

### **2023 Annual Effluent Monitoring Report**

#### Prepared for:

British Columbia Ministry of Environment & Climate Change Strategy EnvAuthorizationsReporting@gov.bc.ca

#### Prepared by:

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#### **Executive Summary**

Queensway Wastewater Treatment Facility (the Facility) is a Class 1 municipal wastewater treatment facility producing a Class C effluent. The facility is located approximately 3 kilometres down Queensway Drive, south of the City of Terrace, and provides secondary treatment of septic effluent from residential and commercial sources in Electoral Area E from Queensway, Churchill, and the Thornhill Commercial Core areas. The facilities authorised works include a two-cell aerated lagoon system, twin exfiltration basins, a flow measurement facility, and an outfall. The facility is authorised under permit number 12645 (the Permit) through the Ministry of Environment and Climate Change Canada (ENV) and includes authorisation to discharge to ground through the twin exfiltration beds (site reference discharge E220346), and to the Skeena River side channel via the outfall during flood stages of the Skeena River (site reference discharge E220347).

The quality of effluent discharged to the exfiltration beds was monitored monthly under the effluent monitoring program. Effluent monitoring was not completed in May during flood conditions of the Skeena River, and a non-compliance report was submitted to ENV for this incident.

The TSS limits of the Municipal Wastewater Regulation and permit were exceeded in June and July of 2023. A non-compliance report was submitted in August discussing the incident. Further root cause analysis was performed by the Regional District of Kitimat Stikine (RDKS), including a survey of sludge depths in aeration lagoons 1 and 2. A root-cause analysis to evaluate conditions leading to the increase in TSS, and a corrective action plan to de-sludge the lagoon is included in this report.

Discharge measurements for 2023 were based on influent flow rate, and precipitation volumes observed at NAVCAN station located at the Northwest Regional Airport. The total annual influent received at the facility was 72,329.9 m³/year, and the total annual discharge to the exfiltration basins was 109,885 m³/year, including precipitation. The average daily influent and effluent volumes were 191.1 m³/day and 301 m³/day, respectively, and below the permitted average discharge limit of 800 m³/day.





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#### 1 Introduction

The objectives of the Queensway Wastewater Treatment Facility 2023 Annual Report include reporting of influent flow volumes, effluent discharge estimates, review of effluent quality in comparison with the applicable criteria, effluent chemical trend analysis, and to provide recommendations. Additionally, this report includes a root-cause analysis and corrective action plan in follow-up with the non-compliance report submitted on August 25, 2023.

#### 2 Background

The Queensway Facility (the facility) is a municipal wastewater treatment facility located approximately 3 kilometres down Queensway Drive, south of the City of Terrace, located on Block A, District Lot 8098, Range 5 Land District, lying on the west side of the British Columbia Hydro and Power Authority Right of Way. The facility was commissioned in 1994, providing secondary treatment of septic effluent from residential and commercial sources in Electoral Area E from Queensway, Churchill, and the Thornhill Commercial Core areas.

The wastewater facility collects effluent from septic tanks of residential buildings, and from the Thornhill Commercial Core, through a combined sewer system. Effluent is conveyed to the wastewater facility through an influent line where flow is measured through an influent flow meter at the facilities blower house. The blower house includes a set of blowers and a force main providing aeration to two aeration lagoons. Effluent passes from the aeration basins into a set of parallel exfiltration basins where it is discharged to the ground. An emergency overflow outfall is located from the infiltration lagoons to a side channel of the Skeena River, approximately 250 metres to the southwest. The facilities authorised works are shown in the Site Plan located in Appendix A.

A master plan for the facility was completed in 2023, which provided an assessment of the wastewater treatment facility capacity and associated sewer system capacity, taking into consideration predicted population projections for the service areas. It was determined that the wastewater system is appropriately sized for current design flows but will require significant upgrades for future buildout scenarios.

#### 2.1 Regulatory Framework Overview

#### **Federal Wastewater Systems Effluent Regulation**

Under the Fisheries Act, the Wastewater Systems Effluent Regulation (WSER) regulates the operation and discharge of effluent from continuous and intermittent discharge wastewater systems in Canada that collect an average daily influent volume of 100 m³ or more, and which deposit effluent to water; or where the deposit of effluent may enter water frequented by fish. Deleterious substances are defined under the Fisheries Act to include any water that contains a substance in such quantity or concentration that would alter the quality of water such that it is likely to become deleterious to fish, or fish habitat. The WSER defines effluent water containing concentrations of carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>)



and suspended solids (TSS) as a deleterious substance under the Fisheries Act but authorizes the deposit of deleterious substances if certain criteria are met for TSS and CBOD<sub>5</sub>. For a discharge to qualify under this exemption, the average concentrations of CBOD<sub>5</sub> and TSS must be below 25 mg/L each over an averaging period.

Averaging period and effluent sampling frequency are determined by the wastewater system type and the average daily influent volume. The WSER also requires that any additional samples that are collected by the wastewater system operator, and are submitted to an accredited laboratory, must be included in the averaging calculations. TSS concentrations from the July, August, September, and October may be excluded from the averaging, provided that a hydraulic retention time (HRT) of 5 consecutive days is met.

Additionally, the regulation sets out requirements for daily influent averaging using continuous monitoring equipment, stipulates requirements for calibration and maintenance of continuous monitoring equipment, stipulates what records are required to be kept and for how long, and regulates reporting requirements. Permitting instruments under the WSER include a Temporary Bypass Authorisation which may be exercised when planned maintenance or conditions are expected to cause exceedances to the CBOD and TSS criteria. Under the WSER the Queensway Wastewater Facility is:

- a continuous discharge wastewater facility,
- required to monitor effluent monthly,
- required to monitor average influent flow rates daily, and
- must use an annual averaging period for CBOD₅ and TSS concentrations.

#### **Provincial Municipal Wastewater Regulation**

Under the Environmental Management Act, the Municipal Wastewater Regulation (MWR) regulates the operation and discharge of permitted municipal wastewater treatment facilities that discharge municipal effluent to ground in volumes greater than 22.7m³/day, or that discharge municipal effluent to water. Under the MWR the facility must be classified under the Environmental Operators Certification Program (EOCP) and must be operated and maintained by persons who are certified under the EOCP. Municipal effluent is classed under the regulation as Class A, Class B, or Class C, according to the treatment objectives of the facility. The effluent class of a facility determines the applicable effluent quality requirements for BOD<sub>5</sub>¹, TSS, fecal coliforms, turbidity and Nitrogen, the latter three of which only apply to Class A and B effluents.

Monitoring requirements including maximum criteria and frequency of sampling for discharges to ground are determined by effluent class and the maximum daily flow of the facility. Monitoring requirements for discharges to water are determined by the maximum daily flow and include toxicity monitoring to rainbow trout using a lethal dose analysis for 50% mortality. Discharges to water must also have a maximum CBOD<sub>5</sub> and TSS value of 10 mg/L under the regulation.

 $<sup>^{1}</sup>$  BOD<sub>5</sub> is defined in the MWR as the carbonaceous 5-day biochemical oxygen demand and defined in this report as CBOD<sub>5</sub>.



The facility produces a Class C effluent, meeting the criteria of secondary treatment for a lagoon system, with  $CBOD_5$  of not more than 45 mg/L, and TSS of not more than 60 mg/L. The frequency of monitoring required is twice a week monitoring of flow frequency, and monthly grab samples of  $CBOD_5$  and TSS. Data must be submitted to the director at minimum quarterly for a system with a maximum daily flow of  $50m^3$  or greater. Discharges to water through the overflow pipe will require effluent monitoring of  $CBOD_5$ , TSS, Total Phosphorous, and orthophosphate. Under the MWR the Queensway Wastewater Facility is:

- registered as a facility producing a Class C effluent,
- required to monitor effluent quality monthly,
- required to monitor the receiving environment if discharge to water occurs, and
- must monitor maximum daily flows twice weekly.

The Queensway Wastewater Facility is a Class 1 Wastewater Treatment Facility, under the Environmental Operators Certification Program (EOCP), certificate No. 406 (Appendix B). The facility has four operators certified at or above Wastewater Treatment Level 1.

#### **Discharge Authorisation**

The facility is authorised to discharge effluent in accordance with the Environmental Management Act under permit number 12645 (the Permit; Appendix C), which includes an authorisation to discharge to the ground, and an authorisation to discharge to the Skeena River side-channel during flood stages of the river. The average authorised rate of discharge is 800 m³ per day, and the maximum authorised rate of discharge is 1,500 m³ per day. The permit was last updated in October 2022 to amend the definition of Biochemical Oxygen Demand to mean Carbonaceous Biochemical Oxygen Demand, to match the BOD definition provided in the MWR (Appendix D).

The monitoring requirements of the permit include the effluent monitoring requirements of the MWR, which are obtained through a monthly grab sample of effluent from the outlet of the aerated lagoon (Site No. E220346) and include monthly reporting of the grab sample data. The authorisation sets additional monitoring parameters, shown in Effluent Monitoring Column of Table 1. If effluent is to be discharge to the Skeena River side-channel, pre-discharge monitoring of the Skeena River side-channel and monitoring of the receiving environment are required. Pre-discharge monitoring and receiving environment monitoring sample requirements are also shown in Table 1.



Table 1 Monitoring Programs and Program Sample Requirements for Queensway Facility, Authorisation 12645

		Monitoring Program		
Parameter	Sample Type	Effluent Monitoring	Outfall Pre-Discharge Monitoring	Receiving Environment Monitoring
Influent Flow Rate (m3/d), continuous measurement	Field	Monthly	NA	NA
Side-Channel Flow Rate	Field	NA	Twice, minimum of one week apart in typical non-flood low-flow conditions	Weekly during outfall discharge and for one month after outfall discharge
Temperature (°C)	Field	Monthly	Twice, minimum of one week apart in typical non-flood low-flow conditions	Weekly for one month after outfall discharge
Dissolved O <sub>2</sub> (mg/L)	Field	Monthly	Twice, minimum of one week apart in typical non-flood low-flow conditions	Weekly for one month after outfall discharge
рН	Field	Monthly	Twice, minimum of one week apart in typical non-flood low-flow conditions	Weekly for one month after outfall discharge
Total Ammonia (mg/L)	Field	Monthly	Twice, minimum of one week apart in typical non-flood low-flow conditions	Weekly for one month after outfall discharge
C-BOD₅ (mg/L)	Grab	Monthly	NA	NA
TSS (mg/L)	Grab	Monthly	NA	NA
Total Phosphorus (mg/L)	Grab	Monthly	NA	NA
Total Nitrogen (mg/L)	Grab	Monthly	Twice, minimum of one week apart in typical non-flood low-flow conditions	Sample if DO <2.0 mg/L or NH3 > 2 mg/L
Nitrate/Nitrite (mg/L)	Grab	NA	Twice, minimum of one week apart in typical non-flood low-flow conditions	Sample if DO <2.0 mg/L or NH3 > 2 mg/L
Fecal Coliform (MPN/100mL)	Grab	NA	Twice, minimum of one week apart in typical non-flood low-flow conditions	Sample if DO <2.0 mg/L or NH3 > 2 mg/L
Fecal Streptococci (MPN/100mL)	Grab	NA	Twice, minimum of one week apart in typical non-flood low-flow conditions	Sample if DO <2.0 mg/L or NH3 > 2 mg/L



#### **3** Discharge Operations

In 2023 all effluent from the facility was discharged to the exfiltration lagoons. There was no discharge of effluent through the outfall to the Skeena River side-channel. The works were inspected regularly during the monthly effluent monitoring sample events.

Maintenance tasks of the Facility completed in 2023 included:

- daily inspection of lift stations/Doorman vault and aerator station,
- recording of influent flow rates,
- monthly oil/ filter change for the blowers,
- flushing manholes (Kulspai),
- lift station charcoal changing,
- regular cleaning of lift and aerator stations,
- weed eating around the sewer lagoons,
- snow removal of associated buildings, and
- recording of deposited solids on the lagoon base at certain locations.

#### 3.1 Monitoring Methodology

Effluent monitoring was carried out by RDKS Works & Services EOCP wastewater technicians, and staff environmental technologist following the British Columbia Field Sampling Manual for Water and Wastewater Sampling. Samples were collected in laboratory supplied bottles by lowering a pole sampler into the effluent weir at the manhole. Samples were then transported in coolers with ice to ALS Laboratories in Burnaby, BC for analysis. Quality assurance (QA) samples consisted of Trip Blanks, Field Blanks, and Field Duplicates. Table 2 presents the regular, and QA samples included in the 2023 monitoring program.

Table 2: Quality Assurance Samples Collected during the 2023 Monitoring Program

Type of QA Sample	Total	Month Sample Submitted
Field Blank	1	October
Field Duplicate	3	June (2), November
Trip Blank	5	June, July, August, September, December
Regular Sample	12	January, February, March, April, June (2), July, August, September, October, November, December

Dissolved oxygen (DO), pH, specific conductance (SPC), and Temperature (T), were measured in the field using a YSI Pro Quatro. Ammonia was not measured in the field. pH measurements were not collected in the field from August to December but were included in the laboratory analysis. The YSI probes were calibrated in the office prior to each sampling event and recorded in a calibration log.



Influent flow rates are measured in the blower building by taking readings from the in-line flow meter at minimum twice a week. Average daily discharge is determined each month on the monitoring visit by subtracting the days since the last monitoring visit using the difference between the two flow readings from each monitoring visit to determine the average daily influent flow rate for the month.

Grab samples were collected each month in 2023, except for May when the facility was not accessible due to flooding of the Skeena River. There was a minimum of 14 days between sampling events, and a maximum of 64 days between the April and June sample. Influent flow rates were recorded for each month, including May.

#### 3.2 Non-Compliance Reporting

During the month of May 2023, the Skeena River experienced flooding, rising from 3.9 to 11.5 metres at the nearest hydrometric data station over a period of 17 days. Typical levels during 2023 ranged from approximately 1 to 4 metres. The flooding resulted in the access to the facility being inundated by flows from the Skeena River. Due to the flooding of the access road, grab samples and monitoring were not completed during the month of June, except for influent flow rate which is monitored continuously in the aerator building. A non-compliance report was submitted on July 2, 2023.

