	: 31-Jan-2024 12:01
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP EFFLUENT	E550	25-Jan-2024	----	----	----		25-Jan-2024	3 days	0 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP INFLUENT	E550	25-Jan-2024	----	----	----		25-Jan-2024	3 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E298	25-Jan-2024	25-Jan-2024	28 days	1 days	✓	25-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP EFFLUENT	E378-U	25-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO3-L	25-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO2-L	25-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E372-U	25-Jan-2024	27-Jan-2024	28 days	3 days	✓	28-Jan-2024	28 days	3 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT	E012.FC	25-Jan-2024	----	----	----		25-Jan-2024	30 hrs	14 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP EFFLUENT	E108	25-Jan-2024	25-Jan-2024	0.25 hrs	14 hrs	✖ EHTR-FM	25-Jan-2024	0.25 hrs	14 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP INFLUENT	E108	25-Jan-2024	25-Jan-2024	0.25 hrs	14 hrs	✖ EHTR-FM	25-Jan-2024	0.25 hrs	14 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT	E160	25-Jan-2024	----	----	----		30-Jan-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP INFLUENT	E160	25-Jan-2024	----	----	----		30-Jan-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1312940	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1312993	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1312872	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1312867	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1312866	1	19	5.2	5.0	✓
pH by Meter	E108	1312743	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1314022	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1314030	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1315959	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1312940	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1312993	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1312872	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1312867	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1312866	1	19	5.2	5.0	✓
pH by Meter	E108	1312743	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1314030	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1315959	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1312940	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1312993	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1312872	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1312867	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1312866	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1314022	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1314030	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1315959	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1312940	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1312872	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1312867	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1312866	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1314030	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2400924  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC WINTER EMS WK 4 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2400924</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 4 - WWTP SAMPLES	Date Samples Received	: 25-Jan-2024 10:00
PO	: ----	Date Analysis Commenced	: 25-Jan-2024
C-O-C number	: ----	Issue Date	: 31-Jan-2024 12:01
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2400924  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC WINTER EMS WK 4 - WWTP SAMPLES



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1312743)											
CG2400902-001	Anonymous	pH	----	E108	0.10	pH units	8.20	8.21	0.122%	4%	----
Physical Tests (QC Lot: 1315959)											
CG2400919-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	3.1	3.3	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1312866)											
CG2400927-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1312867)											
CG2400927-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	44.7	44.9	0.442%	20%	----
Anions and Nutrients (QC Lot: 1312872)											
CG2400924-002	WWTP EFFLUENT	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.332	0.333	0.340%	20%	----
Anions and Nutrients (QC Lot: 1312940)											
CG2400905-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	1.25	mg/L	26.6	31.0	15.3%	20%	----
Anions and Nutrients (QC Lot: 1314030)											
CG2400904-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0100	mg/L	3.52	3.41	3.17%	20%	----
Microbiological Tests (QC Lot: 1314022)											
FJ2400179-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	100	CFU/100mL	600	500	18.2%	65%	----
Aggregate Organics (QC Lot: 1312993)											
CG2400842-011	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1315959)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1312866)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1312867)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1312872)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1312940)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1314030)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1314022)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1312993)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1312743)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1315959)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	93.9	85.0	115	----
Anions and Nutrients (QCLot: 1312866)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.5	90.0	110	----
Anions and Nutrients (QCLot: 1312867)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 1312872)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1312940)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.0	85.0	115	----
Anions and Nutrients (QCLot: 1314030)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	104	80.0	120	----
Aggregate Organics (QCLot: 1312993)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	92.0	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1312866)										
CG2400933-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.502 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1312867)										
CG2400933-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.46 mg/L	2.5 mg/L	98.4	75.0	125	----
Anions and Nutrients (QCLot: 1312872)										
CG2400926-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0516 mg/L	0.05 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 1312940)										
CG2400905-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0929 mg/L	0.1 mg/L	92.9	75.0	125	----
Anions and Nutrients (QCLot: 1314030)										
CG2400904-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----





[www.alsenviro.com](http://www.alsenviro.com)

Vancouver BC, 1988 Triumph Street, V5L 1K5. Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700  
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587  
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5198 Toll Free: 1-800-668-9878 Fax: 780-513-2121  
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: 780-437-2331  
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-9897  
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-4370

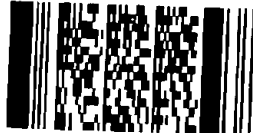

Environmental Division  
Calgary  
Work Order Reference  
**CG2400924**



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

SEND REPORT TO:										ANALYSIS REQUESTED:																				
COMPANY: FERNIE ALPINE RESORT UTILITIES CORPORATION					ATTN: PATRICK MAJER					 Telephone : +1 403 407 1800																				
ADDRESS: 1505 - 17TH AVENUE SOUTH WEST																														
CITY: CALGARY			PROV: ALBERTA		POSTAL CODE: T2T 0E2																									
TEL: 403 - 256 - 8473			FAX: 403 - 244 - 3774		SAMPLER: Nicholas Corman																									
PROJECT NAME AND NO.: FARUC Winter EMS Wk 4 - WWTP samples					QUOTE NO:																									
PO NO.:					ALS CONTACT: Patryk Wojciak																									
REPORT FORMAT:					<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skirco.com <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:																									
WO#      SAMPLE IDENTIFICATION      DATE / TIME COLLECTED      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											X	X																		
										TURN AROUND REQUIRED:					<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH   SPECIFY DATE: _____ (surcharge may apply)					RELINQUISHED BY: Nicholas Corman					DATE: Jan 24 2024					RECEIVED BY: 
SEND INVOICE TO:					<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)					RELINQUISHED BY:					DATE:					RECEIVED BY:					DATE:					
INVOICE FORMAT:					<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX										TIME: 12:15										TIME: 10:00					
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? Yes _____ No _____ N/A _____					Sample Temperature: 5.4 °C					Cooling Method? Icepacks _____ Ice _____ None _____					

Environmental Division  
Calgary  
Work Order Reference  
**CG2400924**



## CERTIFICATE OF ANALYSIS

Work Order	: CG2400926	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 4 - RIVER SAMPLES	Date Samples Received	: 25-Jan-2024 10:00
PO	: ----	Date Analysis Commenced	: 25-Jan-2024
C-O-C number	: ----	Issue Date	: 31-Jan-2024 12:01
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	Elk River Upstream	Elk River @ IDZ	Elk River Downstream	----	----
(Matrix: Water)										
Client sampling date / time					24-Jan-2024 10:15	24-Jan-2024 10:30	24-Jan-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2400926-001	CG2400926-002	CG2400926-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.19	8.21	8.18	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	7.3	<3.0	<3.0	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0077	0.0103	0.0196	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	0.974	1.80	0.417	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0015	0.0029	<0.0010	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	0.0042	<0.0010	0.0077	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0222	0.0245	0.0081	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	0.976	1.80	0.417	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	21	3	5	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2400926</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 4 - RIVER SAMPLES	Date Samples Received	: 25-Jan-2024 10:00
PO	: ----	Issue Date	: 31-Jan-2024 12:02
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River @ IDZ	E298	24-Jan-2024	25-Jan-2024	28 days	1 days	✓	25-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Downstream	E298	24-Jan-2024	25-Jan-2024	28 days	1 days	✓	25-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Upstream	E298	24-Jan-2024	25-Jan-2024	28 days	1 days	✓	25-Jan-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River @ IDZ	E378-U	24-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Downstream	E378-U	24-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Upstream	E378-U	24-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO3-L	24-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO3-L	24-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO3-L	24-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO2-L	24-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO2-L	24-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO2-L	24-Jan-2024	25-Jan-2024	3 days	1 days	✓	25-Jan-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River @ IDZ	E372-U	24-Jan-2024	27-Jan-2024	28 days	3 days	✓	28-Jan-2024	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Downstream	E372-U	24-Jan-2024	27-Jan-2024	28 days	3 days	✓	28-Jan-2024	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Upstream	E372-U	24-Jan-2024	27-Jan-2024	28 days	3 days	✓	28-Jan-2024	28 days	4 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Downstream	E012.FC	24-Jan-2024	----	----	----		25-Jan-2024	30 hrs	27 hrs	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River @ IDZ	E012.FC	24-Jan-2024	----	----	----		25-Jan-2024	30 hrs	28 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Upstream	E012.FC	24-Jan-2024	----	----	----		25-Jan-2024	30 hrs	28 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River @ IDZ	E108	24-Jan-2024	25-Jan-2024	0.25 hrs	27 hrs	✖ EHTR-FM	25-Jan-2024	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Downstream	E108	24-Jan-2024	25-Jan-2024	0.25 hrs	27 hrs	✖ EHTR-FM	25-Jan-2024	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Upstream	E108	24-Jan-2024	25-Jan-2024	0.25 hrs	28 hrs	✖ EHTR-FM	25-Jan-2024	0.25 hrs	28 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River @ IDZ	E160	24-Jan-2024	----	----	----		30-Jan-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Downstream	E160	24-Jan-2024	----	----	----		30-Jan-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Upstream	E160	24-Jan-2024	----	----	----		30-Jan-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1312756	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1312872	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1312867	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1312866	1	19	5.2	5.0	✓
pH by Meter	E108	1312743	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1314022	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1314030	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1315959	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1312756	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1312872	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1312867	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1312866	1	19	5.2	5.0	✓
pH by Meter	E108	1312743	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1314030	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1315959	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1312756	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1312872	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1312867	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1312866	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1314022	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1314030	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1315959	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1312756	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1312872	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1312867	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1312866	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1314030	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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Page : 8 of 8  
Work Order : CG2400926  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC WINTER EMS WK 4 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2400926</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 4 - RIVER SAMPLES	Date Samples Received	: 25-Jan-2024 10:00
PO	: ----	Date Analysis Commenced	: 25-Jan-2024
C-O-C number	: ----	Issue Date	: 31-Jan-2024 12:01
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1312743)											
CG2400902-001	Anonymous	pH	----	E108	0.10	pH units	8.20	8.21	0.122%	4%	----
Physical Tests (QC Lot: 1315959)											
CG2400919-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	3.1	3.3	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1312756)											
CG2400904-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.500	mg/L	22.0	22.0	0.0100%	20%	----
Anions and Nutrients (QC Lot: 1312866)											
CG2400927-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1312867)											
CG2400927-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	44.7	44.9	0.442%	20%	----
Anions and Nutrients (QC Lot: 1312872)											
CG2400924-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.332	0.333	0.340%	20%	----
Anions and Nutrients (QC Lot: 1314030)											
CG2400904-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0100	mg/L	3.52	3.41	3.17%	20%	----
Microbiological Tests (QC Lot: 1314022)											
FJ2400179-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	100	CFU/100mL	600	500	18.2%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1315959)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1312756)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1312866)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1312867)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1312872)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1314030)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1314022)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1312743)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1315959)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	93.9	85.0	115	----
Anions and Nutrients (QCLot: 1312756)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.6	85.0	115	----
Anions and Nutrients (QCLot: 1312866)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.5	90.0	110	----
Anions and Nutrients (QCLot: 1312867)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 1312872)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1314030)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	104	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1312756)										
CG2400904-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1312866)										
CG2400933-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.502 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1312867)										
CG2400933-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.46 mg/L	2.5 mg/L	98.4	75.0	125	----
Anions and Nutrients (QCLot: 1312872)										
CG2400926-001	Elk River Upstream	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0516 mg/L	0.05 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 1314030)										
CG2400904-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----





**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 258, 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-  
**Saskatoon SK**, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

Environmental Division  
Calgary  
Work Order Reference  
**CG2400926**



Telephone : +1 403 407 1000

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**[illegible]

Environmental Division  
Calgary  
Work Order Reference  
CG2400926

Work Order Reference  
CG2400926



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2401235**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC WINTER EMS WK 5 - WWTP SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NC  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 01-Feb-2024 09:40  
**Date Analysis Commenced** : 01-Feb-2024  
**Issue Date** : 07-Feb-2024 10:33

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
PHA	pH adjusted before analysis.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP INFLUENT	WWTP EFFLUENT	----	----	----
(Matrix: Water)										
					Client sampling date / time	31-Jan-2024 09:45	31-Jan-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2401235-001	CG2401235-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.54	7.84	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	193	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0067	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	23.0	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0370	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.183	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.212	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	23.0	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	<1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	136 PHA	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2401235</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 5 - WWTP SAMPLES	Date Samples Received	: 01-Feb-2024 09:40
PO	: ----	Issue Date	: 07-Feb-2024 10:34
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP EFFLUENT	E550	31-Jan-2024	----	----	----		01-Feb-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP INFLUENT	E550	31-Jan-2024	----	----	----		01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E298	31-Jan-2024	01-Feb-2024	28 days	1 days	✓	01-Feb-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP EFFLUENT	E378-U	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO3-L	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO2-L	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E372-U	31-Jan-2024	03-Feb-2024	28 days	3 days	✓	03-Feb-2024	28 days	3 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT	E012.FC	31-Jan-2024	----	----	----		01-Feb-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP EFFLUENT	E108	31-Jan-2024	01-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM	01-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP INFLUENT	E108	31-Jan-2024	01-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM	01-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT	E160	31-Jan-2024	----	----	----		06-Feb-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP INFLUENT	E160	31-Jan-2024	----	----	----		06-Feb-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1319836	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1320430	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1320004	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1319810	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1319811	1	12	8.3	5.0	✓
pH by Meter	E108	1319901	1	13	7.6	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1321433	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1320323	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1322932	1	14	7.1	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1319836	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1320430	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1320004	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1319810	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1319811	1	12	8.3	5.0	✓
pH by Meter	E108	1319901	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1320323	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1322932	1	14	7.1	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1319836	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1320430	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1320004	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1319810	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1319811	1	12	8.3	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1321433	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1320323	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1322932	1	14	7.1	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1319836	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1320004	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1319810	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1319811	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1320323	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



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Work Order : CG2401235  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC WINTER EMS WK 5 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2401235</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 5 - WWTP SAMPLES	Date Samples Received	: 01-Feb-2024 09:40
PO	: ----	Date Analysis Commenced	: 01-Feb-2024
C-O-C number	: ----	Issue Date	: 07-Feb-2024 10:33
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2401235  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC WINTER EMS WK 5 - WWTP SAMPLES



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1319901)											
CG2401194-001	Anonymous	pH	----	E108	0.10	pH units	7.38	7.40	0.271%	4%	----
Physical Tests (QC Lot: 1322932)											
CG2401188-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	30.0	30.2	0.664%	20%	----
Anions and Nutrients (QC Lot: 1319810)											
CG2401192-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.834	0.836	0.311%	20%	----
Anions and Nutrients (QC Lot: 1319811)											
CG2401192-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1319836)											
CG2401194-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0065	<0.0050	0.0015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1320004)											
CG2401233-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0020	0.0024	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1320323)											
CG2401192-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0096	0.0094	0.0002	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1321433)											
CG2401258-003	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	23	19	19.0%	65%	----
Aggregate Organics (QC Lot: 1320430)											
CG2401241-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1322932)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1319810)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1319811)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1319836)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1320004)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1320323)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1321433)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1320430)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1319901)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1322932)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 1319810)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1319811)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 1319836)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	109	85.0	115	----
Anions and Nutrients (QCLot: 1320004)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1320323)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	102	80.0	120	----
Aggregate Organics (QCLot: 1320430)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	94.0	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	
Anions and Nutrients (QCLot: 1319810)										
CG2401192-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.56 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1319811)										
CG2401192-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.522 mg/L	0.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1319836)										
CG2401210-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.100 mg/L	0.1 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1320004)										
CG2401233-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0522 mg/L	0.05 mg/L	104	70.0	130	----
Anions and Nutrients (QCLot: 1320323)										
CG2401192-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0499 mg/L	0.05 mg/L	99.9	70.0	130	----





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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 258, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587  
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5156 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: 403-291-0291  
Saskatoon SK, 819 - 56th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

**Environmental Division  
Calgary**

Work Order Reference

Work Order Reference  
**CG2401235**

## CHAIN OF CUSTODY FORM



Telephone : + 1 403 407 1800

[illegible]

Environmental Division  
Calgary  
Work Order Reference  
CG2401235

Work Order Reference  
CG2401235



CERTIFICATE OF ANALYSIS

Work Order	: CG2401236	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 5 - RIVER SAMPLES	Date Samples Received	: 01-Feb-2024 09:40
PO	: ----	Date Analysis Commenced	: 01-Feb-2024
C-O-C number	: ----	Issue Date	: 07-Feb-2024 10:33
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLIS	Detection Limit Adjusted due to insufficient sample.





Analytical Results

Sub-Matrix: Water					Client sample ID	ELK RIVER UPSTREAM	ELK RIVER @ IDZ	ELK RIVER DOWNSTREAM	----	----
(Matrix: Water)										
					Client sampling date / time	31-Jan-2024 10:15	31-Jan-2024 10:30	31-Jan-2024 10:45	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2401236-001	CG2401236-002	CG2401236-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.20	8.21	8.21	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	10.4	4.6	7.8	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0172	<0.0050	0.0075	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.00	0.100	1.25	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0022	<0.0010	0.0028	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	0.0060	0.0123	0.0026	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0277	0.0290	0.0192	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.00	0.100	1.25	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	8 <sup>DLIS</sup>	3	9	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2401236</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 5 - RIVER SAMPLES	Date Samples Received	: 01-Feb-2024 09:40
PO	: ----	Issue Date	: 07-Feb-2024 10:33
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E298	31-Jan-2024	01-Feb-2024	28 days	1 days	✓	01-Feb-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	31-Jan-2024	01-Feb-2024	28 days	1 days	✓	01-Feb-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	31-Jan-2024	01-Feb-2024	28 days	1 days	✓	01-Feb-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER @ IDZ	E378-U	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER DOWNSTREAM	E378-U	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER UPSTREAM	E378-U	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO3-L	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO2-L	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO2-L	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO2-L	31-Jan-2024	01-Feb-2024	3 days	1 days	✓	01-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E372-U	31-Jan-2024	03-Feb-2024	28 days	3 days	✓	03-Feb-2024	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E372-U	31-Jan-2024	03-Feb-2024	28 days	3 days	✓	03-Feb-2024	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E372-U	31-Jan-2024	03-Feb-2024	28 days	3 days	✓	03-Feb-2024	28 days	3 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER DOWNSTREAM	E012.FC	31-Jan-2024	----	----	----		01-Feb-2024	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER @ IDZ	E012.FC	31-Jan-2024	----	----	----		01-Feb-2024	30 hrs	25 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	31-Jan-2024	----	----	----		01-Feb-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	31-Jan-2024	01-Feb-2024	0.25 hrs	25 hrs	✖ EHTR-FM	01-Feb-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER @ IDZ	E108	31-Jan-2024	01-Feb-2024	0.25 hrs	25 hrs	✖ EHTR-FM	01-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	31-Jan-2024	01-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM	01-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ IDZ	E160	31-Jan-2024	----	----	----		06-Feb-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160	31-Jan-2024	----	----	----		06-Feb-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160	31-Jan-2024	----	----	----		06-Feb-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1319836	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1320004	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1319810	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1319811	1	12	8.3	5.0	✓
pH by Meter	E108	1319901	1	13	7.6	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1321433	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1320323	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1322932	1	14	7.1	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1319836	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1320004	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1319810	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1319811	1	12	8.3	5.0	✓
pH by Meter	E108	1319901	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1320323	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1322932	1	14	7.1	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1319836	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1320004	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1319810	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1319811	1	12	8.3	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1321433	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1320323	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1322932	1	14	7.1	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1319836	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1320004	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1319810	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1319811	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1320323	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2401236  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC WINTER EMS WK 5 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2401236</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 5 - RIVER SAMPLES	Date Samples Received	: 01-Feb-2024 09:40
PO	: ----	Date Analysis Commenced	: 01-Feb-2024
C-O-C number	: ----	Issue Date	: 07-Feb-2024 10:34
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1319901)											
CG2401194-001	Anonymous	pH	----	E108	0.10	pH units	7.38	7.40	0.271%	4%	----
Physical Tests (QC Lot: 1322932)											
CG2401188-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	30.0	30.2	0.664%	20%	----
Anions and Nutrients (QC Lot: 1319810)											
CG2401192-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.834	0.836	0.311%	20%	----
Anions and Nutrients (QC Lot: 1319811)											
CG2401192-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1319836)											
CG2401194-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0065	<0.0050	0.0015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1320004)											
CG2401233-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0020	0.0024	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1320323)											
CG2401192-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0096	0.0094	0.0002	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1321433)											
CG2401258-003	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	23	19	19.0%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1322932)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1319810)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1319811)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1319836)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1320004)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1320323)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1321433)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1319901)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1322932)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 1319810)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1319811)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 1319836)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	109	85.0	115	----
Anions and Nutrients (QCLot: 1320004)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1320323)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	102	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water

					Matrix Spike (MS) Report				
					Spike		Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High
Anions and Nutrients (QCLot: 1319810)									
CG2401192-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.56 mg/L	2.5 mg/L	102	75.0	125
Anions and Nutrients (QCLot: 1319811)									
CG2401192-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.522 mg/L	0.5 mg/L	104	75.0	125
Anions and Nutrients (QCLot: 1319836)									
CG2401210-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.100 mg/L	0.1 mg/L	100	75.0	125
Anions and Nutrients (QCLot: 1320004)									
CG2401233-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0522 mg/L	0.05 mg/L	104	70.0	130
Anions and Nutrients (QCLot: 1320323)									
CG2401192-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0499 mg/L	0.05 mg/L	99.9	70.0	130



# ALS Environmental

ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com



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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  
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 Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-9897  
 Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8370

Environmental Division  
 Calgary  
 Work Order Reference  
**CG2401236**



Telephone: +1 403 407 1800

## CHAIN OF CUSTODY FORM

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:	Nicholas Corman
PROJECT NAME AND NO.:	FARUC Winter EMS Wk 5 - river samples			QUOTE NO.:	
PO NO.:		ALS CONTACT:	Patrik Wojciak		
REPORT FORMAT:	<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> OTHER:				

ANALYSIS REQUESTED:

	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD
Elk River Upstream Routine		X	X							
Elk River Upstream Nutrients				X	X	X	X	X		
Elk River Upstream Bacteriological	X									
Elk River @ IDZ Routine		X	X							
Elk River @ IDZ Nutrients				X	X	X	X	X		
Elk River @ IDZ Bacteriological	X									
Elk River Downstream Routine		X	X							
Elk River Downstream Nutrients				X	X	X	X	X		
Elk River Downstream Bacteriological	X									

NOTES (sample spec comments, due dates, etc.)

FOR LAB USE ONLY

TURN AROUND REQUIRED:	<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH SPECIFY DATE: _____ (surcharge may apply)
SEND INVOICE TO:	<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)
INVOICE FORMAT:	<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	Jan 31 2024	RECEIVED BY:	DATE:
Nicholas Corman	TIME:	12:15		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 ___

Environmental Division  
 Calgary  
 Work Order Reference  
**CG2401236**



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2401551**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC - Winter EMS week 6 - WWTP samples  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NC  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 08-Feb-2024 09:10  
**Date Analysis Commenced** : 08-Feb-2024  
**Issue Date** : 13-Feb-2024 14:29

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP INFLUENT	WWTP EFFLUENT	----	----	----
(Matrix: Water)										
					Client sampling date / time	07-Feb-2024 09:45	07-Feb-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2401551-001	CG2401551-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.39	7.90	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	127	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0060	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	27.5	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0060	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.373	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.396	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	27.5	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	5	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	91.1	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2401551</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC - Winter EMS week 6 - WWTP samples	Date Samples Received	: 08-Feb-2024 09:10
PO	: ----	Issue Date	: 13-Feb-2024 14:26
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP EFFLUENT	E550	07-Feb-2024	----	----	----		08-Feb-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP INFLUENT	E550	07-Feb-2024	----	----	----		08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E298	07-Feb-2024	08-Feb-2024	28 days	1 days	✓	08-Feb-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP EFFLUENT	E378-U	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO3-L	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP EFFLUENT	E235.NO2-L	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP EFFLUENT	E372-U	07-Feb-2024	10-Feb-2024	28 days	3 days	✓	10-Feb-2024	28 days	3 days	✓



Page : 4 of 7  
 Work Order : CG2401551  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC - Winter EMS week 6 - WWTP samples



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP EFFLUENT	E012.FC	07-Feb-2024	----	----	----		08-Feb-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP EFFLUENT	E108	07-Feb-2024	08-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM	08-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP INFLUENT	E108	07-Feb-2024	08-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM	08-Feb-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP EFFLUENT	E160	07-Feb-2024	----	----	----		12-Feb-2024	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP INFLUENT	E160	07-Feb-2024	----	----	----		12-Feb-2024	7 days	5 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1326981	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1327335	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1326858	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1326807	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1326806	1	18	5.5	5.0	✓
pH by Meter	E108	1326782	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1328358	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1327292	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1329676	1	17	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1326981	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1327335	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1326858	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1326807	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1326806	1	18	5.5	5.0	✓
pH by Meter	E108	1326782	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1327292	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1329676	1	17	5.8	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1326981	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1327335	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1326858	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1326807	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1326806	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1328358	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1327292	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1329676	1	17	5.8	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1326981	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1326858	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1326807	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1326806	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1327292	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2401551  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC - Winter EMS week 6 - WWTP samples



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2401551</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC - Winter EMS week 6 - WWTP samples	Date Samples Received	: 08-Feb-2024 09:10
PO	: ----	Date Analysis Commenced	: 08-Feb-2024
C-O-C number	: ----	Issue Date	: 13-Feb-2024 14:25
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1326782)											
CG2401546-001	Anonymous	pH	----	E108	0.10	pH units	7.80	7.74	0.772%	4%	----
Physical Tests (QC Lot: 1329676)											
CG2401550-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	6.7	6.5	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1326806)											
CG2401552-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0056	0.0049	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1326807)											
CG2401552-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0263	0.0249	0.0014	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1326858)											
CG2401550-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0078	0.0078	0.00001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1326981)											
CG2401546-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.125	mg/L	5.50	5.31	3.50%	20%	----
Anions and Nutrients (QC Lot: 1327292)											
CG2401550-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0178	0.0167	0.0011	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1328358)											
CG2401550-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	8	6	28.6%	65%	----
Aggregate Organics (QC Lot: 1327335)											
CG2401557-002	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1329676)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1326806)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1326807)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1326858)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1326981)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1327292)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1328358)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1327335)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1326782)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1329676)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	96.6	85.0	115	----
Anions and Nutrients (QCLot: 1326806)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.1	90.0	110	----
Anions and Nutrients (QCLot: 1326807)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 1326858)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1326981)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.0	85.0	115	----
Anions and Nutrients (QCLot: 1327292)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	99.5	80.0	120	----
Aggregate Organics (QCLot: 1327335)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	98.4	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method						
Anions and Nutrients (QCLot: 1326806)										
CG2401552-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.474 mg/L	0.5 mg/L	94.7	75.0	125	----
Anions and Nutrients (QCLot: 1326807)										
CG2401552-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.36 mg/L	2.5 mg/L	94.2	75.0	125	----
Anions and Nutrients (QCLot: 1326858)										
CG2401550-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0574 mg/L	0.05 mg/L	115	70.0	130	----
Anions and Nutrients (QCLot: 1326981)										
CG2401551-002	WWTP EFFLUENT	Ammonia, total (as N)	7664-41-7	E298	0.0890 mg/L	0.1 mg/L	89.0	75.0	125	----
Anions and Nutrients (QCLot: 1327292)										
CG2401550-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0498 mg/L	0.05 mg/L	99.5	70.0	130	----



# ALS Environmental

ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com



Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700  
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587  
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-219  
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: 403-291-9897  
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8370

Environmental Division  
Calgary

Work Order Reference

CG2401551



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

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:	Nicholas Corman
PROJECT NAME AND NO.:	FARUC Winter EMS Wk 6 - WWTP samples			QUOTE NO.:	
PO NO.:		ALS CONTACT:	Patrik Wojciak		
REPORT FORMAT:	<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com				
	<input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:				

ANALYSIS REQUESTED:

Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD
	X	X						X	
	X	X						X	
			X	X	X	X	X		
X									

NOTES (sample spec  
comments, due dates,

FOR LAB USE ONLY

TURN AROUND REQUIRED: ☒ ROUTINE ☐ RUSH SPECIFY DATE: (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT ☐ DIFFERENT FROM REPORT (provide details)

INVOICE FORMAT: ☐ HARDCOPY ☐ PDF ☐ FAX

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

RELINQUISHED BY:	DATE:	Feb 07 2024	RECEIVED BY:	DATE:	2/7/24
Nicholas Corman	TIME:	12:15		TIME:	9:10
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: 3.9°C	Cooling Method?
Yes No N/A	Frozen? Yes No	Icepacks ice None

Environmental Division  
Calgary  
Work Order Reference  
CG2401551



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2401550**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
 Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC WINTER EMS WK 6 - RIVER SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NC  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Page** : 1 of 4  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 08-Feb-2024 09:10  
**Date Analysis Commenced** : 08-Feb-2024  
**Issue Date** : 13-Feb-2024 13:06

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta









## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	ELK RIVER UPSTREAM	ELK RIVER @ IDZ	ELK RIVER DOWNSTREAM	----	----
(Matrix: Water)										
Client sampling date / time					07-Feb-2024 10:15	07-Feb-2024 10:30	07-Feb-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2401550-001	CG2401550-002	CG2401550-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.33	8.36	8.32	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	6.7	<3.0	<3.0	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	0.789	0.0948	1.44	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0018	<0.0010	0.0029	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	0.0078	0.0099	0.0016	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0207	0.0178	0.0086	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	0.791	0.0948	1.44	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	8	<1	5	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2401550</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 6 - RIVER SAMPLES	Date Samples Received	: 08-Feb-2024 09:10
PO	: ----	Issue Date	: 13-Feb-2024 13:06
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E298	07-Feb-2024	08-Feb-2024	28 days	1 days	✓	08-Feb-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	07-Feb-2024	08-Feb-2024	28 days	1 days	✓	08-Feb-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	07-Feb-2024	08-Feb-2024	28 days	1 days	✓	08-Feb-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER @ IDZ	E378-U	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER DOWNSTREAM	E378-U	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER UPSTREAM	E378-U	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO3-L	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: **x** = Holding time exceedance ; **✓** = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO2-L	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO2-L	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO2-L	07-Feb-2024	08-Feb-2024	3 days	1 days	✓	08-Feb-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E372-U	07-Feb-2024	10-Feb-2024	28 days	3 days	✓	10-Feb-2024	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E372-U	07-Feb-2024	10-Feb-2024	28 days	3 days	✓	10-Feb-2024	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E372-U	07-Feb-2024	10-Feb-2024	28 days	3 days	✓	10-Feb-2024	28 days	3 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER @ IDZ	E012.FC	07-Feb-2024	----	----	----		08-Feb-2024	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER DOWNSTREAM	E012.FC	07-Feb-2024	----	----	----		08-Feb-2024	30 hrs	24 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	07-Feb-2024	----	----	----		08-Feb-2024	30 hrs	24 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER @ IDZ	E108	07-Feb-2024	08-Feb-2024	0.25 hrs	25 hrs	✖ EHTR-FM	08-Feb-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	07-Feb-2024	08-Feb-2024	0.25 hrs	25 hrs	✖ EHTR-FM	08-Feb-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	07-Feb-2024	08-Feb-2024	0.25 hrs	25 hrs	✖ EHTR-FM	08-Feb-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ IDZ	E160	07-Feb-2024	----	----	----		12-Feb-2024	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160	07-Feb-2024	----	----	----		12-Feb-2024	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160	07-Feb-2024	----	----	----		12-Feb-2024	7 days	5 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1326768	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1326858	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1326807	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1326806	1	18	5.5	5.0	✓
pH by Meter	E108	1326782	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1328358	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1327292	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1329676	1	17	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1326768	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1326858	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1326807	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1326806	1	18	5.5	5.0	✓
pH by Meter	E108	1326782	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1327292	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1329676	1	17	5.8	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1326768	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1326858	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1326807	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1326806	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1328358	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1327292	2	40	5.0	5.0	✓
TSS by Gravimetry	E160	1329676	1	17	5.8	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1326768	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1326858	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1326807	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1326806	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1327292	2	40	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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Page : 8 of 8  
Work Order : CG2401550  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC WINTER EMS WK 6 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2401550</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 6 - RIVER SAMPLES	Date Samples Received	: 08-Feb-2024 09:10
PO	: ----	Date Analysis Commenced	: 08-Feb-2024
C-O-C number	: ----	Issue Date	: 13-Feb-2024 13:06
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1326782)											
CG2401546-001	Anonymous	pH	----	E108	0.10	pH units	7.80	7.74	0.772%	4%	----
Physical Tests (QC Lot: 1329676)											
CG2401550-001	ELK RIVER UPSTREAM	Solids, total suspended [TSS]	----	E160	3.0	mg/L	6.7	6.5	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1326768)											
CG2401518-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1326806)											
CG2401552-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0056	0.0049	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1326807)											
CG2401552-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0263	0.0249	0.0014	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1326858)											
CG2401550-001	ELK RIVER UPSTREAM	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0078	0.0078	0.00001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1327291)											
CG2401501-009	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0028	0.0028	0.00008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1327292)											
CG2401550-002	ELK RIVER @ IDZ	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0178	0.0167	0.0011	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1328358)											
CG2401550-001	ELK RIVER UPSTREAM	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	8	6	28.6%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1329676)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1326768)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1326806)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1326807)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1326858)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1327291)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1327292)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1328358)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1326782)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1329676)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	96.6	85.0	115	----
Anions and Nutrients (QCLot: 1326768)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.7	85.0	115	----
Anions and Nutrients (QCLot: 1326806)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.1	90.0	110	----
Anions and Nutrients (QCLot: 1326807)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 1326858)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1327291)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 1327292)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	99.5	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1326768)										
CG2401529-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1326806)										
CG2401552-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.474 mg/L	0.5 mg/L	94.7	75.0	125	----
Anions and Nutrients (QCLot: 1326807)										
CG2401552-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.36 mg/L	2.5 mg/L	94.2	75.0	125	----
Anions and Nutrients (QCLot: 1326858)										
CG2401550-002	ELK RIVER @ IDZ	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0574 mg/L	0.05 mg/L	115	70.0	130	----
Anions and Nutrients (QCLot: 1327291)										
CG2401501-010	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0455 mg/L	0.05 mg/L	91.1	70.0	130	----
Anions and Nutrients (QCLot: 1327292)										
CG2401550-003	ELK RIVER DOWNSTREAM	Phosphorus, total	7723-14-0	E372-U	0.0498 mg/L	0.05 mg/L	99.5	70.0	130	----





Vancouver BC, 1988 Triumph Street, V5L 1K5. Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6188  
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: 780-513-2196  
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5. Tel: 780-791-1524 Fax: 780-791-1586  
Edmonton AB, 9836 - 87th Avenue, T6E 0P5. Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2223  
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5. Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-9897  
Saskatoon SK, 819 - 58th Street East, S7K 6X5. Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8370

Environmental Division  
Calgary  
Work Order Reference  
**CG2401550**



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

SEND REPORT TO:

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:	Nicholas Corman	
PROJECT NAME AND NO.:		FARUC Winter EMS Wk 6 - river samples				QUOTE NO:	
PO NO.:		ALS CONTACT:		Ptryk Wojciak			
REPORT FORMAT:		<input checked="" type="checkbox"/> <b>HARDCOPY</b> <input checked="" type="checkbox"/> <b>EMAIL - ADDRESS:</b> <a href="mailto:pmajer@skircr.com">pmajer@skircr.com</a> <input type="checkbox"/> <b>FAX</b> <input type="checkbox"/> <b>EXCEL</b> <input checked="" type="checkbox"/> <b>PDF</b> <input checked="" type="checkbox"/> <b>OTHER:</b>					

WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED		MATRIX	Fecal C	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					NOTES (sample specific comments, due dates, etc)
		YYYY-MM-DD	TIME																
FOR LAB USE ONLY	Elk River Upstream Routine	2024/02/07	10:15	Water		X	X												
	Elk River Upstream Nutrients	2024/02/07	10:15	Water				X	X	X	X	X							
	Elk River Upstream Bacteriological	2024/02/07	10:15	Water	X														
	Elk River @ IDZ Routine	2024/02/07	10:30	Water		X	X												
	Elk River @ IDZ Nutrients	2024/02/07	10:30	Water				X	X	X	X	X							
	Elk River @ IDZ Bacteriological	2024/02/07	10:30	Water	X														
	Elk River Downstream Routine	2024/02/07	10:45	Water		X	X												
	Elk River Downstream Nutrients	2024/02/07	10:45	Water				X	X	X	X	X							
	Elk River Downstream Bacteriological	2024/02/07	10:45	Water	X														
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH    SPECIFY DATE: _____ (surcharge may apply)			RELINQUISHED BY:		DATE:		Feb 07 2024		RECEIVED BY:		DATE:		2/7				
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)			Nicholas Corman		TIME:		12:15		TIME:		9:10						
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX			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			FOR LAB USE ONLY		Cooler Seal Intact?		Sample Temperature: 3.9 °C		Cooling Method?								
							Yes    No    N/A		Frozen? Yes    No		Icepacks    Ice    None								

Environmental Division  
Calgary  
Work Order Reference  
**CG2401550**



CERTIFICATE OF ANALYSIS

Work Order	: CG2403776	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 1 - WWTP SAMPLES	Date Samples Received	: 28-Mar-2024 09:00
PO	: ----	Date Analysis Commenced	: 28-Mar-2024
C-O-C number	: ----	Issue Date	: 04-Apr-2024 09:36
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
PHA	pH adjusted before analysis.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)										
					Client sampling date / time	28-Mar-2024 00:00	28-Mar-2024 00:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2403776-001	CG2403776-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.72	7.81	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	364 <sup>DLHC</sup>	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0058	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	45.8	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0102	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.765	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.748	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	45.8	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	4	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	298 <sup>PHA</sup>	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2403776</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 1 - WWTP SAMPLES	Date Samples Received	: 28-Mar-2024 09:00
PO	: ----	Issue Date	: 04-Apr-2024 09:37
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: **✖** = Holding time exceedance ; **✓** = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	28-Mar-2024	----	----	----		28-Mar-2024	3 days	0 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	28-Mar-2024	----	----	----		28-Mar-2024	3 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	28-Mar-2024	28-Mar-2024	28 days	1 days	✓	28-Mar-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	28-Mar-2024	30-Mar-2024	3 days	2 days	✓	30-Mar-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	28-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	28-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	28-Mar-2024	31-Mar-2024	28 days	3 days	✓	01-Apr-2024	28 days	4 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	28-Mar-2024	----	----	----		28-Mar-2024	30 hrs	11 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	28-Mar-2024	28-Mar-2024	0.25 hrs	11 hrs	✖ EHTR-FM	28-Mar-2024	0.25 hrs	11 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	28-Mar-2024	28-Mar-2024	0.25 hrs	11 hrs	✖ EHTR-FM	28-Mar-2024	0.25 hrs	11 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	28-Mar-2024	----	----	----		04-Apr-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	28-Mar-2024	----	----	----		04-Apr-2024	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1384500	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1384383	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1384935	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1383945	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1383944	1	20	5.0	5.0	✓
pH by Meter	E108	1383779	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1385969	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1384987	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1389433	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1384500	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1384383	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1384935	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1383945	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1383944	1	20	5.0	5.0	✓
pH by Meter	E108	1383779	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1384987	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1389433	1	19	5.2	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1384500	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1384383	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1384935	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1383945	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1383944	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1385969	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1384987	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1389433	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1384500	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1384935	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1383945	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1383944	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1384987	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2403776  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC SPRING EMS WK 1 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2403776</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 1 - WWTP SAMPLES	Date Samples Received	: 28-Mar-2024 09:00
PO	: ----	Date Analysis Commenced	: 28-Mar-2024
C-O-C number	: ----	Issue Date	: 04-Apr-2024 09:36
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1383779)											
CG2403774-001	Anonymous	pH	----	E108	0.10	pH units	8.24	8.27	0.363%	4%	----
Physical Tests (QC Lot: 1389433)											
CG2403776-001	WWTP Influent	Solids, total suspended [TSS]	----	E160	5.0	mg/L	364	390	6.89%	20%	----
Anions and Nutrients (QC Lot: 1383944)											
CG2403788-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0100	mg/L	0.454	0.448	1.22%	20%	----
Anions and Nutrients (QC Lot: 1383945)											
CG2403788-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0500	mg/L	3.83	3.79	1.21%	20%	----
Anions and Nutrients (QC Lot: 1384500)											
CG2403776-002	WWTP Effluent	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0058	0.0050	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1384935)											
CG2403776-002	WWTP Effluent	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.765	0.774	1.18%	20%	----
Anions and Nutrients (QC Lot: 1384987)											
CG2403772-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0042	0.0042	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1385969)											
CG2403751-002	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1384383)											
CG2403762-010	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1389433)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1383944)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1383945)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1384500)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1384935)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1384987)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1385969)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1384383)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1383779)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1389433)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	105	85.0	115	----
Anions and Nutrients (QCLot: 1383944)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1383945)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1384500)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.4	85.0	115	----
Anions and Nutrients (QCLot: 1384935)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 1384987)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	103	80.0	120	----
Aggregate Organics (QCLot: 1384383)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	88.8	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1383944)										
CG2403788-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.514 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1383945)										
CG2403788-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.56 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1384500)										
CG2403779-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1384935)										
CG2403777-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0507 mg/L	0.05 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 1384987)										
CG2403772-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0469 mg/L	0.05 mg/L	93.8	70.0	130	----



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CERTIFICATE OF ANALYSIS

**Work Order** : **CG2403774**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC SPRING EMS WK 1 - RIVER SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NC  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 28-Mar-2024 09:00  
**Date Analysis Commenced** : 28-Mar-2024  
**Issue Date** : 02-Apr-2024 19:28

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Elke Tabora		Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	ELK RIVER UPSTREAM	ELK RIVER @ IDZ	ELK RIVER DOWNSTREAM	----	----
(Matrix: Water)										
					Client sampling date / time	27-Mar-2024 10:15	27-Mar-2024 10:30	27-Mar-2024 10:45	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2403774-001	CG2403774-002	CG2403774-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	---	E108/CG	0.10	pH units	8.24	8.30	8.27	----	----	
Solids, total suspended [TSS]	---	E160/CG	3.0	mg/L	<3.0	<3.0	6.5	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	2.01	0.0470	2.03	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0045	<0.0010	0.0044	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0044	<0.0010	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0116	0.0077	0.0123	----	----	
Nitrate + Nitrite (as N)	---	EC235.N+N/C G	0.0050	mg/L	2.01	0.0470	2.03	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	---	E012.FC/CG	1	CFU/100mL	2	3	<1	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2403774</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 1 - RIVER SAMPLES	Date Samples Received	: 28-Mar-2024 09:00
PO	: ----	Issue Date	: 02-Apr-2024 19:28
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E298	27-Mar-2024	28-Mar-2024	28 days	1 days	✓	28-Mar-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	27-Mar-2024	28-Mar-2024	28 days	1 days	✓	28-Mar-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	27-Mar-2024	28-Mar-2024	28 days	1 days	✓	28-Mar-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER @ IDZ	E378-U	27-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER DOWNSTREAM	E378-U	27-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER UPSTREAM	E378-U	27-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO3-L	27-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	27-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	27-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO2-L	27-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO2-L	27-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO2-L	27-Mar-2024	28-Mar-2024	3 days	1 days	✓	28-Mar-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E372-U	27-Mar-2024	31-Mar-2024	28 days	4 days	✓	01-Apr-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E372-U	27-Mar-2024	31-Mar-2024	28 days	4 days	✓	01-Apr-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E372-U	27-Mar-2024	31-Mar-2024	28 days	4 days	✓	01-Apr-2024	28 days	5 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER @ IDZ	E012.FC	27-Mar-2024	----	----	----		28-Mar-2024	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER DOWNSTREAM	E012.FC	27-Mar-2024	----	----	----		28-Mar-2024	30 hrs	24 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	27-Mar-2024	----	----	----		28-Mar-2024	30 hrs	24 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER @ IDZ	E108	27-Mar-2024	28-Mar-2024	0.25 hrs	24 hrs	✖ EHTR-FM	28-Mar-2024	0.25 hrs	24 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	27-Mar-2024	28-Mar-2024	0.25 hrs	24 hrs	✖ EHTR-FM	28-Mar-2024	0.25 hrs	24 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	27-Mar-2024	28-Mar-2024	0.25 hrs	25 hrs	✖ EHTR-FM	28-Mar-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ IDZ	E160	27-Mar-2024	----	----	----		02-Apr-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160	27-Mar-2024	----	----	----		02-Apr-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160	27-Mar-2024	----	----	----		02-Apr-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1384150	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1384168	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1383945	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1383944	1	20	5.0	5.0	✓
pH by Meter	E108	1383779	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1385969	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1384987	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1385964	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1384150	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1384168	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1383945	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1383944	1	20	5.0	5.0	✓
pH by Meter	E108	1383779	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1384987	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1385964	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1384150	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1384168	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1383945	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1383944	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1385969	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1384987	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1385964	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1384150	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1384168	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1383945	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1383944	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1384987	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2403774  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 1 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2403774</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 1 - RIVER SAMPLES	Date Samples Received	: 28-Mar-2024 09:00
PO	: ----	Date Analysis Commenced	: 28-Mar-2024
C-O-C number	: ----	Issue Date	: 02-Apr-2024 19:28
Sampler	: NC 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Elke Tabora		Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1383779)											
CG2403774-001	ELK RIVER UPSTREAM	pH	----	E108	0.10	pH units	8.24	8.27	0.363%	4%	----
Physical Tests (QC Lot: 1385964)											
CG2403713-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1383944)											
CG2403788-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0100	mg/L	0.454	0.448	1.22%	20%	----
Anions and Nutrients (QC Lot: 1383945)											
CG2403788-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0500	mg/L	3.83	3.79	1.21%	20%	----
Anions and Nutrients (QC Lot: 1384150)											
CG2403732-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.125	mg/L	5.61	5.62	0.119%	20%	----
Anions and Nutrients (QC Lot: 1384168)											
CG2403772-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1384987)											
CG2403772-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0042	0.0042	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1385969)											
CG2403751-002	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1385964)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1383944)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1383945)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1384150)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1384168)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1384987)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1385969)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1383779)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1385964)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1383944)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1383945)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1384150)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.6	85.0	115	----
Anions and Nutrients (QCLot: 1384168)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 1384987)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	103	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1383944)										
CG2403788-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.514 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1383945)										
CG2403788-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.56 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1384150)										
CG2403744-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1384168)										
CG2403772-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0495 mg/L	0.05 mg/L	99.0	70.0	130	----
Anions and Nutrients (QCLot: 1384987)										
CG2403772-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0469 mg/L	0.05 mg/L	93.8	70.0	130	----





**www.alsenviro.com**

**Vancouver BC**, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700  
**Fort St. John BC**, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587  
**Grand Prairie AB**, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5186 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, 13113 - 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

Environmental Division  
Calgary

Work Order Reference

CG2403774



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

**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:						Nicholas Corman					
PROJECT NAME AND NO.:						FARUC Spring EMS Wk 1 - river samples												QUOTE NO.:																	
PO NO.:												ALS CONTACT:						Patryk Wojciak																	
REPORT FORMAT:						<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com																													
						<input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> OTHER:																													
WO#		SAMPLE IDENTIFICATION				DATE / TIME COLLECTED				MATRIX				ANALYSIS REQUESTED: Fecal Coliforms TSS pH Ortho P Total P NH3-N NO3-N NO2-N BOD5 COD																NOTES (sample spec comments, due dates)					
						YYYY-MM-DD		TIME																											
FOR LAB USE ONLY		Elk River Upstream Routine				2024/03/27    10:15				Water																									
		Elk River Upstream Nutrients				2024/03/27    10:15				Water																									
		Elk River Upstream Bacteriological				2024/03/27    10:15				Water																									
		Elk River @ IDZ Routine				2024/03/27    10:30				Water																									
		Elk River @ IDZ Nutrients				2024/03/27    10:30				Water																									
		Elk River @ IDZ Bacteriological				2024/03/27    10:30				Water																									
		Elk River Downstream Routine				2024/03/27    10:45				Water																									
		Elk River Downstream Nutrients				2024/03/27    10:45				Water																									
		Elk River Downstream Bacteriological				2024/03/27    10:45				Water																									
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH    SPECIFY DATE: _____ (surcharge may apply)												RELINQUISHED BY:				DATE: Mar 27 2024				RECEIVED BY:				DATE: 3/27/24									
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)												Nicholas Corman				TIME: 12:15								TIME: 4:02									
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX																																	
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? Yes ___ No ___ N/A				Sample Temperature: 21°C Frozen? Yes ___ No ___				Cooling Method? Icepacks ___ Ice ___ None ___									

Environmental Division  
Calgary  
Work Order Reference  
**CG2403774**

Work Order Reference  
**CG2403774**



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2403986**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC SPRING EMS WK 2 - WWTP SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : CH  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 03-Apr-2024 09:00  
**Date Analysis Commenced** : 03-Apr-2024  
**Issue Date** : 09-Apr-2024 14:31

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
PHA	pH adjusted before analysis.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)										
					Client sampling date / time	02-Apr-2024 09:45	02-Apr-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2403986-001	CG2403986-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.34	8.07	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	400	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0082	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	29.6	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0053	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.360	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.454	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	29.6	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	6	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	288 PHA	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2403986</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 2 - WWTP SAMPLES	Date Samples Received	: 03-Apr-2024 09:00
PO	: ----	Issue Date	: 09-Apr-2024 14:31
C-O-C number	: ----		
Sampler	: CH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	02-Apr-2024	----	----	----		04-Apr-2024	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	02-Apr-2024	----	----	----		04-Apr-2024	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	02-Apr-2024	03-Apr-2024	28 days	1 days	✓	03-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	02-Apr-2024	05-Apr-2024	28 days	3 days	✓	05-Apr-2024	28 days	3 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	02-Apr-2024	----	----	----		03-Apr-2024	30 hrs	27 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	02-Apr-2024	03-Apr-2024	0.25 hrs	28 hrs	✖ EHTR-FM	03-Apr-2024	0.25 hrs	28 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	02-Apr-2024	03-Apr-2024	0.25 hrs	28 hrs	✖ EHTR-FM	03-Apr-2024	0.25 hrs	28 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	02-Apr-2024	----	----	----		06-Apr-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	02-Apr-2024	----	----	----		06-Apr-2024	7 days	4 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1389566	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1391255	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1389411	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1389315	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1389316	1	20	5.0	5.0	✓
pH by Meter	E108	1389331	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1391207	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1389272	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1391278	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1389566	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1391255	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1389411	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1389315	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1389316	1	20	5.0	5.0	✓
pH by Meter	E108	1389331	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1389272	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1391278	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1389566	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1391255	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1389411	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1389315	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1389316	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1391207	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1389272	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1391278	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1389566	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1389411	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1389315	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1389316	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1389272	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2403986  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC SPRING EMS WK 2 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2403986</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 2 - WWTP SAMPLES	Date Samples Received	: 03-Apr-2024 09:00
PO	: ----	Date Analysis Commenced	: 03-Apr-2024
C-O-C number	: ----	Issue Date	: 09-Apr-2024 14:32
Sampler	: CH 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2403986  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 2 - WWTP SAMPLES



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1389331)											
CG2403971-012	Anonymous	pH	----	E108	0.10	pH units	8.40	8.38	0.238%	4%	----
Physical Tests (QC Lot: 1391278)											
CG2403974-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	10.3	11.5	1.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1389272)											
CG2403971-012	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0094	0.0085	0.0009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1389315)											
CG2403972-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.113	0.113	0.177%	20%	----
Anions and Nutrients (QC Lot: 1389316)											
CG2403972-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0013	0.0001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1389411)											
CG2403964-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1389566)											
CG2403986-002	WWTP Effluent	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0082	0.0080	0.0002	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1391207)											
CG2403985-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1391255)											
CG2403986-002	WWTP Effluent	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1391278)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1389272)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1389315)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1389316)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1389411)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1389566)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1391207)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1391255)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1389331)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1391278)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1389272)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1389315)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1389316)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 1389411)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 1389566)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.6	85.0	115	----
Aggregate Organics (QCLot: 1391255)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	91.6	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1389272)										
CG2403971-013	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0526 mg/L	0.05 mg/L	105	70.0	130	----
Anions and Nutrients (QCLot: 1389315)										
CG2403993-005	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1389316)										
CG2403993-005	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.507 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1389411)										
CG2403964-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0534 mg/L	0.05 mg/L	107	70.0	130	----
Anions and Nutrients (QCLot: 1389566)										
CG2404003-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.100 mg/L	0.1 mg/L	100	75.0	125	----





Vancouver BC, 1986 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, 8936 - 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: 403-291-0291  
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-688-8370 Toll Free: 1-800-667-7845 Fax: 306-668-8383

Environmental Division  
Calgary  
Work Order Reference  
**CG2403986**



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

[illegible]

Environmental Division  
Calgary  
Work Order Reference  
CG2403986



CERTIFICATE OF ANALYSIS

**Work Order** : **CG2403985**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC SPRING EMS WK 2 - RIVER SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : CH  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 03-Apr-2024 09:00  
**Date Analysis Commenced** : 03-Apr-2024  
**Issue Date** : 08-Apr-2024 11:38

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	ELK RIVER UPSTREAM	ELK RIVER @ IDZ	ELK RIVER DOWNSTREAM	----	----
(Matrix: Water)										
Client sampling date / time					02-Apr-2024 10:15	02-Apr-2024 10:30	02-Apr-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2403985-001	CG2403985-002	CG2403985-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.45	8.44	8.45	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	3.9	<3.0	4.3	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0077	<0.0050	0.0069	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.93	0.0945	1.93	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0046	<0.0010	0.0043	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0049	<0.0010	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0101	0.0139	0.0100	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.93	0.0945	1.93	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	1	3	1	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2403985</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 2 - RIVER SAMPLES	Date Samples Received	: 03-Apr-2024 09:00
PO	: ----	Issue Date	: 08-Apr-2024 11:38
C-O-C number	: ----		
Sampler	: CH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E298	02-Apr-2024	03-Apr-2024	28 days	1 days	✓	03-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	02-Apr-2024	03-Apr-2024	28 days	1 days	✓	03-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	02-Apr-2024	03-Apr-2024	28 days	1 days	✓	03-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER @ IDZ	E378-U	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER DOWNSTREAM	E378-U	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER UPSTREAM	E378-U	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO3-L	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO2-L	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO2-L	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO2-L	02-Apr-2024	03-Apr-2024	3 days	1 days	✓	03-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E372-U	02-Apr-2024	05-Apr-2024	28 days	3 days	✓	05-Apr-2024	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E372-U	02-Apr-2024	05-Apr-2024	28 days	3 days	✓	05-Apr-2024	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E372-U	02-Apr-2024	05-Apr-2024	28 days	3 days	✓	05-Apr-2024	28 days	3 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER @ IDZ	E012.FC	02-Apr-2024	----	----	----		03-Apr-2024	30 hrs	26 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER DOWNSTREAM	E012.FC	02-Apr-2024	----	----	----		03-Apr-2024	30 hrs	26 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	02-Apr-2024	----	----	----		03-Apr-2024	30 hrs	26 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER @ IDZ	E108	02-Apr-2024	03-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM	03-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	02-Apr-2024	03-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM	03-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	02-Apr-2024	03-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM	03-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ IDZ	E160	02-Apr-2024	----	----	----		06-Apr-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160	02-Apr-2024	----	----	----		06-Apr-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160	02-Apr-2024	----	----	----		06-Apr-2024	7 days	4 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1389408	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1389411	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1389315	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1389316	1	20	5.0	5.0	✓
pH by Meter	E108	1389331	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1391207	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1389272	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1391278	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1389408	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1389411	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1389315	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1389316	1	20	5.0	5.0	✓
pH by Meter	E108	1389331	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1389272	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1391278	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1389408	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1389411	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1389315	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1389316	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1391207	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1389272	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1391278	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1389408	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1389411	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1389315	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1389316	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1389272	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2403985  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 2 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2403985</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 2 - RIVER SAMPLES	Date Samples Received	: 03-Apr-2024 09:00
PO	: ----	Date Analysis Commenced	: 03-Apr-2024
C-O-C number	: ----	Issue Date	: 08-Apr-2024 11:39
Sampler	: CH 403 254 7669		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2403985  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 2 - RIVER SAMPLES



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1389331)											
CG2403971-012	Anonymous	pH	----	E108	0.10	pH units	8.40	8.38	0.238%	4%	----
Physical Tests (QC Lot: 1391278)											
CG2403974-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	10.3	11.5	1.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1389272)											
CG2403971-012	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0094	0.0085	0.0009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1389315)											
CG2403972-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.113	0.113	0.177%	20%	----
Anions and Nutrients (QC Lot: 1389316)											
CG2403972-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0013	0.0001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1389408)											
CG2403967-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0885	0.0890	0.563%	20%	----
Anions and Nutrients (QC Lot: 1389411)											
CG2403964-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1391207)											
CG2403985-001	ELK RIVER UPSTREAM	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	1	0	Diff <2x LOR	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1391278)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1389272)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1389315)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1389316)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1389408)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1389411)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Microbiological Tests (QCLot: 1391207)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1389331)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1391278)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1389272)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1389315)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1389316)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 1389408)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.3	85.0	115	----
Anions and Nutrients (QCLot: 1389411)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
					Concentration	Target	MS	Low	High	Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method						
Anions and Nutrients (QCLot: 1389272)										
CG2403971-013	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0526 mg/L	0.05 mg/L	105	70.0	130	----
Anions and Nutrients (QCLot: 1389315)										
CG2403993-005	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1389316)										
CG2403993-005	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.507 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1389408)										
CG2403985-001	ELK RIVER UPSTREAM	Ammonia, total (as N)	7664-41-7	E298	0.0979 mg/L	0.1 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 1389411)										
CG2403964-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0534 mg/L	0.05 mg/L	107	70.0	130	----



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CERTIFICATE OF ANALYSIS

Work Order	: CG2404393	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 3 - WWTP SAMPLES	Date Samples Received	: 11-Apr-2024 09:00
PO	: ----	Date Analysis Commenced	: 11-Apr-2024
C-O-C number	: ----	Issue Date	: 17-Apr-2024 10:06
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)					Client sampling date / time	10-Apr-2024 09:45	10-Apr-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2404393-001	CG2404393-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.19	8.00	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	62.9	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0105	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	25.1	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0053	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.494	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.498	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	25.1	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	3	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	57.0	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2404393</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 3 - WWTP SAMPLES	Date Samples Received	: 11-Apr-2024 09:00
PO	: ----	Issue Date	: 17-Apr-2024 10:06
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Holding and Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	10-Apr-2024	----	----	----		11-Apr-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	10-Apr-2024	----	----	----		11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	10-Apr-2024	12-Apr-2024	28 days	2 days	✓	12-Apr-2024	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	10-Apr-2024	15-Apr-2024	28 days	5 days	✓	15-Apr-2024	28 days	5 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	10-Apr-2024	----	----	----		11-Apr-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	10-Apr-2024	11-Apr-2024	0.25 hrs	25 hrs	✖ EHTR-FM	11-Apr-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	10-Apr-2024	11-Apr-2024	0.25 hrs	25 hrs	✖ EHTR-FM	11-Apr-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	10-Apr-2024	----	----	----		16-Apr-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	10-Apr-2024	----	----	----		16-Apr-2024	7 days	6 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1401590	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1399954	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1399487	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1399256	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1399257	1	19	5.2	5.0	✓
pH by Meter	E108	1399175	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1401231	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1399454	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1403504	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1401590	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1399954	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1399487	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1399256	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1399257	1	19	5.2	5.0	✓
pH by Meter	E108	1399175	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1399454	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1403504	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1401590	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1399954	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1399487	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1399256	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1399257	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1401231	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1399454	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1403504	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1401590	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1399487	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1399256	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1399257	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1399454	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2404393  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC SPRING EMS WK 3 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2404393</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 3 - WWTP SAMPLES	Date Samples Received	: 11-Apr-2024 09:00
PO	: ----	Date Analysis Commenced	: 11-Apr-2024
C-O-C number	: ----	Issue Date	: 17-Apr-2024 10:06
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Microbiology, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1399175)											
CG2404388-001	Anonymous	pH	----	E108	0.10	pH units	7.14	7.14	0.00%	4%	----
Physical Tests (QC Lot: 1403504)											
CG2404340-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1399256)											
CG2404386-001	Anonymous	Nitrate (as N)	14797-55-8	E235.N03-L	0.0250	mg/L	50.3	50.3	0.0557%	20%	----
Anions and Nutrients (QC Lot: 1399257)											
CG2404386-001	Anonymous	Nitrite (as N)	14797-65-0	E235.N02-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1399454)											
CG2404388-008	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1399487)											
CG2404393-002	WWTP Effluent	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.494	0.494	0.0142%	20%	----
Anions and Nutrients (QC Lot: 1401590)											
CG2404393-002	WWTP Effluent	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0105	0.0098	0.0007	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1401231)											
CG2404394-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1399954)											
CG2404363-004	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1403504)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1399256)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1399257)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1399454)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1399487)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1401590)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1401231)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1399954)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1399175)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1403504)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	91.4	85.0	115	----
Anions and Nutrients (QCLot: 1399256)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1399257)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1399454)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	99.2	80.0	120	----
Anions and Nutrients (QCLot: 1399487)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 1401590)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.4	85.0	115	----
Aggregate Organics (QCLot: 1399954)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	90.1	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Laboratory sample ID					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Client sample ID	Analyte	CAS Number	Method							
Anions and Nutrients (QCLot: 1399256)										
CG2404396-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.50 mg/L	2.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1399257)										
CG2404396-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.505 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1399454)										
CG2404388-009	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0498 mg/L	0.05 mg/L	99.7	70.0	130	----
Anions and Nutrients (QCLot: 1399487)										
CG2404394-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0520 mg/L	0.05 mg/L	104	70.0	130	----
Anions and Nutrients (QCLot: 1401590)										
CG2404396-004	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0995 mg/L	0.1 mg/L	99.5	75.0	125	----





Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-8700  
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: 780-539-5195 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: 1-800-667-7845 Fax: 306-668-8383


Environmental Division  
Calgary  
Work Order Reference  
**CG2404393**



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN: PATRICK MAJER		ANALYSIS REQUESTED:												 Telephone : + 1 403 407 1800			
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST																			
CITY:		CALGARY		PROV: ALBERTA		POSTAL CODE: T2T 0E2															
TEL:		403 - 256 - 8473		FAX: 403 - 244 - 3774		SAMPLER: Nicholas Corman															
PROJECT NAME AND NO.:		FARUC Spring EMS Wk 3 - WWTP samples				QUOTE NO:															
PO NO.:				ALS CONTACT: Patryk Wojciak																	
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com																			
		<input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:																			
WO#		SAMPLE IDENTIFICATION		DATE / TIME COLLECTED		MATRIX														NOTES (sample specific comments, due dates, etc.)	
				YYYY-MM-DD TIME																	
FOR LAB USE ONLY		WWTP Influent Routine		2024-04-10 9:45		Water															
		WWTP Influent BOD		2024-04-10 9:45		Water															
		WWTP Effluent Routine		2024-04-10 9:55		Water															
		WWTP Effluent BOD		2024-04-10 9:55		Water															
		WWTP Effluent Nutrients		2024-04-10 9:55		Water															
		WWTP Effluent Bacteriological		2024-04-10 9:55		Water															
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH SPECIFY DATE: _____ (surcharge may apply)						RELINQUISHED BY:		DATE: Apr 10 2024		RECEIVED BY:		DATE: Apr 10 2024							
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)						Nicholas Corman		TIME: 12:15		8/2		TIME: 12:00							
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX								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? _____ Yes _____ No _____ N/A														Sample Temperature: _____ °C		Cooling Method?					
														Frozen? _____ Yes _____ No		Icepacks _____ Ice _____ None					

Environmental Division  
Calgary  
Work Order Reference  
CE2404393



CERTIFICATE OF ANALYSIS

**Work Order** : **CG2404394**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC SPRING EMS WK 3 - RIVER SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NC  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 11-Apr-2024 09:00  
**Date Analysis Commenced** : 11-Apr-2024  
**Issue Date** : 17-Apr-2024 10:06

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
RRV	Reported result verified by repeat analysis.





Analytical Results

Sub-Matrix: Water					Client sample ID	ELK RIVER UPSTREAM	ELK RIVER @ IDZ	ELK RIVER DOWNSTREAM	----	----
(Matrix: Water)										
					Client sampling date / time	10-Apr-2024 10:15	10-Apr-2024 10:30	10-Apr-2024 10:45	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2404394-001	CG2404394-002	CG2404394-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.32	8.29	8.32	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	7.1	9.5	8.5	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0063	<0.0050	0.0064	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.78 <sup>RRV</sup>	0.0378	1.77	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0031 <sup>RRV</sup>	<0.0010	0.0029	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	0.0010	0.0044	<0.0010	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0120	0.0202	0.0139	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.78	0.0378	1.77	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	1	6	3	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2404394</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 3 - RIVER SAMPLES	Date Samples Received	: 11-Apr-2024 09:00
PO	: ----	Issue Date	: 17-Apr-2024 10:06
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E298	10-Apr-2024	12-Apr-2024	28 days	2 days	✓	12-Apr-2024	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	10-Apr-2024	12-Apr-2024	28 days	2 days	✓	12-Apr-2024	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	10-Apr-2024	12-Apr-2024	28 days	2 days	✓	12-Apr-2024	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER @ IDZ	E378-U	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER DOWNSTREAM	E378-U	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER UPSTREAM	E378-U	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO3-L	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO2-L	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO2-L	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO2-L	10-Apr-2024	11-Apr-2024	3 days	1 days	✓	11-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E372-U	10-Apr-2024	15-Apr-2024	28 days	5 days	✓	15-Apr-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E372-U	10-Apr-2024	15-Apr-2024	28 days	5 days	✓	15-Apr-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E372-U	10-Apr-2024	15-Apr-2024	28 days	5 days	✓	15-Apr-2024	28 days	5 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER DOWNSTREAM	E012.FC	10-Apr-2024	----	----	----		11-Apr-2024	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER @ IDZ	E012.FC	10-Apr-2024	----	----	----		11-Apr-2024	30 hrs	25 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	10-Apr-2024	----	----	----		11-Apr-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	10-Apr-2024	11-Apr-2024	0.25 hrs	24 hrs	✖ EHTR-FM	11-Apr-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	10-Apr-2024	11-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM	11-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER @ IDZ	E108	10-Apr-2024	11-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM	11-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ IDZ	E160	10-Apr-2024	----	----	----		16-Apr-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160	10-Apr-2024	----	----	----		16-Apr-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160	10-Apr-2024	----	----	----		16-Apr-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1401500	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1399487	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1399256	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1399257	1	19	5.2	5.0	✓
pH by Meter	E108	1399175	2	40	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1401231	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1399454	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1403504	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1401500	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1399487	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1399256	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1399257	1	19	5.2	5.0	✓
pH by Meter	E108	1399175	2	40	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1399454	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1403504	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1401500	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1399487	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1399256	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1399257	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1401231	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1399454	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1403504	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1401500	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1399487	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1399256	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1399257	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1399454	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2404394  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 3 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2404394</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 3 - RIVER SAMPLES	Date Samples Received	: 11-Apr-2024 09:00
PO	: ----	Date Analysis Commenced	: 11-Apr-2024
C-O-C number	: ----	Issue Date	: 17-Apr-2024 10:06
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Microbiology, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta





## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1399175)											
CG2404388-001	Anonymous	pH	----	E108	0.10	pH units	7.14	7.14	0.00%	4%	----
Physical Tests (QC Lot: 1399503)											
CG2404394-002	ELK RIVER @ IDZ	pH	----	E108	0.10	pH units	8.29	8.32	0.361%	4%	----
Physical Tests (QC Lot: 1403504)											
CG2404340-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1399256)											
CG2404386-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	50.3	50.3	0.0557%	20%	----
Anions and Nutrients (QC Lot: 1399257)											
CG2404386-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1399454)											
CG2404388-008	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1399487)											
CG2404393-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.494	0.494	0.0142%	20%	----
Anions and Nutrients (QC Lot: 1401500)											
CG2404326-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	1.25	mg/L	27.5	27.5	0.00728%	20%	----
Microbiological Tests (QC Lot: 1401231)											
CG2404394-001	ELK RIVER UPSTREAM	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	1	0	Diff <2x LOR	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1403504)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1399256)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1399257)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1399454)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1399487)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1401500)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1401231)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1399175)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1399503)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 1403504)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	91.4	85.0	115	----
Anions and Nutrients (QCLot: 1399256)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1399257)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1399454)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	99.2	80.0	120	----
Anions and Nutrients (QCLot: 1399487)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 1401500)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.1	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1399256)										
CG2404396-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.50 mg/L	2.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1399257)										
CG2404396-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.505 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1399454)										
CG2404388-009	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0498 mg/L	0.05 mg/L	99.7	70.0	130	----
Anions and Nutrients (QCLot: 1399487)										
CG2404394-001	ELK RIVER UPSTREAM	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0520 mg/L	0.05 mg/L	104	70.0	130	----
Anions and Nutrients (QCLot: 1401500)										
CG2404326-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----



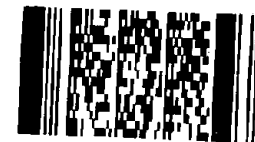


Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700  
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587  
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191  
Fort McMurray AB, Bay 1, 245 Macdonald Crt, 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

Environmental Division  
Calgary

Work Order Reference

CG2404394



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

[illegible]

Environmental Division  
Calgary  
Work Order Reference  
**CG2404394**

Work Order Reference  
**CG2404394**



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2404762**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC SPRING EMS WK 4 - WWTP SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NC  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 18-Apr-2024 09:45  
**Date Analysis Commenced** : 18-Apr-2024  
**Issue Date** : 24-Apr-2024 11:32

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)										
					Client sampling date / time	17-Apr-2024 09:45	17-Apr-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2404762-001	CG2404762-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.09	8.13	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	104	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0089	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	28.3	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0089	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.656	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.682	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	28.3	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	<1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	83.2	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2404762</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 4 - WWTP SAMPLES	Date Samples Received	: 18-Apr-2024 09:45
PO	: ----	Issue Date	: 24-Apr-2024 11:32
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	17-Apr-2024	----	----	----		18-Apr-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	17-Apr-2024	----	----	----		18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	17-Apr-2024	18-Apr-2024	28 days	1 days	✓	18-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	17-Apr-2024	19-Apr-2024	28 days	2 days	✓	22-Apr-2024	28 days	5 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	17-Apr-2024	----	----	----		18-Apr-2024	30 hrs	26 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	17-Apr-2024	18-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM	18-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	17-Apr-2024	18-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM	18-Apr-2024	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	17-Apr-2024	----	----	----		23-Apr-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	17-Apr-2024	----	----	----		23-Apr-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1407891	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1408592	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1407853	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1407849	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1407850	1	20	5.0	5.0	✔
pH by Meter	E108	1408019	1	20	5.0	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1409672	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1409254	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1407917	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1407891	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1408592	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1407853	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1407849	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1407850	1	20	5.0	5.0	✔
pH by Meter	E108	1408019	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1409254	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1407917	1	20	5.0	5.0	✔
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1407891	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1408592	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1407853	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1407849	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1407850	1	20	5.0	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1409672	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1409254	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1407917	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1407891	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1407853	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1407849	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1407850	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1409254	1	20	5.0	5.0	✔