During the month of June, the concentration of TSS from the monthly grab sample obtained on June 14, 2023, was 70.1 mg/L, which exceeded the regulatory limit of 60 mg/L. A follow-up sample was obtained on June 28, 2023. The TSS in the follow-up sample was 45.8 mg/L which was below the regulatory limit. The TSS in the July monthly grab sample obtained on July 12, 2023, was 63.8 which resulted in a second exceedance to the TSS regulatory limit. Possible reasons for the exceedance were considered with the following probable causes:

- Anaerobic conditions caused by an overgrowth of Lemna minor (duckweed) on the lagoons,
- A microalgae bloom that is decaying in the water column as a result of duckweed blocking sunlight required for photosynthesis,
- Excessive sludge buildup in the lagoon,
- Inadequate settling of sludge in the lagoon due to insufficient HRT contributing to short circuiting of effluent through the lagoon,
- Nutrient overload, and
- System upset due to contaminants upstream.

The monthly grab sampling on August 15, 2023, included additional analysis for BTEX, VPH, and EPH to help determine if contaminants were present in the system. A non-compliance report was submitted on August 25, 2023. A follow-up report was to be submitted including the findings of the root-cause investigation. This annual report presents the findings of the root-cause investigation and corrective action plan, detailed in section 4.3 and 4.4 of the report.



#### 3.3 Sludge Depth Investigations

Sludge monitoring was completed on September 20, 2023, to determine the depth of accumulated solids in the two aeration lagoons. Readings were taken by lowering a Sludge Judge Sampler® from a watercraft to the bottom of the lagoon to determine sludge thickness at four locations in aeration cell 1, and eleven locations in aeration cell 2. The sludge depths for aeration cell 2 are modelled in Appendix E, to estimate the probable distribution of sludge accumulation using six equal intervals, or bands, and assuming a flat-bottomed lagoon. The sludge depths ranged from 20 cm to 101 cm, and indicated that a mound of sludge was built up along the inside corner of the lagoon. The sludge measurements taken from aeration cell 1 did not include enough data points to model the analysis, but were of an average thickness of 13.5 cm and ranged from 15 to 76 cm. The wetted depth of the aeration lagoons is 300 cm including any settled sludge. Each of the aeration lagoons have 100 cm of freeboard.

#### 4 Data and Analysis

#### 4.1 Influent Flow Rate and Discharge Volumes

The influent volumes are recorded continuously at the facility and are used to assess compliance with the average and maximum discharge rates. Discharge of effluent from the aeration ponds is assumed to equal influent flow rate plus precipitation over the lagoon area. Influent flow rates and the monthly precipitation measurements from the Terrace Airport NAVCAN station are presented in Table 3. Volumes of precipitation are estimated from the area of the aeration and infiltration lagoons which is approximately 25,375 m² in total (Aeration Bay 1: 2,916 m²; Aeration Bay 2: 9,261 m²; Aeration Bay 3 and 4: 6,599 m² each). Estimates do not include a factor for evaporation, and assume of 50% run-off from the berms into the lagoons during precipitation events.

The average monthly flow rate was determined by multiplying the average influent flow rate for each month by the number of days in each month. The average monthly flow rates were totalled to provide the averaged annual total volume. The annual total volume of influent received as the facility in 2023 was 72,329.9 m<sup>3</sup>.

The total precipitation reported by NAVCAN for the year was 1.48 metres. The total precipitation was multiplied by the estimated area of the lagoons (25,375 m²), to provide the annual volume of precipitation contributing to the total discharge volume. The total estimated volume of precipitation received in the aeration lagoons and infiltration basins was 37,555 m³/year, resulting in a total estimated discharged volume of 109,885 m³/year. This translates to an estimated daily average discharge rate of 301 m³/day, which is below the average authorised discharge rate of 800 m³ per day. Based on the low volumes of influent, and precipitation, and the assumption that there was no evaporation, it is unlikely that the maximum discharge rate of 1500 m³ per day had been exceeded in 2023.



Table 3: Average Influent, Precipitation, and Discharge Volumes by Month for 2023

Date	Average Influent Flow Rate (m³/day)	Average Monthly Flow Rate (m³/month)	Total Precip (mm/month)
January	212.3	6,580.1	122.8
February	288.6	8,081.9	233.3
March	216.4	6,706.9	28.2
April	188.3	5,649.3	79.6
May	230.1	7,133.1	26.6
June	159.2	4,776.0	150.8
July	168.2	5,214.2	58.4
August	172.0	5,332.9	23.5
September	163.9	4,916.1	67.2
October	164.9	5,112.5	109.1
November	195.8	5,874.9	364.6
December	224.3	6,952.1	215.9
Annual Monthly Average	191.1	6,027.5	0.123
Annual Total	Calculated in	72,329.9 m³/year	1,480.0 mm/year (1.48 m/year)
	next column		37,555 m³/year
Total E	109,885 m³/year, or 301 m³/day		

#### 4.2 Effluent Monitoring

The Authorisation requires the field collection of ammonia and pH values. Ammonia was analysed in the lab for each grab sample and was not collected in the field. Field measurements for pH were not collected in from January to May and was collected during only one of the grab samples obtained in June. Measurements for pH were obtained by the lab for all months, with the exception of May when no grab sample was obtained. Observations recorded during the monthly effluent monitoring visits included detailed observations and photos of the duckweed bloom on the two aeration lagoons.

TSS and CBOD<sub>5</sub> values for each grab sample are presented in Figure 1. The monthly reported concentrations in the figure include an average of values when a duplicate sample was collected. Complete lab reports, including certificate of analysis and chain of custody are provided in Appendix F. Effluent Monitoring data is presented in Appendix G. Grab samples were not obtained during the month



of May due to flood conditions of the Skeena River preventing access to the facility. The TSS concentrations from the June 14<sup>th</sup> grab sample and duplicate sample following the flood event resulted in exceedance to the 60 mg/L criteria of the MWR, with an average concentration of 74.5 mg/L. A follow-up sample was obtained on June 28<sup>th</sup> to confirm the exceedance, the TSS results of this sample resulted in an average TSS concentration of 45 mg/L, which was below the regulatory limit. The July 12<sup>th</sup> TSS concentration of the grab sample was 63.8 mg/L, resulting in a second exceedance to the TSS regulatory limit. There were no exceedances to the CBOD<sub>5</sub> regulatory limit of the MWR in 2023.

The average annual concentration for TSS was 26 mg/L, excluding measurements in July and October which were omitted in accordance with the WSER calculation methods. The annual concentration of TSS exceeded the WSER regulatory limit of 25.0 mg/L average concentration. The Annual average concentration of CBOD₅ was 14.2 mg/L, which was below the WSER regulatory limit of 25.0 mg/L.

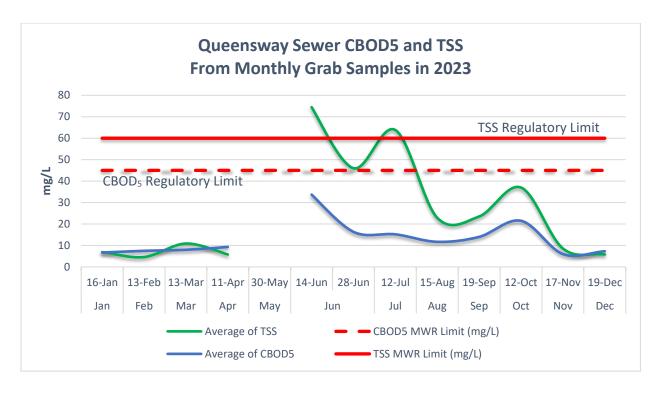


Figure 1: CBOD5 and TSS Concentrations from Queensway Wastewater Facility in 2023

#### 4.3 Root Cause Analysis

TSS concentrations in 2023 were much higher than the historical ranges from the site which resulted in two exceedances to the TSS criteria of the MWR, and an exceedance to the annual average CBOD₅ under the WSER. Concentration of TSS were the highest in the summer months of June, July, August, and September.

The overgrowth of duckweed observed seasonally on the surface of the aeration lagoons during the summer months is believed to be a contributing factor to the increase in TSS concentrations in the



discharged effluent. Duckweed blooms block sunlight from entering the water column, inhibiting the photosynthesis of suspended algae, and causing a die off of algae in the water column. The reduction in DO concentrations observed during the summer support this observation as a contributing factor to upset conditions. This trend has been observed in the water chemistry in the historical dataset, but the TSS concentration had maintained a level below 60 mg/L in past years.

Drought conditions were observed in 2023, and precipitation during the summer months of June, July, August and September in 2023 was lower than historical levels observed in the preceding four years. The total precipitation during these months was 187 mm, and the total average precipitation from 2019-2022 for the same months was 357 mm. In 2023 the total precipitation received was 52% of the total average precipitation received during the same months in the preceding four years<sup>2</sup>.

The lack of precipitation over the aeration lagoons in these months is believed to be an additional input into the conditions contributing to higher strength effluent observed in 2023. Total precipitation observed in 2023 and average precipitation from 2019-2022 are provided in Figure 2. Total Precipitation by year for the months of June, July, August, and September are shown in Table 4.

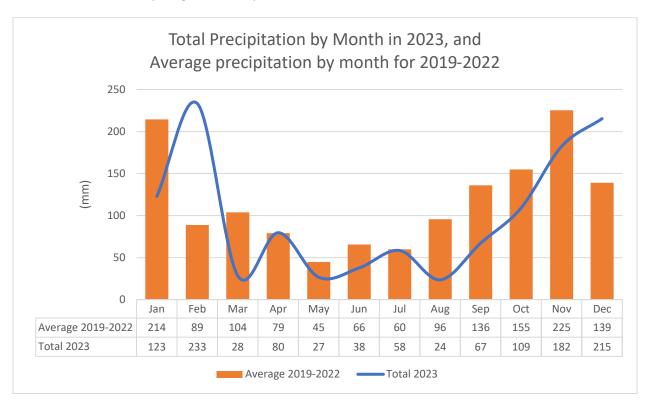


Figure 2: Total Precipitation by Month in 2023, and Average Precipitation by Month from 2019-2022

Sludge buildup was also considered to be concern, and a sludge survey was completed (described in section 3.3). The lagoon has not had sludge removed since commissioning, and sludge levels modelled in

<sup>&</sup>lt;sup>2</sup> Total Precipitation by Month retrieved from NavCan Terrace A station. Missing precipitation data for the months of May, June, July and August in 2020 taken from Terrace PCC station.



Appendix E suggest that the deposition of sludge may be contributing to shorter hydraulic retention times, and potential short-circuiting of effluent through aeration lagoon 2. Excessive sludge buildup may also be causing inadequate settlement due to a reduced water column depth above the settled sludge.

Table 4: Total Precipitation per Year from June to September

Year	Total Precipitation (June-Sept) in mm	Total Precipitation Average (June – Sept) from 2019-2022 in mm
2019	306	
2020	378	257
2021	425	357
2022	318	
2023	187	

Additional sampling for BTEX, VPH, and EPH submitted on August 15, 2023, to investigate if chemical contamination of influent were influencing upset conditions resulted in non-detect values.

#### 4.4 Corrective Action Plan

A corrective action plan includes desludging the lagoon to:

- increase HRT,
- reduce any short circuiting,
- increase available water column for settlement, and
- reduce nutrient mass in the lagoon bottom from the incomplete decomposition of duckweed that has accumulated over the years.

Budget for the desludging project has been requested, and a Request for Proposals has been issued for quotes to perform the work. Desludging works are scheduled to be completed during the summer of 2024.

#### 5 Closure and Recommendations

Monthly grab samples were taken as required by the permit in 2023, apart from the month of May, when flood conditions prevented safe access to the facility. Effluent concentrations of TSS in 2023 were much stronger than previous years. The average annual concentration of TSS was 26.0 mg/L which exceeded the 25.0 mg/L average annual concentration of the WSER. Total TSS concentrations exceeded the 60 mg/L TSS limits of the MWR and facility permit in June and July. Drought conditions in the summer, and an accumulation of sludge deposition in the aeration lagoons, are considered to be primary contributing factors to the high TSS observed in 2023.



The total annual influent received at the facility was 72,329.9 m3/year, and the total annual discharge to the exfiltration basins was 109,885 m³/year, including precipitation. The average daily influent and effluent volumes were 191.1 m³/day and 301 m³/day, respectively.

The following recommendations may be implemented to improve compliance with the applicable regulations:

- Measure ammonia levels in the field with an ammonia meter or request an amendment to the permit to remove the requirement of field measurements of ammonia.
- Collect a duplicate, field blank, and trip blank with each grab sample to meet the requirements of the BC Field Sampling Manual for Quality Control Samples.
- Calibrate the continuous monitoring equipment in the blower building once per year, in accordance with the requirements of the WSER.
- Consider implementing the pre-discharge monitoring program each spring to remain in compliance for any unplanned emergency discharge through the outfall.
- Maintain a digital log of influent readings to further refine the influent and discharge calculations required for reporting under the WSER, MWR and permit.

It is also recommended that a temporary bypass under the WSER by applied for a minimum of 45 days prior to desludging the lagoons to obtain temporary authorisation to deposit effluent which exceeds the criteria if it is expected that desludging the lagoon may lead to upset conditions that may cause a decline in effluent quality.

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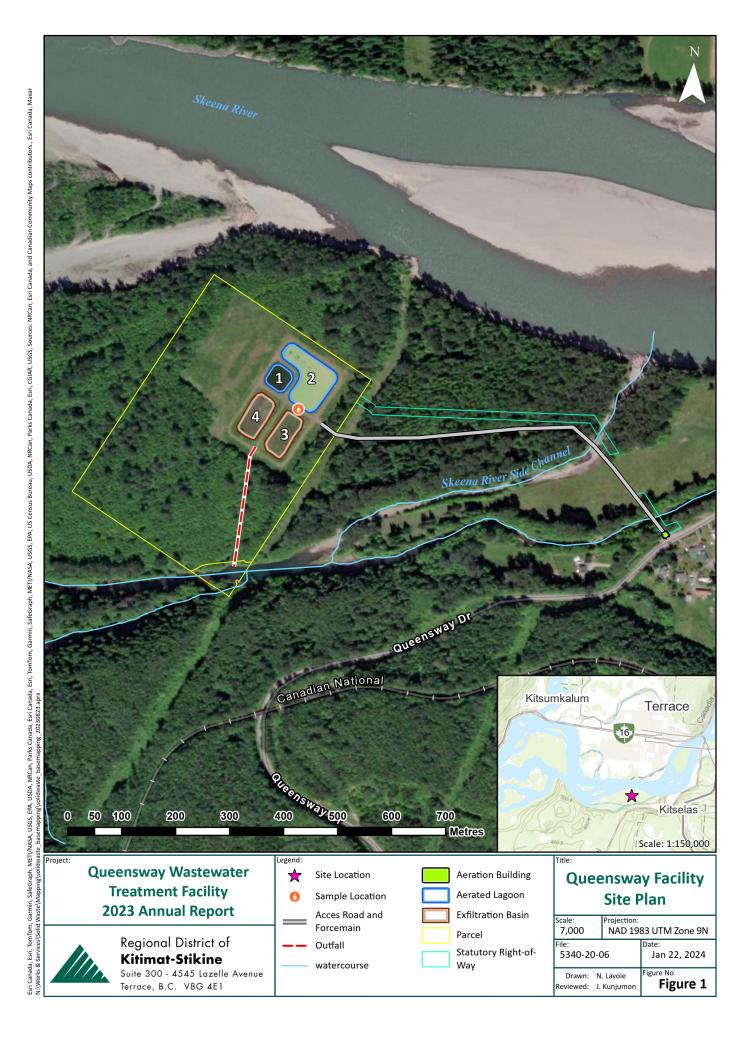
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# CERTIFICATE of CLASSIFICATION

**Environmental Operators Certification Program** 

This is to certify that:



CHAIR, BOARD of DIRECTORS

## Queensway Wastewater Collection System

Facility No. 1511

has been classified as a

**Class I WWC System** 

PRESIDENT and CEO

Dated: July 19, 2022

At: Burnaby, BC Valid until: July 19, 2027

A society incorporated under the Society Act, S.B.C. S-28724





May 23, 2017 Tracking Number: 358897 Authorization Number: 12645

#### **REGISTERED MAIL**

Regional District of Kitimat-Stikine #300 – 4545 Lazelle Avenue Terrace, British Columbia V8G 4E1

#### Dear Permittee:

Enclosed is Amended Permit 12645 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual fee will be determined according to the Permit Fees Regulation.

This permit 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 rests with the permittee. This permit is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

The Director may require the Permittee to repair, alter, remove, improve or add to existing works, or to construct new works, and to submit plans and specifications for works specified in this authorization.

The Director may require the Permittee to conduct monitoring, and may specify procedures for monitoring and analysis, and procedures or requirements respecting the handling, treatment, transportation, discharge or storage of waste.

The Director may amend any requirements under this section, including requiring increased or decreased monitoring based on data submitted by the Permittee and any other data gathered in connection with this authorization.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Telephone: (250) 565-6135

Facsimile: (250) 565-6629

Website: www.gov.bc.ca/env

12645 page 2 Date: May 23, 2017

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the permit are to be submitted by email or electronic transfer to the Director, designated Officer, or as further instructed.

Yours truly,

Daniel P. Bings

for Director, Environmental Management Act

Authorizations - North

Enclosure

cc: Environment Canada

cc: Michael Gull at mgull@rdks.bc.ca





#### MINISTRY OF ENVIRONMENT

#### **PERMIT**

#### 12645

Under the Provisions of the Environmental Management Act

#### Regional District of Kitimat-Stikine 4678 Queensway Drive Terrace, BC

is authorized to discharge effluent to the ground and to the Skeena River during flood stages only from a municipal sewage treatment facility located in Thornhill, near Terrace, British Columbia, subject to the requirements listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may lead to prosecution.

This Permit supersedes and replaces all previous versions of Permit 12645 issued under Section 14 of the *Environmental Management Act*.

Capitalized terms referred to in this authorization are defined in the attached Glossary. Other terms used in this authorization have the same meaning as those defined in the *Environmental Management Act* and applicable regulations.

Where this authorization provides that the Director may require an action to be carried out, the Permittee must carry out the action in accordance with the requirements of the Director.

#### 1. <u>AUTHORIZED DISCHARGES</u>

#### 1.1 **Authorized Source**

This section applies to the discharge of effluent to the exfiltration lagoon No. 3 and No. 4. The site reference number for this discharge is E220346.

- 1.1.1 The average authorized rate of discharge is 800 cubic metres per day.
- 1.1.2 The maximum authorized rate of discharge is 1,500 cubic metres per day.

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(most recent)

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Daniel P. Bings

for Director, Environmental Management Act

Authorizations - North Permit Number: 12645

- PROVINCE OF BRITISH COLUMBIA
  - 1.1.3 The authorized discharge period is continuous.
  - 1.1.4 The characteristics of the discharge must not exceed the following parameters:

Total suspended solids 60 mg/L 5 – Day biochemical oxygen demand 45 mg/L

- 1.1.5 The discharge is authorized from Authorized Works, which are a two-cell aerated lagoon system, twin exfiltration lagoons, a flow measurement facility, an outfall and related appurtenances approximately located as shown on Site Plan A.
- 1.1.6 The location of the facilities from which the discharge originates is approximately 425 metres west north west of the north east corner of Lot 1100, Range 5, Coast District and lying on the west side of the British Columbia Hydro and Power Authority Right of Way, Plan 2640; thence: 350 metres west north west; thence: 480 metres south south west; thence: 350 metres east south east; thence: 480 metres north north east and containing 16.8 ha more or less.

The location of the point of discharge is approximately 600 metres north west of the north west corner of Plan 1940, Range 5, Coast District.

#### 1.2 **Authorized Source**

This section applies to the discharge of effluent from the overflow outfall to the Skeena River. The site reference number for this discharge is E220347.

- 1.2.1 The average authorized rate of discharge is 800 cubic metres per day.
- 1.2.2 The maximum authorized rate of discharge is 1,500 cubic metres per day.
- 1.2.3 The authorized discharge period is continuous.
- 1.2.4 The characteristics of the discharge must not exceed the following parameters:

5- Day biochemical oxygen demand 45 mg/L Total suspended solids 60 mg/L

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for Director, Environmental Management Act

Authorizations - North Permit Number: 12645

- 1.2.5 The discharge is authorized from Authorized Works, which are a two-cell aerated lagoon system, twin exfiltration lagoons, a flow measurement facility, an outfall and related appurtenances approximately located as shown on Site Plan A.
- 1.2.6 The location of the facilities from which the discharge originates is approximately 425 metres west north west of the north east corner of Lot 1100, Range 5, Coast District and lying on the west side of the British Columbia Hydro and Power Authority Right of Way, Plan 2640; thence: 350 metres west north west; thence: 480 metres south south west; thence: 350 metres east south east; thence: 480 metres north north east and containing 16.8 ha more or less.

The location of the point of discharge is approximately 350 metres south of the treatment facility or 600 metres south east of the north west corner of Plan 1940, Range 5, Coast District.

# 2. **GENERAL REQUIREMENTS**

# 2.1 Maintenance of Works and Emergency Procedures

The Permittee must regularly inspect the authorized works and maintain them in good working order.

In the event of an emergency or condition beyond the control of the Permittee which prevents effective operation of the Authorized Works or leads to an unauthorized discharge, the Permittee must take remedial action to restore the effective operation of the Authorized Works and to prevent any unauthorized discharges. The Permittee must immediately report the emergency or condition and the remedial action that has and will be taken to the RAPP line (1-877-952-7277, #7272 from mobile phone) or electronically at this link: http://www.env.gov.bc.ca/cos/rapp/form.htm.

The Director may require the Permittee to reduce or suspend operations until the Authorized Works have been restored, and/or corrective steps have been taken to prevent unauthorized discharges.

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Daniel P. Bings

for Director, Environmental Management Act

#### 2.2 **Bypasses**

The Permittee must not allow any discharge authorized by this authorization to bypass the authorized works, except with the prior written approval of the Director.

# 2.3 Receiving Environment Monitoring

The Permittee must carry out a receiving environment monitoring program attached to the 1996 amended Permit 12645. The program must consist of sampling events at selected sites and must be established by the Permittee in accordance with the written requirements of the Director, that are listed within the 1996 amended Permit 12645. Based on the results from the analyses of the above samples, the Director may extend or alter monitoring requirements of the Permittee.

# 2.4 **Posting of Outfall**

The Permittee must erect, within 90 days of the date of this authorization and maintain a sign along the alignment of the outfall above the high water mark. The sign must identify the nature of the works. The sign must have lettering at least 150 millimetres high and bear the words SEWAGE OUTFALL. The Permittee must confirm whether the wording and size of the sign is acceptable to the Director prior to installing the sign.

#### 2.5 **Fencing**

The Permittee must erect, within 90 days of the date of this authorization, a fence around the sewage treatment facility and such other areas as required by the Director. The fence must consist of sturdy wire-mesh, chain-link or wooden slats at least 1.3 metres high.

#### 2.6 Treatment Plant Sludge Wasting and Disposal

The Permittee must dispose of sludge wasted from the treatment plant at a site and in a manner approved by the Director, or as authorized by regulation under the *Environmental Management Act*.

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for Director, Environmental Management Act

# 2.7 Exfiltration Lagoons

The Permittee must operate the rapid exfiltration lagoons such that:

- (a) there is no overflow from the exfiltration to the surrounding environment, except as authorized by section 1.2 of this permit and
- (b) surface drainage is diverted away from the exfiltration lagoons.

# 2.8 Facility Classification and Operator Certification

The Permittee in a manner and on timelines specified by the Director must have the authorized works classified (and the classification must be maintained) by the Environmental Operators Certification Program Society (Society). The Permittee must cause the authorized works to be operated and maintained by:

- a) persons certified within and according to the program provided by the Society to the satisfaction of the Director, or
- b) persons who are qualified in the safe and proper operation of the facility for the protection of the environment, as demonstrated to the satisfaction of the Director.

The Permittee must notify the Director of the classification level of the facility and certification levels of the operators, and changes of operators and/or operator certification levels within 30 days of any change.

# 3. MONITORING REQUIREMENTS

#### 3.1 **Sampling Procedures**

The Permittee must carry out sampling in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 2013 Edition (Permittee)" or most recent edition, or by alternative procedures as authorized by the Director.

A copy of the above manual is available on the Ministry web page at <a href="https://www.env.gov.bc.ca/epd/wamr/labsys/lab\_meth\_manual.html">www.env.gov.bc.ca/epd/wamr/labsys/lab\_meth\_manual.html</a>.

#### 3.2 Analytical Procedures

The Permittee must carry out analyses in accordance with procedures described

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Daniel P. Bings

for Director, Environmental Management Act

in the "British Columbia Laboratory Manual (2015 Permittee Edition)", or the most recent edition or by alternative procedures as authorized by the Director. A copy of the above manual is available on the Ministry web page at <a href="https://www.env.gov.bc.ca/epd/wamr/labsys/lab\_meth\_manual.html">www.env.gov.bc.ca/epd/wamr/labsys/lab\_meth\_manual.html</a>.

# 3.3 Effluent Grab Sampling

The Permittee must install and maintain a sampling facility and obtain a grab sample of the effluent once each month. The samples must be taken at the outlet of the Aerated Lagoon Cell #2 (S.E.A.M. Site No. E220346). The Permittee must take due care in sampling, storing and transporting the samples to control temperature and avoid contamination, breakage, and any other factor or influence that may compromise the integrity of the samples.

# 3.4 **Effluent Analysis**

The Permittee must collect sample (s) on a monthly basis and obtain analysis of the effluent sample (s) for the following parameters:

Parameter (units)	Sample Type	Sample	Reporting
		Frequency	Frequency
Influent Flow Rate	Field	Continuously	Monthly
$(m^3/day)$	Measurement		
Temperature (°C)	Field	Monthly	Monthly
	Measurement		
Dissolved O <sub>2</sub> (mg/L)	Field	Monthly	Monthly
	Measurement		
pH, pH units	Field	Monthly	Monthly
	Measurement		
Total Ammonia	Field	Monthly	Monthly
(mg/L)	Measurement		
BOD <sub>5</sub> (mg/L)	Grab	Monthly	Monthly
TSS (mg/L)	Grab	Monthly	Monthly
Total Phosphorus	Grab	Monthly	Monthly
(mg/L)			
Total Nitrogen (mg/L)	Grab	Monthly	Monthly

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# 3.5 Outfall Pre-Discharge Monitoring

Prior to commencing discharge to the Skeena River via the side channel and outfall the Permittee must measure the conditions in the side channel. Grab samples must be collected during typical low flow non-flood conditions. A minimum of two (2) sets of samples must be collected with approximately a week between sets. Grab sampling locations must be the same points as those to be used for the receiving environment monitoring program described below. Field measurements must be taken for flow rate, temperature, pH, ammonia, and dissolved oxygen. Water samples from the side channel must be analysed for nitrate/ nitrite, total nitrogen, fecal coliform and fecal streptococci. Data suitably tabulated, must be submitted to the Director after completion of the pre-discharge monitoring program.

The Permittee must take due care in sampling, storing and transporting the samples to control temperature and avoid contamination, breakage, and any other factor or influence that may compromise the integrity of the samples.

# 3.6 **Receiving Environment Monitoring**

The Permittee must collect grab sample (s) from the side channel receiving discharge based on the schedule below and obtain analysis of the effluent sample (s) for the following parameters:

Parameters (units)	Upstream site	Downstream site	Sample
			Frequency
Side channel flow rate			Weekly during
			discharge and for
			1 month after
			discharge
Temperature (°C)	Field	Field	Weekly for 1
	Measurement	Measurement	month after
			discharge
pH, pH units	Field	Field	Weekly for 1
	Measurement	Measurement	month after
			discharge
Ammonia (mg/L)	Field	Field	Weekly for 1
	Measurement	Measurement	month after
			discharge
Dissolved Oxygen	Field	Field	Weekly for 1
(mg/L)	Measurement	Measurement	month after

Date issued: Date amended: May 16, 1994

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			discharge
Nitrate/ Nitrite (mg/L)	Grab	Grab	Sample if D.O.
			<2.0 mg/L or
			$NH_3 > 2.0 \text{ mg/L}$
Total Nitrogen (mg/L)	Grab	Grab	Sample if D.O.
			<2.0 mg/L or
			$NH_3 > 2.0 \text{ mg/L}$
Fecal Coliform (MPN/	Grab	Grab	Sample if D.O.
100 mL)			<2.0 mg/L or
			$NH_3 > 2.0 \text{ mg/L}$
Fecal Streptococci	Grab	Grab	Sample if D.O.
(MPN/ 100 mL)			<2.0 mg/L or
			$NH_3 > 2.0 \text{ mg/L}$

The location of the upstream must be approximately at the B.C. Hydro Right of Way, upstream of the outfall. The location of the downstream site must be 50 – 100 metres downstream of the outfall.

The Permittee must maintain a record of maintenance and calibration steps for all devices used in the sampling program for field measurement.

# 4. REPORTING REQUIREMENTS

#### 4.1 **Annual Report**

The Permittee must collect and maintain data of analyses and flow measurements required under this authorization for inspection when requested by Ministry staff and submit the data for the previous calendar year to the Director in a form satisfactory to the Director. The Permittee must submit data of analyses and flow measurements summarized in a report within 30 days of the subject calendar year.