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2404762  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC SPRING EMS WK 4 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2404762</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 4 - WWTP SAMPLES	Date Samples Received	: 18-Apr-2024 09:45
PO	: ----	Date Analysis Commenced	: 18-Apr-2024
C-O-C number	: ----	Issue Date	: 24-Apr-2024 11:35
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1407917)											
CG2404668-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1408019)											
CG2404745-001	Anonymous	pH	----	E108	0.10	pH units	8.32	8.33	0.120%	4%	----
Anions and Nutrients (QC Lot: 1407849)											
CG2404753-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	6.63	6.60	0.408%	20%	----
Anions and Nutrients (QC Lot: 1407850)											
CG2404753-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0175	0.0175	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1407853)											
CG2404762-002	WWTP Effluent	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.656	0.661	0.785%	20%	----
Anions and Nutrients (QC Lot: 1407891)											
CG2404724-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	1.25	mg/L	30.0	30.6	1.78%	20%	----
Anions and Nutrients (QC Lot: 1409254)											
CG2404759-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0105	0.0106	0.0001	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1409672)											
CG2404764-003	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	3	2	1	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1408592)											
CG2404760-002	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1407917)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1407849)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1407850)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1407853)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1407891)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1409254)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1409672)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1408592)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1407917)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	109	85.0	115	----
Physical Tests (QCLot: 1408019)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 1407849)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1407850)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1407853)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 1407891)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	91.3	85.0	115	----
Anions and Nutrients (QCLot: 1409254)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	105	80.0	120	----
Aggregate Organics (QCLot: 1408592)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	90.5	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1407849)										
CG2404753-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1407850)										
CG2404753-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1407853)										
CG2404763-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0454 mg/L	0.05 mg/L	90.9	70.0	130	----
Anions and Nutrients (QCLot: 1407891)										
CG2404724-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1409254)										
CG2404759-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0514 mg/L	0.05 mg/L	103	70.0	130	----





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: 780-513-219  
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: 1-800-688-9878 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: 403-29  
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-83

Environmental Division  
Calgary  
Work Order Reference  
**CG2404762**



Telephone : +1 403 407 1800

**SEND REPORT TO:**

## CHAIN OF CUSTODY FORM

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Environmental Division

## Library Work Order Reference

Work Order Reference  
**CG2404762**



CERTIFICATE OF ANALYSIS

Work Order	: CG2404764	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 3 - RIVER SAMPLES	Date Samples Received	: 18-Apr-2024 09:00
PO	: ----	Date Analysis Commenced	: 18-Apr-2024
C-O-C number	: ----	Issue Date	: 24-Apr-2024 11:33
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	ELK RIVER UPSTREAM	ELK RIVER @ IDZ	ELK RIVER DOWNSTREAM	----	----
(Matrix: Water)										
					Client sampling date / time	17-Apr-2024 10:15	17-Apr-2024 10:30	17-Apr-2024 10:45	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2404764-001	CG2404764-002	CG2404764-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.36	8.42	8.37	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	12.9	<3.0	12.9	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0052	<0.0050	0.0065	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.44	0.162	1.45	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0016	<0.0010	0.0017	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	0.0013	0.0047	0.0016	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0264	0.0214	0.0256	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.44	0.162	1.45	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	5	1	3	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2404764</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 3 - RIVER SAMPLES	Date Samples Received	: 18-Apr-2024 09:00
PO	: ----	Issue Date	: 24-Apr-2024 11:33
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E298	17-Apr-2024	18-Apr-2024	28 days	1 days	✓	18-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	17-Apr-2024	18-Apr-2024	28 days	1 days	✓	18-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	17-Apr-2024	18-Apr-2024	28 days	1 days	✓	18-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER @ IDZ	E378-U	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER DOWNSTREAM	E378-U	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER UPSTREAM	E378-U	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO3-L	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO2-L	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO2-L	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO2-L	17-Apr-2024	18-Apr-2024	3 days	1 days	✓	18-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E372-U	17-Apr-2024	19-Apr-2024	28 days	2 days	✓	22-Apr-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E372-U	17-Apr-2024	19-Apr-2024	28 days	2 days	✓	22-Apr-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E372-U	17-Apr-2024	19-Apr-2024	28 days	2 days	✓	22-Apr-2024	28 days	5 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER @ IDZ	E012.FC	17-Apr-2024	----	----	----		18-Apr-2024	30 hrs	25 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER DOWNSTREAM	E012.FC	17-Apr-2024	----	----	----		18-Apr-2024	30 hrs	25 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	17-Apr-2024	----	----	----		18-Apr-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER @ IDZ	E108	17-Apr-2024	18-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM	18-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	17-Apr-2024	18-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM	18-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	17-Apr-2024	18-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM	18-Apr-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ IDZ	E160	17-Apr-2024	----	----	----		23-Apr-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160	17-Apr-2024	----	----	----		23-Apr-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160	17-Apr-2024	----	----	----		23-Apr-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1408195	2	40	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1407853	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1407849	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1407850	1	20	5.0	5.0	✓
pH by Meter	E108	1408022	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1409672	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1409254	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1407917	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1408195	2	40	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1407853	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1407849	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1407850	1	20	5.0	5.0	✓
pH by Meter	E108	1408022	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1409254	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1407917	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1408195	2	40	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1407853	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1407849	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1407850	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1409672	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1409254	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1407917	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1408195	2	40	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1407853	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1407849	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1407850	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1409254	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2404764  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 3 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2404764</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 3 - RIVER SAMPLES	Date Samples Received	: 18-Apr-2024 09:00
PO	: ----	Date Analysis Commenced	: 18-Apr-2024
C-O-C number	: ----	Issue Date	: 24-Apr-2024 11:33
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta





## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1407917)											
CG2404668-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1408022)											
CG2404763-001	Anonymous	pH	----	E108	0.10	pH units	7.68	7.64	0.522%	4%	----
Anions and Nutrients (QC Lot: 1407849)											
CG2404753-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	6.63	6.60	0.408%	20%	----
Anions and Nutrients (QC Lot: 1407850)											
CG2404753-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0175	0.0175	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1407853)											
CG2404762-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.656	0.661	0.785%	20%	----
Anions and Nutrients (QC Lot: 1407891)											
CG2404724-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	1.25	mg/L	30.0	30.6	1.78%	20%	----
Anions and Nutrients (QC Lot: 1408195)											
CG2404764-002	ELK RIVER @ IDZ	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1409254)											
CG2404759-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0105	0.0106	0.0001	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1409672)											
CG2404764-003	ELK RIVER DOWNSTREAM	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	3	2	1	Diff <2x LOR	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1407917)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1407849)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1407850)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1407853)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1407891)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1408195)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1409254)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1409672)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1407917)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	109	85.0	115	----
Physical Tests (QCLot: 1408022)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 1407849)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1407850)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1407853)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 1407891)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	91.3	85.0	115	----
Anions and Nutrients (QCLot: 1408195)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.2	85.0	115	----
Anions and Nutrients (QCLot: 1409254)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	105	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

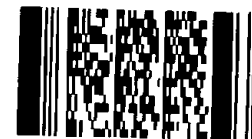
Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1407849)										
CG2404753-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1407850)										
CG2404753-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1407853)										
CG2404763-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0454 mg/L	0.05 mg/L	90.9	70.0	130	----
Anions and Nutrients (QCLot: 1407891)										
CG2404724-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1408195)										
CG2404764-003	ELK RIVER DOWNSTREAM	Ammonia, total (as N)	7664-41-7	E298	0.0958 mg/L	0.1 mg/L	95.8	75.0	125	----
Anions and Nutrients (QCLot: 1409254)										
CG2404759-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0514 mg/L	0.05 mg/L	103	70.0	130	----





**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, 981 St. - 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: 780-791-1588  
**Edmonton AB**, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-900-668-9878 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: 403-291-6100  
**Saskatoon SK**, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-887-7645 Fax: 306-668-8383

Environmental Division  
Calgary  
Work Order Reference  
**CG2404764**



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**[illegible]

Environmental Division  
Calgary  
Work Order Reference  
**CG2404764**



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2405161**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC SPRING EMS WK 5 - WWTP SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : CH  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 25-Apr-2024 09:25  
**Date Analysis Commenced** : 25-Apr-2024  
**Issue Date** : 02-May-2024 14:00

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)					Client sampling date / time	24-Apr-2024 09:45	24-Apr-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2405161-001	CG2405161-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	7.96	8.01	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	107	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0699	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	23.4	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0110	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.701	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.732	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	23.4	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	<1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	108	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2405161</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 5 - WWTP SAMPLES	Date Samples Received	: 25-Apr-2024 09:25
PO	: ----	Issue Date	: 02-May-2024 14:00
C-O-C number	: ----		
Sampler	: CH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	24-Apr-2024	----	----	----		25-Apr-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	24-Apr-2024	----	----	----		25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	24-Apr-2024	25-Apr-2024	28 days	1 days	✓	25-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	24-Apr-2024	28-Apr-2024	28 days	4 days	✓	29-Apr-2024	28 days	5 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	24-Apr-2024	----	----	----		25-Apr-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	24-Apr-2024	26-Apr-2024	0.25 hrs	48 hrs	✖ EHTR-FM	26-Apr-2024	0.25 hrs	48 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	24-Apr-2024	26-Apr-2024	0.25 hrs	48 hrs	✖ EHTR-FM	26-Apr-2024	0.25 hrs	48 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	24-Apr-2024	----	----	----		01-May-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	24-Apr-2024	----	----	----		01-May-2024	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1416688	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1417265	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1416694	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1416870	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1416869	1	17	5.8	5.0	✓
pH by Meter	E108	1418116	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1418695	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1419442	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1420921	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1416688	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1417265	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1416694	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1416870	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1416869	1	17	5.8	5.0	✓
pH by Meter	E108	1418116	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1419442	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1420921	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1416688	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1417265	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1416694	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1416870	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1416869	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1418695	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1419442	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1420921	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1416688	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1416694	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1416870	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1416869	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1419442	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2405161  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC SPRING EMS WK 5 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2405161</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 5 - WWTP SAMPLES	Date Samples Received	: 25-Apr-2024 09:25
PO	: ----	Date Analysis Commenced	: 25-Apr-2024
C-O-C number	: ----	Issue Date	: 02-May-2024 14:00
Sampler	: CH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2405161  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 5 - WWTP SAMPLES



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1418116)											
CG2405142-001	Anonymous	pH	----	E108	0.10	pH units	7.37	7.38	0.136%	4%	----
Physical Tests (QC Lot: 1420921)											
CG2405160-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1416688)											
CG2405160-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0281	0.0276	0.0005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1416694)											
CG2405159-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1416869)											
CG2405173-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1416870)											
CG2405173-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0266	<0.0250	0.0016	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1419442)											
CG2405139-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0042	0.0043	0.0001	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1418695)											
CG2405159-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	<1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1417265)											
CG2405147-007	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1420921)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1416688)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1416694)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1416869)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1416870)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1419442)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1418695)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1417265)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1418116)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1420921)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 1416688)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.6	85.0	115	----
Anions and Nutrients (QCLot: 1416694)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	95.6	80.0	120	----
Anions and Nutrients (QCLot: 1416869)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1416870)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1419442)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	95.9	80.0	120	----
Aggregate Organics (QCLot: 1417265)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	93.3	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water

					Matrix Spike (MS) Report				
					Spike		Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High
Qualifier									
Anions and Nutrients (QCLot: 1416688)									
CG2405160-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125
Anions and Nutrients (QCLot: 1416694)									
CG2405159-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0495 mg/L	0.05 mg/L	99.0	70.0	130
Anions and Nutrients (QCLot: 1416869)									
CG2405173-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.529 mg/L	0.5 mg/L	106	75.0	125
Anions and Nutrients (QCLot: 1416870)									
CG2405173-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.66 mg/L	2.5 mg/L	106	75.0	125
Anions and Nutrients (QCLot: 1419442)									
CG2405139-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0498 mg/L	0.05 mg/L	99.7	70.0	130





Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4198 Toll Free: 1-800-665-0243 Fax: 604-253-6700  
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 8W7, 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: 780-791-1588  
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: 403-291-1  
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

Environmental Division  
Calgary  
Work Order Reference  
**CG2405161**



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN: PATRICK MAJER		ANALYSIS REQUESTED:									
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST													
CITY:		CALGARY		PROV:		ALBERTA		POSTAL CODE:		T2T 0E2					
TEL:		403 - 256 - 8473		FAX:		403 - 244 - 3774		SAMPLER:		Claudia Heinrich					
PROJECT NAME AND NO.:		FARUC Spring EMS Wk 5 - WWTP samples				QUOTE NO:									
PO NO.:				ALS CONTACT:		Ptryk Wojciak									
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: <u>pmajer@skircr.com</u> <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:													

[illegible]

Environmental Division  
Calgary  
Work Order Reference  
CG2405161

Work Order Reference  
**CG2405161**



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2405159**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC SPRING EMS WK 5 - RIVER SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : CH  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 25-Apr-2024 09:25  
**Date Analysis Commenced** : 25-Apr-2024  
**Issue Date** : 01-May-2024 12:57

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak		Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	ELK RIVER UPSTREAM	ELK RIVER @ IDZ	ELK RIVER DOWNSTREAM	----	----
(Matrix: Water)										
Client sampling date / time					24-Apr-2024 10:15	24-Apr-2024 10:30	24-Apr-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2405159-001	CG2405159-002	CG2405159-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.36	8.21	8.36	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	3.6	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.72	1.89	1.72	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0022	0.0013	0.0025	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0477	<0.0010	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0102	0.0611	0.0099	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.72	1.89	1.72	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	1	1	5	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2405159</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 5 - RIVER SAMPLES	Date Samples Received	: 25-Apr-2024 09:25
PO	: ----	Issue Date	: 01-May-2024 12:59
C-O-C number	: ----		
Sampler	: CH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E298	24-Apr-2024	25-Apr-2024	28 days	1 days	✓	25-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E298	24-Apr-2024	25-Apr-2024	28 days	1 days	✓	25-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E298	24-Apr-2024	25-Apr-2024	28 days	1 days	✓	25-Apr-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER @ IDZ	E378-U	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER DOWNSTREAM	E378-U	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE ELK RIVER UPSTREAM	E378-U	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO3-L	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO3-L	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO3-L	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER @ IDZ	E235.NO2-L	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER DOWNSTREAM	E235.NO2-L	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE ELK RIVER UPSTREAM	E235.NO2-L	24-Apr-2024	25-Apr-2024	3 days	1 days	✓	25-Apr-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER @ IDZ	E372-U	24-Apr-2024	28-Apr-2024	28 days	4 days	✓	29-Apr-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER DOWNSTREAM	E372-U	24-Apr-2024	28-Apr-2024	28 days	4 days	✓	29-Apr-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) ELK RIVER UPSTREAM	E372-U	24-Apr-2024	28-Apr-2024	28 days	4 days	✓	29-Apr-2024	28 days	5 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER DOWNSTREAM	E012.FC	24-Apr-2024	----	----	----		25-Apr-2024	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER @ IDZ	E012.FC	24-Apr-2024	----	----	----		25-Apr-2024	30 hrs	25 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) ELK RIVER UPSTREAM	E012.FC	24-Apr-2024	----	----	----		25-Apr-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE ELK RIVER @ IDZ	E108	24-Apr-2024	26-Apr-2024	0.25 hrs	47 hrs	✖ EHTR-FM	26-Apr-2024	0.25 hrs	47 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER DOWNSTREAM	E108	24-Apr-2024	26-Apr-2024	0.25 hrs	47 hrs	✖ EHTR-FM	26-Apr-2024	0.25 hrs	47 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE ELK RIVER UPSTREAM	E108	24-Apr-2024	26-Apr-2024	0.25 hrs	47 hrs	✖ EHTR-FM	26-Apr-2024	0.25 hrs	47 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER @ IDZ	E160	24-Apr-2024	----	----	----		01-May-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER DOWNSTREAM	E160	24-Apr-2024	----	----	----		01-May-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ELK RIVER UPSTREAM	E160	24-Apr-2024	----	----	----		01-May-2024	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1417304	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1416694	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1416870	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1416869	1	17	5.8	5.0	✓
pH by Meter	E108	1418116	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1418695	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1419442	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1420919	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1417304	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1416694	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1416870	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1416869	1	17	5.8	5.0	✓
pH by Meter	E108	1418116	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1419442	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1420919	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1417304	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1416694	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1416870	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1416869	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1418695	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1419442	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1420919	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1417304	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1416694	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1416870	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1416869	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1419442	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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Page : 8 of 8  
Work Order : CG2405159  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 5 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2405159</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 5 - RIVER SAMPLES	Date Samples Received	: 25-Apr-2024 09:25
PO	: ----	Date Analysis Commenced	: 25-Apr-2024
C-O-C number	: ----	Issue Date	: 01-May-2024 13:00
Sampler	: CH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak		Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2405159  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 5 - RIVER SAMPLES



---

## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1418116)											
CG2405142-001	Anonymous	pH	----	E108	0.10	pH units	7.37	7.38	0.136%	4%	----
Physical Tests (QC Lot: 1420919)											
CG2405105-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1416694)											
CG2405159-001	ELK RIVER UPSTREAM	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1416869)											
CG2405173-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1416870)											
CG2405173-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0266	<0.0250	0.0016	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1417304)											
CG2405159-001	ELK RIVER UPSTREAM	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1419442)											
CG2405139-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0042	0.0043	0.0001	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1418695)											
CG2405159-001	ELK RIVER UPSTREAM	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	<1	0	Diff <2x LOR	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1420919)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1416694)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1416869)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1416870)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1417304)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1419442)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1418695)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1418116)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1420919)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	94.1	85.0	115	----
Anions and Nutrients (QCLot: 1416694)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	95.6	80.0	120	----
Anions and Nutrients (QCLot: 1416869)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1416870)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1417304)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 1419442)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	95.9	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1416694)										
CG2405159-002	ELK RIVER @ IDZ	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0495 mg/L	0.05 mg/L	99.0	70.0	130	----
Anions and Nutrients (QCLot: 1416869)										
CG2405173-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.529 mg/L	0.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1416870)										
CG2405173-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.66 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1417304)										
CG2405159-002	ELK RIVER @ IDZ	Ammonia, total (as N)	7664-41-7	E298	0.102 mg/L	0.1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1419442)										
CG2405139-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0498 mg/L	0.05 mg/L	99.7	70.0	130	----





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: 250-261-5597  
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

Environmental Division  
Calgary  
Work Order Reference  
**CG2405159**



Telephone : +1 403 407 1800

SEND REPORT TO:

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:		Claudia Heinrich							
PROJECT NAME AND NO.:				FARUC Spring EMS Wk 5 - river samples				QUOTE NO:	
PO NO.:				ALS CONTACT:		Patryk Wojciak			
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY		<input checked="" type="checkbox"/> EMAIL - ADDRESS:		pmajer@skircr.com			
		<input type="checkbox"/> FAX		<input type="checkbox"/> EXCEL		<input checked="" type="checkbox"/> PDF		<input checked="" type="checkbox"/> OTHER:	

[illegible]

NOTES (sample specific comments, due dates, etc)

**FOR LAB USE ONLY**

TURN AROUND REQUIRED:	<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH            SPECIFY DATE: _____ (surcharge may apply)
SEND INVOICE TO:	<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)
INVOICE FORMAT:	<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO wastewater@skifernie.com

RELINQUISHED BY:	DATE:	April 24 2024	RECEIVED BY:	DATE:	7/10/24
Nicholas Corman	TIME:	12:15	<i>[Signature]</i>	TIME:	9:28
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY		
Cooler Seal Intact?	Sample Temperature: <i>5</i> °C	Cooling Method?
Yes No N/A	Frozen? Yes No	Icepacks Ice None

G:\QUALITY\00 DOCUMENTS\10 AUTHORIZED\FORMS\updated CoC for ALS EMS - river samples only.xls

**Environmental Division**  
**Calgary**  
**Work Order Reference**  
**CG2405159**



CERTIFICATE OF ANALYSIS

Work Order	: CG2405571	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 5 - WWTP SAMPLES	Date Samples Received	: 02-May-2024 06:55
PO	: ----	Date Analysis Commenced	: 02-May-2024
C-O-C number	: ----	Issue Date	: 12-May-2024 14:32
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)										
					Client sampling date / time	01-May-2024 09:45	01-May-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2405571-001	CG2405571-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	7.97	8.03	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	69.3	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0138	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	20.1	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0058	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.482	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.457	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	20.1	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	<1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	57.7 <sup>HTD</sup>	<2.0 <sup>HTD</sup>	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2405571</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 5 - WWTP SAMPLES	Date Samples Received	: 02-May-2024 06:55
PO	: ----	Issue Date	: 12-May-2024 14:32
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	01-May-2024	----	----	----		02-May-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	01-May-2024	----	----	----		02-May-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	01-May-2024	02-May-2024	28 days	1 days	✓	02-May-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	01-May-2024	02-May-2024	28 days	1 days	✓	07-May-2024	28 days	6 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	01-May-2024	----	----	----		02-May-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	01-May-2024	02-May-2024	0.25 hrs	31 hrs	✖ EHTR-FM	02-May-2024	0.25 hrs	31 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	01-May-2024	02-May-2024	0.25 hrs	32 hrs	✖ EHTR-FM	02-May-2024	0.25 hrs	32 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	01-May-2024	----	----	----		08-May-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	01-May-2024	----	----	----		08-May-2024	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1426476	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1426394	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1425832	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1425588	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1425593	1	18	5.5	5.0	✔
pH by Meter	E108	1426449	1	20	5.0	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1427863	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1426139	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1430205	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1426476	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1426394	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1425832	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1425588	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1425593	1	18	5.5	5.0	✔
pH by Meter	E108	1426449	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1426139	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1430205	1	20	5.0	5.0	✔
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1426476	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1426394	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1425832	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1425588	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1425593	1	18	5.5	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1427863	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1426139	1	20	5.0	5.0	✔
TSS by Gravimetry	E160	1430205	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1426476	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1425832	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1425588	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1425593	1	18	5.5	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1426139	1	20	5.0	5.0	✔





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



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 Work Order : CG2405571  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC SPRING EMS WK 5 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2405571</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 5 - WWTP SAMPLES	Date Samples Received	: 02-May-2024 06:55
PO	: ----	Date Analysis Commenced	: 02-May-2024
C-O-C number	: ----	Issue Date	: 12-May-2024 14:32
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2405571  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 5 - WWTP SAMPLES



---

## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1426449)											
CG2405562-003	Anonymous	pH	----	E108	0.10	pH units	8.06	8.07	0.124%	4%	----
Physical Tests (QC Lot: 1430205)											
CG2405496-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1425588)											
CG2405549-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	5.93	5.92	0.105%	20%	----
Anions and Nutrients (QC Lot: 1425593)											
CG2405549-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0173	0.0182	0.0009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1425832)											
CG2405551-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1426139)											
CG2405551-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0033	0.0030	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1426476)											
CG2405564-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1427863)											
CG2405572-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	18	16	11.8%	65%	----
Aggregate Organics (QC Lot: 1426394)											
CG2405525-004	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1430205)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1425588)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1425593)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1425832)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1426139)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1426476)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1427863)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1426394)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1426449)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1430205)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	105	85.0	115	----
Anions and Nutrients (QCLot: 1425588)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 1425593)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1425832)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 1426139)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	99.6	80.0	120	----
Anions and Nutrients (QCLot: 1426476)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	109	85.0	115	----
Aggregate Organics (QCLot: 1426394)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	100	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1425588)										
CG2405549-005	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1425593)										
CG2405549-005	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1425832)										
CG2405551-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0444 mg/L	0.05 mg/L	88.8	70.0	130	----
Anions and Nutrients (QCLot: 1426139)										
CG2405551-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1426476)										
CG2405571-002	WWTP Effluent	Ammonia, total (as N)	7664-41-7	E298	0.115 mg/L	0.1 mg/L	115	75.0	125	----





**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: 403-291-9897  
**Saskatoon SK**, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8370

Environmental Division  
Calgary  
Work Order Reference  
**CG2405571**



Telephone : +1 403 407 1800

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

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: Nicholas Cormian
PROJECT NAME AND NO.:		FARUC Spring EMS Wk 5 - WWTP samples		QUOTE NO:
PO NO.:		ALS CONTACT:	Ptryk Wojciak	
REPORT FORMAT:	<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: <a href="mailto:pmaier@skircr.com">pmaier@skircr.com</a> <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:			

[illegible]

NOTES (sample spec  
comments, due dates, e

Environmental Division  
Calgary  
Work Order Reference  
CG2405571

Work Order Reference  
CG2405571

Work Order Reference  
CG2405571

TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH    SPECIFY DATE: _____ (surcharge may apply)		RELINQUISHED BY:	DATE:	May 1st, 2024	RECEIVED BY:	DATE:	05/02
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)		Nicholas Corman	TIME:	12:15	<i>JA</i>	TIME:	6:55
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX		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: <i>41</i> °C		Cooling Method?		
				Yes ___ No ___ N/A	Frozen? Yes ___ No ___		Icepacks ___ Ice ___ None ___		



CERTIFICATE OF ANALYSIS

Work Order	: CG2405572	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 6 - RIVER SAMPLES	Date Samples Received	: 02-May-2024 06:55
PO	: ----	Date Analysis Commenced	: 02-May-2024
C-O-C number	: ----	Issue Date	: 08-May-2024 16:14
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	Elk River Upstream	Elk River @ IDZ	Elk River Downstream	----	----
(Matrix: Water)										
Client sampling date / time					01-May-2024 10:15	01-May-2024 10:30	01-May-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2405572-001	CG2405572-002	CG2405572-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.35	8.38	8.36	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	6.5	<3.0	3.9	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.62	0.597	1.63	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0015	0.0010	0.0015	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0112	<0.0010	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0124	0.0222	0.0130	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.62	0.598	1.63	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	18	5	10	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2405572</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 6 - RIVER SAMPLES	Date Samples Received	: 02-May-2024 06:55
PO	: ----	Issue Date	: 08-May-2024 16:12
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River @ IDZ	E298	01-May-2024	02-May-2024	28 days	1 days	✓	02-May-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Downstream	E298	01-May-2024	02-May-2024	28 days	1 days	✓	02-May-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Upstream	E298	01-May-2024	02-May-2024	28 days	1 days	✓	02-May-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River @ IDZ	E378-U	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Downstream	E378-U	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Upstream	E378-U	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO3-L	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO3-L	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO3-L	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO2-L	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO2-L	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO2-L	01-May-2024	02-May-2024	3 days	1 days	✓	02-May-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River @ IDZ	E372-U	01-May-2024	02-May-2024	28 days	1 days	✓	07-May-2024	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Downstream	E372-U	01-May-2024	02-May-2024	28 days	1 days	✓	07-May-2024	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Upstream	E372-U	01-May-2024	02-May-2024	28 days	1 days	✓	07-May-2024	28 days	6 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River @ IDZ	E012.FC	01-May-2024	----	----	----		02-May-2024	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Downstream	E012.FC	01-May-2024	----	----	----		02-May-2024	30 hrs	24 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Upstream	E012.FC	01-May-2024	----	----	----		02-May-2024	30 hrs	24 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River @ IDZ	E108	01-May-2024	02-May-2024	0.25 hrs	31 hrs	✖ EHTR-FM	02-May-2024	0.25 hrs	31 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Downstream	E108	01-May-2024	02-May-2024	0.25 hrs	31 hrs	✖ EHTR-FM	02-May-2024	0.25 hrs	31 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Upstream	E108	01-May-2024	02-May-2024	0.25 hrs	31 hrs	✖ EHTR-FM	02-May-2024	0.25 hrs	31 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River @ IDZ	E160	01-May-2024	----	----	----		08-May-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Downstream	E160	01-May-2024	----	----	----		08-May-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Upstream	E160	01-May-2024	----	----	----		08-May-2024	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1426199	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1425833	2	40	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1425588	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1425593	1	18	5.5	5.0	✓
pH by Meter	E108	1426449	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1427863	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1426139	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1430205	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1426199	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1425833	2	40	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1425588	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1425593	1	18	5.5	5.0	✓
pH by Meter	E108	1426449	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1426139	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1430205	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1426199	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1425833	2	40	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1425588	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1425593	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1427863	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1426139	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1430205	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1426199	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1425833	2	40	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1425588	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1425593	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1426139	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2405572  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 6 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2405572</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 6 - RIVER SAMPLES	Date Samples Received	: 02-May-2024 06:55
PO	: ----	Date Analysis Commenced	: 02-May-2024
C-O-C number	: ----	Issue Date	: 08-May-2024 16:14
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2405572  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 6 - RIVER SAMPLES



---

## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1426449)											
CG2405562-003	Anonymous	pH	----	E108	0.10	pH units	8.06	8.07	0.124%	4%	----
Physical Tests (QC Lot: 1430205)											
CG2405496-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1425588)											
CG2405549-001	Anonymous	Nitrate (as N)	14797-55-8	E235.N03-L	0.0250	mg/L	5.93	5.92	0.105%	20%	----
Anions and Nutrients (QC Lot: 1425593)											
CG2405549-001	Anonymous	Nitrite (as N)	14797-65-0	E235.N02-L	0.0050	mg/L	0.0173	0.0182	0.0009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1425832)											
CG2405551-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1425833)											
CG2405572-003	Elk River Downstream	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1426139)											
CG2405551-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0033	0.0030	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1426199)											
CG2405572-001	Elk River Upstream	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1427863)											
CG2405572-001	Elk River Upstream	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	18	16	11.8%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1430205)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1425588)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1425593)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1425832)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1425833)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1426139)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1426199)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1427863)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1426449)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1430205)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	105	85.0	115	----
Anions and Nutrients (QCLot: 1425588)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 1425593)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1425832)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 1425833)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 1426139)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	99.6	80.0	120	----
Anions and Nutrients (QCLot: 1426199)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	108	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1425588)										
CG2405549-005	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1425593)										
CG2405549-005	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1425832)										
CG2405551-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0444 mg/L	0.05 mg/L	88.8	70.0	130	----
Anions and Nutrients (QCLot: 1425833)										
CG2405573-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0477 mg/L	0.05 mg/L	95.3	70.0	130	----
Anions and Nutrients (QCLot: 1426139)										
CG2405551-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1426199)										
CG2405572-002	Elk River @ IDZ	Ammonia, total (as N)	7664-41-7	E298	0.112 mg/L	0.1 mg/L	112	75.0	125	----





SEND REPORT TO:

**CHAIN OF CUSTODY FORM**

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN: PATRICK MAJER		ANALYSIS REQUESTED:															
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST																			
CITY:		CALGARY		PROV: ALBERTA		POSTAL CODE: T2T 0E2															
TEL:		403 - 256 - 8473		FAX: 403 - 244 - 3774		SAMPLER: Nicholas Corman															
PROJECT NAME AND NO.:				FARUC Spring EMS Wk 6 - river samples				QUOTE NO.:													
PO NO.:				ALS CONTACT: Patryk Wojciak																	
REPORT FORMAT:				<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> OTHER:																	
FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED		MATRIX		Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)			
				YYYY-MM-DD	TIME																
		Elk River Upstream Routine		2024/05/01	10:15	Water		X	X												
		Elk River Upstream Nutrients		2024/05/01	10:15	Water				X	X	X	X	X							
		Elk River Upstream Bacteriological		2024/05/01	10:15	Water	X														
		Elk River @ IDZ Routine		2024/05/01	10:30	Water		X	X												
		Elk River @ IDZ Nutrients		2024/05/01	10:30	Water				X	X	X	X	X							
		Elk River @ IDZ Bacteriological		2024/05/01	10:30	Water	X														
		Elk River Downstream Routine		2024/05/01	10:45	Water		X	X												
		Elk River Downstream Nutrients		2024/05/01	10:45	Water				X	X	X	X	X							
		Elk River Downstream Bacteriological		2024/05/01	10:45	Water	X														
	TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH   SPECIFY DATE: _____ (surcharge may apply)						RELINQUISHED BY:		DATE: May 1st, 2024		RECEIVED BY:		DATE: 5/1/24						
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)						Nicholas Corman		TIME: 12:15		TIME: 8:55		4.1							
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX						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: _____ °C						Cooling Method?									
Yes ___ No ___ N/A						Frozen? Yes ___ No ___						Icepacks ___ Ice ___ None ___									



CERTIFICATE OF ANALYSIS

Work Order	: CG2407990	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC June monthly - WWTP samples	Date Samples Received	: 13-Jun-2024 09:00
PO	: ----	Date Analysis Commenced	: 13-Jun-2024
C-O-C number	: ----	Issue Date	: 20-Jun-2024 10:25
Sampler	: Claudia Heinrich		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)										
					Client sampling date / time	12-Jun-2024 09:45	12-Jun-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2407990-001	CG2407990-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.15	8.39	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	79.2	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0083	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	22.9	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0075	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.615	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.619	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	22.9	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	72.6	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2407990</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC June monthly - WWTP samples	Date Samples Received	: 13-Jun-2024 09:00
PO	: ----	Issue Date	: 20-Jun-2024 10:23
C-O-C number	: ----		
Sampler	: Claudia Heinrich		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	12-Jun-2024	----	----	----		13-Jun-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	12-Jun-2024	----	----	----		13-Jun-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	12-Jun-2024	18-Jun-2024	28 days	6 days	✓	18-Jun-2024	28 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	12-Jun-2024	13-Jun-2024	3 days	1 days	✓	13-Jun-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	12-Jun-2024	13-Jun-2024	3 days	1 days	✓	13-Jun-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	12-Jun-2024	13-Jun-2024	3 days	1 days	✓	13-Jun-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	12-Jun-2024	14-Jun-2024	28 days	2 days	✓	19-Jun-2024	28 days	7 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	12-Jun-2024	----	----	----		13-Jun-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	12-Jun-2024	15-Jun-2024	0.25 hrs	78 hrs	✖ EHTR-FM	15-Jun-2024	0.25 hrs	78 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	12-Jun-2024	15-Jun-2024	0.25 hrs	78 hrs	✖ EHTR-FM	15-Jun-2024	0.25 hrs	78 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	12-Jun-2024	----	----	----		19-Jun-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	12-Jun-2024	----	----	----		19-Jun-2024	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1499987	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1493035	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1492685	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1492981	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1492980	1	20	5.0	5.0	✓
pH by Meter	E108	1496418	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1495114	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1494825	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1498543	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1499987	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1493035	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1492685	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1492981	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1492980	1	20	5.0	5.0	✓
pH by Meter	E108	1496418	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1494825	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1498543	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1499987	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1493035	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1492685	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1492981	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1492980	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1495114	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1494825	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1498543	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1499987	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1492685	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1492981	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1492980	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1494825	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2407990  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC June monthly - WWTP samples



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2407990</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC June monthly - WWTP samples	Date Samples Received	: 13-Jun-2024 09:00
PO	: ----	Date Analysis Commenced	: 13-Jun-2024
C-O-C number	: ----	Issue Date	: 20-Jun-2024 10:34
Sampler	: Claudia Heinrich		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2407990  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC June monthly - WWTP samples



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1496418)											
CG2407964-001	Anonymous	pH	----	E108	0.10	pH units	8.00	7.98	0.250%	4%	----
Physical Tests (QC Lot: 1498543)											
CG2407990-001	WWTP Influent	Solids, total suspended [TSS]	----	E160	3.0	mg/L	79.2	74.2	6.52%	20%	----
Anions and Nutrients (QC Lot: 1492685)											
CG2407990-002	WWTP Effluent	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.615	0.612	0.590%	20%	----
Anions and Nutrients (QC Lot: 1492980)											
CG2408004-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1492981)											
CG2408004-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	10.6	10.7	0.316%	20%	----
Anions and Nutrients (QC Lot: 1494825)											
CG2407977-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0326	0.0337	3.47%	20%	----
Anions and Nutrients (QC Lot: 1499987)											
CG2407990-002	WWTP Effluent	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0083	0.0077	0.0006	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1495114)											
CG2407990-002	WWTP Effluent	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1493035)											
CG2407936-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	3.2	3.2	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1498543)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1492685)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1492980)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1492981)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1494825)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1499987)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1495114)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1493035)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1496418)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1498543)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	88.4	85.0	115	----
Anions and Nutrients (QCLot: 1492685)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	99.9	80.0	120	----
Anions and Nutrients (QCLot: 1492980)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1492981)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1494825)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 1499987)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.8	85.0	115	----
Aggregate Organics (QCLot: 1493035)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	90.6	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1492685)										
CG2408004-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0488 mg/L	0.05 mg/L	97.6	70.0	130	----
Anions and Nutrients (QCLot: 1492980)										
CG2408004-005	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.534 mg/L	0.5 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 1492981)										
CG2408004-005	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.64 mg/L	2.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1494825)										
CG2407977-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	----	----		70.0	130	----
Anions and Nutrients (QCLot: 1499987)										
CG2407999-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----



# 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 255, 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

SEND REPORT TO:

## CHAIN OF CUSTODY FORM

PAGE 1 OF 1

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN: PATRICK MAJER		ANALYSIS REQUESTED:													
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST				<div style="text-align: center;"> <p>Environmental Division Calgary Work Order Reference <b>CG2407990</b></p> <p>Telephone : +1 403 407 1800</p> </div>													
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2														
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Claudia Heinrich														
PROJECT NAME AND NO.:		FARUC June monthly - WWTP samples		QUOTE NO:															
PO NO.:		ALS CONTACT: Patryk Wojcik		Email: pmajer@skircr.com															
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS																	
		<input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:																	
WO#	SAMPLE IDENTIFICATION		DATE / TIME COLLECTED		MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD				
			YYYY-MM-DD	TIME															
FOR LAB USE ONLY		WWTP Influent Routine	2024-06-12	9:45	Water		X	X											
		WWTP Influent BOD	2024-06-12	9:45	Water										X				
		WWTP Effluent Routine	2024-06-12	9:55	Water		X	X											
		WWTP Effluent BOD	2024-06-12	9:55	Water										X				
		WWTP Effluent Nutrients	2024-06-12	9:55	Water				X	X	X	X	X						
		WWTP Effluent Bacteriological	2024-06-12	9:55	Water	X													
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH   SPECIFY DATE: _____ (surcharge may apply)				RELINQUISHED BY:		DATE:		Jun 12 2024		RECEIVED BY:		DATE:		6/13/24			
						C Heinrich		TIME:		12:15				TIME:		9:06			
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)				RELINQUISHED BY:		DATE:				RECEIVED BY:		DATE:					
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX						TIME:						TIME:					
SPECIAL INSTRUCTIONS:		PLEASE SEND A COPY OF THE RESULTS TO: wastewater@skifernie.com				FOR LAB USE ONLY													
						Cooler Seal Intact?		Sample Temperature: 4.1 °C		Cooling Method?									
						Yes ___ No ___ N/A		Frozen? ___ Yes ___ No		Icepacks ___ Ice ___ None									



CERTIFICATE OF ANALYSIS

Work Order	: CG2410000	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC July monthly - WWTP samples	Date Samples Received	: 18-Jul-2024 09:00
PO	: ----	Date Analysis Commenced	: 18-Jul-2024
C-O-C number	: ----	Issue Date	: 24-Jul-2024 08:23
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

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





Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
					Client sampling date / time	17-Jul-2024 09:45	17-Jul-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2410000-001	CG2410000-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.27	7.95	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	243 <sup>DLHC</sup>	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0164	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	31.9	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0095	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.296	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.277	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	31.9	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	191	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2410000</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC July monthly - WWTP samples	Date Samples Received	: 18-Jul-2024 09:00
PO	: ----	Issue Date	: 24-Jul-2024 08:23
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	17-Jul-2024	----	----	----		18-Jul-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	17-Jul-2024	----	----	----		18-Jul-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	17-Jul-2024	20-Jul-2024	28 days	3 days	✓	20-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	17-Jul-2024	18-Jul-2024	3 days	1 days	✓	18-Jul-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	17-Jul-2024	18-Jul-2024	3 days	1 days	✓	18-Jul-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	17-Jul-2024	18-Jul-2024	3 days	1 days	✓	18-Jul-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	17-Jul-2024	21-Jul-2024	28 days	4 days	✓	23-Jul-2024	28 days	6 days	✓



Page : 4 of 7  
 Work Order : CG2410000  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC July monthly - WWTP samples



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	17-Jul-2024	----	----	----		18-Jul-2024	30 hrs	27 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	17-Jul-2024	19-Jul-2024	0.25 hrs	56 hrs	✖ EHTR-FM	20-Jul-2024	0.25 hrs	71 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	17-Jul-2024	19-Jul-2024	0.25 hrs	56 hrs	✖ EHTR-FM	20-Jul-2024	0.25 hrs	72 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	17-Jul-2024	----	----	----		20-Jul-2024	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	17-Jul-2024	----	----	----		20-Jul-2024	7 days	3 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1556316	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1552614	2	35	5.7	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1552008	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1552043	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1552044	1	18	5.5	5.0	✓
pH by Meter	E108	1555259	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1554979	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1556619	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1552577	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1556316	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1552614	2	35	5.7	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1552008	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1552043	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1552044	1	18	5.5	5.0	✓
pH by Meter	E108	1555259	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1556619	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1552577	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1556316	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1552614	2	35	5.7	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1552008	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1552043	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1552044	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1554979	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1556619	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1552577	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1556316	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1552008	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1552043	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1552044	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1556619	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



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 Work Order : CG2410000  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC July monthly - WWTP samples



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2410000</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC July monthly - WWTP samples	Date Samples Received	: 18-Jul-2024 09:00
PO	: ----	Date Analysis Commenced	: 18-Jul-2024
C-O-C number	: ----	Issue Date	: 24-Jul-2024 08:23
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2410000  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC July monthly - WWTP samples



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1552577)											
CG2409944-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1555259)											
CG2410000-001	WWTP Influent	pH	----	E108	0.10	pH units	8.27	8.29	0.242%	4%	----
Anions and Nutrients (QC Lot: 1552008)											
CG2409988-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1552043)											
CG2409980-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1552044)											
CG2409980-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1556316)											
CG2409989-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.0072	0.0022	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1556619)											
CG2409989-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0105	0.0103	0.0002	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1554979)											
CG2410000-002	WWTP Effluent	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	1	<1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1552613)											
CG2409984-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 1552614)											
CG2410008-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1552577)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1552008)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1552043)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1552044)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1556316)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1556619)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1554979)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1552613)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 1552614)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1552577)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	93.2	85.0	115	----
Physical Tests (QCLot: 1555259)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Anions and Nutrients (QCLot: 1552008)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	106	80.0	120	----
Anions and Nutrients (QCLot: 1552043)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.5	90.0	110	----
Anions and Nutrients (QCLot: 1552044)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 1556316)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.6	85.0	115	----
Anions and Nutrients (QCLot: 1556619)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.8	80.0	120	----
Aggregate Organics (QCLot: 1552613)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	93.8	85.0	115	----
Aggregate Organics (QCLot: 1552614)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	98.0	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Laboratory sample ID					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Client sample ID	Analyte	CAS Number	Method							
Anions and Nutrients (QCLot: 1552008)										
CG2409989-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0505 mg/L	0.05 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 1552043)										
CG2409980-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1552044)										
CG2409980-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.512 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1556316)										
CG2409989-003	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.108 mg/L	0.1 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 1556619)										
CG2409989-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0481 mg/L	0.05 mg/L	96.1	70.0	130	----





**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, 981 - 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: 780-791-1588  
**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: 403-291-0288  
**Saskatoon SK**, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

Environmental Division  
Calgary  
Work Order Reference  
**CG2410000**



Telephone : +1 403 407 1800

**SEND REPORT TO:**

## CHAIN OF CUSTODY FORM

[illegible]



CERTIFICATE OF ANALYSIS

Work Order	: CG2412282	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 1 - WWTP SAMPLES	Date Samples Received	: 29-Aug-2024 09:00
PO	: ----	Date Analysis Commenced	: 29-Aug-2024
C-O-C number	: ----	Issue Date	: 03-Sep-2024 14:31
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)										
					Client sampling date / time	28-Aug-2024 09:45	28-Aug-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2412282-001	CG2412282-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.05	7.95	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	191	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0286	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	34.1	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0153	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.672	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.750	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	34.1	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	<1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	120	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2412282</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 1 - WWTP SAMPLES	Date Samples Received	: 29-Aug-2024 09:00
PO	: ----	Issue Date	: 03-Sep-2024 14:31
C-O-C number	: ----		
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	28-Aug-2024	----	----	----		29-Aug-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	28-Aug-2024	----	----	----		29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	28-Aug-2024	29-Aug-2024	28 days	1 days	✓	29-Aug-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	30-Aug-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	30-Aug-2024	3 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	28-Aug-2024	30-Aug-2024	28 days	2 days	✓	30-Aug-2024	28 days	2 days	✓



Page : 4 of 7  
 Work Order : CG2412282  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 1 - WWTP SAMPLES



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	28-Aug-2024	----	----	----		29-Aug-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	28-Aug-2024	29-Aug-2024	0.25 hrs	25 hrs	✖ EHTR-FM	29-Aug-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	28-Aug-2024	29-Aug-2024	0.25 hrs	25 hrs	✖ EHTR-FM	29-Aug-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	28-Aug-2024	----	----	----		30-Aug-2024	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	28-Aug-2024	----	----	----		30-Aug-2024	7 days	2 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1624938	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1624708	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1623798	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1623748	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1623747	1	18	5.5	5.0	✓
pH by Meter	E108	1623606	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1626627	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626014	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1624929	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1624938	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1624708	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1623798	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1623748	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1623747	1	18	5.5	5.0	✓
pH by Meter	E108	1623606	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626014	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1624929	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1624938	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1624708	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1623798	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1623748	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1623747	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1626627	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626014	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1624929	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1624938	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1623798	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1623748	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1623747	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626014	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



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 Work Order : CG2412282  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 1 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2412282</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 1 - WWTP SAMPLES	Date Samples Received	: 29-Aug-2024 09:00
PO	: ----	Date Analysis Commenced	: 29-Aug-2024
C-O-C number	: ----	Issue Date	: 03-Sep-2024 14:30
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1623606)											
CG2412272-001	Anonymous	pH	----	E108	0.10	pH units	8.01	8.00	0.125%	4%	----
Physical Tests (QC Lot: 1624929)											
CG2412275-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.8	mg/L	431	517	18.1%	20%	----
Anions and Nutrients (QC Lot: 1623747)											
CG2412302-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1623748)											
CG2412302-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1623798)											
CG2412281-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1624938)											
CG2412281-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0058	<0.0050	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1626014)											
CG2412262-004	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0151	0.0158	0.0006	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1626627)											
CG2412281-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	227	218	4.04%	65%	----
Aggregate Organics (QC Lot: 1624708)											
CG2412250-002	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1624929)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1623747)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1623748)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1623798)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1624938)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1626014)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1626627)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1624708)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1623606)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1624929)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	97.9	85.0	115	----
Anions and Nutrients (QCLot: 1623747)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1623748)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1623798)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.9	80.0	120	----
Anions and Nutrients (QCLot: 1624938)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 1626014)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	101	80.0	120	----
Aggregate Organics (QCLot: 1624708)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	97.6	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1623747)										
CG2412304-015	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.504 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1623748)										
CG2412304-015	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.48 mg/L	2.5 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 1623798)										
CG2412281-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1624938)										
CG2412281-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0958 mg/L	0.1 mg/L	95.8	75.0	125	----
Anions and Nutrients (QCLot: 1626014)										
CG2412262-005	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0504 mg/L	0.05 mg/L	101	70.0	130	----





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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: 403-291-9997 Toll Free: 1-800-668-9878 Fax: 403-291-0298  
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-687-7645 Fax: 306-668-8383

## CHAIN OF CUSTODY FORM

PAGE 1 OF

**SEND REPORT TO:**

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION				ATTN:		PATRICK MAJER		ANALYSIS REQUESTED:																	
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST																									
CITY:		CALGARY		PROV:		ALBERTA		POSTAL CODE:																T2T 0E2			
TEL:		403 - 256 - 8473		FAX:		403 - 244 - 3774		SAMPLER:																Nicholas Corman			
PROJECT NAME AND NO.:				FARUC Fall EMS Wk 1 - WWTP samples				QUOTE NO.:																			
PO NO.:				ALS CONTACT:		Patrik Wojciak																		pmajer@skircr.com			
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS																									
		<input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:																									
WO#		SAMPLE IDENTIFICATION			DATE / TIME COLLECTED		MATRIX																				
					YYYY-MM-DD TIME																						
FOR LAB USE ONLY		WWTP Influent Routine			2024-08-28 9:45		Water																				
		WWTP Influent BOD			2024-08-28 9:45		Water																				
		WWTP Effluent Routine			2024-08-28 9:55		Water																				
		WWTP Effluent BOD			2024-08-28 9:55		Water																				
		WWTP Effluent Nutrients			2024-08-28 9:55		Water																				
		WWTP Effluent Bacteriological			2024-08-28 9:55		Water																				
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH SPECIFY DATE: (surcharge may apply)								RELINQUISHED BY:		DATE:		Aug 28/24		RECEIVED BY:		DATE:									
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details) <input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX								N Corman		TIME:		12:15		FE		TIME:									
INVOICE FORMAT:												DATE:				RECEIVED BY:		DATE:									
SPECIAL INSTRUCTIONS:		PLEASE SEND A COPY OF THE RESULTS TO: wastewater@skifernie.com								FOR LAB USE ONLY		Cooler Seal Intact?		Sample Temperature: 8.8 °C		Cooling Method?											
										Yes No N/A		Frozen? Yes No		Icepacks Ice None													



CERTIFICATE OF ANALYSIS

Work Order	: CG2412281	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 1 - RIVER SAMPLES	Date Samples Received	: 29-Aug-2024 09:00
PO	: ----	Date Analysis Commenced	: 29-Aug-2024
C-O-C number	: ----	Issue Date	: 03-Sep-2024 12:12
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Eunice Cura	Lab Analyst	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	Elk River Upstream	Elk River @ IDZ	Elk River Downstream	----	----
(Matrix: Water)										
Client sampling date / time					28-Aug-2024 10:15	28-Aug-2024 10:30	28-Aug-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2412281-001	CG2412281-002	CG2412281-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.42	8.01	8.37	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	6.3	<3.0	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0058	0.0168	<0.0050	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.36	4.78	1.37	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0019	0.0046	0.0019	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.109	0.0012	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0028	0.127	0.0070	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.36	4.78	1.37	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	227	56	241	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2412281</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 1 - RIVER SAMPLES	Date Samples Received	: 29-Aug-2024 09:00
PO	: ----	Issue Date	: 03-Sep-2024 12:35
C-O-C number	: ----		
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River @ IDZ	E298	28-Aug-2024	29-Aug-2024	28 days	1 days	✓	29-Aug-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Downstream	E298	28-Aug-2024	29-Aug-2024	28 days	1 days	✓	29-Aug-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Upstream	E298	28-Aug-2024	29-Aug-2024	28 days	1 days	✓	29-Aug-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River @ IDZ	E378-U	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Downstream	E378-U	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Upstream	E378-U	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO3-L	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO3-L	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO3-L	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO2-L	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO2-L	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO2-L	28-Aug-2024	29-Aug-2024	3 days	1 days	✓	29-Aug-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River @ IDZ	E372-U	28-Aug-2024	30-Aug-2024	28 days	2 days	✓	30-Aug-2024	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Downstream	E372-U	28-Aug-2024	30-Aug-2024	28 days	2 days	✓	30-Aug-2024	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Upstream	E372-U	28-Aug-2024	30-Aug-2024	28 days	2 days	✓	30-Aug-2024	28 days	2 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River @ IDZ	E012.FC	28-Aug-2024	----	----	----		29-Aug-2024	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Downstream	E012.FC	28-Aug-2024	----	----	----		29-Aug-2024	30 hrs	24 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Upstream	E012.FC	28-Aug-2024	----	----	----		29-Aug-2024	30 hrs	24 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River Downstream	E108	28-Aug-2024	29-Aug-2024	0.25 hrs	24 hrs	✖ EHTR-FM	29-Aug-2024	0.25 hrs	24 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River @ IDZ	E108	28-Aug-2024	29-Aug-2024	0.25 hrs	25 hrs	✖ EHTR-FM	29-Aug-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Upstream	E108	28-Aug-2024	29-Aug-2024	0.25 hrs	25 hrs	✖ EHTR-FM	29-Aug-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River @ IDZ	E160	28-Aug-2024	----	----	----		30-Aug-2024	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Downstream	E160	28-Aug-2024	----	----	----		30-Aug-2024	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Upstream	E160	28-Aug-2024	----	----	----		30-Aug-2024	7 days	2 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1624938	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1623798	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1623748	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1623747	1	18	5.5	5.0	✓
pH by Meter	E108	1623606	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1626627	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626014	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1624929	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1624938	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1623798	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1623748	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1623747	1	18	5.5	5.0	✓
pH by Meter	E108	1623606	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626014	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1624929	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1624938	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1623798	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1623748	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1623747	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1626627	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626014	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1624929	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1624938	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1623798	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1623748	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1623747	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626014	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2412281  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 1 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2412281</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 1 - RIVER SAMPLES	Date Samples Received	: 29-Aug-2024 09:00
PO	: ----	Date Analysis Commenced	: 29-Aug-2024
C-O-C number	: ----	Issue Date	: 03-Sep-2024 12:14
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Eunice Cura	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1623606)											
CG2412272-001	Anonymous	pH	----	E108	0.10	pH units	8.01	8.00	0.125%	4%	----
Physical Tests (QC Lot: 1624929)											
CG2412275-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.8	mg/L	431	517	18.1%	20%	----
Anions and Nutrients (QC Lot: 1623747)											
CG2412302-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1623748)											
CG2412302-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1623798)											
CG2412281-001	Elk River Upstream	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1624938)											
CG2412281-001	Elk River Upstream	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0058	<0.0050	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1626014)											
CG2412262-004	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0151	0.0158	0.0006	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1626627)											
CG2412281-001	Elk River Upstream	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	227	218	4.04%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1624929)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1623747)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1623748)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1623798)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1624938)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1626014)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1626627)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1623606)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1624929)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	97.9	85.0	115	----
Anions and Nutrients (QCLot: 1623747)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1623748)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1623798)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.9	80.0	120	----
Anions and Nutrients (QCLot: 1624938)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 1626014)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	101	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1623747)										
CG2412304-015	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.504 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1623748)										
CG2412304-015	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.48 mg/L	2.5 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 1623798)										
CG2412281-002	Elk River @ IDZ	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1624938)										
CG2412281-002	Elk River @ IDZ	Ammonia, total (as N)	7664-41-7	E298	0.0958 mg/L	0.1 mg/L	95.8	75.0	125	----
Anions and Nutrients (QCLot: 1626014)										
CG2412262-005	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0504 mg/L	0.05 mg/L	101	70.0	130	----



# ALS Environmental

ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com



Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700  
 Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587  
 Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191  
 Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1586  
 Edmonton AB, 8936 - 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 1 OF 1

SEND REPORT TO:

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER		ANALYSIS REQUESTED:														
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST																			
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2																
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Nicholas Corman																
PROJECT NAME AND NO.:		FARUC Fall EMS Wk 1 - river samples		QUOTE NO.:																	
PO NO.:		ALS CONTACT:	Ptryk Wojciak																		
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: <u>pmajer@skircr.com</u> <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> OTHER:																			
WO#	SAMPLE IDENTIFICATION			DATE / TIME COLLECTED		MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD	NOTES (sample specific comments, due dates, etc.)				
				YYYY-MM-DD	TIME																
FOR LAB USE ONLY		Elk River Upstream Routine		2024/08/28	10:15	Water		X	X												
		Elk River Upstream Nutrients		2024/08/28	10:15	Water				X	X	X	X	X							
		Elk River Upstream Bacteriological		2024/08/28	10:15	Water	X														
		Elk River @ IDZ Routine		2024/08/28	10:30	Water		X	X												
		Elk River @ IDZ Nutrients		2024/08/28	10:30	Water				X	X	X	X	X							
		Elk River @ IDZ Bacteriological		2024/08/28	10:30	Water	X														
		Elk River Downstream Routine		2024/08/28	10:45	Water		X	X												
		Elk River Downstream Nutrients		2024/08/28	10:45	Water				X	X	X	X	X							
		Elk River Downstream Bacteriological		2024/08/28	10:45	Water	X														
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH   SPECIFY DATE: _____ (surcharge may apply)						RELINQUISHED BY:		DATE:	Aug 28/24	RECEIVED BY:	DATE:	8/27							
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)						Nicholas Corman		TIME:	12:15	PE	TIME:	9:00							
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX								DATE:		RECEIVED BY:	DATE:								
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: 8.9 °C	Cooling Method?									
										Yes   No   N/A	Frozen? Yes   No	Icepacks   Ice   None									

Environmental Division  
 Calgary  
 Work Order Reference  
**CG2412281**



Telephone : +1 403 407 1800



CERTIFICATE OF ANALYSIS

Work Order	: CG2412616	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 2 - WWTP SAMPLES	Date Samples Received	: 05-Sep-2024 09:05
PO	: ----	Date Analysis Commenced	: 05-Sep-2024
C-O-C number	: ----	Issue Date	: 11-Sep-2024 12:23
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Eunice Cura	Lab Analyst	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)										
					Client sampling date / time	05-Sep-2024 09:45	05-Sep-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2412616-001	CG2412616-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.16	7.94	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	88.4	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0273	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	26.7	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0193	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.372	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.534	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	26.7	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	<1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	90.9	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2412616</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 2 - WWTP SAMPLES	Date Samples Received	: 05-Sep-2024 09:05
PO	: ----	Issue Date	: 11-Sep-2024 12:23
C-O-C number	: ----		
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	05-Sep-2024	----	----	----		05-Sep-2024	3 days	0 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	05-Sep-2024	----	----	----		05-Sep-2024	3 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	05-Sep-2024	05-Sep-2024	28 days	0 days	✓	05-Sep-2024	28 days	0 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	05-Sep-2024	05-Sep-2024	3 days	0 days	✓	05-Sep-2024	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	05-Sep-2024	05-Sep-2024	3 days	0 days	✓	05-Sep-2024	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	05-Sep-2024	05-Sep-2024	3 days	0 days	✓	05-Sep-2024	3 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	05-Sep-2024	08-Sep-2024	28 days	3 days	✓	11-Sep-2024	28 days	6 days	✓



Page : 4 of 7  
 Work Order : CG2412616  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 2 - WWTP SAMPLES



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	05-Sep-2024	----	----	----		05-Sep-2024	30 hrs	2 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	05-Sep-2024	05-Sep-2024	0.25 hrs	2 hrs	✖ EHTL	05-Sep-2024	0.25 hrs	2 hrs	✖ EHTL
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	05-Sep-2024	05-Sep-2024	0.25 hrs	2 hrs	✖ EHTL	05-Sep-2024	0.25 hrs	2 hrs	✖ EHTL
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	05-Sep-2024	----	----	----		10-Sep-2024	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	05-Sep-2024	----	----	----		10-Sep-2024	7 days	5 days	✓

**Legend & Qualifier Definitions**

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1635702	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1635744	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1635061	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1635536	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1635535	1	20	5.0	5.0	✓
pH by Meter	E108	1634904	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1637533	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1639249	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1637955	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1635702	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1635744	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1635061	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1635536	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1635535	1	20	5.0	5.0	✓
pH by Meter	E108	1634904	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1639249	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1637955	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1635702	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1635744	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1635061	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1635536	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1635535	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1637533	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1639249	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1637955	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1635702	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1635061	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1635536	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1635535	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1639249	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2412616  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 2 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2412616</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 2 - WWTP SAMPLES	Date Samples Received	: 05-Sep-2024 09:05
PO	: ----	Date Analysis Commenced	: 05-Sep-2024
C-O-C number	: ----	Issue Date	: 11-Sep-2024 12:25
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Eunice Cura	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2412616  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 2 - WWTP SAMPLES



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1634904)											
CG2412585-001	Anonymous	pH	----	E108	0.10	pH units	8.44	8.41	0.356%	4%	----
Physical Tests (QC Lot: 1637955)											
CG2412616-001	WWTP Influent	Solids, total suspended [TSS]	----	E160	3.0	mg/L	88.4	85.2	3.69%	20%	----
Anions and Nutrients (QC Lot: 1635061)											
CG2412586-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0035	0.0036	0.00008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1635535)											
CG2412640-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1635536)											
CG2412640-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0290	0.0279	0.0011	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1635702)											
CG2412594-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0522	0.0522	0.00%	20%	----
Anions and Nutrients (QC Lot: 1639249)											
CG2412609-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0861	0.0859	0.209%	20%	----
Microbiological Tests (QC Lot: 1637533)											
CG2412595-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	5	CFU/100mL	190	180	5.40%	65%	----
Aggregate Organics (QC Lot: 1635744)											
CG2412585-004	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1637955)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1635061)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1635535)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1635536)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1635702)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1639249)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1637533)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1635744)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1634904)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1637955)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	107	85.0	115	----
Anions and Nutrients (QCLot: 1635061)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	105	80.0	120	----
Anions and Nutrients (QCLot: 1635535)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 1635536)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1635702)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.4	85.0	115	----
Anions and Nutrients (QCLot: 1639249)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	101	80.0	120	----
Aggregate Organics (QCLot: 1635744)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	102	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1635061)										
CG2412586-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0508 mg/L	0.05 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 1635535)										
CG2412640-012	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.495 mg/L	0.5 mg/L	98.9	75.0	125	----
Anions and Nutrients (QCLot: 1635536)										
CG2412640-012	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.47 mg/L	2.5 mg/L	98.9	75.0	125	----
Anions and Nutrients (QCLot: 1635702)										
CG2412595-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1639249)										
CG2412609-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----





SEND REPORT TO:

CHAIN OF CUSTODY FORM

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER	ANALYSIS REQUESTED:												<p>Telephone : +1 403 407 1800</p>	NOTES (sample specific comments, due dates, etc.)
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST				Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD				
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2														
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Nicholas Corman														
PROJECT NAME AND NO.:		FARUC Fall EMS Wk 2 - WWTP samples		QUOTE NO.:															
PO NO.:		ALS CONTACT:		Patrik Wojciak															
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: <u>pmajer@skircr.com</u> <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:																	
WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED		MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					
		YYYY-MM-DD	TIME																
FOR LAB USE ONLY	WWTP Influent Routine	2024-09-04	9:45	Water		X	X												
	WWTP Influent BOD	2024-09-04	9:45	Water									X						
	WWTP Effluent Routine	2024-09-04	9:55	Water		X	X												
	WWTP Effluent BOD	2024-09-04	9:55	Water									X						
	WWTP Effluent Nutrients	2024-09-04	9:55	Water				X	X	X	X	X							
	WWTP Effluent Bacteriological	2024-09-04	9:55	Water	X														
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH   SPECIFY DATE: _____ (surcharge may apply)				RELINQUISHED BY:		DATE:		Sep 04/24		RECEIVED BY:		DATE:		05/09/24			
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)				N Corman		TIME:		12:15				TIME:					
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX						DATE:				RECEIVED BY:		DATE:					
SPECIAL INSTRUCTIONS:		PLEASE SEND A COPY OF THE RESULTS TO: <u>wastewater@skifernie.com</u>				FOR LAB USE ONLY													
						Cooler Seal Intact?		Sample Temperature: _____ °C		Cooling Method?									
						Yes ___ No ___ N/A		Frozen? Yes ___ No ___		Icepacks ___ Ice ___ None									



CERTIFICATE OF ANALYSIS

**Work Order** : **CG2412617**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary AB Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC SPRING EMS WK 2 - RIVER SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NICHOLAS CORMAN  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Page** : 1 of 3  
**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 05-Sep-2024 09:05  
**Date Analysis Commenced** : 05-Sep-2024  
**Issue Date** : 11-Sep-2024 12:23

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Eunice Cura	Lab Analyst	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	Elk River Upstream	Elk River @ IDZ	Elk River Downstream	----	----
(Matrix: Water)										
Client sampling date / time					04-Sep-2024 10:15	04-Sep-2024 10:30	04-Sep-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2412617-001	CG2412617-002	CG2412617-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.42	8.38	8.47	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0120	0.0439	0.0282	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.47	0.158	1.46	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0021	<0.0010	0.0023	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0101	<0.0010	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0047	0.0178	0.0044	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.47	0.158	1.46	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	114	14	98	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2412617</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 2 - RIVER SAMPLES	Date Samples Received	: 05-Sep-2024 09:05
PO	: ----	Issue Date	: 11-Sep-2024 12:26
C-O-C number	: ----		
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River @ IDZ	E298	04-Sep-2024	05-Sep-2024	28 days	1 days	✓	05-Sep-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Downstream	E298	04-Sep-2024	05-Sep-2024	28 days	1 days	✓	05-Sep-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Upstream	E298	04-Sep-2024	05-Sep-2024	28 days	1 days	✓	05-Sep-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River @ IDZ	E378-U	04-Sep-2024	05-Sep-2024	3 days	1 days	✓	05-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Downstream	E378-U	04-Sep-2024	05-Sep-2024	3 days	1 days	✓	05-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Upstream	E378-U	04-Sep-2024	05-Sep-2024	3 days	1 days	✓	05-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO3-L	04-Sep-2024	05-Sep-2024	3 days	1 days	✓	05-Sep-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO3-L	04-Sep-2024	05-Sep-2024	3 days	1 days	✓	05-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO3-L	04-Sep-2024	05-Sep-2024	3 days	1 days	✓	05-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO2-L	04-Sep-2024	05-Sep-2024	3 days	1 days	✓	05-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO2-L	04-Sep-2024	05-Sep-2024	3 days	1 days	✓	05-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO2-L	04-Sep-2024	05-Sep-2024	3 days	1 days	✓	05-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River @ IDZ	E372-U	04-Sep-2024	08-Sep-2024	28 days	4 days	✓	11-Sep-2024	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Downstream	E372-U	04-Sep-2024	08-Sep-2024	28 days	4 days	✓	11-Sep-2024	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Upstream	E372-U	04-Sep-2024	08-Sep-2024	28 days	4 days	✓	11-Sep-2024	28 days	7 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Downstream	E012.FC	04-Sep-2024	----	----	----		05-Sep-2024	30 hrs	25 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River @ IDZ	E012.FC	04-Sep-2024	----	----	----		05-Sep-2024	30 hrs	26 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Upstream	E012.FC	04-Sep-2024	----	----	----		05-Sep-2024	30 hrs	26 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River Downstream	E108	04-Sep-2024	06-Sep-2024	0.25 hrs	48 hrs	✖ EHTR-FM	06-Sep-2024	0.25 hrs	48 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River @ IDZ	E108	04-Sep-2024	06-Sep-2024	0.25 hrs	49 hrs	✖ EHTR-FM	06-Sep-2024	0.25 hrs	49 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Upstream	E108	04-Sep-2024	06-Sep-2024	0.25 hrs	49 hrs	✖ EHTR-FM	06-Sep-2024	0.25 hrs	49 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River @ IDZ	E160	04-Sep-2024	----	----	----		10-Sep-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Downstream	E160	04-Sep-2024	----	----	----		10-Sep-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Upstream	E160	04-Sep-2024	----	----	----		10-Sep-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1635702	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1635062	1	3	33.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1635333	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1635334	1	17	5.8	5.0	✓
pH by Meter	E108	1636929	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1637533	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1639249	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1637955	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1635702	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1635062	1	3	33.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1635333	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1635334	1	17	5.8	5.0	✓
pH by Meter	E108	1636929	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1639249	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1637955	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1635702	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1635062	1	3	33.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1635333	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1635334	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1637533	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1639249	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1637955	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1635702	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1635062	1	3	33.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1635333	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1635334	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1639249	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2412617  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 2 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2412617</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC SPRING EMS WK 2 - RIVER SAMPLES	Date Samples Received	: 05-Sep-2024 09:05
PO	: ----	Date Analysis Commenced	: 05-Sep-2024
C-O-C number	: ----	Issue Date	: 11-Sep-2024 12:23
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Eunice Cura	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2412617  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC SPRING EMS WK 2 - RIVER SAMPLES



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1636929)											
CG2412609-001	Anonymous	pH	----	E108	0.10	pH units	7.84	7.86	0.255%	4%	----
Physical Tests (QC Lot: 1637955)											
CG2412616-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	88.4	85.2	3.69%	20%	----
Anions and Nutrients (QC Lot: 1635062)											
CG2412617-001	Elk River Upstream	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1635333)											
CG2412623-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	29.0	29.1	0.244%	20%	----
Anions and Nutrients (QC Lot: 1635334)											
CG2412623-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1635702)											
CG2412594-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0522	0.0522	0.00%	20%	----
Anions and Nutrients (QC Lot: 1639249)											
CG2412609-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0861	0.0859	0.209%	20%	----
Microbiological Tests (QC Lot: 1637533)											
CG2412595-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	5	CFU/100mL	190	180	5.40%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1637955)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1635062)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1635333)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1635334)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1635702)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1639249)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1637533)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1636929)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1637955)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	107	85.0	115	----
Anions and Nutrients (QCLot: 1635062)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	105	80.0	120	----
Anions and Nutrients (QCLot: 1635333)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.9	90.0	110	----
Anions and Nutrients (QCLot: 1635334)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1635702)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.4	85.0	115	----
Anions and Nutrients (QCLot: 1639249)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	101	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1635062)										
CG2412617-002	Elk River @ IDZ	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0518 mg/L	0.05 mg/L	104	70.0	130	----
Anions and Nutrients (QCLot: 1635333)										
CG2412623-007	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.44 mg/L	2.5 mg/L	97.7	75.0	125	----
Anions and Nutrients (QCLot: 1635334)										
CG2412623-007	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.490 mg/L	0.5 mg/L	98.0	75.0	125	----
Anions and Nutrients (QCLot: 1635702)										
CG2412595-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1639249)										
CG2412609-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----





**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  
**Edmonton AB**, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free:  
**Calgary AB**, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897  
**Saskatoon SK**, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free:  
**Regina SK**, 1000 - 10th Avenue, S4S 0A6, Tel: 306-773-2222 Toll Free: 1-800-668-8370