The Permittee must submit all data required to be submitted under this section by email to the Ministry's Routine Environmental Reporting Submission Mailbox (RERSM) at <a href="mailto:EnvAuthorizationsReporting@gov.bc.ca">EnvAuthorizationsReporting@gov.bc.ca</a> or as otherwise instructed by the Director. For guidelines on how to properly name the files and email subject lines or for more information visit the Ministry website: <a href="http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/routine-environmental-reporting-submission-mailbox">http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/routine-environmental-reporting-submission-mailbox</a>

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# 4.2 **Non-compliance Notification**

The Permittee must immediately notify the Director or designate by email at <a href="mailto:EnvironmentalCompliance@gov.bc.ca">EnvironmentalCompliance@gov.bc.ca</a> or as otherwise instructed by the Director of any non-compliance with the requirements of this authorization by the Permittee and take remedial action to remedy any effects of such non-compliance. The Permittee must provide the Director with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification, unless otherwise directed by the Director.

# 4.3 Non-compliance Reporting

If the Permittee fails to comply with any of the requirements of this authorization, the Permittee must, within 30 days of such non-compliance, submit to the Director a written report that is satisfactory to the Director and includes, but is not necessarily limited to, the following:

- a. all relevant test results obtained by the Permittee related to the noncompliance,
- b. an explanation of the most probable cause(s) of the noncompliance, and c. a description of remedial action planned and/or taken by the Permittee to prevent similar noncompliance(s) in the future.

The Permittee must submit all non-compliance reporting required to be submitted under this section by email to the Ministry's Compliance Reporting Submission Mailbox (CRSM) at <a href="mailto:EnvironmentalCompliance@gov.bc.ca">EnvironmentalCompliance@gov.bc.ca</a> or as otherwise instructed by the Director. For guidelines on how to report a non-compliance or for more information visit the Ministry website:

<a href="http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/non-compliance-reporting-mailbox">http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/non-compliance-reporting-mailbox</a>

#### 4.4 Non-compliance Reporting and Exceedances

The Permittee must cause each data submission required by this authorization to include a statement outlining the number of exceedances of permitted discharges that occurred during the reporting period, the dates of each such exceedance, an explanation as to the cause of the exceedances, and a description of the measures taken by the Permittee to rectify the cause of each such exceedance. If no exceedances occurred over the reporting period, the required statement may instead indicate that no exceedance of permitted discharges

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occurred during the reporting period.

# 4.5 **Spill Reporting**

The Permittee must immediately report all spills to the environment (as defined in the Spill Reporting Regulation) in accordance with the Spill Reporting Regulation, which among other things, requires notification to the Provincial Emergency Program at 1-800-663-3456.

# LICENCE TO PUBLISH DOCUMENT

- a. Subject to paragraph b, the permittee authorizes the Province to publish on the Ministry of Environment website the entirety of any Regulatory Document.
- b. The Province will not publish any information that could not, it if were subject to a request under section 5 of the Freedom of Information and Protection of Privacy Act, be disclosed under that Act.
- c. The permittee will identify and save harmless the Province and the Province's employees and agents from any claim for infringements of copyright or other intellectual property rights that the Province or any of the Province's employees or agents may sustain, incur, suffer or be put to at any time that arise from the publication of a Regulatory Document

d.

### **GLOSSARY**

"Authorized Works" means a two-cell aerated lagoon system, twin exfiltration lagoons, a flow measurement facility, an outfall and related appurtenances as stated in Section 1.1.4.

"Facility" means a sewage treatment system located in Thornhill, near Terrace, British Columbia.

"Province" means Her Majesty the Queen in right of British Columbia.

"Regulatory Document" means any document that the permittee is required to provide to the Director or the Province pursuant to: (i) this authorization; (ii) any regulation made under the *Environmental Management Act* that regulates the facility described in this authorization or the discharge of waste from the facility;

Date issued: Date amended:

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for Director, Environmental Management Act

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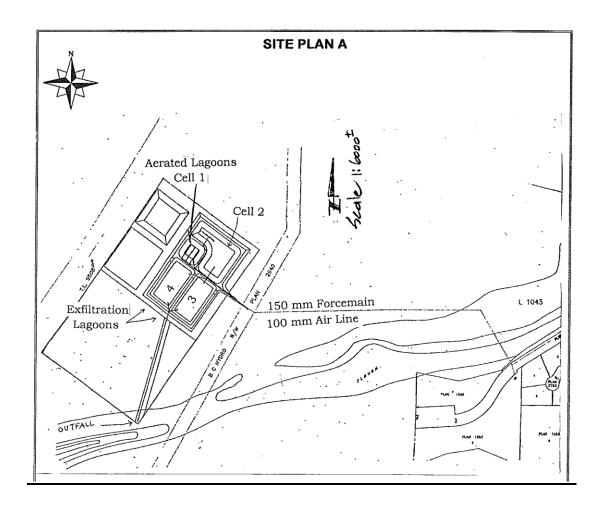
(most recent)

or (iii) any order issued under the *Environmental Management Act* directed against the permittee that is related to the facility described in this authorization or the discharge of waste from that facility.

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 $for\ Director,\ Environmental\ Management\ Act$ 

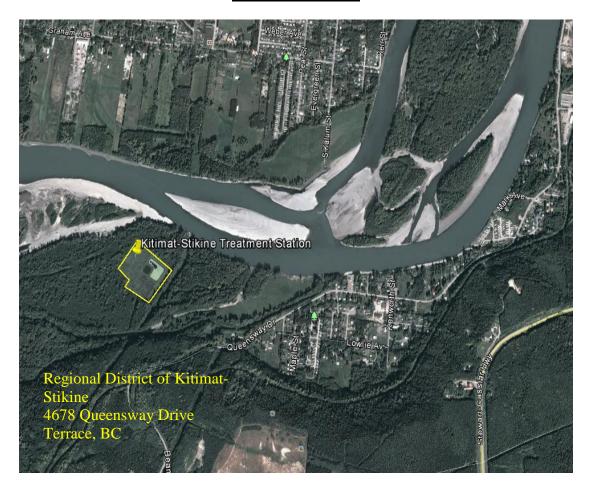


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Daniel P. Bings

 $for\ Director,\ Environmental\ Management\ Act$ 

# **LOCATION MAP**

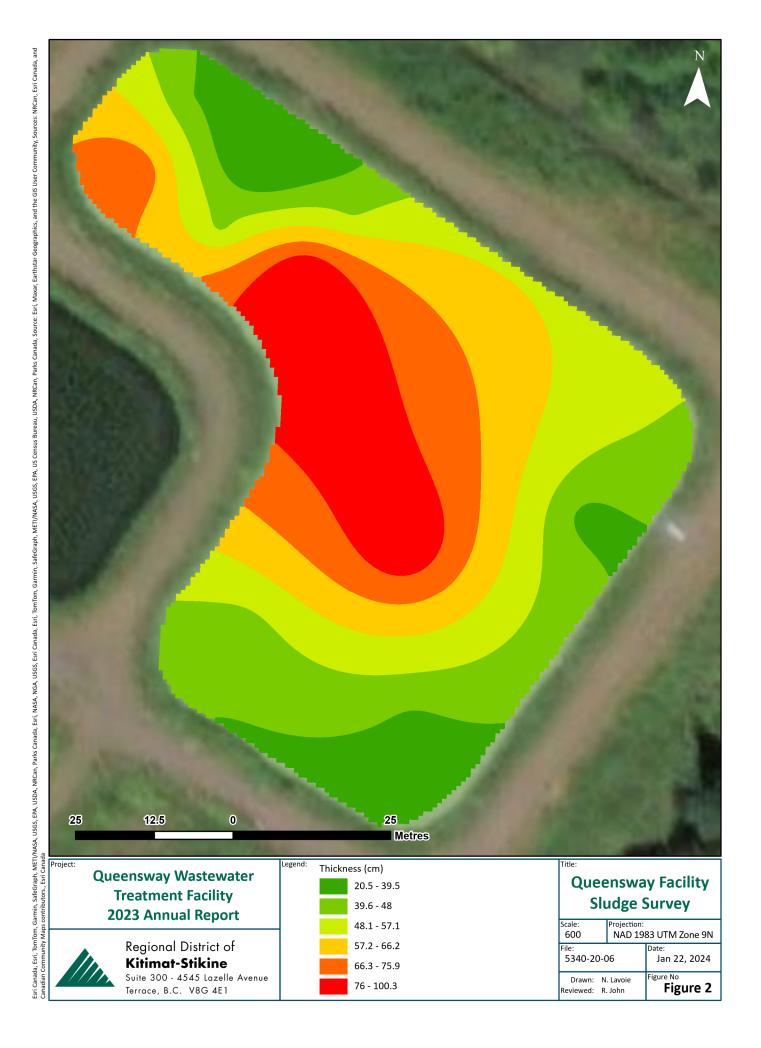


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# **ALS Canada Ltd.**



# **CERTIFICATE OF ANALYSIS**

Work Order : VA23A1385 Page

Terrace BC Canada V8G 4E1

Amendment : 1

Client Laboratory : Regional District of Kitimat-Stikine : Vancouver - Environmental

: Nicole Lavoie Contact

Address Address : # 300 - 4545 Lazelle Avenue

Burnaby BC Canada V5A 1W9

Telephone

**Project** : Queensway Sewer

PO C-O-C number Sampler Site

Quote number : VA22-RDKS100-001

No. of samples received : 1 No. of samples analysed : 1

: 1 of 3

**Account Manager** : Amber Springer

: 8081 Lougheed Highway

Telephone : +1 604 253 4188 Date Samples Received : 18-Jan-2023 13:15

**Date Analysis Commenced** : 20-Jan-2023

Issue Date : 30-Jan-2023 14:51

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 Laboratory Department **Position** 

Lindsay Gung Supervisor - Water Chemistry Inorganics, Burnaby, British Columbia Miles Gropen Department Manager - Inorganics Inorganics, Burnaby, British Columbia Page : 2 of 3

Work Order : VA23A1385 Amendment 1

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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

<: 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.

#### **Workorder Comments**

Amended COA(1): Total Nitrogen data has been revised due to a lab error.

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Work Order : VA23A1385 Amendment 1

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# Analytical Results

Sub-Matrix: Effluent			CI	lient sample ID	Queensway	 	 
(Matrix: Water)					Sewer		
	Client sampling date / time				16-Jan-2023 10:45	 	 
Analyte	CAS Number	Method	LOR	Unit	VA23A1385-001	 	 
					Result	 	 
Physical Tests							
рН		E108	0.10	pH units	8.03	 	 
Solids, total suspended [TSS]		E160	3.0	mg/L	6.9	 	 
Anions and Nutrients							
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	38.9	 	 
Nitrogen, total	7727-37-9	E366	0.030	mg/L	39.6	 	 
Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	5.35	 	 
Aggregate Organics							
Biochemical oxygen demand [BOD]		E550	2.0	mg/L	8.4	 	 
Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	6.7	 	 

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



# **QUALITY CONTROL INTERPRETIVE REPORT**

**Work Order** : **VA23A1385** Page : 1 of 7

Amendment :1

Client : Regional District of Kitimat-Stikine : Vancouver - Environmental

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

 Telephone
 :--- Telephone
 :+1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 18-Jan-2023 13:15

 PO
 : --- Issue Date
 : 30-Jan-2023 14:51

C-O-C number : ---Sampler : ---Site : ----

Quote number : VA22-RDKS100-001

No. of samples received :1

No. of samples analysed :1

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.

Terrace BC Canada V8G 4E1

**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**

<u>No</u> Quality Control Sample Frequency Outliers occur.

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Work Order : VA23A1385 Amendment 1
Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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					Ev	/aluation: × =	Holding time exce	edance ; 🔻	= Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	Extraction / Preparation Analysis						
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Queensway Sewer	E550	16-Jan-2023					20-Jan-2023	3 days	4 days	*
										EHT
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE										
Queensway Sewer	E555	16-Jan-2023					20-Jan-2023	0 hrs	95 hrs	×
										EHTL
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Queensway Sewer	E298	16-Jan-2023	24-Jan-2023				24-Jan-2023	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Queensway Sewer	E366	16-Jan-2023	24-Jan-2023				25-Jan-2023	28 days	9 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
Queensway Sewer	E372-U	16-Jan-2023	24-Jan-2023				25-Jan-2023	28 days	9 days	✓
Physical Tests : pH by Meter										
HDPE										
Queensway Sewer	E108	16-Jan-2023	24-Jan-2023				24-Jan-2023	0.25	0.53	#
								hrs	hrs	EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE	E400	40 1 2000					04 1 0000	7 -1	0 -1	
Queensway Sewer	E160	16-Jan-2023					24-Jan-2023	7 days	8 days	# EHT
										EHI

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Work Order : VA23A1385 Amendment 1
Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **Legend & Qualifier Definitions**

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

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.

EHT: Exceeded ALS recommended hold time prior to analysis.

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

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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		Evaluatio	n: × = QC freque	ency outside spe	ecification; ✓ = 0	QC frequency wit	hin specificatio
Quality Control Sample Type			Co	ount		Frequency (%)	
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	812398	1	15	6.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	808786	1	18	5.5	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	808992	1	3	33.3	5.0	✓
pH by Meter	E108	812136	1	13	7.6	5.0	✓
Total Nitrogen by Colourimetry	E366	812402	1	7	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	812399	1	12	8.3	5.0	✓
TSS by Gravimetry	E160	809810	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	812398	1	15	6.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	808786	1	18	5.5	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	808992	1	3	33.3	5.0	✓
pH by Meter	E108	812136	1	13	7.6	5.0	✓
Total Nitrogen by Colourimetry	E366	812402	1	7	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	812399	1	12	8.3	5.0	✓
TSS by Gravimetry	E160	809810	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	812398	1	15	6.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	808786	1	18	5.5	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	808992	1	3	33.3	5.0	✓
Total Nitrogen by Colourimetry	E366	812402	1	7	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	812399	1	12	8.3	5.0	✓
TSS by Gravimetry	E160	809810	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	812398	1	15	6.6	5.0	✓
Total Nitrogen by Colourimetry	E366	812402	1	7	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	812399	1	12	8.3	5.0	<b>√</b>

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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
pH by Meter	E108	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,
	Vancouver -			pH should be measured in the field within the recommended 15 minute hold time.
	Environmental			
TSS by Gravimetry	E160	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 $104 \pm 1^{\circ}$ C, with gravimetric measurement of the
	Vancouver -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Environmental			brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298	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).
	Vancouver -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Environmental			
Total Nitrogen by Colourimetry	E366	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
	Environmental			
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
	Environmental			
Biochemical Oxygen Demand - 5 day	E550	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.
	Vancouver -			
	Environmental			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	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. Nitrification inhibitor is added to
	Vancouver -			samples to prevent nitrogenous compounds from consuming oxygen resulting in only
	Environmental			carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when
				free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	Vancouver -			
	Environmental			

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Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
	Vancouver -			
	Environmental			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	Vancouver -			
	Environmental			

# **ALS Canada Ltd.**



# **QUALITY CONTROL REPORT**

Work Order :VA23A1385

Amendment : 1

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO : ---C-O-C number :---

Sampler : ----

Site :----

Quote number : VA22-RDKS100-001

No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 6

Laboratory : Vancouver - Environmental

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Date Samples Received :18-Jan-2023 13:15

Date Analysis Commenced : 20-Jan-2023

Laboratory Department

Issue Date : 30-Jan-2023 14:51

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

**Position** 

- 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

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.

Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics Burnahy British Columbia

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Work Order: VA23A1385 Amendment 1
Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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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Work Order: VA23A1385 Amendment 1
Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer



### 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: 809810)														
FJ2300135-002	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	6.1	5.7	0.4	Diff <2x LOR					
Physical Tests (QC	Lot: 812136)														
VA23A1226-004	Anonymous	pH		E108	0.10	pH units	8.10	8.00	1.24%	4%					
Anions and Nutrient	ts (QC Lot: 812398)														
VA23A0562-006	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0050	0.0056	0.0006	Diff <2x LOR					
Anions and Nutrient	ts (QC Lot: 812399)														
VA23A0562-006	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0098	0.0084	0.0014	Diff <2x LOR					
Anions and Nutrient	ts (QC Lot: 812402)														
VA23A1064-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.034	0.032	0.001	Diff <2x LOR					
Aggregate Organics	(QC Lot: 808786)														
FJ2300122-011	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0.0%	30%					
Aggregate Organics	(QC Lot: 808992)														
VA23A1277-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	2.1	2.1	0.0%	30%					

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Work Order: VA23A1385 Amendment 1
Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer



# 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: 809810)						
Solids, total suspended [TSS]		E160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 812398)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 812399)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 812402)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	
Aggregate Organics (QCLot: 808786)						
Biochemical oxygen demand [BOD]		E550	2	mg/L	<2.0	
Aggregate Organics (QCLot: 808992)						
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	<2.0	

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Work Order: VA23A1385 Amendment 1
Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer



### 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: 809810)															
Solids, total suspended [TSS]		E160	3	mg/L	150 mg/L	99.5	85.0	115							
Physical Tests (QCLot: 812136)															
рН		E108		pH units	7 pH units	100	98.0	102							
Anions and Nutrients (QCLot: 812398)															
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115							
Anions and Nutrients (QCLot: 812399)															
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	90.9	80.0	120							
Anions and Nutrients (QCLot: 812402)															
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	96.9	75.0	125							
Aggregate Organics (QCLot: 808786)															
Biochemical oxygen demand [BOD]		E550	2	mg/L	198 mg/L	102	85.0	115							
Aggregate Organics (QCLot: 808992)															
Carbonaceous biochemical oxygen demand [CBOD]		E555	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										
					Spi	ike	Recovery (%)	Recovery	Limits (%)						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration Target		MS	Low	High	Qualifier					
Anions and Nutri	ents (QCLot: 812398)														
VA23A0562-007	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0980 mg/L	0.1 mg/L	98.0	75.0	125						
Anions and Nutri	ents (QCLot: 812399)														
VA23A0562-007	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0488 mg/L	0.05 mg/L	97.5	70.0	130						
Anions and Nutri	ents (QCLot: 812402)														
VA23A1064-002	Anonymous	Nitrogen, total	7727-37-9	E366	0.403 mg/L	0.4 mg/L	101	70.0	130						

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Work Order: VA23A1385 Amendment 1
Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer





# Chain of Custody (COC) / Analytical Request Form

# Affix ALS barcode label here

(lab use only)

Page

COC Number: 17 -

of

Canada Toll Free: 1 800 668 9878

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Street:	4545 Lazelle Avenue		Email 1 or Fax	enviro.dept@rd	ks.bc.ca			Date an	d Time	Requir	ed for	all E&F	TATs:						······			
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Postal Code:	V8G4E1		Email 3	pmiller@rdks.bo	c.ca; jlacroix@rdks	s.bc.ca			Analysis Request													
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# ALS Canada Ltd.



# **CERTIFICATE OF ANALYSIS**

Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address : # 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone : ---

Project : Queensway Sewer

C-O-C number : --Sampler : --Site : ---

Quote number : VA22-RDKS100-001

No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 3

Laboratory : Vancouver - Environmental

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby BC Canada V5A 1W9

Telephone : +1 604 253 4188

Date Samples Received : 15-Feb-2023 14:10

Date Analysis Commenced : 16-Feb-2023

Issue Date : 24-Feb-2023 16:44

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**

PO

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

Caitlin Macey Team Leader - Inorganics Inorganics, Burnaby, British Columbia

Page : 2 of 3

Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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

<: 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.

Page : 3 of 3

Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## Analytical Results

Sub-Matrix: Water			CI	lient sample ID	Queensway	 	 
(Matrix: Water)					Sewer		
			Client samp	oling date / time	13-Feb-2023 11:25	 	 
Analyte	CAS Number	Method	LOR	Unit	VA23A3399-001	 	 
					Result	 	 
Physical Tests							
рН		E108	0.10	pH units	8.18	 	 
Solids, total suspended [TSS]		E160	3.0	mg/L	4.6	 	 
Anions and Nutrients							
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	31.9	 	 
Nitrogen, total	7727-37-9	E366	0.030	mg/L	32.6	 	 
Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	4.05	 	 
Aggregate Organics							
Biochemical oxygen demand [BOD]		E550	2.0	mg/L	7.4	 	 
Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	7.5	 	 

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



## **QUALITY CONTROL INTERPRETIVE REPORT**

**Work Order** : **VA23A3399** Page : 1 of 7

Client : Regional District of Kitimat-Stikine Laboratory : Vancouver - Environmental

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

 Telephone
 :-- Telephone
 :+1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 15-Feb-2023 14:10

PO : ---- Issue Date : 24-Feb-2023 16:44
C-O-C number :---Sampler -----

Quote number : VA22-RDKS100-001

No. of samples received :1

No. of samples analysed :1

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

Site

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.

Page : 3 of 7 Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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					Ev	/aluation: ≭ =	Holding time excee	edance ; 🔻	= Within	Holding Tim
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Queensway Sewer	E550	13-Feb-2023					16-Feb-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]										
Queensway Sewer	E555	13-Feb-2023					16-Feb-2023	3 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Queensway Sewer	E298	13-Feb-2023	20-Feb-2023				22-Feb-2023	28 days	9 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Queensway Sewer	E366	13-Feb-2023	20-Feb-2023				21-Feb-2023	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
Queensway Sewer	E372-U	13-Feb-2023	20-Feb-2023				21-Feb-2023	28 days	8 days	✓
Physical Tests : pH by Meter										
HDPE										
Queensway Sewer	E108	13-Feb-2023	22-Feb-2023				23-Feb-2023	0.25	23.25	<b>30</b>
								hrs	hrs	EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE										
Queensway Sewer	E160	13-Feb-2023					21-Feb-2023	7 days	8 days	sc .
										EHT

Page : 4 of 7

Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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).

Page : 5 of 7 Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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		Evaluati	on: × = QC freque	ency outside spe	ecification; ✓ =	QC frequency wit	hin specificatio
Quality Control Sample Type			Co	ount		Frequency (%)	
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	840142	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	837032	1	20	5.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	837558	1	9	11.1	5.0	✓
pH by Meter	E108	841686	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	840139	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	840140	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	837915	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	840142	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	837032	1	20	5.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	837558	1	9	11.1	5.0	✓
pH by Meter	E108	841686	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	840139	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	840140	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	837915	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	840142	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	837032	1	20	5.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	837558	1	9	11.1	5.0	✓
Total Nitrogen by Colourimetry	E366	840139	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	840140	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	837915	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	840142	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	840139	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	840140	1	20	5.0	5.0	✓

Page : 6 of 7 Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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
pH by Meter	E108	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,
	Vancouver -			pH should be measured in the field within the recommended 15 minute hold time.
	Environmental			
TSS by Gravimetry	E160	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 $104 \pm 1^{\circ}$ C, with gravimetric measurement of the
	Vancouver -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Environmental			brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298	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).
	Vancouver -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Environmental			
Total Nitrogen by Colourimetry	E366	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
	Environmental			
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
	Environmental			
Biochemical Oxygen Demand - 5 day	E550	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.
	Vancouver -			
	Environmental			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	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. Nitrification inhibitor is added to
	Vancouver -			samples to prevent nitrogenous compounds from consuming oxygen resulting in only
	Environmental			carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when
				free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	Vancouver -			
	Environmental			

Page : 7 of 7 Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
	Vancouver -			
	Environmental			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	Vancouver -			
	Environmental			

## **ALS Canada Ltd.**



## **QUALITY CONTROL REPORT**

Work Order :VA23A3399

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO : --C-O-C number : --Sampler : ---

Site · ---

Quote number : VA22-RDKS100-001

No. of samples received : 1

No. of samples analysed : 1

Page : 1 of 6

Laboratory : Vancouver - Environmental

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Date Samples Received : 15-Feb-2023 14:10

Date Analysis Commenced : 16-Feb-2023

Issue Date : 24-Feb-2023 16:46

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

Caitlin Macey Team Leader - Inorganics Vancouver Inorganics, Burnaby, British Columbia

Page : 2 of 6

Work Order: VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

## ALS

#### **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.

Page : 3 of 6 Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

#### 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							Labora	tory Duplicate (DI	JP) 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: 837915)										
VA23A3255-002	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	19.0	19.0	0	Diff <2x LOR	
Physical Tests (QC	Lot: 841686)										
VA23A3446-003	Anonymous	pH		E108	0.10	pH units	8.11	8.11	0.00%	4%	
Anions and Nutrien	ts (QC Lot: 840139)										
VA23A3379-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	1.14	1.14	0.420%	20%	
Anions and Nutrient	ts (QC Lot: 840140)										
VA23A3379-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0079	0.0079	0.00002	Diff <2x LOR	
Anions and Nutrien	ts (QC Lot: 840142)										
VA23A3379-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	
Aggregate Organics	(QC Lot: 837032)										
VA23A3387-001	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	
Aggregate Organics	(QC Lot: 837558)										
VA23A3284-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	<2.0	<2.0	0.0%	30%	

Page : 4 of 6 Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### 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

	040 Normalian	M-4hI	1.00	11-14		0!!!
Analyte	CAS Number	wetnoa	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 837915)						
Solids, total suspended [TSS]		E160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 840139)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 840140)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 840142)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	
Aggregate Organics (QCLot: 837032)						
Biochemical oxygen demand [BOD]		E550	2	mg/L	<2.0	
Aggregate Organics (QCLot: 837558)						
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	<2.0	

Page : 5 of 6
Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

#### 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	-Matrix: Water					Laboratory Co	ontrol Sample (LCS)	Report	
					Spike	Recovery (%)	Recovery	Limits (%)	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 837915)									
Solids, total suspended [TSS]		E160	3	mg/L	150 mg/L	101	85.0	115	
Physical Tests (QCLot: 841686)									
рН		E108		pH units	7 pH units	100	98.0	102	
Anions and Nutrients (QCLot: 840139)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	96.6	75.0	125	
Anions and Nutrients (QCLot: 840140)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.0	80.0	120	
Anions and Nutrients (QCLot: 840142)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	105	85.0	115	
Aggregate Organics (QCLot: 837032)									
Biochemical oxygen demand [BOD]		E550	2	mg/L	198 mg/L	102	85.0	115	
Aggregate Organics (QCLot: 837558)									
Carbonaceous biochemical oxygen demand [CBOD]		E555	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.

Sub-Matrix: Water	rix: Water					Matrix Spike (MS) Report									
					Sp	Spike Recove			Limits (%)						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration Target		MS	Low	High	Qualifier					
Anions and Nutri	ents (QCLot: 840139)														
VA23A3385-001	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	20 mg/L	ND	70.0	130						
Anions and Nutri	ents (QCLot: 840140)														
VA23A3385-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130						
Anions and Nutri	ents (QCLot: 840142)														
VA23A3385-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B					

Page : 6 of 6 Work Order : VA23A3399

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### Qualifiers

Qualifier Description

MS-B Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

## ALS Environmenta

## Chain of Custody (COC) / Analytical Request Form

## Affix ALS barcode label here

(lab use only)

Page

COC Number: 17 -

of

Canada Toli Free: 1 800 668 9878

	www.alsglobel.com															•						
Report To	Contact and company name below will appear	r on the final report	2	Report Format	/ Distribution			Select	Servi	ce Lev	rel Bel	ow - (	Conta	t your AM	to con	firm all	E&P T	ATs (sı	ircharg	es may	apply)	,
Company:	Regional District of Kitimat-Stikine		Select Report F	ormat: 🔽 PDF	Z EXCEL Z E	DD (DIGITAL)	ļ —	Re	gular	[R]	✓ St	andard	TAT if	received by	3 pm - b	usiness	days - r	no surcha	rges app	ly		
Contact:	Nicole Lavoie		Quality Control	(QC) Report with R	eport 🖸 YES	☐ NO	ş Ş	4 day	/ [P4-	20%]	Π.		NCY	1 Busine	ss day	/ [E1 -	100%	,]			_	
Phone:	250-615-6100		☑ Compare Resu	its to Criteria on Report	provide details belo	ow if box checked	DRIT #88 D	3 day	/ [P3-	25%]			89	Same Da	v, Wee	kend	or Sta	tutory	holida	v (E2 -:	200%	
	Company address below will appear on the final i	report	Select Distributi	ion: 🛛 EMAIL	MATL	FAX	ag 180	2 day	[P2-	50%]			EM	(Laborato								L
Street:	4545 Lazelle Avenue		Email 1 or Fax	envira.dept@rdks.	.bc.ca		Date and Time Required for all E&P TATs:															
City/Province:	Terrace/BC		Email 2	ckerr@rdks.bc.ca;	jkunjumon@rdk	s.bc.ca	For tes	ts that c	an not b	oe perfo	rmed ad	cordin	g to the	service level	selected	, you will	l be conf	tacted.				
Postal Code:	V8G4E1		Email 3	pmiller@rdks.bc.c	a; jlacrolx@rdks.	bc.ca								Analysi	s Requ	ıest				-		
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Company:	Regional District of Kitimat-Stikine		Email 1 or Fax	anne-maries@rdk	s.bc.ca				,	mg	and									7	provide further	. (
Contact:	Nicole Lavoie		Email 2	envira.dept@rdks.	.bc.ca		] .		0.03mg/L)	005	Demand	1			1		ı l		-		de f	
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		ederal Wastewater Sys	stems Effluent Re	egulations (JUN, 20	112)		Ice P	acks		ice C	ubes		Cust	dy seal in	tact	Yes		]	No	) -		<b>]</b>
□ Y	ES NO						Cool	ing Init	iated							·						1
Are samples for	human consumption/ use? Qu	reensway Sewer Cust	om Criteria for R	DKS				IN	ITIAL C	OOLE	RTEM	PERA	TURES	°C		FI	INAL CO	OOLER T	EMPER/	TURES	°C	
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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

<sup>1.</sup> If any water samples are taken from a Regulated Drinking Water (DW), System, please submit using an Authorized DW COC form.