**Environmental Division**  
**Calgary**  
 Work Order Reference

**Environmental Division  
Calgary**

Work Order Reference  
**CG2412617**

PAGE 1 OF

**SEND REPORT TO:**

## CHAIN OF CUSTODY FORM

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: Nicholas Corman	
PROJECT NAME AND NO.:			FARUC Fall EMS Wk 2 - river samples				QUOTE NO:		
PO NO.:				ALS CONTACT:		Ptryk Wojciak			
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> OTHER:							



Telephone : + 1 403 407 1800

[illegible]



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>CG2413165</b>		
<b>Client</b>	: <b>Fernie Alpine Resort Utilities Corporation</b>	<b>Laboratory</b>	: ALS Environmental - Calgary
<b>Contact</b>	: Patrick Majer	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1505 - 17TH AVENUE SW Calgary Alberta Canada T2T 0E2	<b>Address</b>	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
<b>Telephone</b>	: 403 254 7669	<b>Telephone</b>	: +1 403 407 1800
<b>Project</b>	: FARUC FALL EMS WK 3 - WWTP SAMPLES	<b>Date Samples Received</b>	: 13-Sep-2024 09:45
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 13-Sep-2024
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 19-Sep-2024 16:02
<b>Sampler</b>	: MH		
<b>Site</b>	: ----		
<b>Quote number</b>	: CG21-FARU100-0002		
<b>No. of samples received</b>	: 2		
<b>No. of samples analysed</b>	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
mg/L	milligrams per litre
pH units	pH units
CFU/100mL	colony forming units per hundred millilitres

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Work Order : CG2413165  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 3 - WWTP SAMPLES

---







## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
Client sampling date / time						12-Sep-2024 09:45	12-Sep-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	CG2413165-001	CG2413165-002	----	----	----	----
					Result	Result	----	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.03	7.94	----	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	104	<3.0	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0323	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	----	32.3	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	----	0.0185	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.305	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.330	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	32.3	----	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	----	<1	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	82.2	<2.0	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2413165</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 3 - WWTP SAMPLES	Date Samples Received	: 13-Sep-2024 09:45
PO	: ----	Issue Date	: 19-Sep-2024 16:02
C-O-C number	: ----		
Sampler	: MH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Holding and Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	12-Sep-2024	----	----	----		13-Sep-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	12-Sep-2024	----	----	----		13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	12-Sep-2024	17-Sep-2024	28 days	5 days	✓	17-Sep-2024	28 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	12-Sep-2024	18-Sep-2024	28 days	6 days	✓	19-Sep-2024	28 days	7 days	✓



Page : 4 of 7  
 Work Order : CG2413165  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 3 - WWTP SAMPLES



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	12-Sep-2024	----	----	----		13-Sep-2024	30 hrs	26 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	12-Sep-2024	13-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM	13-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	12-Sep-2024	13-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM	13-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	12-Sep-2024	----	----	----		18-Sep-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	12-Sep-2024	----	----	----		18-Sep-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1656664	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1650963	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1650046	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1650015	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1650016	1	20	5.0	5.0	✓
pH by Meter	E108	1650050	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1651573	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1656316	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1657644	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1656664	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1650963	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1650046	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1650015	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1650016	1	20	5.0	5.0	✓
pH by Meter	E108	1650050	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1656316	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1657644	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1656664	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1650963	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1650046	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1650015	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1650016	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1651573	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1656316	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1657644	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1656664	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1650046	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1650015	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1650016	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1656316	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2413165  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 3 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2413165</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 3 - WWTP SAMPLES	Date Samples Received	: 13-Sep-2024 09:45
PO	: ----	Date Analysis Commenced	: 13-Sep-2024
C-O-C number	: ----	Issue Date	: 19-Sep-2024 16:02
Sampler	: MH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1650050)											
CG2413147-001	Anonymous	pH	----	E108	0.10	pH units	8.06	8.03	0.373%	4%	----
Physical Tests (QC Lot: 1657644)											
CG2413148-005	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	6.7	9.5	2.8	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1650015)											
CG2413131-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	5.94	5.95	0.168%	20%	----
Anions and Nutrients (QC Lot: 1650016)											
CG2413131-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0058	0.0060	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1650046)											
CG2413165-002	WWTP Effluent	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0050	mg/L	0.305	0.303	0.401%	20%	----
Anions and Nutrients (QC Lot: 1656316)											
CG2413153-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0085	0.0085	0.00002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1656664)											
CG2413151-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0212	0.0260	0.0048	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1651573)											
CG2413164-003	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	110	99	10.5%	65%	----
Aggregate Organics (QC Lot: 1650963)											
CG2413105-015	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1657644)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1650015)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1650016)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1650046)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1656316)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1656664)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1651573)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1650963)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1650050)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1657644)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	99.4	85.0	115	----
Anions and Nutrients (QCLot: 1650015)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 1650016)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 1650046)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1656316)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1656664)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.3	85.0	115	----
Aggregate Organics (QCLot: 1650963)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	95.1	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1650015)										
CG2413131-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1650016)										
CG2413131-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.494 mg/L	0.5 mg/L	98.8	75.0	125	----
Anions and Nutrients (QCLot: 1650046)										
CG2413168-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0526 mg/L	0.05 mg/L	105	70.0	130	----
Anions and Nutrients (QCLot: 1656316)										
CG2413154-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0491 mg/L	0.05 mg/L	98.1	70.0	130	----
Anions and Nutrients (QCLot: 1656664)										
CG2413151-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----





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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-F  
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 781  
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-6  
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9997 Toll Free: 1-800-6  
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-6

Environmental Division  
Calgary

Work Order Reference

Work Order Reference  
**CG2413165**

1 OF

## CHAIN OF CUSTODY FORM

[illegible]



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	<b>: CG2413164</b>		
<b>Client</b>	<b>: Fernie Alpine Resort Utilities Corporation</b>	<b>Laboratory</b>	<b>: ALS Environmental - Calgary</b>
<b>Contact</b>	<b>: Patrick Majer</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1505 - 17TH AVENUE SW</b>	<b>Address</b>	<b>: 2559 29th Street NE</b>
	<b>: Calgary Alberta Canada T2T 0E2</b>		<b>: Calgary AB Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 403 254 7669</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: FARUC FALL EMS WK 3 - RIVER SAMPLES</b>	<b>Date Samples Received</b>	<b>: 13-Sep-2024 09:45</b>
<b>PO</b>	<b>: ----</b>	<b>Date Analysis Commenced</b>	<b>: 13-Sep-2024</b>
<b>C-O-C number</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 19-Sep-2024 16:02</b>
<b>Sampler</b>	<b>: CH</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-FARU100-0002</b>		
<b>No. of samples received</b>	<b>: 3</b>		
<b>No. of samples analysed</b>	<b>: 3</b>		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
mg/L	milligrams per litre
pH units	pH units
CFU/100mL	colony forming units per hundred millilitres

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Work Order : CG2413164  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 3 - RIVER SAMPLES

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## Analytical Results

Sub-Matrix: Water  
 (Matrix: Water)

Client sample ID					Elk River Upstream	Elk River @ IDZ	Elk River Downstream	----	----
Client sampling date / time					12-Sep-2024 10:15	12-Sep-2024 10:30	12-Sep-2024 10:45	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	CG2413164-001	CG2413164-002	CG2413164-003	----	----
					Result	Result	Result	----	----
Physical Tests									
pH	----	E108/CG	0.10	pH units	8.45	7.98	8.43	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0155	0.0169	0.0381	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	1.44	2.80	1.45	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	0.0018	0.0020	0.0014	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0607	<0.0010	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0031	0.0643	0.0029	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.44	2.80	1.45	----	----
Microbiological Tests									
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	86	9	110	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2413164</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 3 - RIVER SAMPLES	Date Samples Received	: 13-Sep-2024 09:45
PO	: ----	Issue Date	: 19-Sep-2024 16:02
C-O-C number	: ----		
Sampler	: CH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River @ IDZ	E298	12-Sep-2024	17-Sep-2024	28 days	5 days	✓	17-Sep-2024	28 days	5 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Downstream	E298	12-Sep-2024	17-Sep-2024	28 days	5 days	✓	17-Sep-2024	28 days	5 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Upstream	E298	12-Sep-2024	17-Sep-2024	28 days	5 days	✓	17-Sep-2024	28 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River @ IDZ	E378-U	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Downstream	E378-U	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Upstream	E378-U	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO3-L	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO3-L	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO3-L	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO2-L	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO2-L	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO2-L	12-Sep-2024	13-Sep-2024	3 days	1 days	✓	13-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River @ IDZ	E372-U	12-Sep-2024	18-Sep-2024	28 days	6 days	✓	19-Sep-2024	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Downstream	E372-U	12-Sep-2024	18-Sep-2024	28 days	6 days	✓	19-Sep-2024	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Upstream	E372-U	12-Sep-2024	18-Sep-2024	28 days	6 days	✓	19-Sep-2024	28 days	7 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River @ IDZ	E012.FC	12-Sep-2024	----	----	----		13-Sep-2024	30 hrs	25 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Downstream	E012.FC	12-Sep-2024	----	----	----		13-Sep-2024	30 hrs	25 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Upstream	E012.FC	12-Sep-2024	----	----	----		13-Sep-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River @ IDZ	E108	12-Sep-2024	13-Sep-2024	0.25 hrs	25 hrs	✖ EHTR-FM	13-Sep-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Downstream	E108	12-Sep-2024	13-Sep-2024	0.25 hrs	25 hrs	✖ EHTR-FM	13-Sep-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Upstream	E108	12-Sep-2024	13-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM	13-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River @ IDZ	E160	12-Sep-2024	----	----	----		18-Sep-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Downstream	E160	12-Sep-2024	----	----	----		18-Sep-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Upstream	E160	12-Sep-2024	----	----	----		18-Sep-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1656664	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1650045	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1650015	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1650016	1	20	5.0	5.0	✓
pH by Meter	E108	1650050	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1651573	2	24	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1656316	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1657644	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1656664	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1650045	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1650015	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1650016	1	20	5.0	5.0	✓
pH by Meter	E108	1650050	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1656316	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1657644	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1656664	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1650045	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1650015	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1650016	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1651573	2	24	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1656316	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1657644	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1656664	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1650045	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1650015	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1650016	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1656316	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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Page : 8 of 8  
Work Order : CG2413164  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 3 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2413164</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 3 - RIVER SAMPLES	Date Samples Received	: 13-Sep-2024 09:45
PO	: ----	Date Analysis Commenced	: 13-Sep-2024
C-O-C number	: ----	Issue Date	: 19-Sep-2024 16:01
Sampler	: CH		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta





## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1650050)											
CG2413147-001	Anonymous	pH	----	E108	0.10	pH units	8.06	8.03	0.373%	4%	----
Physical Tests (QC Lot: 1657644)											
CG2413148-005	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	6.7	9.5	2.8	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1650015)											
CG2413131-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	5.94	5.95	0.168%	20%	----
Anions and Nutrients (QC Lot: 1650016)											
CG2413131-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0058	0.0060	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1650045)											
CG2413142-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0013	0.0013	0.00006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1656316)											
CG2413153-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0085	0.0085	0.00002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1656664)											
CG2413151-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0212	0.0260	0.0048	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1651572)											
CG2413138-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	2	CFU/100mL	72	68	5.71%	65%	----
Microbiological Tests (QC Lot: 1651573)											
CG2413164-003	Elk River Downstream	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	110	99	10.5%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1657644)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1650015)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1650016)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1650045)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1656316)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1656664)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1651572)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Microbiological Tests (QCLot: 1651573)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1650050)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1657644)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	99.4	85.0	115	----
Anions and Nutrients (QCLot: 1650015)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 1650016)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 1650045)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1656316)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	102	80.0	120	----
Anions and Nutrients (QCLot: 1656664)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.3	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1650015)										
CG2413131-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1650016)										
CG2413131-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.494 mg/L	0.5 mg/L	98.8	75.0	125	----
Anions and Nutrients (QCLot: 1650045)										
CG2413142-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0514 mg/L	0.05 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 1656316)										
CG2413154-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0491 mg/L	0.05 mg/L	98.1	70.0	130	----
Anions and Nutrients (QCLot: 1656664)										
CG2413151-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----





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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 8W7, Tel: 250-261-5517 Fax: 250-261-5587  
**Grand Prairie AB**, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-688-9878 Fax: 780-513-2191  
**Fort McMurray AB**, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1525  
**Edmonton AB**, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1  
**Calgary AB**, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-261-5587  
**Saskatoon SK**, 819 - 58th Street East, S7K 6X5, Tel: 306-658-8370 Toll Free: 1-800-261-5587

**Environmental Division**  
**Calgary**  
 Attn: Order Reference

Environmental Division  
Calgary

Work Order Reference

CG2413164

PAGE 1 OF

SEND REPORT TO:

## CHAIN OF CUSTODY FORM

SENDER REPORT TO:		COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:		PATRICK MAJER		ANALYSIS REQUESTED	
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST									
CITY:		CALGARY		PROV:		ALBERTA		POSTAL CODE:		T2T 0E2	
TEL:		403 - 256 - 8473		FAX:		403 - 244 - 3774		SAMPLER:		C. Heinrich	
PROJECT NAME AND NO.:			FARUC Fall EMS Wk 3 - river samples					QUOTE NO.:			
PO NO.:				ALS CONTACT:		Patrik Wojciak					
REPORT FORMAT:			<input checked="" type="checkbox"/> <b>HARDCOPY</b> <input checked="" type="checkbox"/> <b>EMAIL - ADDRESS:</b> <u>pmajer@skircr.com</u> <input type="checkbox"/> <b>FAX</b> <input type="checkbox"/> <b>EXCEL</b> <input checked="" type="checkbox"/> <b>PDF</b> <input checked="" type="checkbox"/> <b>OTHER:</b>								



Telephone : +1 403 407 1800

[illegible]



CERTIFICATE OF ANALYSIS

Work Order	: CG2413560	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 2 - WWTP SAMPLES	Date Samples Received	: 19-Sep-2024 09:00
PO	: ----	Date Analysis Commenced	: 19-Sep-2024
C-O-C number	: ----	Issue Date	: 26-Sep-2024 10:35
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

Sub-Matrix: Water					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
(Matrix: Water)										
					Client sampling date / time	18-Sep-2024 09:45	18-Sep-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2413560-001	CG2413560-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.19	7.92	----	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	104	<3.0	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0202	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	----	33.8	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	----	0.0279	----	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.443	----	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.443	----	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	33.8	----	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	----	<1	----	----	----	
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	128	<2.0	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2413560</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 2 - WWTP SAMPLES	Date Samples Received	: 19-Sep-2024 09:00
PO	: ----	Issue Date	: 26-Sep-2024 10:18
C-O-C number	: ----		
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	18-Sep-2024	----	----	----		19-Sep-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	18-Sep-2024	----	----	----		19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	18-Sep-2024	25-Sep-2024	28 days	7 days	✓	25-Sep-2024	28 days	7 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	18-Sep-2024	23-Sep-2024	28 days	5 days	✓	24-Sep-2024	28 days	6 days	✓



Page : 4 of 7  
 Work Order : CG2413560  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 2 - WWTP SAMPLES



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	18-Sep-2024	----	----	----		19-Sep-2024	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	18-Sep-2024	19-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM	19-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	18-Sep-2024	19-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM	19-Sep-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	18-Sep-2024	----	----	----		25-Sep-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	18-Sep-2024	----	----	----		25-Sep-2024	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1672562	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1662027	2	37	5.4	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1660749	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1661080	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1661079	1	15	6.6	5.0	✓
pH by Meter	E108	1660927	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1664176	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1667581	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1671449	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1672562	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1662027	2	37	5.4	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1660749	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1661080	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1661079	1	15	6.6	5.0	✓
pH by Meter	E108	1660927	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1667581	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1671449	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1672562	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1662027	2	37	5.4	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1660749	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1661080	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1661079	1	15	6.6	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1664176	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1667581	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1671449	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1672562	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1660749	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1661080	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1661079	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1667581	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



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 Work Order : CG2413560  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 2 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2413560</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 2 - WWTP SAMPLES	Date Samples Received	: 19-Sep-2024 09:00
PO	: ----	Date Analysis Commenced	: 19-Sep-2024
C-O-C number	: ----	Issue Date	: 26-Sep-2024 10:21
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1660927)											
CG2413555-001	Anonymous	pH	----	E108	0.10	pH units	8.47	8.49	0.236%	4%	----
Physical Tests (QC Lot: 1671449)											
CG2413536-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	40.7	42.9	5.27%	20%	----
Anions and Nutrients (QC Lot: 1660749)											
CG2413554-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0040	0.0037	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1661079)											
CG2413582-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0039	0.0041	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1661080)											
CG2413582-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	13.1	13.1	0.0916%	20%	----
Anions and Nutrients (QC Lot: 1667581)											
CG2413555-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0190	0.0182	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1672562)											
CG2413555-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0156	0.0152	0.0004	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1664176)											
CG2413535-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	5	CFU/100mL	185	170	8.45%	65%	----
Aggregate Organics (QC Lot: 1662026)											
CG2413521-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 1662027)											
SK2405146-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1671449)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1660749)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1661079)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1661080)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1667581)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1672562)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1664176)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1662026)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 1662027)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1660927)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1671449)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1660749)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100.0	80.0	120	----
Anions and Nutrients (QCLot: 1661079)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1661080)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 1667581)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.5	80.0	120	----
Anions and Nutrients (QCLot: 1672562)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	104	85.0	115	----
Aggregate Organics (QCLot: 1662026)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	91.5	85.0	115	----
Aggregate Organics (QCLot: 1662027)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	90.4	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1660749)										
CG2413555-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0478 mg/L	0.05 mg/L	95.6	70.0	130	----
Anions and Nutrients (QCLot: 1661079)										
CG2413582-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1661080)										
CG2413582-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.46 mg/L	2.5 mg/L	98.5	75.0	125	----
Anions and Nutrients (QCLot: 1667581)										
CG2413555-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1672562)										
CG2413555-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----





## CHAIN OF CUSTODY FORM

PAGE 1 OF 1

SEND REPORT TO:

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN: PATRICK MAJER		ANALYSIS REQUESTED:																				
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST										Fecal Coliforms TSS pH Ortho P Total P NH3-N NO3-N NO2-N BOD5 COD								NOTES (sample specific comments, due dates, etc.)						
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2																					
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Nicholas Corman																					
PROJECT NAME AND NO.:		FARUC Fall EMS Wk 4 - WWTP samples				QUOTE NO.:																				
PO NO.:		ALS CONTACT: Patryk Wojciak																								
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:																								
WO#	SAMPLE IDENTIFICATION			DATE / TIME COLLECTED		MATRIX																				
				YYYY-MM-DD	TIME																					
FOR LAB USE ONLY		WWTP Influent Routine		2024-09-18	9:45	Water		X	X																	
		WWTP Influent BOD		2024-09-18	9:45	Water											X									
		WWTP Effluent Routine		2024-09-18	9:55	Water		X	X																	
		WWTP Effluent BOD		2024-09-18	9:55	Water											X									
		WWTP Effluent Nutrients		2024-09-18	9:55	Water				X	X	X	X	X												
		WWTP Effluent Bacteriological		2024-09-18	9:55	Water	X																			
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH SPECIFY DATE: _____ (surcharge may apply)										RELINQUISHED BY:		DATE:	Sept. 18/24	RECEIVED BY:	DATE:	19/9								
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)										N Corman		TIME:	12:15	<i>[Signature]</i>	TIME:	9:00								
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX										RELINQUISHED BY:		DATE:		RECEIVED BY:	DATE:									
SPECIAL INSTRUCTIONS:		PLEASE SEND A COPY OF THE RESULTS TO: wastewater@skifernie.com												TIME:			TIME:									
												FOR LAB USE ONLY		Cooler Seal Intact?		Sample Temperature: 7.6 °C		Cooling Method?								
												Yes No N/A		Frozen? Yes No		Icepacks Ice None										



CERTIFICATE OF ANALYSIS

Work Order	: CG2413559	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 4 - RIVER SAMPLES	Date Samples Received	: 19-Sep-2024 09:00
PO	: ----	Date Analysis Commenced	: 19-Sep-2024
C-O-C number	: ----	Issue Date	: 26-Sep-2024 10:20
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.





Analytical Results

Sub-Matrix: Water					Client sample ID	Elk River Upstream	Elk River @ IDZ	Elk River Downstream	----	----
(Matrix: Water)										
Client sampling date / time					18-Sep-2024 10:15	18-Sep-2024 10:30	18-Sep-2024 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2413559-001	CG2413559-002	CG2413559-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.35	8.07	8.35	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0175	0.0091	0.0053	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/C G	0.0050	mg/L	1.39	1.40	3.45	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/C G	0.0010	mg/L	0.0022	0.0021	0.0025	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	<0.0010	<0.0010 <sup>HTD</sup>	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0021	0.0960	0.0032	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.39	1.40	3.45	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100mL	53	15	62	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2413559</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 4 - RIVER SAMPLES	Date Samples Received	: 19-Sep-2024 09:00
PO	: ----	Issue Date	: 26-Sep-2024 10:17
C-O-C number	: ----		
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River @ IDZ	E298	18-Sep-2024	25-Sep-2024	28 days	7 days	✓	25-Sep-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Downstream	E298	18-Sep-2024	25-Sep-2024	28 days	7 days	✓	25-Sep-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Upstream	E298	18-Sep-2024	25-Sep-2024	28 days	7 days	✓	25-Sep-2024	28 days	7 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River @ IDZ	E378-U	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Upstream	E378-U	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Downstream	E378-U	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	24-Sep-2024	3 days	6 days	✖ EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO3-L	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: **✖** = Holding time exceedance ; **✓** = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO3-L	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO3-L	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO2-L	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO2-L	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO2-L	18-Sep-2024	19-Sep-2024	3 days	1 days	✓	19-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River @ IDZ	E372-U	18-Sep-2024	23-Sep-2024	28 days	5 days	✓	24-Sep-2024	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Downstream	E372-U	18-Sep-2024	23-Sep-2024	28 days	5 days	✓	24-Sep-2024	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Upstream	E372-U	18-Sep-2024	23-Sep-2024	28 days	5 days	✓	24-Sep-2024	28 days	6 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River @ IDZ	E012.FC	18-Sep-2024	----	----	----		19-Sep-2024	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Downstream	E012.FC	18-Sep-2024	----	----	----		19-Sep-2024	30 hrs	24 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Upstream	E012.FC	18-Sep-2024	----	----	----		19-Sep-2024	30 hrs	24 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River @ IDZ	E108	18-Sep-2024	19-Sep-2024	0.25 hrs	24 hrs	✖ EHTR-FM	19-Sep-2024	0.25 hrs	24 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Downstream	E108	18-Sep-2024	19-Sep-2024	0.25 hrs	24 hrs	✖ EHTR-FM	19-Sep-2024	0.25 hrs	24 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Upstream	E108	18-Sep-2024	19-Sep-2024	0.25 hrs	25 hrs	✖ EHTR-FM	19-Sep-2024	0.25 hrs	25 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River @ IDZ	E160	18-Sep-2024	----	----	----		25-Sep-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Downstream	E160	18-Sep-2024	----	----	----		25-Sep-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Upstream	E160	18-Sep-2024	----	----	----		25-Sep-2024	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1672562	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1660749	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1661080	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1661079	1	15	6.6	5.0	✓
pH by Meter	E108	1660746	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1664176	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1667581	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1671449	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1672562	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1660749	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1661080	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1661079	1	15	6.6	5.0	✓
pH by Meter	E108	1660746	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1667581	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1671449	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1672562	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1660749	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1661080	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1661079	1	15	6.6	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1664176	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1667581	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1671449	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1672562	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1660749	1	19	5.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1661080	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1661079	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1667581	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2413559  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 4 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2413559</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 4 - RIVER SAMPLES	Date Samples Received	: 19-Sep-2024 09:00
PO	: ----	Date Analysis Commenced	: 19-Sep-2024
C-O-C number	: ----	Issue Date	: 26-Sep-2024 10:34
Sampler	: Nicholas Corman		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2413559  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 4 - RIVER SAMPLES



---

## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1660746)											
CG2413549-001	Anonymous	pH	----	E108	0.10	pH units	8.41	8.41	0.00%	4%	----
Physical Tests (QC Lot: 1671449)											
CG2413536-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	40.7	42.9	5.27%	20%	----
Anions and Nutrients (QC Lot: 1660749)											
CG2413554-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0040	0.0037	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1661079)											
CG2413582-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0039	0.0041	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1661080)											
CG2413582-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	13.1	13.1	0.0916%	20%	----
Anions and Nutrients (QC Lot: 1667581)											
CG2413555-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0190	0.0182	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1672562)											
CG2413555-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0156	0.0152	0.0004	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1664176)											
CG2413535-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	5	CFU/100mL	185	170	8.45%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1671449)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1660749)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1661079)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1661080)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1667581)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1672562)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1664176)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1660746)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1671449)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1660749)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100.0	80.0	120	----
Anions and Nutrients (QCLot: 1661079)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1661080)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 1667581)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.5	80.0	120	----
Anions and Nutrients (QCLot: 1672562)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	104	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1660749)										
CG2413555-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0478 mg/L	0.05 mg/L	95.6	70.0	130	----
Anions and Nutrients (QCLot: 1661079)										
CG2413582-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1661080)										
CG2413582-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.46 mg/L	2.5 mg/L	98.5	75.0	125	----
Anions and Nutrients (QCLot: 1667581)										
CG2413555-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1672562)										
CG2413555-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----






## CHAIN OF CUSTODY FORM

PAGE 1 OF 1

SEND REPORT TO:

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER		ANALYSIS REQUESTED:																																																																																																																																																															
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST						<div style="text-align: center;"> <b>Environmental Division</b>  <b>Calgary</b>                      Work Order Reference  <b>CG2413559</b> </div>  <p>Telephone : +1 403 407 1800</p>																																																																																																																																																														
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2																																																																																																																																																																	
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Nicholas Corman																																																																																																																																																																	
PROJECT NAME AND NO.:	FARUC Fall EMS Wk 4 - river samples			QUOTE NO.:																																																																																																																																																																		
PO NO.:			ALS CONTACT:	Patrik Wojciak			<div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> HARDCOPY   <input checked="" type="checkbox"/> EMAIL - ADDRESS: <u>pmajer@skircr.com</u>  <input type="checkbox"/> FAX   <input type="checkbox"/> EXCEL   <input checked="" type="checkbox"/> PDF   <input checked="" type="checkbox"/> OTHER:                         </div> <div> <table border="1"> <tr> <th>WO#</th> <th>SAMPLE IDENTIFICATION</th> <th colspan="2">DATE / TIME COLLECTED</th> <th>MATRIX</th> <th>Fecal Coliforms</th> <th>TSS</th> <th>pH</th> <th>Ortho P</th> <th>Total P</th> <th>NH3-N</th> <th>NO3-N</th> <th>NO2-N</th> <th>BOD5</th> <th>COD</th> </tr> <tr> <td></td> <td>Elk River Upstream Routine</td> <td>2024/09/18</td> <td>10:15</td> <td>Water</td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Elk River Upstream Nutrients</td> <td>2024/09/18</td> <td>10:15</td> <td>Water</td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Elk River Upstream Bacteriological</td> <td>2024/09/18</td> <td>10:15</td> <td>Water</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Elk River @ IDZ Routine</td> <td>2024/09/18</td> <td>10:30</td> <td>Water</td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Elk River @ IDZ Nutrients</td> <td>2024/09/18</td> <td>10:30</td> <td>Water</td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Elk River @ IDZ Bacteriological</td> <td>2024/09/18</td> <td>10:30</td> <td>Water</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Elk River Downstream Routine</td> <td>2024/09/18</td> <td>10:45</td> <td>Water</td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Elk River Downstream Nutrients</td> <td>2024/09/18</td> <td>10:45</td> <td>Water</td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Elk River Downstream Bacteriological</td> <td>2024/09/18</td> <td>10:45</td> <td>Water</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> </div> </div>										WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED		MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD		Elk River Upstream Routine	2024/09/18	10:15	Water		X	X									Elk River Upstream Nutrients	2024/09/18	10:15	Water				X	X	X	X	X				Elk River Upstream Bacteriological	2024/09/18	10:15	Water	X											Elk River @ IDZ Routine	2024/09/18	10:30	Water		X	X									Elk River @ IDZ Nutrients	2024/09/18	10:30	Water				X	X	X	X	X				Elk River @ IDZ Bacteriological	2024/09/18	10:30	Water	X											Elk River Downstream Routine	2024/09/18	10:45	Water		X	X									Elk River Downstream Nutrients	2024/09/18	10:45	Water				X	X	X	X	X				Elk River Downstream Bacteriological	2024/09/18	10:45	Water	X									
WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED		MATRIX	Fecal Coliforms	TSS											pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD																																																																																																																																														
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FOR LAB USE ONLY	TURN AROUND REQUIRED:	<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH   SPECIFY DATE: _____ (surcharge may apply)		RELINQUISHED BY:	DATE:	Sept. 18/24	RECEIVED BY:	DATE:	19/29
	SEND INVOICE TO:	<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)		Nicholas Corman	TIME:	12:15		TIME:	9:00
	INVOICE FORMAT:	<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX		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	7.6 °C	Cooling Method?	
					Yes   No   N/A	Frozen?	Yes   No	Icepacks   Ice   None	



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2414003**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
 Calgary Alberta Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC FALL EMS WK 5 - WWTP SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 26-Sep-2024 09:00  
**Date Analysis Commenced** : 26-Sep-2024  
**Issue Date** : 02-Oct-2024 13:18

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
mg/L	milligrams per litre
pH units	pH units
CFU/100mL	colony forming units per hundred millilitres

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

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



Work Order : CG2414003  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 5 - WWTP SAMPLES

---







## Analytical Results

Sub-Matrix: Water

(Matrix: Water)

					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
					Client sampling date / time	25-Sep-2024 09:45	25-Sep-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	CG2414003-001	CG2414003-002	----	----	----	----
					Result	Result	----	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.12	8.03	----	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	324 <sup>DLHC</sup>	<3.0	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0188	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	----	27.9	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	----	0.0227	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.460	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.466	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	27.9	----	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	----	<1	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	155	<2.0	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2414003</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 5 - WWTP SAMPLES	Date Samples Received	: 26-Sep-2024 09:00
PO	: ----	Issue Date	: 02-Oct-2024 13:11
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	25-Sep-2024	----	----	----		26-Sep-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	25-Sep-2024	----	----	----		26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	25-Sep-2024	01-Oct-2024	28 days	6 days	✓	01-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	25-Sep-2024	01-Oct-2024	28 days	6 days	✓	02-Oct-2024	28 days	7 days	✓



Page : 4 of 7  
 Work Order : CG2414003  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 5 - WWTP SAMPLES



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	25-Sep-2024	----	----	----		26-Sep-2024	30 hrs	27 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	25-Sep-2024	26-Sep-2024	0.25 hrs	30 hrs	✖ EHTR-FM	26-Sep-2024	0.25 hrs	30 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	25-Sep-2024	26-Sep-2024	0.25 hrs	30 hrs	✖ EHTR-FM	26-Sep-2024	0.25 hrs	30 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	25-Sep-2024	----	----	----		29-Sep-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	25-Sep-2024	----	----	----		29-Sep-2024	7 days	4 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1683035	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1676038	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1675050	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1676305	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1676306	1	20	5.0	5.0	✓
pH by Meter	E108	1675793	1	18	5.5	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1678056	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1681713	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1680380	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1683035	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1676038	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1675050	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1676305	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1676306	1	20	5.0	5.0	✓
pH by Meter	E108	1675793	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1681713	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1680380	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1683035	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1676038	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1675050	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1676305	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1676306	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1678056	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1681713	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1680380	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1683035	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1675050	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1676305	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1676306	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1681713	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
Work Order : CG2414003  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 5 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2414003</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 5 - WWTP SAMPLES	Date Samples Received	: 26-Sep-2024 09:00
PO	: ----	Date Analysis Commenced	: 26-Sep-2024
C-O-C number	: ----	Issue Date	: 02-Oct-2024 13:10
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1675793)											
CG2414003-001	WWTP Influent	pH	----	E108	0.10	pH units	8.12	8.15	0.369%	4%	----
Physical Tests (QC Lot: 1680380)											
CG2413879-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1675050)											
CG2413974-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1676305)											
CG2414002-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	11.8	12.0	1.41%	20%	----
Anions and Nutrients (QC Lot: 1676306)											
CG2414002-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1681713)											
CG2413995-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0073	0.0082	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1683035)											
CG2413992-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.311	0.316	1.47%	20%	----
Microbiological Tests (QC Lot: 1678056)											
CG2413988-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	8	6	28.6%	65%	----
Aggregate Organics (QC Lot: 1676038)											
CG2413991-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1680380)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1675050)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1676305)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1676306)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1681713)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1683035)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1678056)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1676038)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1675793)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1680380)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 1675050)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 1676305)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1676306)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	96.9	90.0	110	----
Anions and Nutrients (QCLot: 1681713)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	93.4	80.0	120	----
Anions and Nutrients (QCLot: 1683035)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	108	85.0	115	----
Aggregate Organics (QCLot: 1676038)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	92.7	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Laboratory sample ID					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Client sample ID	Analyte	CAS Number	Method							
Anions and Nutrients (QCLot: 1675050)										
CG2413986-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0531 mg/L	0.05 mg/L	106	70.0	130	----
Anions and Nutrients (QCLot: 1676305)										
CG2414002-009	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.47 mg/L	2.5 mg/L	98.8	75.0	125	----
Anions and Nutrients (QCLot: 1676306)										
CG2414002-009	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.489 mg/L	0.5 mg/L	97.8	75.0	125	----
Anions and Nutrients (QCLot: 1681713)										
CG2413995-004	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0498 mg/L	0.05 mg/L	99.7	70.0	130	----
Anions and Nutrients (QCLot: 1683035)										
CG2413994-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----





**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, 981 St. - 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 Court, 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: 1-800-688-9878 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

PAGE 1 OF

**SEND REPORT TO:**

## CHAIN OF CUSTODY FORM

[illegible]





## 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: 1505-17 <sup>th</sup> Ave SW Calgary	Phone No: (403) 256-8473	Fax No: (403) 244-3774	After Hours/Emergency No: (403) 861-8730
Water Supplier: — Patrick Majer	Phone No: (403) 256-8473	Fax No: (403) 244-3774	After Hours/Emergency No: (403) 861-8730
Sampler/Submitter: Nicholas Gorman Claudia Heinrich (Claudia on vacation)	Phone No: 778-581-6707 (250) 409-4120	Fax No: ( )	(250) 409-4120

<sup>2</sup> Person to whom results should be sent.