## ALS Canada Ltd.



## **CERTIFICATE OF ANALYSIS**

Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address : # 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone · ---

Project : Queensway Sewer

C-O-C number : --Sampler : --Site : ---

Quote number : VA22-RDKS100-001

No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 3

Laboratory : Vancouver - Environmental

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby BC Canada V5A 1W9

Telephone : +1 604 253 4188

Date Samples Received : 13-Mar-2023 21:45

Date Analysis Commenced : 15-Mar-2023

Issue Date : 21-Mar-2023 15:12

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**

PO

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

Lindsay Gung Supervisor - Water Chemistry Inorganics, Burnaby, British Columbia

Page : 2 of 3

Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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

<: 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.

Page : 3 of 3

Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## Analytical Results

Sub-Matrix: Water			CI	lient sample ID	Queensway	 	 
(Matrix: Water)					Sewer		
			Client samp	oling date / time	13-Mar-2023 11:00	 	 
Analyte	CAS Number	Method	LOR	Unit	VA23A5375-001	 	 
					Result	 	 
Physical Tests							
рН		E108	0.10	pH units	8.15	 	 
Solids, total suspended [TSS]		E160	3.0	mg/L	10.9	 	 
Anions and Nutrients							
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	30.9	 	 
Nitrogen, total	7727-37-9	E366	0.030	mg/L	35.8	 	 
Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	4.07	 	 
Aggregate Organics							
Biochemical oxygen demand [BOD]		E550	2.0	mg/L	8.2	 	 
Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	8.0	 	 

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



## **QUALITY CONTROL INTERPRETIVE REPORT**

**Work Order** : **VA23A5375** Page : 1 of 7

Client : Regional District of Kitimat-Stikine Laboratory : Vancouver - Environmental

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

 Telephone
 :--- Telephone
 : +1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 13-Mar-2023 21:45

PO : ---- Issue Date : 21-Mar-2023 15:13
C-O-C number :---Sampler -----

Quote number : VA22-RDKS100-001

No. of samples received :1

No. of samples analysed :1

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

Site

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.

Page : 3 of 7 Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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.

atrix: Water					ΕV	/aluation: × =	Holding time excee	edance ; 🔻	/ = Within	Holding Time
nalyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
ggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Queensway Sewer	E550	13-Mar-2023					16-Mar-2023	3 days	3 days	✓
ggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]										
Queensway Sewer	E555	13-Mar-2023					16-Mar-2023	3 days	3 days	✓
nions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)	F000	40.140000	40.14 0000				40.14 0000	00.1	0.1	1
Queensway Sewer	E298	13-Mar-2023	18-Mar-2023				19-Mar-2023	28 days	6 days	<b>√</b>
nions and Nutrients : Total Nitrogen by Colourimetry				I	I					
Amber glass total (sulfuric acid)  Queensway Sewer	E366	13-Mar-2023	18-Mar-2023				21-Mar-2023	28 days	8 days	1
Queensway Sewei	L300	13-Wai-2023	10-Wai-2023				21-IVIAI-2023	20 days	o days	•
wise and National Table Discourse by Colonian to 10,000 and 11										
nions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)  Amber glass total (sulfuric acid)										
Queensway Sewer	E372-U	13-Mar-2023	18-Mar-2023				20-Mar-2023	28 days	7 days	✓
association of the second of t									, -	
hysical Tests : pH by Meter										
HDPE										
Queensway Sewer	E108	13-Mar-2023	15-Mar-2023				16-Mar-2023	0.25	19.25	<b>32</b>
								hrs	hrs	EHTR-FM
hysical Tests : TSS by Gravimetry										
HDPE										
Queensway Sewer	E160	13-Mar-2023					21-Mar-2023	7 days	8 days	*
										EHT

Page : 4 of 7

Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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).

Page : 5 of 7
Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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.

flatrix: Water Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.								
uality Control Sample Type			Co	ount		Frequency (%)	)	
nalytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation	
boratory Duplicates (DUP)								
mmonia by Fluorescence	E298	868164	1	3	33.3	5.0	✓	
ochemical Oxygen Demand - 5 day	E550	865700	1	12	8.3	5.0	✓	
ochemical Oxygen Demand (Carbonaceous) - 5 day	E555	865294	1	8	12.5	5.0	✓	
l by Meter	E108	863732	1	17	5.8	5.0	✓	
otal Nitrogen by Colourimetry	E366	868162	1	2	50.0	5.0	✓	
otal Phosphorus by Colourimetry (0.002 mg/L)	E372-U	868163	1	2	50.0	5.0	✓	
SS by Gravimetry	E160	868622	1	20	5.0	5.0	✓	
boratory Control Samples (LCS)								
mmonia by Fluorescence	E298	868164	1	3	33.3	5.0	✓	
ochemical Oxygen Demand - 5 day	E550	865700	1	12	8.3	5.0	✓	
ochemical Oxygen Demand (Carbonaceous) - 5 day	E555	865294	1	8	12.5	5.0	✓	
l by Meter	E108	863732	1	17	5.8	5.0	✓	
otal Nitrogen by Colourimetry	E366	868162	1	2	50.0	5.0	✓	
otal Phosphorus by Colourimetry (0.002 mg/L)	E372-U	868163	1	2	50.0	5.0	✓	
SS by Gravimetry	E160	868622	1	20	5.0	5.0	✓	
ethod Blanks (MB)								
mmonia by Fluorescence	E298	868164	1	3	33.3	5.0	✓	
ochemical Oxygen Demand - 5 day	E550	865700	1	12	8.3	5.0	✓	
ochemical Oxygen Demand (Carbonaceous) - 5 day	E555	865294	1	8	12.5	5.0	✓	
otal Nitrogen by Colourimetry	E366	868162	1	2	50.0	5.0	✓	
otal Phosphorus by Colourimetry (0.002 mg/L)	E372-U	868163	1	2	50.0	5.0	✓	
SS by Gravimetry	E160	868622	1	20	5.0	5.0	✓	
atrix Spikes (MS)								
nmonia by Fluorescence	E298	868164	1	3	33.3	5.0	✓	
otal Nitrogen by Colourimetry	E366	868162	1	2	50.0	5.0	✓	
otal Phosphorus by Colourimetry (0.002 mg/L)	E372-U	868163	1	2	50.0	5.0	✓	

Page : 6 of 7 Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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
pH by Meter	E108	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,
	Vancouver -			pH should be measured in the field within the recommended 15 minute hold time.
	Environmental		15111 2512 5 ( 1)	
TSS by Gravimetry	E160	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 $104 \pm 1^{\circ}$ C, with gravimetric measurement of the
	Vancouver -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Environmental			brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298	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).
	Vancouver -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Environmental			
Total Nitrogen by Colourimetry	E366	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
	Environmental			
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
B: 1 : 10 B 1 5 1	Environmental	<b>NA</b>	A D. I.A. 5040 D. ( I)	
Biochemical Oxygen Demand - 5 day	E550	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.
	Vancouver -			
	Environmental			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	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. Nitrification inhibitor is added to
	Vancouver -			samples to prevent nitrogenous compounds from consuming oxygen resulting in only
	Environmental			carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when
				free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	Vancouver -			
	Environmental			

Page : 7 of 7 Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
	Vancouver -			
	Environmental			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	Vancouver -			
	Environmental			

## **ALS Canada Ltd.**



## **QUALITY CONTROL REPORT**

Work Order :VA23A5375

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO :--C-O-C number :--Sampler :---

Site · ---

Quote number : VA22-RDKS100-001

No. of samples received : 1

No. of samples analysed : 1

Page : 1 of 6

Laboratory : Vancouver - Environmental

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Date Samples Received : 13-Mar-2023 21:45

Date Analysis Commenced : 15-Mar-2023

Issue Date : 21-Mar-2023 15:13

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

Lindsay Gung Supervisor - Water Chemistry Vancouver Inorganics, Burnaby, British Columbia

Page 2 of 6 Work Order:

VA23A5375

Client Regional District of Kitimat-Stikine

**Project** Queensway Sewer

#### **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.

Page : 3 of 6 Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

#### 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							Labora	tory Duplicate (D	UP) 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: 863732)										
WR2300176-001	Anonymous	pH		E108	0.10	pH units	7.54	7.56	0.265%	4%	
Physical Tests (QC	Lot: 868622)										
FJ2300545-001	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	<3.0	3.5	0.5	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 868162)										
VA23A5375-001	Queensway Sewer	Nitrogen, total	7727-37-9	E366	1.50	mg/L	35.8	35.8	0.218%	20%	
Anions and Nutrient	ts (QC Lot: 868163)										
VA23A5375-001	Queensway Sewer	Phosphorus, total	7723-14-0	E372-U	0.200	mg/L	4.07	4.04	0.661%	20%	
Anions and Nutrient	ts (QC Lot: 868164)										
VA23A5375-001	Queensway Sewer	Ammonia, total (as N)	7664-41-7	E298	0.500	mg/L	30.9	29.7	4.22%	20%	
Aggregate Organics	(QC Lot: 865294)										
KS2300780-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	6.0	mg/L	25.3	25.2	0.4%	30%	
Aggregate Organics	(QC Lot: 865700)										
VA23A5395-002	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	

Page : 4 of 6 Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

### 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: 868622)						
Solids, total suspended [TSS]		E160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 868162)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 868163)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 868164)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	
Aggregate Organics (QCLot: 865294)						
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	<2.0	
Aggregate Organics (QCLot: 865700)						
Biochemical oxygen demand [BOD]		E550	2	mg/L	<2.0	

Page : 5 of 6 Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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	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: 863732)													
рН		E108		pH units	7 pH units	100	98.0	102					
Physical Tests (QCLot: 868622)													
Solids, total suspended [TSS]		E160	3	mg/L	150 mg/L	110	85.0	115					
Anions and Nutrients (QCLot: 868162)													
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	97.2	75.0	125					
Anions and Nutrients (QCLot: 868163)													
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.1	80.0	120					
Anions and Nutrients (QCLot: 868164)													
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.1	85.0	115					
Aggregate Organics (QCLot: 865294)													
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	198 mg/L	99.1	85.0	115					
Aggregate Organics (QCLot: 865700)													
Biochemical oxygen demand [BOD]		E550	2	mg/L	198 mg/L	98.9	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								
					Spi	ike	Recovery (%)	Recovery			
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier	
Anions and Nutri	ents (QCLot: 868162)										
VA23A5386-001	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	40 mg/L	ND	70.0	130		
Anions and Nutri	ents (QCLot: 868163)										
VA23A5386-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	5 mg/L	ND	70.0	130		
Anions and Nutri	ents (QCLot: 868164)										
VA23A5383-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B	

Page : 6 of 6 Work Order : VA23A5375

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### Qualifiers

Qualifier Description

MS-B Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.



## Chain of Custody (COC) / Analytical Request Form

## Affix ALS barcode label here

(lab use only)

Page

COC Number: 17 -

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(ALS)	<u>www.alsqlobal.com</u>	Canada Toll	Free: 1 800 6	68 9878		(lao a	30 0	.97									•				
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REFER TO BACK	K PAGE FOR ALS LOCATIONS AND SAMPLIN	IG INFORMATION		AAHI	TE-LABORATOR	Y COPY YEL	LOW/; •	CLIENT	COPY	P							7	>		SEPT.2	O17, FRONT

## **ALS Canada Ltd.**



## **CERTIFICATE OF ANALYSIS**

**Work Order** : VA23A7839 Page : 1 of 3

Client : Regional District of Kitimat-Stikine Laboratory : Vancouver - Environmental

**Account Manager** Contact : Nicole Lavoie : Amber Springer

Address : # 300 - 4545 Lazelle Avenue Address : 8081 Lougheed Highway

> Terrace BC Canada V8G 4E1 Burnaby BC Canada V5A 1W9

> > **Date Analysis Commenced**

Telephone Telephone : +1 604 253 4188

**Project** Date Samples Received : Queensway Sewer : 12-Apr-2023 12:30 PO

: 13-Apr-2023 C-O-C number Issue Date : 20-Apr-2023 15:44

Sampler Site

Quote number : VA22-RDKS100-001

No. of samples received : 1 No. of samples analysed : 1

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
Brieanna Allen	Production/Validation Manager	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

Page : 2 of 3

Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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

<: 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.

Page : 3 of 3 Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## Analytical Results

Sub-Matrix: Effluent Client sa			lient sample ID	Queensway	 	 	
(Matrix: Water)					Sewer		
Client sampling date / time					11-Apr-2023 10:30	 	 
Analyte	CAS Number	Method	LOR	Unit	VA23A7839-001	 	 
					Result	 	 
Physical Tests							
pH		E108	0.10	pH units	8.10	 	 
Solids, total suspended [TSS]		E160	3.0	mg/L	5.8	 	 
Anions and Nutrients							
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	30.8	 	 
Nitrogen, total	7727-37-9	E366	0.030	mg/L	31.6	 	 
Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	4.25	 	 
Aggregate Organics							
Biochemical oxygen demand [BOD]		E550	2.0	mg/L	14.7	 	 
Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	9.3	 	 

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



## **QUALITY CONTROL INTERPRETIVE REPORT**

**Work Order** : **VA23A7839** Page : 1 of 7

Client : Regional District of Kitimat-Stikine Laboratory : Vancouver - Environmental

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

 Telephone
 :-- Telephone
 :+1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 12-Apr-2023 12:30

PO : ---- Issue Date : 20-Apr-2023 15:44
C-O-C number :--Sampler :---

Quote number : VA22-RDKS100-001

No. of samples received :1

No. of samples analysed :1

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

Site

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.

Page : 3 of 7 Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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					E	/aluation: × =	Holding time excee	edance ; •	✓ = Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Queensway Sewer	E550	11-Apr-2023					13-Apr-2023	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]										
Queensway Sewer	E555	11-Apr-2023					14-Apr-2023	3 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										,
Queensway Sewer	E298	11-Apr-2023	17-Apr-2023				19-Apr-2023	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)	F200	44 4 2002	47 4 2002				40 4 2002	00 4	7 -1	1
Queensway Sewer	E366	11-Apr-2023	17-Apr-2023				18-Apr-2023	28 days	7 days	•
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)				I	I					
Amber glass total (sulfuric acid)  Queensway Sewer	E372-U	11-Apr-2023	17-Apr-2023				18-Apr-2023	28 days	7 days	<b>√</b>
Queensway Sewer	L372-0	11-Apr-2023	17-Apr-2023				10-Apr-2023	20 uays	7 uays	•
Physical Tests : pH by Meter HDPE										
Queensway Sewer	E108	11-Apr-2023	13-Apr-2023				14-Apr-2023	0.25	9.25	×
Quotional other		11-7 tp1-2020	10-7 tp1-2020				177101-2020	0.25 hrs	9.25 hrs	EHTR-FM
Physical Tests - TSS by Cassimator								1113	1113	
Physical Tests : TSS by Gravimetry  HDPE							I	I		
Queensway Sewer	E160	11-Apr-2023					17-Apr-2023	7 days	6 days	1
								,	,,	

Page : 4 of 7

Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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).

Page : 5 of 7 Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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	on: × = QC freque	ency outside spe	ecification; ✓ = 0	QC frequency wit	hin specificatio
Quality Control Sample Type			Co	ount		Frequency (%)	
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	899948	1	19	5.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	896662	1	15	6.6	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	898171	1	16	6.2	5.0	✓
pH by Meter	E108	896829	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	900265	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	899947	1	17	5.8	5.0	✓
TSS by Gravimetry	E160	900642	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	899948	1	19	5.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	896662	1	15	6.6	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	898171	1	16	6.2	5.0	✓
pH by Meter	E108	896829	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	900265	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	899947	1	17	5.8	5.0	✓
TSS by Gravimetry	E160	900642	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	899948	1	19	5.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	896662	1	15	6.6	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	898171	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	900265	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	899947	1	17	5.8	5.0	✓
TSS by Gravimetry	E160	900642	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	899948	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	900265	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	899947	1	17	5.8	5.0	✓

Page : 6 of 7 Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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
pH by Meter	E108	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,
	Vancouver -			pH should be measured in the field within the recommended 15 minute hold time.
	Environmental			
TSS by Gravimetry	E160	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 $104 \pm 1^{\circ}$ C, with gravimetric measurement of the
	Vancouver -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Environmental			brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Ammonia by Fluorescence	E298	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).
	Vancouver -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Environmental			
Total Nitrogen by Colourimetry	E366	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
	Environmental			
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
	Environmental			
Biochemical Oxygen Demand - 5 day	E550	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.
	Vancouver -			
	Environmental			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	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. Nitrification inhibitor is added to
	Vancouver -			samples to prevent nitrogenous compounds from consuming oxygen resulting in only
	Environmental			carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when
				free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	Vancouver -			
	Environmental			

Page : 7 of 7 Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
	Vancouver -			
	Environmental			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	Vancouver -			
	Environmental			

# **ALS Canada Ltd.**



# **QUALITY CONTROL REPORT**

Work Order :VA23A7839

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO :---C-O-C number :---Sampler :----

Site · ----

Quote number : VA22-RDKS100-001

No. of samples received : 1

No. of samples analysed : 1

Page : 1 of 5

Laboratory : Vancouver - Environmental

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Date Samples Received : 12-Apr-2023 12:30

Date Analysis Commenced : 13-Apr-2023

Issue Date : 20-Apr-2023 15:44

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
Brieanna Allen	Production/Validation Manager	Vancouver Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

Page : 2 of 5 Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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.

Page : 3 of 5 Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

#### 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							Labora	atory Duplicate (D	UP) 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: 900642)										
KS2301113-001	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	10.8	11.2	0.4	Diff <2x LOR	
Anions and Nutrien	ts (QC Lot: 899947)										
VA23A7831-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0282	0.0278	1.36%	20%	
Anions and Nutrien	ts (QC Lot: 899948)										
VA23A7839-001	Queensway Sewer	Ammonia, total (as N)	7664-41-7	E298	0.250	mg/L	30.8	31.0	0.786%	20%	
Anions and Nutrien	ts (QC Lot: 900265)										
VA23A7700-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.386	0.391	1.26%	20%	
Aggregate Organics	s (QC Lot: 896662)										
FJ2300771-001	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	2.8	3.2	0.4	Diff <2x LOR	
Aggregate Organics	s (QC Lot: 898171)										
VA23A7879-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	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: 900642)						
Solids, total suspended [TSS]		E160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 899947)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 899948)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 900265)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	
Aggregate Organics (QCLot: 896662)						
Biochemical oxygen demand [BOD]		E550	2	mg/L	<2.0	
Aggregate Organics (QCLot: 898171)						
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	<2.0	

Page : 4 of 5 Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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 Co	ontrol Sample (LCS)	Report	
					Spike	Recovery (%)	Recovery	Limits (%)	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 896829)									
рН		E108		pH units	7 pH units	99.7	98.0	102	
Physical Tests (QCLot: 900642)									
Solids, total suspended [TSS]		E160	3	mg/L	150 mg/L	100	85.0	115	
Anions and Nutrients (QCLot: 899947)	7700 44.0	5070.11						100	
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	93.8	80.0	120	
Anions and Nutrients (QCLot: 899948)									
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: 900265)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	94.3	75.0	125	
Aggregate Organics (QCLot: 896662)									
Biochemical oxygen demand [BOD]		E550	2	mg/L	198 mg/L	98.5	85.0	115	
Aggregate Organics (QCLot: 898171)									
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	198 mg/L	97.9	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								
					Sp	ike	Recovery (%)	Recovery	Limits (%)					
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier				
<b>Anions and Nutri</b>	ents (QCLot: 899947)													
VA23A7831-007	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130					
Anions and Nutri	ents (QCLot: 899948)													
VA23A7866-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0931 mg/L	0.1 mg/L	93.1	75.0	125					
Anions and Nutri	ents (QCLot: 900265)													
VA23A7800-001	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130					

Page : 5 of 5 Work Order : VA23A7839

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer





# Chain of Custody (COC) / Analytical Request Form

#### Affix ALS barcode label here

(lab use only)

Page

COC Number: 17 -

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Canada Toll Free: 1 800 668 9878

	www.aisglobal.com																					
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#### ALS Canada Ltd.



### **CERTIFICATE OF ANALYSIS**

Work Order : VA23B3551

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address : # 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone · ----

Project : Queensway Sewer

C-O-C number : --Sampler : --Site : ---

Quote number : VA22-RDKS100-001

No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 3

Laboratory : Vancouver - Environmental

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby BC Canada V5A 1W9

Telephone : +1 604 253 4188

Date Samples Received : 15-Jun-2023 13:00

Date Analysis Commenced : 16-Jun-2023

Issue Date : 26-Jun-2023 15:37

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**

PO

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

Miles Gropen Department Manager - Inorganics Inorganics, Burnaby, British Columbia

Page : 2 of 3 Work Order : VA23B3551

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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
μS/cm	microsiemens per centimetre
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
HTDC	Hold time exceeded for dilution or re-analysis. Reported results are consistent with
	initial results (tested within hold time), and are valid and defensible.

Page : 3 of 3 Work Order : VA23B3551

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# Analytical Results

Sub-Matrix: Water			Cl	ient sample ID	Exfiltration	DUP	Travel Blank	 
(Matrix: Water)					Lagoons 3 & 4			
			Client samp	ling date / time	14-Jun-2023 10:10	14-Jun-2023 12:00	14-Jun-2023	 
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B3551-001	VA23B3551-002	VA23B3551-003	 
					Result	Result	Result	 
Physical Tests								
Conductivity		E100/VA	2.0	μS/cm	379	378	<2.0	 
рН		E108/VA	0.10	pH units	7.48	6.99	5.55	 
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	70.1	78.8	<3.0	 
pH @ 15°C (WSER)		E108A/VA	0.10	pH units	6.63	6.62	5.88	 
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	6.42	6.56	<0.0050	 
Ammonia, un-ionized (as N), 15°C (WSER)	7664-41-7	EC298/VA	0.0010	mg/L	0.0075	0.0074	<0.0010	 
Kjeldahl nitrogen, total [TKN]		E318/VA	0.050	mg/L	12.1	13.1	<0.050	 
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.432	0.433	<0.0050	 
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	15.2 HTDC	15.2 HTDC	<0.0010	 
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	26.3	25.9	<0.030	 
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	4.20	4.16	<0.0020	 
Aggregate Organics								
Biochemical oxygen demand [BOD]		E550/VA	2.0	mg/L	76.5	79.7	<2.0	 
Carbonaceous biochemical oxygen demand [CBOD]		E555/VA	2.0	mg/L	33.1	34.3	<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 : VA23B3551 Page : 1 of 11

Client : Regional District of Kitimat-Stikine Laboratory : Vancouver - Environmental

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :---- Telephone :+1 604 253 4188

Project :Queensway Sewer Date Samples Received :15-Jun-2023 13:00

Quote number : VA22-RDKS100-001

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

Site

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.

Terrace BC Canada V8G 4E1

**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 autliere coour

- 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.

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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					Εν	/aluation: ≭ =	Holding time excee	edance ; 🕥	✓ = Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
DUP	E550	14-Jun-2023					17-Jun-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]							I			
Exfiltration Lagoons 3 & 4	E550	14-Jun-2023					17-Jun-2023	3 days	3 days	✓
-										
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Travel Blank	E550	14-Jun-2023					17-Jun-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]								<u> </u>		
DUP	E555	14-Jun-2023					16-Jun-2023	3 days	2 days	1
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]										
Exfiltration Lagoons 3 & 4	E555	14-Jun-2023					16-Jun-2023	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day								T		
HDPE [BOD HT 3d] Travel Blank	E555	14-Jun-2023					16-Jun-2023	3 days	2 days	<b>√</b>
Havel Dialik	2000	14-0411-2020					10-0411-2020	0 days	2 days	·
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
DUP	E298	14-Jun-2023	20-Jun-2023				21-Jun-2023	28 days	7 days	✓

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Matrix: Water					Ev	aluation: 🗴 =	Holding time exce	edance ; 🔻	= Within	Holding Tin
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analysis		
Container / Client Sample ID(s)			Preparation Date	Holding Rec	g Times Actual	Eval	Analysis Date	Holding Rec	Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Exfiltration Lagoons 3 & 4	E298	14-Jun-2023	20-Jun-2023				21-Jun-2023	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Travel Blank	E298	14-Jun-2023	20-Jun-2023				21-Jun-2023	28 days	7 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE DUP	E235.NO3-L	14-Jun-2023	17-Jun-2023				17-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Exfiltration Lagoons 3 & 4	E235.NO3-L	14-Jun-2023	17-Jun-2023				17-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	14-Jun-2023	17-Jun-2023				17-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE DUP	E235.NO2-L	14-Jun-2023	17-Jun-2023				17-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Exfiltration Lagoons 3 & 4	E235.NO2-L	14-Jun-2023	17-Jun-2023				17-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	14-Jun-2023	17-Jun-2023				17-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) DUP	E318	14-Jun-2023	20-Jun-2023				21-Jun-2023	28 days	7 days	✓

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Client : Regional District of Kitimat-Stikine

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Matrix: Water Evaluation: **x** = Holding time exceedance; ✓ = Within Holding Time Extraction / Preparation Analyte Group Method Sampling Date Analysis Container / Client Sample ID(s) Preparation **Holding Times** Eval Analysis Date Holding Times Eval Rec Actual Rec Actual Date Anions and Nutrients: Total Kjeldahl Nitrogen by Fluorescence (Low Level) Amber glass total (sulfuric acid) E318 14-Jun-2023 20-Jun-2023 28 days ✓ Exfiltration Lagoons 3 & 4 21-Jun-2023 7 days Anions and Nutrients: Total Kjeldahl Nitrogen by Fluorescence (Low Level) Amber glass total (sulfuric acid) Travel Blank E318 14-Jun-2023 20-Jun-2023 21-Jun-2023 28 days 7 days ✓ Anions and Nutrients : Total Nitrogen by Colourimetry Amber glass total (sulfuric acid) DUP E366 14-Jun-2023 20-Jun-2023 21-Jun-2023 28 days 7 days ✓ ----**Anions and Nutrients : Total Nitrogen by Colourimetry** Amber glass total (sulfuric acid) ✓ Exfiltration Lagoons 3 & 4 E366 14-Jun-2023 20-Jun-2023 21-Jun-2023 28 days 7 days Anions and Nutrients: Total Nitrogen by Colourimetry Amber glass total (sulfuric acid) E366 14-Jun-2023 20-Jun-2023 21-Jun-2023 28 days 7 days ✓ Travel Blank Anions and Nutrients: Total Phosphorus by Colourimetry (0.002 mg/L) Amber glass total (sulfuric acid) E372-U 14-Jun-2023 ✓ DUP 20-Jun-2023 22-Jun-2023 28 days 8 days ----Anions and Nutrients: Total Phosphorus by Colourimetry (0.002 mg/L) Amber glass total (sulfuric acid) Exfiltration Lagoons 3 & 4 E372-U 14-Jun-2023 20-Jun-2023 22-Jun-2023 28 days 8 days ✓ Anions and Nutrients: Total Phosphorus by Colourimetry (0.002 mg/L) Amber glass total (sulfuric acid) E372-U 8 days ✓ Travel Blank 14-Jun-2023 20-Jun-2023 22-Jun-2023 28 days Physical Tests : Conductivity in Water HDPE 17-Jun-2023 DUP E100 14-Jun-2023 18-Jun-2023 28 days ✓ 4 days

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Matrix: Water					Ev	raluation: 🗴 =	Holding time exce	edance ; 🕥	= Within	Holding Tim
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation Date	Holding Rec	7 Times Actual	Eval	Analysis Date	Holding Rec	7 Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	14-Jun-2023	17-Jun-2023				18-Jun-2023	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Exfiltration Lagoons 3 & 4	E100	14-Jun-2023	17-Jun-2023				19-Jun-2023	28 days	5 days	<b>√</b>
Physical Tests : pH by Meter at 15C (WSER)										
HDPE DUP	E108A	14-Jun-2023					19-Jun-2023	5 days	5 days	4
Physical Tests : pH by Meter at 15C (WSER)										
HDPE Exfiltration Lagoons 3 & 4	E108A	14-Jun-2023					19-Jun-2023	5 days	5 days	✓
Physical Tests : pH by Meter at 15C (WSER)										
HDPE Travel Blank	E108A	14-Jun-2023					19-Jun-2023	5 days	5 days	<b>√</b>
Physical Tests : pH by Meter										
HDPE  DUP	E108	14-Jun-2023	17-Jun-2023				18-Jun-2023	0.25 hrs	23.25 hrs	* EHTR-FM
Physical Tests : pH by Meter										
<b>HDPE</b> Travel Blank	E108	14-Jun-2023	17-Jun-2023				18-Jun-2023	0.25 hrs	23.25 hrs	# EHTR-FM
Physical Tests : pH by Meter										
HDPE Exfiltration Lagoons 3 & 4	E108	14-Jun-2023	17-Jun-2023				19-Jun-2023	0.25 hrs	44.25 hrs	* EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Travel Blank	E160	14-Jun-2023					21-Jun-2023	7 days	6 days	✓

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Matrix: Water

Client : Regional District of Kitimat-Stikine

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Evaluation: × = Holding time exceedance: ✓ = Within Holding Time

nalyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding Times Eval		Analysis Date Hold		g Times	Eval	
			Date	Rec	Actual			Rec	Actual	
hysical Tests : TSS by Gravimetry										
HDPE										
DUP	E160	14-Jun-2023					21-Jun-2023	7 days	7 days	✓
hysical Tests : TSS by Gravimetry										
HDPE										
Exfiltration Lagoons 3 & 4	E160	14-Jun-2023					21-Jun-2023	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).