<sup>3</sup> 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<sup>4</sup>:

Interior Health

Drinking Water Officer Name: Jennifer Beverly	Phone No: (250) 342-5658	Fax No: ( )	After Hours/Emergency No: (866) 457-5648
Medical Health Officer Name:	Phone No: ( )	Fax No: ( )	After Hours/Emergency No: ( )

<sup>4</sup> 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 <input type="checkbox"/> ICE <input type="checkbox"/> NONE <input type="checkbox"/>	



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2413988**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
 Calgary Alberta Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC FALL EMS WK 5 - RIVER SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
 Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 26-Sep-2024 09:00  
**Date Analysis Commenced** : 26-Sep-2024  
**Issue Date** : 02-Oct-2024 13:08

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
mg/L	milligrams per litre
pH units	pH units
CFU/100mL	colony forming units per hundred millilitres

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Work Order : CG2413988  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 5 - RIVER SAMPLES

---







## Analytical Results

Sub-Matrix: Water  
 (Matrix: Water)

Client sample ID					Elk River Upstream	Elk River @ IDZ	Elk River Downstream	----	----
Client sampling date / time					25-Sep-2024 10:15	25-Sep-2024 10:30	25-Sep-2024 10:45	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	CG2413988-001	CG2413988-002	CG2413988-003	----	----
					Result	Result	Result	----	----
Physical Tests									
pH	----	E108/CG	0.10	pH units	8.42	8.13	8.43	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	0.0105	0.0092	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	1.53	7.45	1.54	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	0.0024	0.0081	0.0025	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.103	<0.0010	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	<0.0020	0.108	<0.0020	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.53	7.46	1.54	----	----
Microbiological Tests									
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	8	1	6	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2413988</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 5 - RIVER SAMPLES	Date Samples Received	: 26-Sep-2024 09:00
PO	: ----	Issue Date	: 02-Oct-2024 13:15
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River @ IDZ	E298	25-Sep-2024	01-Oct-2024	28 days	6 days	✓	01-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Downstream	E298	25-Sep-2024	01-Oct-2024	28 days	6 days	✓	01-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Upstream	E298	25-Sep-2024	01-Oct-2024	28 days	6 days	✓	01-Oct-2024	28 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River @ IDZ	E378-U	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Downstream	E378-U	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Upstream	E378-U	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO3-L	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO3-L	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO3-L	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO2-L	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO2-L	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO2-L	25-Sep-2024	26-Sep-2024	3 days	1 days	✓	26-Sep-2024	3 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River @ IDZ	E372-U	25-Sep-2024	01-Oct-2024	28 days	6 days	✓	02-Oct-2024	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Downstream	E372-U	25-Sep-2024	01-Oct-2024	28 days	6 days	✓	02-Oct-2024	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Upstream	E372-U	25-Sep-2024	01-Oct-2024	28 days	6 days	✓	02-Oct-2024	28 days	7 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River @ IDZ	E012.FC	25-Sep-2024	----	----	----		26-Sep-2024	30 hrs	26 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Downstream	E012.FC	25-Sep-2024	----	----	----		26-Sep-2024	30 hrs	26 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Upstream	E012.FC	25-Sep-2024	----	----	----		26-Sep-2024	30 hrs	26 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River Downstream	E108	25-Sep-2024	26-Sep-2024	0.25 hrs	27 hrs	✖ EHTR-FM	26-Sep-2024	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River @ IDZ	E108	25-Sep-2024	26-Sep-2024	0.25 hrs	28 hrs	✖ EHTR-FM	26-Sep-2024	0.25 hrs	28 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River Upstream	E108	25-Sep-2024	26-Sep-2024	0.25 hrs	28 hrs	✖ EHTR-FM	26-Sep-2024	0.25 hrs	28 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River @ IDZ	E160	25-Sep-2024	----	----	----		29-Sep-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Downstream	E160	25-Sep-2024	----	----	----		29-Sep-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Upstream	E160	25-Sep-2024	----	----	----		29-Sep-2024	7 days	4 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1683347	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1675050	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1676394	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1676395	1	20	5.0	5.0	✓
pH by Meter	E108	1675531	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1678056	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1681712	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1680380	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1683347	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1675050	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1676394	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1676395	1	20	5.0	5.0	✓
pH by Meter	E108	1675531	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1681712	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1680380	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1683347	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1675050	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1676394	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1676395	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1678056	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1681712	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1680380	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1683347	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1675050	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1676394	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1676395	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1681712	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



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Work Order : CG2413988  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 5 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2413988</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 5 - RIVER SAMPLES	Date Samples Received	: 26-Sep-2024 09:00
PO	: ----	Date Analysis Commenced	: 26-Sep-2024
C-O-C number	: ----	Issue Date	: 02-Oct-2024 13:10
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Anthony Calero	Supervisor - Inorganic	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2413988  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 5 - RIVER SAMPLES

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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1675531)											
CG2413985-001	Anonymous	pH	----	E108	0.10	pH units	8.02	7.93	1.13%	4%	----
Physical Tests (QC Lot: 1680380)											
CG2413879-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1675050)											
CG2413974-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1676394)											
CG2414001-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.158	0.156	0.0027	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1676395)											
CG2414001-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1681712)											
CG2413966-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0400	mg/L	1.24	1.26	2.28%	20%	----
Anions and Nutrients (QC Lot: 1683347)											
CG2413985-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.125	mg/L	3.71	3.93	5.82%	20%	----
Microbiological Tests (QC Lot: 1678056)											
CG2413988-001	Elk River Upstream	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	8	6	28.6%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1680380)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1675050)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1676394)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1676395)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1681712)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1683347)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1678056)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1675531)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1680380)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 1675050)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 1676394)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1676395)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	96.8	90.0	110	----
Anions and Nutrients (QCLot: 1681712)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	94.2	80.0	120	----
Anions and Nutrients (QCLot: 1683347)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	109	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1675050)										
CG2413986-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0531 mg/L	0.05 mg/L	106	70.0	130	----
Anions and Nutrients (QCLot: 1676394)										
CG2414001-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1676395)										
CG2414001-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.488 mg/L	0.5 mg/L	97.6	75.0	125	----
Anions and Nutrients (QCLot: 1681712)										
CG2413966-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1683347)										
CG2413985-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	----	----		75.0	125	----



03-291-0700  
Environmental Division  
Calgary  
Work Order Reference  
**CG2413988**

Telephone : +1 403 407 1800

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN: PATRICK MAJER		ANALYSIS REQUESTED:									
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST													
CITY:		CALGARY		PROV:		ALBERTA		POSTAL CODE:		T2T 0E2					
TEL:		403 - 256 - 8473		FAX:		403 - 244 - 3774		SAMPLER:		Nicholas Corman					
PROJECT NAME AND NO.:			FARUC Fall EMS Wk 5 - river samples				QUOTE NO:								
PO NO.:				ALS CONTACT:		Patryk Wojciak									
REPORT FORMAT:			<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> OTHER:												

[illegible]

☒ ROUTINE    ☐ RUSH · SPECIFY DATE: \_\_\_\_\_ (surcharge may apply)

☐ SAME AS REPORT ☐ DIFFERENT FROM REPORT (provide details)

☐ HARDCOPY.      ☐ PDF      ☐ FAX

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

RELINQUISHED BY:	DATE:	Sept. 25/24	RECEIVED BY:	DATE:	9/26
Nicholas Corman	TIME:	12:15	FE	TIME:	9:20
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY
------------------

Cooler Seal intact? ☐ Yes ☐ No ☐ N/A Sample Temperature: 10.1 °C Cooling Method? ☐ Icepacks ☐ Ice ☐ None  
Frozen? ☐ Yes ☐ No



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2414402**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary Alberta Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC FALL EMS WK 6 - WWTP SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NC  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 03-Oct-2024 09:00  
**Date Analysis Commenced** : 03-Oct-2024  
**Issue Date** : 09-Oct-2024 09:20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
mg/L	milligrams per litre
pH units	pH units
CFU/100mL	colony forming units per hundred millilitres

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Work Order : CG2414402  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 6 - WWTP SAMPLES

---







## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
Client sampling date / time						02-Oct-2024 09:45	02-Oct-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	CG2414402-001	CG2414402-002	----	----	----	----
					Result	Result	----	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.09	8.14	----	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	52.8	<3.0	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0132	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	----	29.0	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	----	0.0202	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.320	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.361	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	29.0	----	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	----	<1	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	82.4	<2.0	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2414402</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 6 - WWTP SAMPLES	Date Samples Received	: 03-Oct-2024 09:00
PO	: ----	Issue Date	: 09-Oct-2024 09:19
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	02-Oct-2024	----	----	----		03-Oct-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	02-Oct-2024	----	----	----		03-Oct-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	02-Oct-2024	04-Oct-2024	28 days	2 days	✓	04-Oct-2024	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	02-Oct-2024	03-Oct-2024	3 days	1 days	✓	03-Oct-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	02-Oct-2024	03-Oct-2024	3 days	1 days	✓	03-Oct-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	02-Oct-2024	03-Oct-2024	3 days	1 days	✓	03-Oct-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	02-Oct-2024	08-Oct-2024	28 days	6 days	✓	08-Oct-2024	28 days	6 days	✓



Page : 4 of 7  
 Work Order : CG2414402  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 6 - WWTP SAMPLES



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	02-Oct-2024	----	----	----		03-Oct-2024	30 hrs	26 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	02-Oct-2024	03-Oct-2024	0.25 hrs	26 hrs	✖ EHTR-FM	03-Oct-2024	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	02-Oct-2024	03-Oct-2024	0.25 hrs	27 hrs	✖ EHTR-FM	03-Oct-2024	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	02-Oct-2024	----	----	----		08-Oct-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	02-Oct-2024	----	----	----		08-Oct-2024	7 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1691814	1	18	5.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1689090	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1688200	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1688481	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1688480	1	17	5.8	5.0	✓
pH by Meter	E108	1688242	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1691354	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1695056	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1695167	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1691814	1	18	5.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1689090	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1688200	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1688481	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1688480	1	17	5.8	5.0	✓
pH by Meter	E108	1688242	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1695056	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1695167	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1691814	1	18	5.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1689090	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1688200	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1688481	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1688480	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1691354	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1695056	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1695167	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1691814	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1688200	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1688481	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1688480	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1695056	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2414402  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC FALL EMS WK 6 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2414402</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 6 - WWTP SAMPLES	Date Samples Received	: 03-Oct-2024 09:00
PO	: ----	Date Analysis Commenced	: 03-Oct-2024
C-O-C number	: ----	Issue Date	: 09-Oct-2024 09:20
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1688242)											
CG2414399-001	Anonymous	pH	----	E108	0.10	pH units	7.64	7.66	0.261%	4%	----
Physical Tests (QC Lot: 1695167)											
CG2414394-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	8.6	7.2	1.4	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1688200)											
CG2414402-002	WWTP Effluent	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.320	0.339	5.86%	20%	----
Anions and Nutrients (QC Lot: 1688480)											
CG2414408-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.278	0.283	1.85%	20%	----
Anions and Nutrients (QC Lot: 1688481)											
CG2414408-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	1.84	1.85	0.314%	20%	----
Anions and Nutrients (QC Lot: 1691814)											
CG2414398-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0102	0.0095	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1695056)											
CG2414394-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.100	mg/L	3.35	3.25	2.95%	20%	----
Microbiological Tests (QC Lot: 1691354)											
CG2414394-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	5	CFU/100mL	5	5	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1689090)											
CG2414402-002	WWTP Effluent	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1695167)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1688200)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1688480)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1688481)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1691814)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1695056)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1691354)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1689090)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1688242)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1695167)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 1688200)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1688480)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 1688481)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1691814)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	111	85.0	115	----
Anions and Nutrients (QCLot: 1695056)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	100	80.0	120	----
Aggregate Organics (QCLot: 1689090)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	91.4	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1688200)										
CG2414404-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0505 mg/L	0.05 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 1688480)										
CG2414408-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.416 mg/L	0.5 mg/L	83.2	75.0	125	----
Anions and Nutrients (QCLot: 1688481)										
CG2414408-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1691814)										
CG2414398-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0832 mg/L	0.1 mg/L	83.2	75.0	125	----
Anions and Nutrients (QCLot: 1695056)										
CG2414394-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----



# ALS Environmental

ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com



Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700  
 Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587  
 Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191  
 Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B5, Tel: 780-791-1524 Fax: 780-791-1500  
 Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878  
 Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878  
 Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-668-9878

Environmental Division  
 Calgary

Work Order Reference  
**CG2414402**

E 1 OF 1

SEND REPORT TO:

## CHAIN OF CUSTODY FORM

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN: PATRICK MAJER		ANALYSIS REQUESTED:																
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST										<p>Telephone : +1 403 407 1800</p>				NOTES (sample specific comments, due dates, etc.)						
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2																	
TEL:	403 - 256 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Nicholas Corman																	
PROJECT NAME AND NO.:		FARUC Fall EMS Wk 6 - WWTP samples				QUOTE NO.:																
PO NO.:		ALS CONTACT: Patryk Wojciak																				
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: pmajer@skircr.com <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:																				
WO#	SAMPLE IDENTIFICATION			DATE / TIME COLLECTED		MATRIX		Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					
				YYYY-MM-DD	TIME																	
FOR LAB USE ONLY		WWTP Influent Routine		2024-10-02	9:45	Water		X	X													
		WWTP Influent BOD		2024-10-02	9:45	Water											X					
		WWTP Effluent Routine		2024-10-02	9:55	Water		X	X													
		WWTP Effluent BOD		2024-10-02	9:55	Water											X					
		WWTP Effluent Nutrients		2024-10-02	9:55	Water				X	X	X	X	X								
		WWTP Effluent Bacteriological		2024-10-02	9:55	Water	X															
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH   SPECIFY DATE: _____ (surcharge may apply)										RELINQUISHED BY:		DATE:	Oct. 2/2024	RECEIVED BY:		DATE:	03/10/24			
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)										N Corman		TIME:	12:15	TIME:		9:50				
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX												TIME:		TIME:						
SPECIAL INSTRUCTIONS:		PLEASE SEND A COPY OF THE RESULTS TO: wastewater@skifernie.com										FOR LAB USE ONLY										
												Cooler Seal Intact?		Sample Temperature: _____ °C		Cooling Method?						
												Yes   No   N/A		Frozen? Yes   No		Icepacks   Ice   None						



## CERTIFICATE OF ANALYSIS

**Work Order** : **CG2414404**  
**Client** : **Fernie Alpine Resort Utilities Corporation**  
**Contact** : Patrick Majer  
**Address** : 1505 - 17TH AVENUE SW  
Calgary Alberta Canada T2T 0E2  
**Telephone** : 403 254 7669  
**Project** : FARUC FALL EMS WK 6 - RIVER SAMPLES  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : NC  
**Site** : ----  
**Quote number** : CG21-FARU100-0002  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Laboratory** : ALS Environmental - Calgary  
**Account Manager** : Patryk Wojciak  
**Address** : 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone** : +1 403 407 1800  
**Date Samples Received** : 03-Oct-2024 09:00  
**Date Analysis Commenced** : 03-Oct-2024  
**Issue Date** : 09-Oct-2024 09:20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
mg/L	milligrams per litre
pH units	pH units
CFU/100mL	colony forming units per hundred millilitres

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

Qualifier	Description
RRV	Reported result verified by repeat analysis.



Work Order : CG2414404  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 6 - RIVER SAMPLES

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## Analytical Results

Sub-Matrix: Water

(Matrix: Water)

					Client sample ID	Elk River Upstream	Elk River @ IDZ	Elk River Downstream	----	----
Client sampling date / time						03-Oct-2024 10:15	03-Oct-2024 10:30	03-Oct-2024 10:45	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	CG2414404-001	CG2414404-002	CG2414404-003	----	----	----
					Result	Result	Result	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.46	8.14	8.46	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	0.0322	<0.0050	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	1.52 <sup>RRV</sup>	16.6	1.52	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	0.0015 <sup>RRV</sup>	0.0741	0.0017	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	0.0010	0.173	<0.0010	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	<0.0020	0.178	0.0038	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.52	16.7	1.52	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	2	7	4	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2414404</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 6 - RIVER SAMPLES	Date Samples Received	: 03-Oct-2024 09:00
PO	: ----	Issue Date	: 09-Oct-2024 09:20
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River @ IDZ	E298	03-Oct-2024	04-Oct-2024	28 days	1 days	✓	04-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Downstream	E298	03-Oct-2024	04-Oct-2024	28 days	1 days	✓	04-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River Upstream	E298	03-Oct-2024	04-Oct-2024	28 days	1 days	✓	04-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River @ IDZ	E378-U	03-Oct-2024	03-Oct-2024	3 days	0 days	✓	03-Oct-2024	3 days	0 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Downstream	E378-U	03-Oct-2024	03-Oct-2024	3 days	0 days	✓	03-Oct-2024	3 days	0 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River Upstream	E378-U	03-Oct-2024	03-Oct-2024	3 days	0 days	✓	03-Oct-2024	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO3-L	03-Oct-2024	03-Oct-2024	3 days	0 days	✓	03-Oct-2024	3 days	0 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO3-L	03-Oct-2024	03-Oct-2024	3 days	0 days	✓	03-Oct-2024	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO3-L	03-Oct-2024	03-Oct-2024	3 days	0 days	✓	03-Oct-2024	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River @ IDZ	E235.NO2-L	03-Oct-2024	03-Oct-2024	3 days	0 days	✓	03-Oct-2024	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Downstream	E235.NO2-L	03-Oct-2024	03-Oct-2024	3 days	0 days	✓	03-Oct-2024	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River Upstream	E235.NO2-L	03-Oct-2024	03-Oct-2024	3 days	0 days	✓	03-Oct-2024	3 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River @ IDZ	E372-U	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Downstream	E372-U	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River Upstream	E372-U	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Downstream	E012.FC	03-Oct-2024	----	----	----		03-Oct-2024	30 hrs	1.75 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River @ IDZ	E012.FC	03-Oct-2024	----	----	----		03-Oct-2024	30 hrs	2 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River Upstream	E012.FC	03-Oct-2024	----	----	----		03-Oct-2024	30 hrs	2 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River @ IDZ	E108	03-Oct-2024	03-Oct-2024	0.25 hrs	2 hrs	✖ EHTL	03-Oct-2024	0.25 hrs	2 hrs	✖ EHTL
Physical Tests : pH by Meter										
HDPE Elk River Downstream	E108	03-Oct-2024	03-Oct-2024	0.25 hrs	2 hrs	✖ EHTL	03-Oct-2024	0.25 hrs	2 hrs	✖ EHTL
Physical Tests : pH by Meter										
HDPE Elk River Upstream	E108	03-Oct-2024	03-Oct-2024	0.25 hrs	2 hrs	✖ EHTL	03-Oct-2024	0.25 hrs	2 hrs	✖ EHTL
Physical Tests : TSS by Gravimetry										
HDPE Elk River @ IDZ	E160	03-Oct-2024	----	----	----		08-Oct-2024	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Downstream	E160	03-Oct-2024	----	----	----		08-Oct-2024	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River Upstream	E160	03-Oct-2024	----	----	----		08-Oct-2024	7 days	5 days	✓

**Legend & Qualifier Definitions**

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1691814	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1688200	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1688481	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1688480	1	17	5.8	5.0	✓
pH by Meter	E108	1688242	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1691354	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1695056	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1695167	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1691814	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1688200	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1688481	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1688480	1	17	5.8	5.0	✓
pH by Meter	E108	1688242	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1695056	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1695167	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1691814	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1688200	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1688481	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1688480	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1691354	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1695056	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1695167	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1691814	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1688200	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1688481	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1688480	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1695056	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2414404  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 6 - RIVER SAMPLES



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2414404</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC FALL EMS WK 6 - RIVER SAMPLES	Date Samples Received	: 03-Oct-2024 09:00
PO	: ----	Date Analysis Commenced	: 03-Oct-2024
C-O-C number	: ----	Issue Date	: 09-Oct-2024 09:21
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2414404  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC FALL EMS WK 6 - RIVER SAMPLES

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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1688242)											
CG2414399-001	Anonymous	pH	----	E108	0.10	pH units	7.64	7.66	0.261%	4%	----
Physical Tests (QC Lot: 1695167)											
CG2414394-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	8.6	7.2	1.4	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1688200)											
CG2414402-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.320	0.339	5.86%	20%	----
Anions and Nutrients (QC Lot: 1688480)											
CG2414408-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.278	0.283	1.85%	20%	----
Anions and Nutrients (QC Lot: 1688481)											
CG2414408-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	1.84	1.85	0.314%	20%	----
Anions and Nutrients (QC Lot: 1691814)											
CG2414398-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0102	0.0095	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1695056)											
CG2414394-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.100	mg/L	3.35	3.25	2.95%	20%	----
Microbiological Tests (QC Lot: 1691354)											
CG2414394-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	5	CFU/100mL	5	5	0	Diff <2x LOR	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1695167)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1688200)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1688480)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1688481)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1691814)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1695056)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1691354)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1688242)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1695167)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 1688200)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 1688480)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 1688481)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1691814)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	111	85.0	115	----
Anions and Nutrients (QCLot: 1695056)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	100	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1688200)										
CG2414404-001	Elk River Upstream	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0505 mg/L	0.05 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 1688480)										
CG2414408-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.416 mg/L	0.5 mg/L	83.2	75.0	125	----
Anions and Nutrients (QCLot: 1688481)										
CG2414408-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1691814)										
CG2414398-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0832 mg/L	0.1 mg/L	83.2	75.0	125	----
Anions and Nutrients (QCLot: 1695056)										
CG2414394-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----





SEND REPORT TO:

**CHAIN OF CUSTODY FORM**

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN:	PATRICK MAJER		ANALYSIS REQUESTED:										
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST															
CITY:	CALGARY	PROV:	ALBERTA	POSTAL CODE:	T2T 0E2												
TEL:	403 - 258 - 8473	FAX:	403 - 244 - 3774	SAMPLER:	Nicholas Corman												
PROJECT NAME AND NO.:		FARUC Fall EMS Wk 6 - river samples		QUOTE NO.:													
PO NO.:		ALS CONTACT:		Patrik Wojciak													
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: <u>pmajer@skircr.com</u> <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> OTHER:															
WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED		MATRIX	Fecal Coliforms	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD			NOTES (sample specific comments, due dates, etc.)
		YYYY-MM-DD	TIME														
FOR LAB USE ONLY	Elk River Upstream Routine	2024/10/02	10:15	Water		X	X										
	Elk River Upstream Nutrients	2024/10/02	10:15	Water				X	X	X	X	X					
	Elk River Upstream Bacteriological	2024/10/02	10:15	Water	X												
	Elk River @ IDZ Routine	2024/10/02	10:30	Water		X	X										
	Elk River @ IDZ Nutrients	2024/10/02	10:30	Water				X	X	X	X	X					
	Elk River @ IDZ Bacteriological	2024/10/02	10:30	Water	X												
	Elk River Downstream Routine	2024/10/02	10:45	Water		X	X										
	Elk River Downstream Nutrients	2024/10/02	10:45	Water				X	X	X	X	X					
	Elk River Downstream Bacteriological	2024/10/02	10:45	Water	X												
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH   SPECIFY DATE: _____ (surcharge may apply)						RELINQUISHED BY:		DATE:	Oct. 2/2024	RECEIVED BY:	DATE:	03/10/24			
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)						Nicholas Corman		TIME:	12:15	(V)	TIME:	9:00			
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX								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?					
								Yes ___ No ___ N/A		Frozen? Yes ___ No ___		Icepacks ___ Ice ___ None					



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	<b>: CG2417657</b>		
<b>Client</b>	<b>: Fernie Alpine Resort Utilities Corporation</b>	<b>Laboratory</b>	<b>: ALS Environmental - Calgary</b>
<b>Contact</b>	<b>: Patrick Majer</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1505 - 17TH AVENUE SW</b>	<b>Address</b>	<b>: 2559 29th Street NE</b>
	<b>: Calgary Alberta Canada T2T 0E2</b>		<b>: Calgary AB Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 403 254 7669</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: FARUC Monthly (November) - WWTP samples</b>	<b>Date Samples Received</b>	<b>: 28-Nov-2024 08:50</b>
<b>PO</b>	<b>: ----</b>	<b>Date Analysis Commenced</b>	<b>: 28-Nov-2024</b>
<b>C-O-C number</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 04-Dec-2024 17:00</b>
<b>Sampler</b>	<b>: NC</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-FARU100-0002</b>		
<b>No. of samples received</b>	<b>: 2</b>		
<b>No. of samples analysed</b>	<b>: 2</b>		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Eunice Cura	Lab Analyst	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
mg/L	milligrams per litre
pH units	pH units
CFU/100mL	colony forming units per hundred millilitres

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Work Order : CG2417657  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC Monthly (November) - WWTP samples

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## Analytical Results

Sub-Matrix: Water

(Matrix: Water)

					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
					Client sampling date / time	26-Nov-2024 09:45	26-Nov-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2417657-001	CG2417657-002	----	----	----	----
					Result	Result	----	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.03	8.32	----	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	110	<3.0	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0100	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	----	15.8	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	----	0.0090	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.400	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.407	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	15.8	----	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	----	<1	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	71.4	<2.0	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.



CERTIFICATE OF ANALYSIS

Work Order	: CG2417657	Page	: 1 of 3
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Monthly (November) - WWTP samples	Date Samples Received	: 28-Nov-2024 08:50
PO	: ----	Date Analysis	: 28-Nov-2024
C-O-C number	: ----	Commenced	
Sampler	: NC	Issue Date	: 04-Dec-2024 17:00
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Eunice Cura	Lab Analyst	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).  
Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.  
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

<i>Unit</i>	<i>Description</i>
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less than.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





Analytical Results

CG2417657-001

Sub-Matrix:Water

(Matrix: Water)

Client sample ID: WWTP Influent

Client sampling date / time: 26-Nov-2024 09:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.03	0.10	pH units	E108/CG	28-Nov-2024	28-Nov-2024	1788323
Solids, total suspended [TSS]	----	110	3.0	mg/L	E160/CG	-	02-Dec-2024	1791755
Aggregate Organics								
Biochemical oxygen demand [BOD]	----	71.4	20.0	mg/L	E550/CG	-	28-Nov-2024	1788620

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

CG2417657-002

Sub-Matrix:Water

(Matrix: Water)

Client sample ID: WWTP Effluent

Client sampling date / time: 26-Nov-2024 09:55

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.32	0.10	pH units	E108/CG	28-Nov-2024	28-Nov-2024	1788323
Solids, total suspended [TSS]	----	<3.0	3.0	mg/L	E160/CG	-	02-Dec-2024	1791755
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	0.0100	0.0050	mg/L	E298/CG	28-Nov-2024	02-Dec-2024	1788066
Nitrate (as N)	14797-55-8	15.8	0.0050	mg/L	E235.NO3-L/CG	28-Nov-2024	28-Nov-2024	1788077
Nitrite (as N)	14797-65-0	0.0090	0.0010	mg/L	E235.NO2-L/CG	28-Nov-2024	28-Nov-2024	1788076
Phosphate, ortho-, dissolved (as P)	14265-44-2	0.400	0.0050	mg/L	E378-U/CG	28-Nov-2024	28-Nov-2024	1787897
Phosphorus, total	7723-14-0	0.407	0.0100	mg/L	E372-U/CG	03-Dec-2024	04-Dec-2024	1793965
Nitrate + Nitrite (as N)	----	15.8	0.0051	mg/L	EC235.N+N/CG	-	29-Nov-2024	1789984
Microbiological Tests								
Coliforms, thermotolerant [fecal]	----	<1	1	CFU/100m L	E012.FC/CG	-	28-Nov-2024	1789833
Aggregate Organics								
Biochemical oxygen demand [BOD]	----	<2.0	2.0	mg/L	E550/CG	-	28-Nov-2024	1788620

Please refer to the General Comments section for an explanation of any result qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2417657</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Monthly (November) - WWTP samples	Date Samples Received	: 28-Nov-2024 08:50
PO	: ----	Issue Date	: 04-Dec-2024 17:00
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	26-Nov-2024	----	----	----		28-Nov-2024	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	26-Nov-2024	----	----	----		28-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	26-Nov-2024	28-Nov-2024	28 days	2 days	✓	28-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	26-Nov-2024	28-Nov-2024	3 days	2 days	✓	28-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	26-Nov-2024	28-Nov-2024	3 days	2 days	✓	28-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	26-Nov-2024	28-Nov-2024	3 days	2 days	✓	28-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	26-Nov-2024	03-Dec-2024	28 days	7 days	✓	04-Dec-2024	28 days	8 days	✓



Page : 4 of 7  
 Work Order : CG2417657  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC Monthly (November) - WWTP samples



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	26-Nov-2024	----	----	----		28-Nov-2024	30 hrs	48 hrs	✖ EHTR
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	26-Nov-2024	28-Nov-2024	0.25 hrs	53 hrs	✖ EHTR-FM	28-Nov-2024	0.25 hrs	53 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	26-Nov-2024	28-Nov-2024	0.25 hrs	53 hrs	✖ EHTR-FM	28-Nov-2024	0.25 hrs	53 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	26-Nov-2024	----	----	----		02-Dec-2024	7 days	6 days	✔
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	26-Nov-2024	----	----	----		02-Dec-2024	7 days	6 days	✔

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1788066	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1788620	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1787897	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1788077	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1788076	1	20	5.0	5.0	✓
pH by Meter	E108	1788323	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1789833	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1793965	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1791755	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1788066	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1788620	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1787897	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1788077	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1788076	1	20	5.0	5.0	✓
pH by Meter	E108	1788323	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1793965	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1791755	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1788066	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1788620	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1787897	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1788077	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1788076	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1789833	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1793965	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1791755	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1788066	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1787897	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1788077	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1788076	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1793965	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC  ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108  ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160  ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L  ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L  ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298  ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U  ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550  ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
Work Order : CG2417657  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC Monthly (November) - WWTP samples



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2417657</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Monthly (November) - WWTP samples	Date Samples Received	: 28-Nov-2024 08:50
PO	: ----	Date Analysis Commenced	: 28-Nov-2024
C-O-C number	: ----	Issue Date	: 04-Dec-2024 16:59
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Eunice Cura	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1788323)											
CG2417641-001	Anonymous	pH	----	E108	0.10	pH units	7.97	7.67	3.84%	4%	----
Physical Tests (QC Lot: 1791755)											
CG2417600-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	5.7	5.1	0.6	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1787897)											
CG2417657-002	WWTP Effluent	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0050	mg/L	0.400	0.400	0.152%	20%	----
Anions and Nutrients (QC Lot: 1788066)											
CG2417602-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.122	0.119	2.41%	20%	----
Anions and Nutrients (QC Lot: 1788076)											
CG2417660-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0100	mg/L	0.259	0.264	1.91%	20%	----
Anions and Nutrients (QC Lot: 1788077)											
CG2417660-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0500	mg/L	6.65	6.70	0.653%	20%	----
Anions and Nutrients (QC Lot: 1793965)											
CG2417645-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.100	mg/L	2.92	2.98	2.09%	20%	----
Microbiological Tests (QC Lot: 1789833)											
CG2417657-002	WWTP Effluent	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1788620)											
CG2417638-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1791755)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1787897)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1788066)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1788076)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1788077)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1793965)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1789833)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1788620)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1788323)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1791755)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	96.3	85.0	115	----
Anions and Nutrients (QCLot: 1787897)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 1788066)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.2	85.0	115	----
Anions and Nutrients (QCLot: 1788076)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1788077)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1793965)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.4	80.0	120	----
Aggregate Organics (QCLot: 1788620)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	92.6	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1787897)										
CG2417660-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0462 mg/L	0.05 mg/L	92.3	70.0	130	----
Anions and Nutrients (QCLot: 1788066)										
CG2417602-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0994 mg/L	0.1 mg/L	99.4	75.0	125	----
Anions and Nutrients (QCLot: 1788076)										
CG2417660-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.500 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1788077)										
CG2417660-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.48 mg/L	2.5 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 1793965)										
CG2417645-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----





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: 250-281-5517 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-  
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: 780-437-23  
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-  
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7845 Fax: 306-668-1



Environmental Division  
Calgary  
Work Order Reference  
**CG2417657**



Telephone - +1 403 407 1800

**SEND REPORT TO:**

## CHAIN OF CUSTODY FORM

COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION		ATTN: PATRICK MAJER		ANALYSIS REQUESTED:												 Telephone: +1 403 407 1800			
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST																			
CITY:		CALGARY		PROV: ALBERTA		POSTAL CODE: T2T 0E2															
TEL:		403 - 256 - 8473		FAX: 403 - 244 - 3774		SAMPLER: Nicholas Corman															
PROJECT NAME AND NO.:		FARUC Monthly (November) - WWTP samples				QUOTE NO:															
PO NO.:		ALS CONTACT: Patryk Wojciak																			
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: <a href="mailto:pmaier@skircr.com">pmaier@skircr.com</a>																			
		<input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input type="checkbox"/> PDF <input type="checkbox"/> OTHER:																			
WO#		SAMPLE IDENTIFICATION		DATE / TIME COLLECTED		MATRIX		Fecal Coliforms TSS pH Ortho P Total P NH3-N NO3-N NO2-N BOD5 COD												NOTES (sample specific comments, due dates, etc.)	
				YYYY-MM-DD TIME																	
FOR LAB USE ONLY		WWTP Influent Routine		2024-11-26 9:45		Water															
		WWTP Influent BOD		2024-11-26 9:45		Water															
		WWTP Effluent Routine		2024-11-26 9:55		Water															
		WWTP Effluent BOD		2024-11-26 9:55		Water															
		WWTP Effluent Nutrients		2024-11-26 9:55		Water															
		WWTP Effluent Bacteriological		2024-11-26 9:55		Water															
TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH SPECIFY DATE: _____ (surcharge may apply)						RELINQUISHED BY:		DATE: Nov 26/2024		RECEIVED BY:		DATE: 11/25/2024							
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)						N Corman		TIME: 12:15				TIME: 12:15							
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX						RELINQUISHED BY:		DATE:		RECEIVED BY:		DATE:							
SPECIAL INSTRUCTIONS:		PLEASE SEND A COPY OF THE RESULTS TO: <a href="mailto:wastewater@skifernie.com">wastewater@skifernie.com</a>								TIME:				TIME:							
								FOR LAB USE ONLY		Cooler Seal Intact?		Sample Temperature: 6.5°C		Cooling Method?							
										Yes No N/A		Frozen? Yes No		Icepacks Ice None							



## CERTIFICATE OF ANALYSIS

**Work Order : CG2418598**

**Client :** Fernie Alpine Resort Utilities Corporation  
**Contact :** Patrick Majer  
**Address :** 1505 - 17TH AVENUE SW  
Calgary Alberta Canada T2T 0E2  
**Telephone :** 403 254 7669  
**Project :** FARUC Monthly (December) - WWTP samples  
**PO :** ----  
**C-O-C number :** ----  
**Sampler :** NC  
**Site :** ----  
**Quote number :** CG21-FARU100-0002  
**No. of samples received :** 2  
**No. of samples analysed :** 2

**Laboratory :** ALS Environmental - Calgary  
**Account Manager :** Patryk Wojciak  
**Address :** 2559 29th Street NE  
Calgary AB Canada T1Y 7B5  
**Telephone :** +1 403 407 1800  
**Date Samples Received :** 19-Dec-2024 11:30  
**Date Analysis Commenced :** 19-Dec-2024  
**Issue Date :** 24-Dec-2024 12:23

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

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





**Analytical Results**

					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
					Client sampling date / time	18-Dec-2024 09:45	18-Dec-2024 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2418598-001	CG2418598-002	----	----	----	----
					Result	Result	----	----	----	----
<b>Physical Tests</b>										
pH	----	E108/CG	0.10	pH units	7.73	7.65	----	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	619 <sup>DLHC</sup>	<3.0	----	----	----	----
<b>Anions and Nutrients</b>										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0181	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	----	25.0	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	----	0.0052	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.242	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.284	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	25.0	----	----	----	----
<b>Microbiological Tests</b>										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	----	2	----	----	----	----
<b>Aggregate Organics</b>										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	202	<2.0	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2418598</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Monthly (December) - WWTP samples	Date Samples Received	: 19-Dec-2024 11:30
PO	: ----	Issue Date	: 24-Dec-2024 12:23
C-O-C number	: ----		
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	18-Dec-2024	----	----	----		19-Dec-2024	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	18-Dec-2024	----	----	----		19-Dec-2024	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	18-Dec-2024	19-Dec-2024	28 days	1 days	✓	19-Dec-2024	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	18-Dec-2024	20-Dec-2024	3 days	2 days	✓	20-Dec-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	18-Dec-2024	19-Dec-2024	3 days	1 days	✓	19-Dec-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	18-Dec-2024	19-Dec-2024	3 days	1 days	✓	19-Dec-2024	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	18-Dec-2024	20-Dec-2024	28 days	2 days	✓	24-Dec-2024	28 days	6 days	✓



Page : 4 of 7  
 Work Order : CG2418598  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC Monthly (December) - WWTP samples



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	18-Dec-2024	----	----	----		19-Dec-2024	30 hrs	26 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	18-Dec-2024	19-Dec-2024	0.25 hrs	29 hrs	✖ EHTR-FM	19-Dec-2024	0.25 hrs	29 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	18-Dec-2024	19-Dec-2024	0.25 hrs	29 hrs	✖ EHTR-FM	19-Dec-2024	0.25 hrs	29 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	18-Dec-2024	----	----	----		21-Dec-2024	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	18-Dec-2024	----	----	----		21-Dec-2024	7 days	3 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1816640	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1822241	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1818428	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1817144	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1817145	1	19	5.2	5.0	✔
pH by Meter	E108	1817015	1	7	14.2	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1818589	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1816976	1	19	5.2	5.0	✔
TSS by Gravimetry	E160	1819729	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1816640	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1822241	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1818428	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1817144	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1817145	1	19	5.2	5.0	✔
pH by Meter	E108	1817015	1	7	14.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1816976	1	19	5.2	5.0	✔
TSS by Gravimetry	E160	1819729	1	20	5.0	5.0	✔
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1816640	1	20	5.0	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1822241	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1818428	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1817144	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1817145	1	19	5.2	5.0	✔
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1818589	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1816976	1	19	5.2	5.0	✔
TSS by Gravimetry	E160	1819729	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1816640	1	20	5.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1818428	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1817144	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1817145	1	19	5.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1816976	1	19	5.2	5.0	✔





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2418598  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC Monthly (December) - WWTP samples



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2418598</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Monthly (December) - WWTP samples	Date Samples Received	: 19-Dec-2024 11:30
PO	: ----	Date Analysis Commenced	: 19-Dec-2024
C-O-C number	: ----	Issue Date	: 24-Dec-2024 12:23
Sampler	: NC		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta



Page : 2 of 6  
Work Order : CG2418598  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC Monthly (December) - WWTP samples



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1817015)											
CG2418583-001	Anonymous	pH	----	E108	0.10	pH units	7.64	7.66	0.261%	4%	----
Physical Tests (QC Lot: 1819729)											
CG2418539-004	Anonymous	Solids, total suspended [TSS]	----	E160	150	mg/L	12800	12500	2.45%	20%	----
Anions and Nutrients (QC Lot: 1816640)											
CG2418574-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0500	mg/L	1.65	1.62	1.87%	20%	----
Anions and Nutrients (QC Lot: 1816976)											
CG2418577-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0040	mg/L	0.125	0.122	2.70%	20%	----
Anions and Nutrients (QC Lot: 1817144)											
CG2418547-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1817145)											
CG2418547-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0011	0.0011	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1818428)											
CG2418598-002	WWTP Effluent	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0050	mg/L	0.242	0.242	0.190%	20%	----
Microbiological Tests (QC Lot: 1818589)											
CG2418580-003	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1822241)											
CG2418554-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1819729)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1816640)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1816976)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1817144)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1817145)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1818428)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Microbiological Tests (QCLot: 1818589)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1822241)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1817015)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1819729)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1816640)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	109	85.0	115	----
Anions and Nutrients (QCLot: 1816976)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	95.4	80.0	120	----
Anions and Nutrients (QCLot: 1817144)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1817145)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1818428)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	102	80.0	120	----
Aggregate Organics (QCLot: 1822241)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	94.3	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1816640)										
CG2418577-006	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.116 mg/L	0.1 mg/L	116	75.0	125	----
Anions and Nutrients (QCLot: 1816976)										
CG2418577-004	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1817144)										
CG2418547-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.35 mg/L	2.5 mg/L	94.0	75.0	125	----
Anions and Nutrients (QCLot: 1817145)										
CG2418547-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.472 mg/L	0.5 mg/L	94.4	75.0	125	----
Anions and Nutrients (QCLot: 1818428)										
CG2418618-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0473 mg/L	0.05 mg/L	94.6	70.0	130	----





## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

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: Nicholas Corman
PROJECT NAME AND NO.:		FARUC Monthly (December) - WWTP samples		QUOTE NO:
PO NO:		ALS CONTACT:	Ptryk Wojciak	
REPORT FORMAT:		<input checked="" type="checkbox"/> <b>HARDCOPY</b> <input checked="" type="checkbox"/> <b>EMAIL - ADDRESS:</b> <u>pmajer@skirco.com</u>		
		<input type="checkbox"/> <b>FAX</b> <input type="checkbox"/> <b>EXCEL</b> <input type="checkbox"/> <b>PDF</b> <input type="checkbox"/> <b>OTHER:</b>		

ANALYSIS REQUESTED:									
	Fecal Coliforms								
	TSS	X							
	pH	X							
	Ortho P								
	Total P								
	NH3-N								
	NO3-N								
	NO2-N								
	BOD5		X						
	COD								
X					X	X	X	X	



Telephone : +1 403 407 1800

[illegible]

	RELINQUISHED BY:	DATE:	Dec. 18/2024	RECEIVED BY:	DATE:	12/19
	N Corman	TIME:	12:15	CH	TIME:	11:30
	RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
		TIME:			TIME:	
FOR LAB USE ONLY						
Cooler Seal Intact?		Sample Temperature: 4.3 °C		Cooling Method?		
Yes ___ No ___ N/A		Frozen? ___ Yes ___ No		___ Icepacks ___ Ice ___ None		



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	<b>: CG2500056</b>		
<b>Client</b>	<b>: Fernie Alpine Resort Utilities Corporation</b>	<b>Laboratory</b>	<b>: ALS Environmental - Calgary</b>
<b>Contact</b>	<b>: Patrick Majer</b>	<b>Account Manager</b>	<b>: Patryk Wojciak</b>
<b>Address</b>	<b>: 1505 - 17TH AVENUE SW</b>	<b>Address</b>	<b>: 2559 29th Street NE</b>
	<b>: Calgary Alberta Canada T2T 0E2</b>		<b>: Calgary AB Canada T1Y 7B5</b>
<b>Telephone</b>	<b>: 403 254 7669</b>	<b>Telephone</b>	<b>: +1 403 407 1800</b>
<b>Project</b>	<b>: FARUC Winter EMS Wk 1 - WWTP samples</b>	<b>Date Samples Received</b>	<b>: 03-Jan-2025 09:00</b>
<b>PO</b>	<b>: ----</b>	<b>Date Analysis Commenced</b>	<b>: 03-Jan-2025</b>
<b>C-O-C number</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 09-Jan-2025 09:52</b>
<b>Sampler</b>	<b>: ----</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: CG21-FARU100-0002</b>		
<b>No. of samples received</b>	<b>: 2</b>		
<b>No. of samples analysed</b>	<b>: 2</b>		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Qualifiers

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





## Analytical Results

Sub-Matrix: Water

(Matrix: Water)

					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
					Client sampling date / time	02-Jan-2025 09:45	02-Jan-2025 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2500056-001	CG2500056-002	----	----	----	----
					Result	Result	----	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.73	7.93	----	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	460 <sup>DLHC</sup>	<3.0	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	20.8	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	----	13.2	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	----	1.83	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.585	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.619	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	15.0	----	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	----	39	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	335	<2.0	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2500056</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 1 - WWTP samples	Date Samples Received	: 03-Jan-2025 09:00
PO	: ----	Issue Date	: 09-Jan-2025 09:51
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	02-Jan-2025	----	----	----		03-Jan-2025	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT-48h] WWTP Effluent	E550	02-Jan-2025	----	----	----		03-Jan-2025	48 hrs	22 hrs	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	02-Jan-2025	03-Jan-2025	28 days	1 days	✓	03-Jan-2025	28 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	02-Jan-2025	09-Jan-2025	28 days	7 days	✓	09-Jan-2025	28 days	7 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	02-Jan-2025	----	----	----		03-Jan-2025	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	02-Jan-2025	03-Jan-2025	0.25 hrs	24 hrs	✖ EHTR-FM	03-Jan-2025	0.25 hrs	24 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	02-Jan-2025	03-Jan-2025	0.25 hrs	24 hrs	✖ EHTR-FM	03-Jan-2025	0.25 hrs	24 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	02-Jan-2025	----	----	----		06-Jan-2025	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	02-Jan-2025	----	----	----		06-Jan-2025	7 days	4 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1829081	1	18	5.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1829476	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1828875	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1828944	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1828945	1	15	6.6	5.0	✓
pH by Meter	E108	1828899	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1829733	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1831864	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	1830673	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1829081	1	18	5.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1829476	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1828875	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1828944	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1828945	1	15	6.6	5.0	✓
pH by Meter	E108	1828899	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1831864	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	1830673	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1829081	1	18	5.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1829476	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1828875	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1828944	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1828945	1	15	6.6	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1829733	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1831864	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	1830673	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1829081	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1828875	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1828944	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1828945	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1831864	1	19	5.2	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2500056  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC Winter EMS Wk 1 - WWTP samples



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2500056</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 1 - WWTP samples	Date Samples Received	: 03-Jan-2025 09:00
PO	: ----	Date Analysis Commenced	: 03-Jan-2025
C-O-C number	: ----	Issue Date	: 09-Jan-2025 09:51
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta





## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1828899)											
CG2500035-012	Anonymous	pH	----	E108	0.10	pH units	7.77	7.76	0.129%	4%	----
Physical Tests (QC Lot: 1830673)											
FJ2500008-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	14.8	15.0	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1828875)											
CG2500037-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0157	0.0159	1.14%	20%	----
Anions and Nutrients (QC Lot: 1828944)											
CG2500046-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.189	0.187	0.0013	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1828945)											
CG2500046-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1829081)											
CG2500046-004	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.0056	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1831864)											
CG2500044-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0400	mg/L	1.15	1.15	0.176%	20%	----
Microbiological Tests (QC Lot: 1829733)											
CG2500058-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	8	7	13.3%	65%	----
Aggregate Organics (QC Lot: 1829476)											
CG2500013-002	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1830673)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1828875)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1828944)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1828945)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1829081)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1831864)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1829733)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1829476)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1828899)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1830673)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 1828875)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	96.8	80.0	120	----
Anions and Nutrients (QCLot: 1828944)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1828945)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1829081)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.4	85.0	115	----
Anions and Nutrients (QCLot: 1831864)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.4	80.0	120	----
Aggregate Organics (QCLot: 1829476)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	94.6	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1828875)										
CG2500037-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1828944)										
CG2500046-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.58 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1828945)										
CG2500046-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1829081)										
CG2500050-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1831864)										
CG2500046-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0514 mg/L	0.05 mg/L	103	70.0	130	----





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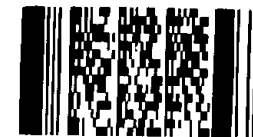
Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700  
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587  
Grand Prairie AB, 9595 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191  
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

Environmental Division  
Calgary

Work Order Reference

CG2500056



Telephone : +1 403 407 1800

**SEND REPORT TO:**

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: C. Heinrich
PROJECT NAME AND NO.:		FARUC Winter EMS Wk 1 - WWTP samples		QUOTE NO:
PO NO.:		ALS CONTACT:	Patryk Wojciak	
REPORT FORMAT:	<input checked="" type="checkbox"/> <b>HARDCOPY</b> <input checked="" type="checkbox"/> <b>EMAIL - ADDRESS:</b> <u>pmajer@skircr.com</u> <input type="checkbox"/> <b>FAX</b> <input type="checkbox"/> <b>EXCEL</b> <input type="checkbox"/> <b>PDF</b> <input type="checkbox"/> <b>OTHER:</b>			

ANALYSIS REQUESTED:[illegible]

NOTES (sample specific  
comments, due dates, etc.)

FOR LAB USE ONLY

TURN AROUND REQUIRED:		<input checked="" type="radio"/> ROUTINE <input type="radio"/> RUSH    SPECIFY DATE: _____ (surcharge may apply)	
SEND INVOICE TO:		<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)	
INVOICE FORMAT:		<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX	
SPECIAL INSTRUCTIONS:		PLEASE SEND A COPY OF THE RESULTS TO: <a href="mailto:wastewater@skifernie.com">wastewater@skifernie.com</a>	

RELINQUISHED BY:	DATE:	Jan 02/25	RECEIVED BY:	DATE:	1/2/25
C. Heinrich	TIME:	12:15	<i>[Signature]</i>	TIME:	9:00
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY		
Cooler Seal Intact? Yes    No    N/A	Sample Temperature: <u>22</u> °C Frozen?    Yes    No	Cooling Method? Icepacks    Ice    None



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>CG2500058</b>		
<b>Client</b>	: <b>Fernie Alpine Resort Utilities Corporation</b>	<b>Laboratory</b>	: ALS Environmental - Calgary
<b>Contact</b>	: Patrick Majer	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1505 - 17TH AVENUE SW Calgary Alberta Canada T2T 0E2	<b>Address</b>	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
<b>Telephone</b>	: 403 254 7669	<b>Telephone</b>	: +1 403 407 1800
<b>Project</b>	: FARUC Winter EMS Wk 1 - river samples	<b>Date Samples Received</b>	: 03-Jan-2025 10:00
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 03-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 09-Jan-2025 09:51
<b>Sampler</b>	: ----		
<b>Site</b>	: ----		
<b>Quote number</b>	: CG21-FARU100-0002		
<b>No. of samples received</b>	: 3		
<b>No. of samples analysed</b>	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Hannah Phung	Lab Assistant	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





## Analytical Results

Sub-Matrix: Water  
 (Matrix: Water)

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Elk River UP	Elk River IDZ	Elk River DN	----	----
Client sampling date / time					02-Jan-2025 10:15	02-Jan-2025 10:30	02-Jan-2025 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2500058-001	CG2500058-002	CG2500058-003	----	----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.30	8.20	8.29	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0074	1.63	0.0174	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	1.40	1.04	1.37	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	0.0025	0.101	0.0031	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0487	<0.0010	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0038	0.0590	0.0057	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.40	1.14	1.37	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	8	6	8	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2500058</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 1 - river samples	Date Samples Received	: 03-Jan-2025 10:00
PO	: ----	Issue Date	: 09-Jan-2025 09:51
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River DN	E298	02-Jan-2025	04-Jan-2025	28 days	2 days	✓	04-Jan-2025	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River IDZ	E298	02-Jan-2025	04-Jan-2025	28 days	2 days	✓	04-Jan-2025	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River UP	E298	02-Jan-2025	04-Jan-2025	28 days	2 days	✓	04-Jan-2025	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River DN	E378-U	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River IDZ	E378-U	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River UP	E378-U	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River DN	E235.NO3-L	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River IDZ	E235.NO3-L	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River UP	E235.NO3-L	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River DN	E235.NO2-L	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River IDZ	E235.NO2-L	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River UP	E235.NO2-L	02-Jan-2025	03-Jan-2025	3 days	1 days	✓	03-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River DN	E372-U	02-Jan-2025	09-Jan-2025	28 days	7 days	✓	09-Jan-2025	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River IDZ	E372-U	02-Jan-2025	09-Jan-2025	28 days	7 days	✓	09-Jan-2025	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River UP	E372-U	02-Jan-2025	09-Jan-2025	28 days	7 days	✓	09-Jan-2025	28 days	7 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River DN	E012.FC	02-Jan-2025	----	----	----		03-Jan-2025	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River IDZ	E012.FC	02-Jan-2025	----	----	----		03-Jan-2025	30 hrs	24 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River UP	E012.FC	02-Jan-2025	----	----	----		03-Jan-2025	30 hrs	24 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River DN	E108	02-Jan-2025	03-Jan-2025	0.25 hrs	23 hrs	✖ EHTR-FM	03-Jan-2025	0.25 hrs	23 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River IDZ	E108	02-Jan-2025	03-Jan-2025	0.25 hrs	23 hrs	✖ EHTR-FM	03-Jan-2025	0.25 hrs	23 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River UP	E108	02-Jan-2025	03-Jan-2025	0.25 hrs	24 hrs	✖ EHTR-FM	03-Jan-2025	0.25 hrs	24 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River DN	E160	02-Jan-2025	----	----	----		06-Jan-2025	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River IDZ	E160	02-Jan-2025	----	----	----		06-Jan-2025	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River UP	E160	02-Jan-2025	----	----	----		06-Jan-2025	7 days	4 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1829660	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1828875	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1828944	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1828945	1	15	6.6	5.0	✓
pH by Meter	E108	1828899	1	19	5.2	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1829733	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1831864	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	1830673	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1829660	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1828875	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1828944	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1828945	1	15	6.6	5.0	✓
pH by Meter	E108	1828899	1	19	5.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1831864	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	1830673	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1829660	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1828875	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1828944	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1828945	1	15	6.6	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1829733	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1831864	1	19	5.2	5.0	✓
TSS by Gravimetry	E160	1830673	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1829660	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1828875	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1828944	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1828945	1	15	6.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1831864	1	19	5.2	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2500058  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC Winter EMS Wk 1 - river samples



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2500058</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 1 - river samples	Date Samples Received	: 03-Jan-2025 10:00
PO	: ----	Date Analysis Commenced	: 03-Jan-2025
C-O-C number	: ----	Issue Date	: 09-Jan-2025 09:50
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Hannah Phung	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Microbiology, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1828899)											
CG2500035-012	Anonymous	pH	----	E108	0.10	pH units	7.77	7.76	0.129%	4%	----
Physical Tests (QC Lot: 1830673)											
FJ2500008-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	14.8	15.0	0.2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1828875)											
CG2500037-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0157	0.0159	1.14%	20%	----
Anions and Nutrients (QC Lot: 1828944)											
CG2500046-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.189	0.187	0.0013	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1828945)											
CG2500046-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1829660)											
CG2500035-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0500	mg/L	0.986	0.977	0.896%	20%	----
Anions and Nutrients (QC Lot: 1831864)											
CG2500044-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0400	mg/L	1.15	1.15	0.176%	20%	----
Microbiological Tests (QC Lot: 1829733)											
CG2500058-001	Elk River UP	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	8	7	13.3%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1830673)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1828875)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1828944)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1828945)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1829660)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1831864)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1829733)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1828899)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1830673)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 1828875)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	96.8	80.0	120	----
Anions and Nutrients (QCLot: 1828944)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1828945)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1829660)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	86.0	85.0	115	----
Anions and Nutrients (QCLot: 1831864)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	97.4	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1828875)										
CG2500037-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1828944)										
CG2500046-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.58 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1828945)										
CG2500046-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1829660)										
CG2500035-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1831864)										
CG2500046-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0514 mg/L	0.05 mg/L	103	70.0	130	----



Telephone : + 1 403 407 1800

SEND REPORT TO:						ANALYSIS REQUESTED:												
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:	C. Heinrich											
PROJECT NAME AND NO.:		FARUC Winter EMS Wk 1 - river samples				QUOTE NO.:												
PO NO.:				ALS CONTACT:	Patryk Wojciak													
REPORT FORMAT:		<input checked="" type="checkbox"/> HARDCOPY <input checked="" type="checkbox"/> EMAIL - ADDRESS: <u>pmaier@skircr.com</u> <input type="checkbox"/> FAX <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> OTHER:																

[illegible]

TURN AROUND REQUIRED: ☒ ROUTINE ☐ RUSH SPECIFY DATE: \_\_\_\_\_ (surcharge may apply)

SEND INVOICE TO:	<input type="checkbox"/> SAME AS REPORT <input type="checkbox"/> DIFFERENT FROM REPORT (provide details)
INVOICE FORMAT:	<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/> FAX

INVOICE FORMAT:	<input type="checkbox"/> HARDCOPY <input type="checkbox"/> PDF <input type="checkbox"/>
SPECIAL INSTRUCTIONS:	PLEASE FAX A COPY OF THE RESULTS TO 250-423-4652 OR E-MAIL TO <a href="mailto:wastewater@skifernie.com">wastewater@skifernie.com</a>

RELINQUISHED BY:	DATE:	Jan 02/25	RECEIVED BY:	DATE:	1/2/25
C. Heinrich	TIME:	12:15	PC	TIME:	9:00
RELINQUISHED BY:	DATE:		RECEIVED BY:	DATE:	
	TIME:			TIME:	

FOR LAB USE ONLY		
Cooler Seal Intact?	Sample Temperature: <u>1.0°C</u>	Cooling Method?
Yes    No    N/A	Frozen?    Yes    No	<u>    </u> Icepacks <u>    </u> Ice <u>    </u> None



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>CG2500261</b>		
<b>Client</b>	: <b>Fernie Alpine Resort Utilities Corporation</b>	<b>Laboratory</b>	: ALS Environmental - Calgary
<b>Contact</b>	: Patrick Majer	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1505 - 17TH AVENUE SW Calgary Alberta Canada T2T 0E2	<b>Address</b>	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
<b>Telephone</b>	: 403 254 7669	<b>Telephone</b>	: +1 403 407 1800
<b>Project</b>	: FARUC Winter EMS (Week 2) - WWTP Samples	<b>Date Samples Received</b>	: 09-Jan-2025 09:50
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 09-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 14-Jan-2025 16:07
<b>Sampler</b>	: NICHOLAS CORMAN		
<b>Site</b>	: ----		
<b>Quote number</b>	: CG21-FARU100-0002		
<b>No. of samples received</b>	: 2		
<b>No. of samples analysed</b>	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Eunice Cura	Lab Analyst	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





## Analytical Results

Sub-Matrix: Water

(Matrix: Water)

					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
					Client sampling date / time	08-Jan-2025 09:45	08-Jan-2025 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2500261-001	CG2500261-002	----	----	----	----
					Result	Result	----	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.30	8.11	----	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	126	<3.0	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0137	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	----	23.8	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	----	0.0091	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.115	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.155	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	23.8	----	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	----	<1	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	69.1	<2.0	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2500261</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS (Week 2) - WWTP Samples	Date Samples Received	: 09-Jan-2025 09:50
PO	: ----	Issue Date	: 14-Jan-2025 16:08
C-O-C number	: ----		
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	08-Jan-2025	----	----	----		09-Jan-2025	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	08-Jan-2025	----	----	----		09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	08-Jan-2025	10-Jan-2025	28 days	2 days	✓	10-Jan-2025	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	08-Jan-2025	10-Jan-2025	28 days	2 days	✓	12-Jan-2025	28 days	4 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	08-Jan-2025	----	----	----		09-Jan-2025	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	08-Jan-2025	09-Jan-2025	0.25 hrs	26 hrs	✖ EHTR-FM	09-Jan-2025	0.25 hrs	26 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	08-Jan-2025	09-Jan-2025	0.25 hrs	27 hrs	✖ EHTR-FM	09-Jan-2025	0.25 hrs	27 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	08-Jan-2025	----	----	----		10-Jan-2025	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	08-Jan-2025	----	----	----		10-Jan-2025	7 days	2 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
Analytical Methods			QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1835494	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1834699	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1834265	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1834320	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1834321	1	20	5.0	5.0	✓
pH by Meter	E108	1834222	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1835841	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1835639	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1835682	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1835494	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1834699	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1834265	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1834320	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1834321	1	20	5.0	5.0	✓
pH by Meter	E108	1834222	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1835639	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1835682	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1835494	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1834699	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1834265	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1834320	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1834321	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1835841	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1835639	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1835682	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1835494	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1834265	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1834320	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1834321	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1835639	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2500261  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC Winter EMS (Week 2) - WWTP Samples



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2500261</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS (Week 2) - WWTP Samples	Date Samples Received	: 09-Jan-2025 09:50
PO	: ----	Date Analysis Commenced	: 09-Jan-2025
C-O-C number	: ----	Issue Date	: 14-Jan-2025 16:10
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Eunice Cura	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1834222)											
CG2500254-004	Anonymous	pH	----	E108	0.10	pH units	8.11	8.11	0.00%	4%	----
Physical Tests (QC Lot: 1835682)											
CG2500246-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1834265)											
CG2500218-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1834320)											
CG2500218-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1834321)											
CG2500218-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1835494)											
CG2500261-002	WWTP Effluent	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0137	0.0122	0.0015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1835639)											
CG2500221-007	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0024	0.0027	0.0004	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1835841)											
CG2500262-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	5	4	22.2%	65%	----
Aggregate Organics (QC Lot: 1834699)											
CG2500257-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1835682)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1834265)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1834320)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1834321)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1835494)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1835639)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1835841)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1834699)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1834222)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1835682)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 1834265)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.0	80.0	120	----
Anions and Nutrients (QCLot: 1834320)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1834321)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1835494)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.6	85.0	115	----
Anions and Nutrients (QCLot: 1835639)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	96.4	80.0	120	----
Aggregate Organics (QCLot: 1834699)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	90.8	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1834265)										
CG2500218-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0510 mg/L	0.05 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 1834320)										
CG2500218-014	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1834321)										
CG2500218-014	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.513 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1835494)										
CG2500262-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.100 mg/L	0.1 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1835639)										
CG2500222-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0484 mg/L	0.05 mg/L	96.7	70.0	130	----





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: 1-800-688-9878 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 1 OF

**SEND REPORT TO:**

[illegible]



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>CG2500262</b>		
<b>Client</b>	: <b>Fernie Alpine Resort Utilities Corporation</b>	<b>Laboratory</b>	: ALS Environmental - Calgary
<b>Contact</b>	: Patrick Majer	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1505 - 17TH AVENUE SW Calgary Alberta Canada T2T 0E2	<b>Address</b>	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
<b>Telephone</b>	: 403 254 7669	<b>Telephone</b>	: +1 403 407 1800
<b>Project</b>	: FARUC - WINTER EMS (WEEK 2) - RIVER SAMPLE	<b>Date Samples Received</b>	: 09-Jan-2025 09:50
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 09-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 14-Jan-2025 08:21
<b>Sampler</b>	: NICHOLAS CORMAN		
<b>Site</b>	: ----		
<b>Quote number</b>	: CG21-FARU100-0002		
<b>No. of samples received</b>	: 3		
<b>No. of samples analysed</b>	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





## Analytical Results

Sub-Matrix: Water  
 (Matrix: Water)

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Elk River UP	Elk River IDZ	Elk River DN	----	----
Client sampling date / time					08-Jan-2025 10:15	08-Jan-2025 10:30	08-Jan-2025 10:45	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2500262-001	CG2500262-002	CG2500262-003	----	----	
					Result	Result	Result	----	----	
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.38	8.32	8.41	----	----	
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	0.153	0.0059	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	1.19	1.06	1.22	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	0.0025	0.0121	0.0027	----	----	
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	0.0013	0.0186	0.0016	----	----	
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0031	0.0255	0.0031	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.19	1.07	1.22	----	----	
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	5	<1	6	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2500262</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC - WINTER EMS (WEEK 2) - RIVER SAMPLE	Date Samples Received	: 09-Jan-2025 09:50
PO	: ----	Issue Date	: 14-Jan-2025 08:21
C-O-C number	: ----		
Sampler	: NICHOLAS CORMAN		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River DN	E298	08-Jan-2025	10-Jan-2025	28 days	2 days	✓	10-Jan-2025	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River IDZ	E298	08-Jan-2025	10-Jan-2025	28 days	2 days	✓	10-Jan-2025	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River UP	E298	08-Jan-2025	10-Jan-2025	28 days	2 days	✓	10-Jan-2025	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River DN	E378-U	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River IDZ	E378-U	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River UP	E378-U	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River DN	E235.NO3-L	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River IDZ	E235.NO3-L	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River UP	E235.NO3-L	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River DN	E235.NO2-L	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River IDZ	E235.NO2-L	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River UP	E235.NO2-L	08-Jan-2025	09-Jan-2025	3 days	1 days	✓	09-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River DN	E372-U	08-Jan-2025	12-Jan-2025	28 days	4 days	✓	13-Jan-2025	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River IDZ	E372-U	08-Jan-2025	12-Jan-2025	28 days	4 days	✓	13-Jan-2025	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River UP	E372-U	08-Jan-2025	12-Jan-2025	28 days	4 days	✓	13-Jan-2025	28 days	5 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River DN	E012.FC	08-Jan-2025	----	----	----		09-Jan-2025	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River IDZ	E012.FC	08-Jan-2025	----	----	----		09-Jan-2025	30 hrs	25 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River UP	E012.FC	08-Jan-2025	----	----	----		09-Jan-2025	30 hrs	25 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River DN	E108	08-Jan-2025	09-Jan-2025	0.25 hrs	28 hrs	✖ EHTR-FM	09-Jan-2025	0.25 hrs	28 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River IDZ	E108	08-Jan-2025	09-Jan-2025	0.25 hrs	28 hrs	✖ EHTR-FM	09-Jan-2025	0.25 hrs	28 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River UP	E108	08-Jan-2025	09-Jan-2025	0.25 hrs	29 hrs	✖ EHTR-FM	09-Jan-2025	0.25 hrs	29 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River UP	E160	08-Jan-2025	----	----	----		10-Jan-2025	7 days	2 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River DN	E160	08-Jan-2025	----	----	----		12-Jan-2025	7 days	4 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River IDZ	E160	08-Jan-2025	----	----	----		12-Jan-2025	7 days	4 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1835494	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1834495	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1834137	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1834138	1	17	5.8	5.0	✓
pH by Meter	E108	1834497	1	14	7.1	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1835841	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1836621	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1836865	2	39	5.1	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1835494	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1834495	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1834137	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1834138	1	17	5.8	5.0	✓
pH by Meter	E108	1834497	1	14	7.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1836621	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1836865	2	39	5.1	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1835494	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1834495	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1834137	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1834138	1	17	5.8	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1835841	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1836621	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1836865	2	39	5.1	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1835494	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1834495	1	13	7.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1834137	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1834138	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1836621	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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Page : 8 of 8  
Work Order : CG2500262  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC - WINTER EMS (WEEK 2) - RIVER SAMPLE



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: CG2500262</b>	<b>Page</b>	<b>: 1 of 6</b>
<b>Client</b>	: Fernie Alpine Resort Utilities Corporation	<b>Laboratory</b>	: ALS Environmental - Calgary
<b>Contact</b>	: Patrick Majer	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	<b>Address</b>	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
<b>Telephone</b>	: 403 254 7669	<b>Telephone</b>	: +1 403 407 1800
<b>Project</b>	: FARUC - WINTER EMS (WEEK 2) - RIVER SAMPLE	<b>Date Samples Received</b>	: 09-Jan-2025 09:50
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 09-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 14-Jan-2025 08:21
<b>Sampler</b>	: NICHOLAS CORMAN		
<b>Site</b>	: ----		
<b>Quote number</b>	: CG21-FARU100-0002		
<b>No. of samples received</b>	: 3		
<b>No. of samples analysed</b>	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1834497)											
CG2500221-001	Anonymous	pH	----	E108	0.10	pH units	8.36	8.36	0.00%	4%	----
Physical Tests (QC Lot: 1835682)											
CG2500246-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1836865)											
CG2500262-002	Elk River IDZ	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1834137)											
CG2500217-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	25.9	25.9	0.00657%	20%	----
Anions and Nutrients (QC Lot: 1834138)											
CG2500217-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1834495)											
CG2500221-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1835494)											
CG2500261-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0137	0.0122	0.0015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1836621)											
CG2500257-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0276	0.0275	0.109%	20%	----
Microbiological Tests (QC Lot: 1835841)											
CG2500262-001	Elk River UP	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	5	4	22.2%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1835682)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 1836865)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1834137)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1834138)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1834495)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1835494)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1836621)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1835841)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1834497)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1835682)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	100	85.0	115	----
Physical Tests (QCLot: 1836865)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	94.3	85.0	115	----
Anions and Nutrients (QCLot: 1834137)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 1834138)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1834495)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.9	80.0	120	----
Anions and Nutrients (QCLot: 1835494)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.6	85.0	115	----
Anions and Nutrients (QCLot: 1836621)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	98.0	80.0	120	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1834137)										
CG2500244-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1834138)										
CG2500244-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.509 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1834495)										
CG2500221-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0503 mg/L	0.05 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 1835494)										
CG2500262-001	Elk River UP	Ammonia, total (as N)	7664-41-7	E298	0.100 mg/L	0.1 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1836621)										
CG2500257-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0504 mg/L	0.05 mg/L	101	70.0	130	----





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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: 1-800-687-7645 Fax: 306-668-8383

PAGE 1 OF

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

[illegible]



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>CG2500514</b>		
<b>Client</b>	: <b>Fernie Alpine Resort Utilities Corporation</b>	<b>Laboratory</b>	: ALS Environmental - Calgary
<b>Contact</b>	: Patrick Majer	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1505 - 17TH AVENUE SW Calgary Alberta Canada T2T 0E2	<b>Address</b>	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
<b>Telephone</b>	: 403 254 7669	<b>Telephone</b>	: +1 403 407 1800
<b>Project</b>	: FARUC WINTER EMS WK 3 - WWTP SAMPLES	<b>Date Samples Received</b>	: 16-Jan-2025 08:25
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 16-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 23-Jan-2025 11:59
<b>Sampler</b>	: ----		
<b>Site</b>	: ----		
<b>Quote number</b>	: CG21-FARU100-0002		
<b>No. of samples received</b>	: 2		
<b>No. of samples analysed</b>	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Catherine Fong	Lab Analyst	Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





## Analytical Results

Sub-Matrix: Water

(Matrix: Water)

					Client sample ID	WWTP Influent	WWTP Effluent	----	----	----
					Client sampling date / time	15-Jan-2025 09:45	15-Jan-2025 09:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2500514-001	CG2500514-002	----	----	----	----
					Result	Result	----	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.57	7.87	----	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	78.2	<3.0	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	----	0.0113	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	----	34.1	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	----	0.0057	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	----	0.548	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	----	0.564	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	----	34.1	----	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	----	7	----	----	----	----
Aggregate Organics										
Biochemical oxygen demand [BOD]	----	E550/CG	2.0	mg/L	80.2	<2.0	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2500514</b>	Page	: 1 of 7
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 3 - WWTP SAMPLES	Date Samples Received	: 16-Jan-2025 08:25
PO	: ----	Issue Date	: 23-Jan-2025 11:58
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Effluent	E550	15-Jan-2025	----	----	----		16-Jan-2025	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] WWTP Influent	E550	15-Jan-2025	----	----	----		16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) WWTP Effluent	E298	15-Jan-2025	18-Jan-2025	28 days	3 days	✓	18-Jan-2025	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE WWTP Effluent	E378-U	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO3-L	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE WWTP Effluent	E235.NO2-L	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) WWTP Effluent	E372-U	15-Jan-2025	22-Jan-2025	28 days	7 days	✓	22-Jan-2025	28 days	7 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) WWTP Effluent	E012.FC	15-Jan-2025	----	----	----		16-Jan-2025	30 hrs	23 hrs	✓
Physical Tests : pH by Meter										
HDPE WWTP Effluent	E108	15-Jan-2025	16-Jan-2025	0.25 hrs	31 hrs	✖ EHTR-FM	16-Jan-2025	0.25 hrs	31 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE WWTP Influent	E108	15-Jan-2025	16-Jan-2025	0.25 hrs	31 hrs	✖ EHTR-FM	16-Jan-2025	0.25 hrs	31 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE WWTP Effluent	E160	15-Jan-2025	----	----	----		22-Jan-2025	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE WWTP Influent	E160	15-Jan-2025	----	----	----		22-Jan-2025	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1844097	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1842254	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1841594	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1842037	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1842036	1	20	5.0	5.0	✓
pH by Meter	E108	1842260	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1843416	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1844418	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1846296	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1844097	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1842254	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1841594	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1842037	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1842036	1	20	5.0	5.0	✓
pH by Meter	E108	1842260	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1844418	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1846296	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1844097	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1842254	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1841594	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1842037	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1842036	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1843416	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1844418	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1846296	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1844097	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1841594	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1842037	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1842036	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1844418	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Calgary	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.



Page : 7 of 7  
 Work Order : CG2500514  
 Client : Fernie Alpine Resort Utilities Corporation  
 Project : FARUC WINTER EMS WK 3 - WWTP SAMPLES



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298  ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372  ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2500514</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC WINTER EMS WK 3 - WWTP SAMPLES	Date Samples Received	: 16-Jan-2025 08:25
PO	: ----	Date Analysis Commenced	: 16-Jan-2025
C-O-C number	: ----	Issue Date	: 23-Jan-2025 11:58
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Catherine Fong	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1842260)											
CG2500486-001	Anonymous	pH	----	E108	0.10	pH units	7.60	7.64	0.525%	4%	----
Physical Tests (QC Lot: 1846296)											
CG2500514-001	WWTP Influent	Solids, total suspended [TSS]	----	E160	3.0	mg/L	78.2	79.8	2.02%	20%	----
Anions and Nutrients (QC Lot: 1841594)											
CG2500498-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1842036)											
CG2500560-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0059	<0.0050	0.0009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1842037)											
CG2500560-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	4.39	4.40	0.302%	20%	----
Anions and Nutrients (QC Lot: 1844097)											
CG2500514-002	WWTP Effluent	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0113	0.0103	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1844418)											
CG2500514-002	WWTP Effluent	Phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.564	0.563	0.163%	20%	----
Microbiological Tests (QC Lot: 1843416)											
CG2500516-001	Anonymous	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	7	5	33.3%	65%	----
Aggregate Organics (QC Lot: 1842254)											
CG2500491-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1846296)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1841594)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1842036)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1842037)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1844097)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1844418)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1843416)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----
Aggregate Organics (QCLot: 1842254)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1842260)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1846296)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1841594)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	96.3	80.0	120	----
Anions and Nutrients (QCLot: 1842036)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1842037)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1844097)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.4	85.0	115	----
Anions and Nutrients (QCLot: 1844418)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	99.7	80.0	120	----
Aggregate Organics (QCLot: 1842254)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	94.6	85.0	115	----





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1841594)										
CG2500498-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0509 mg/L	0.05 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 1842036)										
CG2500517-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.500 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1842037)										
CG2500517-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.51 mg/L	2.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1844097)										
CG2500516-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1844418)										
CG2500516-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0518 mg/L	0.05 mg/L	104	70.0	130	----





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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, 8936 - 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: 306-668-6370 Toll Free: 1-800-667-7645 Fax: 306-668-6370

## CHAIN OF CUSTODY FORM

**SEND REPORT TO:**

SEND REPORT TO:																					
COMPANY:		FERNIE ALPINE RESORT UTILITIES CORPORATION				ATTN:		PATRICK MAJER		ANALYSIS REQUESTED:											
ADDRESS:		1505 - 17TH AVENUE SOUTH WEST																			
CITY:		CALGARY		PROV:		ALBERTA		POSTAL CODE:												T2T 0E2	
TEL:		403 - 256 - 8473		FAX:		403 - 244 - 3774		SAMPLER:												C. Heinrich	
PROJECT NAME AND NO.:		FARUC Winter EMS Wk 3 - WWTP samples				QUOTE NO:															
PO NO:				ALS CONTACT:		Patryk Wojciak															
REPORT FORMAT:		<input checked="" type="checkbox"/> <b>HARDCOPY</b> <input checked="" type="checkbox"/> <b>EMAIL - ADDRESS</b> <a href="mailto:pmajer@skircr.com">pmajer@skircr.com</a> <input type="checkbox"/> <b>FAX</b> <input type="checkbox"/> <b>EXCEL</b> <input type="checkbox"/> <b>PDF</b> <input type="checkbox"/> <b>OTHER:</b>																			

Environmental Division  
Calgary  
Work Order Reference  
**CG2500514**



Telephone : +1 403 407 1800

WO#		SAMPLE IDENTIFICATION	DATE / TIME COLLECTED		MATRIX	Fecal Coli	TSS	pH	Ortho P	Total P	NH3-N	NO3-N	NO2-N	BOD5	COD					NOTES (sample specific comments, due dates, etc.)
			YYYY-MM-DD	TIME																
FOR LAB USE ONLY		WWTP Influent Routine	2025-01-15	9:45	Water		X	X												
		WWTP Influent BOD	2025-01-15	9:45	Water									X						
		WWTP Effluent Routine	2025-01-15	9:55	Water		X	X												
		WWTP Effluent BOD	2025-01-15	9:55	Water									X						
		WWTP Effluent Nutrients	2025-01-15	9:55	Water				X	X	X	X	X							
		WWTP Effluent Bacteriological	2025-01-15	9:55	Water	X														

TURN AROUND REQUIRED:

SEND INVOICE TO:

INVOICE FORMAT:

SPECIAL INSTRUCTIONS:

☒ ROUTINE
☐ RUSH
SPECIFY DATE: \_\_\_\_\_ (surcharge may apply)

☐ SAME AS REPORT
☐ DIFFERENT FROM REPORT (provide details)

☐ HARDCOPY
☐ PDF
☐ FAX

PLEASE SEND A COPY OF THE RESULTS TO: wastewater@skifernie.com

RELINQUISHED BY: C. Heinrich

DATE: Jan 15/25

TIME: 12:15

RECEIVED BY:

DATE: 1/16

TIME: 8:25

RELINQUISHED BY:

DATE:

TIME:

RECEIVED BY:

DATE:

TIME:

FOR LAB USE ONLY

Cooler Seal Intact? ☒ Yes ☐ No ☐ N/A

Sample Temperature: 38 °C

Cooling Method? ☒ Icepacks ☐ Ice ☐ None



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>CG2500516</b>		
<b>Client</b>	: <b>Fernie Alpine Resort Utilities Corporation</b>	<b>Laboratory</b>	: ALS Environmental - Calgary
<b>Contact</b>	: Patrick Majer	<b>Account Manager</b>	: Patryk Wojciak
<b>Address</b>	: 1505 - 17TH AVENUE SW Calgary Alberta Canada T2T 0E2	<b>Address</b>	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
<b>Telephone</b>	: 403 254 7669	<b>Telephone</b>	: +1 403 407 1800
<b>Project</b>	: FARUC Winter EMS Wk 3 - River Samples	<b>Date Samples Received</b>	: 16-Jan-2025 08:25
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 16-Jan-2025
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 23-Jan-2025 11:59
<b>Sampler</b>	: ----		
<b>Site</b>	: ----		
<b>Quote number</b>	: CG21-FARU100-0002		
<b>No. of samples received</b>	: 3		
<b>No. of samples analysed</b>	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Microbiology, Calgary, Alberta





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
LOR: Limit of Reporting (detection limit).

Unit	Description
CFU/100mL	colony forming units per hundred millilitres
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.





## Analytical Results

Sub-Matrix: Water  
 (Matrix: Water)

					Client sample ID	Elk River UP	Elk River IDZ	Elk River DN	----	----
					Client sampling date / time	15-Jan-2025 10:15	15-Jan-2025 10:30	15-Jan-2025 10:45	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	CG2500516-001	CG2500516-002	CG2500516-003	----	----	----
					Result	Result	Result	----	----	----
Physical Tests										
pH	----	E108/CG	0.10	pH units	8.27	8.28	8.26	----	----	----
Solids, total suspended [TSS]	----	E160/CG	3.0	mg/L	<3.0	<3.0	<3.0	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	0.0355	<0.0050	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/CG	0.0050	mg/L	1.39	1.35	1.42	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/CG	0.0010	mg/L	0.0024	0.0052	0.0030	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/CG	0.0010	mg/L	<0.0010	0.0180	<0.0010	----	----	----
Phosphorus, total	7723-14-0	E372-U/CG	0.0020	mg/L	0.0037	0.0246	0.0030	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/C G	0.0050	mg/L	1.39	1.36	1.42	----	----	----
Microbiological Tests										
Coliforms, thermotolerant [fecal]	----	E012.FC/CG	1	CFU/100 mL	7	<1	5	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>CG2500516</b>	Page	: 1 of 8
Client	: <b>Fernie Alpine Resort Utilities Corporation</b>	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 3 - River Samples	Date Samples Received	: 16-Jan-2025 08:25
PO	: ----	Issue Date	: 23-Jan-2025 11:58
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River DN	E298	15-Jan-2025	18-Jan-2025	28 days	3 days	✓	18-Jan-2025	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River IDZ	E298	15-Jan-2025	18-Jan-2025	28 days	3 days	✓	18-Jan-2025	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Elk River UP	E298	15-Jan-2025	18-Jan-2025	28 days	3 days	✓	18-Jan-2025	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River DN	E378-U	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River IDZ	E378-U	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE Elk River UP	E378-U	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River DN	E235.NO3-L	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River IDZ	E235.NO3-L	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Elk River UP	E235.NO3-L	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River DN	E235.NO2-L	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River IDZ	E235.NO2-L	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Elk River UP	E235.NO2-L	15-Jan-2025	16-Jan-2025	3 days	1 days	✓	16-Jan-2025	3 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River DN	E372-U	15-Jan-2025	22-Jan-2025	28 days	7 days	✓	22-Jan-2025	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River IDZ	E372-U	15-Jan-2025	22-Jan-2025	28 days	7 days	✓	22-Jan-2025	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Elk River UP	E372-U	15-Jan-2025	22-Jan-2025	28 days	7 days	✓	22-Jan-2025	28 days	7 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River DN	E012.FC	15-Jan-2025	----	----	----		16-Jan-2025	30 hrs	24 hrs	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River IDZ	E012.FC	15-Jan-2025	----	----	----		16-Jan-2025	30 hrs	24 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (MF-mFC)										
Sterile HDPE (Sodium thiosulphate) Elk River UP	E012.FC	15-Jan-2025	----	----	----		16-Jan-2025	30 hrs	24 hrs	✓
Physical Tests : pH by Meter										
HDPE Elk River DN	E108	15-Jan-2025	16-Jan-2025	0.25 hrs	30 hrs	✖ EHTR-FM	16-Jan-2025	0.25 hrs	30 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River IDZ	E108	15-Jan-2025	16-Jan-2025	0.25 hrs	31 hrs	✖ EHTR-FM	16-Jan-2025	0.25 hrs	31 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Elk River UP	E108	15-Jan-2025	16-Jan-2025	0.25 hrs	31 hrs	✖ EHTR-FM	16-Jan-2025	0.25 hrs	31 hrs	✖ EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Elk River DN	E160	15-Jan-2025	----	----	----		22-Jan-2025	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River IDZ	E160	15-Jan-2025	----	----	----		22-Jan-2025	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Elk River UP	E160	15-Jan-2025	----	----	----		22-Jan-2025	7 days	7 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1844097	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1841594	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1841803	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1841802	1	20	5.0	5.0	✓
pH by Meter	E108	1842260	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1843416	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1844418	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1846296	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1844097	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1841594	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1841803	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1841802	1	20	5.0	5.0	✓
pH by Meter	E108	1842260	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1844418	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1846296	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1844097	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1841594	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1841803	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1841802	1	20	5.0	5.0	✓
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC	1843416	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1844418	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1846296	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1844097	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1841594	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1841803	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1841802	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1844418	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (MF-mFC)	E012.FC ALS Environmental - Calgary	Water	APHA 9222 D (mod)	Following filtration (0.45 µm), and incubation at 44.5 ± 0.2°C for 22-26 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Calgary	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Calgary	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Calgary	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
---------------------	--------------	--------	------------------	---------------------



Page : 8 of 8  
Work Order : CG2500516  
Client : Fernie Alpine Resort Utilities Corporation  
Project : FARUC Winter EMS Wk 3 - River Samples



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Calgary	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

Work Order	: <b>CG2500516</b>	Page	: 1 of 6
Client	: Fernie Alpine Resort Utilities Corporation	Laboratory	: ALS Environmental - Calgary
Contact	: Patrick Majer	Account Manager	: Patryk Wojciak
Address	: 1505 - 17TH AVENUE SW Calgary AB Canada T2T 0E2	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 403 254 7669	Telephone	: +1 403 407 1800
Project	: FARUC Winter EMS Wk 3 - River Samples	Date Samples Received	: 16-Jan-2025 08:25
PO	: ----	Date Analysis Commenced	: 16-Jan-2025
C-O-C number	: ----	Issue Date	: 23-Jan-2025 11:58
Sampler	: ----		
Site	: ----		
Quote number	: CG21-FARU100-0002		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Sunil Palak	Lab Analyst	Calgary Microbiology, Calgary, Alberta





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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

---

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

---





Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1842260)											
CG2500486-001	Anonymous	pH	----	E108	0.10	pH units	7.60	7.64	0.525%	4%	----
Physical Tests (QC Lot: 1846296)											
CG2500514-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	78.2	79.8	2.02%	20%	----
Anions and Nutrients (QC Lot: 1841594)											
CG2500498-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1841802)											
CG2500533-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1841803)											
CG2500533-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	34.9	34.8	0.0815%	20%	----
Anions and Nutrients (QC Lot: 1844097)											
CG2500514-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0113	0.0103	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1844418)											
CG2500514-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.564	0.563	0.163%	20%	----
Microbiological Tests (QC Lot: 1843416)											
CG2500516-001	Elk River UP	Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	7	5	33.3%	65%	----





Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1846296)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1841594)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1841802)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1841803)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1844097)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1844418)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Microbiological Tests (QCLot: 1843416)						
Coliforms, thermotolerant [fecal]	----	E012.FC	1	CFU/100mL	<1	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1842260)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1846296)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1841594)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	96.3	80.0	120	----
Anions and Nutrients (QCLot: 1841802)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1841803)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1844097)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	97.4	85.0	115	----
Anions and Nutrients (QCLot: 1844418)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.03 mg/L	99.7	80.0	120	----





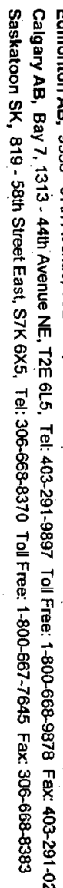
Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Laboratory sample ID					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Client sample ID	Analyte	CAS Number	Method							
Anions and Nutrients (QCLot: 1841594)										
CG2500498-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0509 mg/L	0.05 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 1841802)										
CG2500547-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.500 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1841803)										
CG2500547-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.49 mg/L	2.5 mg/L	99.7	75.0	125	----
Anions and Nutrients (QCLot: 1844097)										
CG2500516-001	Elk River UP	Ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1844418)										
CG2500516-001	Elk River UP	Phosphorus, total	7723-14-0	E372-U	0.0518 mg/L	0.05 mg/L	104	70.0	130	----



**Vancouver BC,** 1988 Triumph Street, V5L 1K5. Tel: 604-253-4168. Toll Free: 1-800-665-0243. Fax: 604-253-6700.  
**Fort St. John BC,** Box 256, 9631 - 98A Avenue, V1J 6W7. Tel: 250-261-5917. Fax: 250-261-5567.  
**Grand Prairie AB,** 9596 - 111 Street, T8V 5W1. Tel: 780-539-5190. Toll Free: 1-800-668-9878. Fax: 780-513-2191.



**Environmental Division**  
**Calgary**

## CHAIN OF CUSTODY FORM

CG2500516

[illegible]





**NAUTILUS**  
ENVIRONMENTAL

## **Acute Toxicity Test Results**

Sample collected February 14, 2024

Final Report

March 11, 2024

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



## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates			Receipt temperature
	Collected	Received	Rainbow trout test initiation	
WWTP Effluent / 2324-1488	2024-02-14 at 1100h	2024-02-15 at 0950h	2024-02-18 at 1340h	7.9°C

## TEST TYPES

- Rainbow trout 96-h LC50 test

## RESULTS

### Toxicity test results

Sample ID	Rainbow trout LC50 (% v/v)
WWTP Effluent	> 100

LC = Lethal Concentration

## QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	4.4 (4.2-4.7) g/L KCl <sup>1</sup>
Reference toxicant historical mean (2 SD Range)	3.8 (3.0-4.7) g/L KCl
Reference toxicant CV	7.1%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

<sup>1</sup>Test date 2024-01-31

LC = Lethal Concentration, CL = Confidence Limit, SD = Standard Deviation, CV = Coefficient of Variation



*Muneera Siddiqua*

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Report By:  
Muneera Siddiqua  
Laboratory Assistant

*D. Meyer*

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Reviewed By:  
Daisy Meyer, BSc  
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**

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**Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.**

Test species	<i>Oncorhynchus mykiss</i>
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**

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# Trout Bench Sheet

 Method TRD Client FER116 Reference 2324-1488 Chamber 1
**Test Log**

Day	Date	Time	Initial	Chem. Cart	Double Counted	Daily Data Review	Sample Information
0	2024/02/18	1340 *	ZB	7	KO	AM	Initial pH: <u>7.1</u>
1	2024/02/19	0920	JK	-	-	KO	Initial EC (µS/cm): <u>796</u>
2	2024/02/20	0850	AC	-	-	AM	Salinity (ppt): <u>1</u>
3	2024/02/21	0655	40	-	-	EC	
4	2024/02/22	1310	40/BS	7	-	DM	

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

**Sample Pre-Aeration**

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

Preaeration time 0 hours 0.5 hours 1 hour 1.5 hours 2 hours

DO(mg/L) of 100%

Temp (°C) of 100%

8.8	8.9			
15				

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	7.8	7.8	7.8	7.8	7.7	7.6
Day 4	7.6	7.9	7.9	7.4	7.4	7.7

	EC (µS/cm)					
Day 0	447	480	502	560	678	888
Day 4	422	449	471	527	632	830

	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	8.9	8.4	8.4	8.4	8.4	8.4

	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			Test Organism Information	
Control Fish	Length (cm)	Weight (g)	Batch	20231207TR
1	3.5	0.4	Loading Density (g/L): (must be ≤0.5 g/L)	0.2
2	3.9	0.5		
3	3.9	0.5	Mean Length (cm):	3.7
4	3.7	0.4		
5	3.6	0.3	Length Range (cm):	33-4.1
6	3.6	0.4		
7	3.9	0.5	Mean Weight (g): (Must be ≥0.3g)	0.4
8	4.1	0.6		
9	4.0	0.5	Weight Range (g):	0.3-0.6
10	3.3	0.3		
Comments :			Test Volume (L) 18	

 Reviewed By: NA

 Date Reviewed: 2024-03-04



**APPENDIX C – Chain-of-custody form**

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Form 020: Revised by TP 2021/11/17



**END OF REPORT**

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## **Acute Toxicity Test Results**

Sample collected May 8, 2024

Final Report

June 3, 2024

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



## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates		Rainbow trout test initiation	Receipt temperature
	Collected	Received		
WWTP Effluent/ 2324-2091	2024-05-08 at 0900h	2024-05-09 at 0920h	2024-05-09 at 1410h	11.1°C

## TEST TYPES

- Rainbow trout 96-h LC50 test

## RESULTS

### Toxicity test results

Sample ID	Rainbow trout LC50 (% v/v)
WWTP Effluent	>100

LC = Lethal Concentration

## QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	3.3 (2.8-3.8) g/L KCl <sup>1</sup>
Reference toxicant historical mean (2 SD Range)	3.8 (3.0-5.0) g/L KCl
Reference toxicant CV	8.5%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

<sup>1</sup> Test date 2024-05-23

LC = Lethal Concentration, CL = Confidence Limit, SD = Standard Deviation, CV = Coefficient of Variation



*Kristy Nguyen*

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Report By:  
Kristy Nguyen  
Laboratory Assistant

*Emma Pedersen*

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Reviewed By:  
Emma Pedersen, BSc, BIT  
Laboratory 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**

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**Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.**

Test species	<i>Oncorhynchus mykiss</i>
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, & 2023 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**

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# Trout Bench Sheet

Method TRD Client FER116 Reference 2324-2091 Chamber 3

## Test Log

Day	Date	Time	Initial	Chem. Cart	Double Counted	Daily Data Review	Sample Information
0	2024-05-09	1410	JK/AO	-	AO	XC	Initial pH: <u>7.7</u>
1	2024-05-10	1040	JK	-	-	NA	Initial EC (µS/cm): <u>713</u>
2	2024-05-11	0855	AO	-	-	EP	Salinity (ppt): <u>0</u>
3	2024-05-12	0845	WP	-	-	XC	
4	2024-05-13	1330	CCP/MBM	-	-	AI	

Note: \*, time when the test was loaded with fish

## Sample Pre-Aeration

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

Preaeration time

DO(mg/L) of 100%

Temp (°C) of 100%

0 hours	0.5 hours	1 hour	1.5 hours	2 hours
<u>9.3</u>	<u>9.2</u>	<u>9.6</u>		
<u>16</u>	<u>46</u>			

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.	6.25	12.5	25	50	100		
-------	------	------	----	----	-----	--	--

pH (units) (range: 5.5-8.5)

Day 0	<u>7.6</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.6</u>		
Day 4	<u>7.8</u>	<u>7.9</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>		

EC (uS/cm)

Day 0	<u>513</u>	<u>544</u>	<u>567</u>	<u>674</u>	<u>630</u>		
Day 4	<u>503</u>	<u>537</u>	<u>556</u>	<u>647</u>	<u>805</u>		

DO (mg/L) (70-100% saturation at test temp.)

Day 0	<u>8.9</u>	<u>8.9</u>	<u>8.4</u>	<u>8.6</u>	<u>8.236</u>		
Day 4	<u>8.6</u>	<u>8.6</u>	<u>8.6</u>	<u>8.6</u>	<u>8.6</u>		

Temperature (°C) (range: 14-16°C)

Day 0	<u>14</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>16</u>		
Day 4	<u>16</u>	<u>16</u>	<u>16</u>	<u>16</u>	<u>16</u>		

Number Alive (in brackets number stressed)

Day 0	10	10	10	10	10		
Day 1	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>		
Day 2	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>		
Day 3	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>		
Day 4	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>		

Unless otherwise noted, behavior is considered to be normal

Test Volume: 18L

Control Reference Number: 20240509CTLB

Comments:

Reviewed By: KM

Date Reviewed: 2024-05-28



# Control Trout Bench Sheet

Client NE

Control Reference Number 20240509CTLB

Chamber 3

## Test Log

Day	Date	Time	Initial	Chem. Cart	Double Counted	Daily Data Review
0	2024-05-09	1400 *	JK/AO	7	AO	JK
1	2024-05-10	1035	JK	-	-	NA
2	2024-05-11	0855	AO	-	-	EP
3	2024-05-12	0845	NP	-	-	SC
4	2024-05-13	1320	NP/PR/SH	7	-	AT

Sample Reference Number(s):
2324-2083-01
2324-2083-02
2324-2088-01
2324-2088-02
2324-2091

Note: \*, time when the test was loaded with fish

## Control Pre-Aeration

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

Test Chemistry and Biology	
Conc.	CTL
pH (units) (range: 5.5-8.5)	
Day 0	7.3
Day 4	7.7
EC (uS/cm)	
Day 0	491
Day 4	496
DO (mg/L) (70-100% saturation at test temp.)	
Day 0	5.3
Day 4	8.6
Temperature (°C) (range: 14-16°C)	
Day 0	15
Day 4	16
<b>DO in mg/L (70% - 100% saturation)**</b> 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	
Number Alive (In brackets number stressed)	
Day 0	10
Day 1	10
Day 2	10
Day 3	10
Day 4	10

Test Organism Information	
Batch	20240306TR
Source	Trout Lodge
Tank #	13
Held at 15± 2°C for ≥14 days (must be ≥14 days)	Y
Percent stock mortality (7 days prior to test, must be <2%)	0
Test Volume (L)	16 <sup>JK</sup>

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	4.1	0.8
2	4.2	0.6
3	4.2	0.6
4	4.4	0.9
5	3.5	0.3
6	4.1	0.5
7	3.2	0.3
8	4.2	0.6
9	4.2	0.6
10	3.9	0.4
Loading Density (g/L): <u>0.4</u> (must be ≤0.5 g/L)		
Mean Length (cm): <u>4.1</u>		
Length Range (cm): <u>3.2-4.4</u>		
Mean Weight (g): <u>0.3-0.6 BH</u> (Must be ≥0.3g)		
Weight Range (g): <u>0.3-0.9</u>		

Comments :

Reviewed By: NA

Date Reviewed: 2024-05-13



**APPENDIX C – Chain-of-custody form**

---





TESTING LOCATION (Please Circle)

Burnaby  
8664 Commerce Court  
Burnaby, British Columbia, Canada  
V5A 4N7  
Phone 604.420.8773

Calgary  
10823 27 Street SE  
Calgary, Alberta, Canada  
T2Z 3V9  
Phone 403.253.7121

Chain of Custody

Point Edward  
704 Mara Street, Suite 122  
Point Edward, Ontario, Canada  
N7V 1X4  
Phone 519.339.8787

Date \_\_\_\_\_ Page 1 of 1

<b>Report to:</b>				<b>Invoice To:</b>			
Company Fermie Alpine Resort Utilities Corp.				Company Fermie Alpine Resort Utilities Corp.			
Address 1505-17th Ave SW				Address 1505-17th Ave SW			
City/Prov/PC Calgary AB T2T 0E2				City/Prov/PC Calgary AB T2T 0E2			
Contact Patrick Majer				Contact Patrick Majer			
Phone (403) 861-8730				Phone (403) 861-8730			
Email pmajer@skircr.com				Email pmajer@skircr.com			
PO No.				PO No.			
Sample Collection By: <u>C. Heinrich</u>				Sample Type: <input type="radio"/> Grab <input type="radio"/> OR <input type="radio"/> Composite			
SAMPLE ID	DATE (DD/MM/YY)	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS		
1 WWTP Effluent	08/05/24	09:00	WW	2x10 L			
2 7024105109							
3 0970							
4 <del>Point Edward</del> <u>Heinrich</u>							
5 BSLN/AS							
6 2x20L carboys							
7 Good Cond.							
8 NoSLN/AS							
9 11.1°C							
10 2324-2091							
SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)				SAMPLE RECEIPT DETAILS (LABORATORY)			
Please copy results & billing to: cheinrich@skirfernie.com  Thank you!				1. Total No. of Containers	4. Ice Present in Cooler?	Y / N	
				2. Courier	5. Seal Present?	Y / N	
				3. Good Condition?	6. Initials Present on Seal?	Y / N	
RELINQUISHED BY (CLIENT)				RECEIVED BY (LABORATORY)			
C. Heinrich (Printed Name)				(Signature)			
08/05/24 12:00 (Date DD/MM/YY and Time)				(Date DD/MM/YY and Time)			
FARUC (Company)				FARUC (Company)			
Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.							
Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling, or transport of the sample, application or interpretation of the test data or results in part or in whole.							
Form 020, Revised by TP 2021/11/17							



**END OF REPORT**

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# Acute Toxicity Test Results

Sample collected September 18, 2024

Final Report

October 2, 2024

Submitted to: **Fernie Alpine Resort Utilities Corp.**  
Calgary, AB



## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates		Rainbow trout test initiation	Receipt temperature
	Collected	Received		
WWTP Effluent / 2425-0164	2024-09-18 at 1000h	2024-09-19 at 0900h	2024-09-19 at 1310h	12.8°C

## TEST TYPES

- Rainbow trout 96-h LC50 test

## RESULTS

### Toxicity test results

Sample ID	Rainbow trout LC50 (% v/v)
WWTP Effluent	> 100

LC = Lethal Concentration

## QA/QC

QA/QC summary	Rainbow trout
Reference toxicant LC50 (95% CL)	3.6 (3.4-3.9) g/L KCl <sup>1</sup>
Reference toxicant historical mean (2 SD Range)	3.8 (2.9-5.0) g/L KCl
Reference toxicant CV	9.0%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

<sup>1</sup> Test date 2024-09-11

LC = Lethal Concentration, CL = Confidence Limit, SD = Standard Deviation, CV = Coefficient of Variation



*Jessica Knoch*

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Report By:  
Jessica Knoch, BSc  
Laboratory Biologist

*Emma Pedersen*

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Reviewed By:  
Emma Pedersen, BSc, BIT  
Laboratory 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**

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**Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.**

Test species	<i>Oncorhynchus mykiss</i>
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, & 2023 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**

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Method TRD Client FER116 Reference 2425-0164 Chamber 3
**Test Log**

Day	Date	Time	Initial	Chem. Cart	Double Counted	Daily Data Review	Sample Information
0	2024/09/19	1310 *	PK	7	BP	JK	Initial pH: <u>7.9</u>
1	2024/09/20	0735	SY	-	-	HO	Initial EC (µS/cm): <u>852</u>
2	2024/09/21	0736	JO	-	-	MS	Salinity (ppt): <u>0</u>
3	2024/09/22	0815	BP	-	-	XC	
4	2024/09/23	1240	SY	7	-	JK	

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

**Sample Pre-Aeration**

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

Preaeration time

DO(mg/L) of 100%

Temp (°C) of 100%

0 hours	0.5 hours	1 hour	1.5 hours	2 hours
<u>8.6</u>	<u>8.8</u>			
<u>16 15</u>				

**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.	6.25	12.5	25	50	100
-------	------	------	----	----	-----

	pH (units) (range: 5.5-8.5)				
Day 0	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.7</u>
Day 4	<u>8.0</u>	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>	<u>8.0</u>

	EC (µS/cm)				
Day 0	<u>445</u>	<u>478</u>	<u>531</u>	<u>634</u>	<u>656</u>
Day 4	<u>449</u>	<u>489</u>	<u>542</u>	<u>644</u>	<u>865</u>

	DO (mg/L) (70-100% saturation at test temp.)				
Day 0	<u>8.6</u>	<u>8.6</u>	<u>8.8</u>	<u>8.8</u>	<u>8.8</u>
Day 4	<u>8.2</u>	<u>8.3</u>	<u>8.2</u>	<u>8.2</u>	<u>8.2</u>

	Temperature (°C) (range: 14-16°C)				
Day 0	<u>10</u>	<u>16</u>	<u>15</u>	<u>15</u>	<u>15</u>
Day 4	<u>16</u>	<u>16</u>	<u>16</u>	<u>16</u>	<u>16</u>

	Number Alive (In brackets number stressed)				
Day 0	10	10	10	10	10
Day 1	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Day 2	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Day 3	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Day 4	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>

Unless otherwise noted, behavior is considered to be normal

 Test Volume: 18

 Control Reference Number: 20240919CTLA

Comments:

 Reviewed By: XC

 Date Reviewed: 2024-09-24



# Control Trout Bench Sheet

 Client NE

 Control Reference Number 20240919CTLA

 Chamber 3
**Test Log**

Day	Date	Time	Initial	Chem. Cart	Double Counted	Daily Data Review
0	2024/09/19	1310 *	PK	7	BP	JK
1	2024/09/20	0740	SY	-	-	KO
2	2024/09/21	0755	AB	-	-	MS
3	2024/09/22	0815	BP	-	-	XC
4	2024/09/23	1240	SY	7	-	JK

Sample Reference Number(s):
2425-0165
2425-0166
2425-0167
2425-0168
2425-0164

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

**Control Pre-Aeration**

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

Test Chemistry and Biology	
Conc.	CTL
pH (units) (range: 5.5-8.5)	
Day 0	8.2
Day 4	8.2 → 8.2
EC (uS/cm)	
Day 0	924
Day 4	433
DO (mg/L) (70-100% saturation at test temp.)	
Day 0	8.8
Day 4	8.6
Temperature (°C) (range: 14-16°C)	
Day 0	15
Day 4	16
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	
Number Alive (In brackets number stressed):	
Day 0	10
Day 1	10
Day 2	10
Day 3	10
Day 4	10

Test Organism Information	
Batch	2040606TR
Source	Troutlodge
Tank #	5
Held at 15 ± 2°C for ≥ 14 days (must be ≥ 14 days)	Y
Percent stock mortality (7 days prior to test, must be < 2%)	0.06
Test Volume (L)	16

Acceptable Test Volume Ranges (10% of the control)
14 L control allows for 13 L - 15 L test(s)
16 L control allows for 14 L - 18 L test(s)
18 L control allows for 16 L - 20 L test(s)

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	4.5	0.7
2	3.7	0.3
3	3.7	0.4
4	4.3	0.7
5	3.9	0.5
6	3.9	0.5
7	4.8	0.9
8	4.4	0.7
9	3.1	0.3
10	4.1	0.5
Loading Density (g/L): (must be ≤ 0.5 g/L)		0.3
Mean Length (cm):		4.0
Length Range (cm):		3.1-4.8
Mean Weight (g): (Must be ≥ 0.3g)		0.6
Weight Range (g):		0.3-0.9

Comments/Protocol Deviations:

none

 Reviewed By: EP

 Date Reviewed: 2024/09/23



**APPENDIX C – Chain-of-custody form**

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TESTING LOCATION (Please Circle)

Burnaby

Calgary

Point Edward

8664 Commerce Court  
Burnaby, British Columbia, Canada  
V5A 4N7  
Phone 604.420.8773

704 Mara Street, Suite 122  
Point Edward, Ontario, Canada  
N7V 1X4  
Phone 519.339.8787

Date \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

<b>Report to:</b>				<b>Invoice To:</b>				<b>ANALYSES REQUIRED</b>					
Company Fernie Alpine Resort Utilities Corp. Address 1505-17th Ave SW City/Prov/PC Calgary AB T2T 0E2 Contact Patrick Majer Phone (403) 861-8730 Email pmajer@skircr.com				Company Fernie Alpine Resort Utilities Corp. Address 1505-17th Ave SW City/Prov/PC Calgary AB T2T 0E2 Contact Patrick Majer Phone (403) 861-8730 Email pmajer@skircr.com PO No.				LC50 96 hr trout bioassay					
<b>Sample Collection By:</b>				<b>Sample Type:</b>				<b>Receipt Temperature (°C)</b>					
Grab <input checked="" type="radio"/> OR Composite <input type="radio"/>													
SAMPLE ID		DATE (DD/MM/YY)	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS							
1 WWTP Effluent		18/09/24	10:00		2x10 L								
2													
3 2425-0664													
4 2024/09/14													
5 PK													
6 Nautilus													
7 0900													
8 2x20L carboys													
9 Good Cond.													
10 NDC / NW E													
<b>SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)</b>				<b>SAMPLE RECEIPT DETAILS (LABORATORY)</b>				<b>SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)</b>					
				1. Total No. of Containers		4. Ice Present in Cooler?	Y / N						
				2. Courier		5. Seal Present?	Y / N						
				3. Good Condition?		6. Initials Present on Seal?	Y / N						
<b>RELINQUISHED BY (CLIENT)</b>				<b>RECEIVED BY (LABORATORY)</b>									
Nicholas Gorman				(Signature)									
(Printed Name) (P: 778-531-6707 E: nicholas.gorman@nautilus.ca)				(Date DD/MM/YY and Time)									
FARUC				18/09/24 10:00				Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling, or transport of the sample, application or interpretation of the test data or results in part or in whole.					
(Company)				(Company)									
(Date DD/MM/YY and Time)				(Date DD/MM/YY and Time)				Form 020; Revised by TP 2021/11/17					

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.



**END OF REPORT**

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