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Client : Regional District of Kitimat-Stikine

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# **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		Evaluati	ion: × = QC freque	ency outside spe	ecification; ✓ =	QC frequency wit	thin specification
Quality Control Sample Type				unt		Frequency (%)	)
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	998890	1	7	14.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	994350	1	20	5.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	993250	1	7	14.2	5.0	✓
Conductivity in Water	E100	994463	2	37	5.4	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	994465	2	36	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	994466	2	39	5.1	5.0	✓
pH by Meter	E108	994461	2	38	5.2	5.0	✓
pH by Meter at 15C (WSER)	E108A	996863	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	998888	1	7	14.2	5.0	✓
Total Nitrogen by Colourimetry	E366	998887	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	998889	1	13	7.6	5.0	✓
TSS by Gravimetry	E160	999836	2	40	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	998890	1	7	14.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	994350	1	20	5.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	993250	1	7	14.2	5.0	✓
Conductivity in Water	E100	994463	2	37	5.4	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	994465	2	36	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	994466	2	39	5.1	5.0	✓
pH by Meter	E108	994461	2	38	5.2	5.0	✓
pH by Meter at 15C (WSER)	E108A	996863	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	998888	1	7	14.2	5.0	✓
Total Nitrogen by Colourimetry	E366	998887	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	998889	1	13	7.6	5.0	✓
TSS by Gravimetry	E160	999836	2	40	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	998890	1	7	14.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	994350	1	20	5.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	993250	1	7	14.2	5.0	✓
Conductivity in Water	E100	994463	2	37	5.4	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	994465	2	36	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	994466	2	39	5.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	998888	1	7	14.2	5.0	✓
Total Nitrogen by Colourimetry	E366	998887	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	998889	1	13	7.6	5.0	<b>√</b>

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Project : Queensway Sewer



Matrix: Water		Evaluation	n: × = QC freque	ency outside spe	ecification; ✓ = 0	QC frequency wit	hin specification.
Quality Control Sample Type			Co	ount		Frequency (%)	
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Method Blanks (MB) - Continued							
TSS by Gravimetry	E160	999836	2	40	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	998890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	994465	2	36	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	994466	2	39	5.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	998888	1	7	14.2	5.0	✓
Total Nitrogen by Colourimetry	E366	998887	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	998889	1	13	7.6	5.0	✓

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# **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
Conductivity in Water	E100	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water
	Vancouver -			sample. Conductivity measurements are temperature-compensated to 25°C.
	Environmental			
pH by Meter	E108	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally $20 \pm 5^{\circ}$ C). For high accuracy test results,
	Vancouver -			pH should be measured in the field within the recommended 15 minute hold time.
	Environmental			
pH by Meter at 15C (WSER)	E108A	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at 15 ± 1°C, and is used to calculate Un-Ionized Ammonia for the federal Wastewater
	Vancouver -			Systems Effluent Regulation.
	Environmental			
TSS by Gravimetry	E160	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 $104 \pm 1^{\circ}$ C, with gravimetric measurement of the
	Vancouver -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Environmental			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	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	Vancouver -			
	Environmental			
Nitrate in Water by IC (Low Level)	E235.NO3-L	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	Vancouver -			
	Environmental			
Ammonia by Fluorescence	E298	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).
	Vancouver -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Environmental			
Total Kjeldahl Nitrogen by Fluorescence (Low	E318	Water	Method Fialab 100,	TKN in water is determined by automated continuous flow analysis with membrane
Level)			2018	diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde).
	Vancouver -			This method is approved under US EPA 40 CFR Part 136 (May 2021).
	Environmental			
Total Nitrogen by Colourimetry	E366	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
	Environmental			

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Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	Vancouver -			
	Environmental		1-111-1-11	
Biochemical Oxygen Demand - 5 day	E550	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.
	Vancouver -			
	Environmental			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	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. Nitrification inhibitor is added to
	Vancouver -			samples to prevent nitrogenous compounds from consuming oxygen resulting in only
	Environmental			carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Un-ionized Ammonia at 15°C, WSER	EC298	Water	WSER 29June2012	Un-ionized Ammonia at 15C is calculated from test results for Total Ammonia and for pH at 15C, as per the federal Wastewater Systems Effluent Regulation, and is expressed in
	Vancouver -			units of mg/L "as N".
	Environmental			
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	Vancouver - Environmental			
Digestion for TKN in water	EP318	Water	APHA 4500-Norg D	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst,
			(mod)	which converts organic nitrogen sources to Ammonia, which is then quantified by the
	Vancouver -			analytical method as TKN. This method is unsuitable for samples containing high levels
	Environmental			of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
	Vancouver -			
	Environmental			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	Vancouver -			

#### **ALS Canada Ltd.**



# **QUALITY CONTROL REPORT**

Work Order : VA23B3551

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO : --C-O-C number : --Sampler : ---

Site ·---

Quote number : VA22-RDKS100-001

No. of samples received : 3

No. of samples analysed : 3

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Laboratory : Vancouver - Environmental

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Date Samples Received : 15-Jun-2023 13:00

Date Analysis Commenced : 16-Jun-2023

Issue Date : 26-Jun-2023 15:38

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 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

Miles Gropen Department Manager - Inorganics

Vancouver Inorganics, Burnaby, British Columbia

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Work Order: VA23B3551

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

#### **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				rt		
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: 994461)										
VA23B3678-001	Anonymous	рН		E108	0.10	pH units	8.25	8.25	0.00%	4%	
Physical Tests (QC	Lot: 994463)										
VA23B3678-001	Anonymous	Conductivity		E100	2.0	μS/cm	317	317	0.00%	10%	
Physical Tests (QC	Lot: 994677)										
VA23B3684-003	Anonymous	рН		E108	0.10	pH units	8.16	8.16	0.00%	4%	
Physical Tests (QC	Lot: 994678)										
VA23B3684-003	Anonymous	Conductivity		E100	2.0	μS/cm	3060	3030	0.985%	10%	
Physical Tests (QC	Lot: 996863)										
VA23B3543-001	Anonymous	pH @ 15°C (WSER)		E108A	0.10	pH units	7.31	7.34	0.410%	4%	
Physical Tests (QC	Lot: 999836)										
KS2302066-001	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	131	133	1.97%	20%	
Physical Tests (QC	Lot: 999842)										
VA23B3544-001	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	92.0	90.6	1.53%	20%	
Anions and Nutrient	s (QC Lot: 994465)										
VA23B3678-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 994466)										
VA23B3678-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 994681)										
VA23B3684-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	14.5	14.4	0.896%	20%	
Anions and Nutrient	s (QC Lot: 994682)										
VA23B3684-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0081	0.0058	0.0022	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 998887)										
VA23B3417-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.600	mg/L	3.58	3.50	0.081	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 998888)										
VA23B3502-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	0.050	mg/L	0.227	0.233	0.006	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 998889)										
VA23B3502-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0066	0.0066	0.00001	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 998890)										
VA23B3502-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	
Aggregate Organics	(QC Lot: 993250)										

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Work Order : VA23B3551

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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	
<b>Aggregate Organics</b>	(QC Lot: 993250) - con	tinued										
VA23B3543-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	<2.0	<2.0	0.0%	30%		
<b>Aggregate Organics</b>	(QC Lot: 994350)											
KS2302069-001	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR		

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 Work Order
 :
 VA23B3551

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#### 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: 994463)					
Conductivity	E100	1	μS/cm	1.2	
Physical Tests (QCLot: 994678)					
Conductivity	E100	1	μS/cm	<1.0	
Physical Tests (QCLot: 999836)					
Solids, total suspended [TSS]	E160	3	mg/L	<3.0	
Physical Tests (QCLot: 999842)					
Solids, total suspended [TSS]	E160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 994465)					
Nitrate (as N)	14797-55-8 E235.NO3-	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 994466)					
Nitrite (as N)	14797-65-0 E235.NO2-	0.001	mg/L	<0.0010	
Anions and Nutrients (QCLot: 994681)					
Nitrate (as N)	14797-55-8 E235.NO3-	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 994682)					
Nitrite (as N)	14797-65-0 E235.NO2-	0.001	mg/L	<0.0010	
Anions and Nutrients (QCLot: 998887)					
Nitrogen, total	7727-37-9 E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 998888)					
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	<0.050	
Anions and Nutrients (QCLot: 998889)					
Phosphorus, total	7723-14-0 E372-U	0.002	mg/L	<0.0020	
nions and Nutrients (QCLot: 998890)					
Ammonia, total (as N)	7664-41-7 E298	0.005	mg/L	<0.0050	
Aggregate Organics (QCLot: 993250)					
Carbonaceous biochemical oxygen demand [CBOD]	E555	2	mg/L	<2.0	
Aggregate Organics (QCLot: 994350)					
Biochemical oxygen demand [BOD]	E550	 2	mg/L	<2.0	

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### 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: 994461)																	
рН		E108		pH units	7 pH units	100	98.0	102									
Physical Tests (QCLot: 994463)																	
Conductivity		E100	1	μS/cm	146.9 μS/cm	98.6	90.0	110									
Physical Tests (QCLot: 994677)																	
рН		E108		pH units	7 pH units	100	98.0	102									
Physical Tests (QCLot: 994678)																	
Conductivity		E100	1	μS/cm	146.9 μS/cm	98.9	90.0	110									
Physical Tests (QCLot: 996863)																	
pH @ 15°C (WSER)		E108A		pH units	7 pH units	101	98.0	102									
Physical Tests (QCLot: 999836)																	
Solids, total suspended [TSS]		E160	3	mg/L	150 mg/L	92.1	85.0	115									
Physical Tests (QCLot: 999842)																	
Solids, total suspended [TSS]		E160	3	mg/L	150 mg/L	94.7	85.0	115									
Anions and Nutrients (QCLot: 994465)	14707 55 0	E235.NO3-L	0.005	ma a //	0.5 "	400	90.0	110									
Nitrate (as N)	14797-55-6	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110									
Anions and Nutrients (QCLot: 994466)	14707 65 0	E235.NO2-L	0.001	ma/l	0.5	07.2	90.0	110	I								
Nitrite (as N)	14797-03-0	LZ33.NOZ-L	0.001	mg/L	0.5 mg/L	97.3	90.0	110									
Anions and Nutrients (QCLot: 994681)  Nitrate (as N)	1/1797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110									
,	14737-33-0	L200.1400-L	0.000	mg/L	2.5 Hg/L	100	30.0	110									
Anions and Nutrients (QCLot: 994682) Nitrite (as N)	1/797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/l	97.9	90.0	110									
	147 57 -05-0		0.001	mg/L	0.5 mg/L	87.8	30.0	110									
Anions and Nutrients (QCLot: 998887) Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125									
	7727-07-0		0.00	mg/L	0.5 mg/L	103	70.0	120									
Anions and Nutrients (QCLot: 998888)  Kjeldahl nitrogen, total [TKN]		E318	0.05	mg/L	4 mg/L	104	75.0	125									
			3.00	g/ _	7 III9/L	104	. 5.0										
Anions and Nutrients (QCLot: 998889) Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.2	80.0	120									
	7720 14-0		3.302	g/ _	0.05 Hig/L	03.2	23.0										
Anions and Nutrients (QCLot: 998890) Ammonia, total (as N)	7664-41-7	F298	0.005	mg/L	0.2 mg/L	97.7	85.0	115									
Printonia, total (as IV)	7007-41-7		0.000	mg/L	U.Z IIIY/L	91.1	00.0	110									
A																	
Aggregate Organics (QCLot: 993250)																	

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Client : Regional District of Kitimat-Stikine

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Sub-Matrix: Water					Laboratory Control Sample (LCS) Report											
					Spike	Recovery (%)	Recovery	Limits (%)								
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low High		Qualifier							
Aggregate Organics (QCLot: 993250) - continu	ed															
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	198 mg/L	90.0	85.0	115								
Aggregate Organics (QCLot: 994350)																
Biochemical oxygen demand [BOD]		E550	2	mg/L	198 mg/L	85.9	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 (%)	very (%) Recovery Li									
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Concentration Target		Low	High	Qualifier							
Anions and Nutri	ents (QCLot: 994465)																
WR2300529-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.69 mg/L	2.5 mg/L	108	75.0	125								
Anions and Nutrients (QCLot: 994466)																	
VA23B3502-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.506 mg/L	0.5 mg/L	101	75.0	125								
Anions and Nutrients (QCLot: 994681)																	
VA23B3684-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	13.0 mg/L	12.5 mg/L	104	75.0	125								
Anions and Nutri	ents (QCLot: 994682)																
VA23B3684-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.54 mg/L	2.5 mg/L	101	75.0	125								
Anions and Nutri	ents (QCLot: 998887)																
VA23B3433-001	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	4 mg/L	ND	70.0	130								
Anions and Nutri	ents (QCLot: 998888)																
VA23B3502-003	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	2.70 mg/L	2.5 mg/L	108	70.0	130								
Anions and Nutri	ents (QCLot: 998889)																
VA23B3502-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0454 mg/L	0.05 mg/L	90.9	70.0	130								
Anions and Nutri	ents (QCLot: 998890)																
VA23B3502-003	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.194 mg/L	0.2 mg/L	96.9	75.0	125								

#### Chain of Custody (COC) / Analytical Request Form

Affix ALS barcode label here

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COC Number: 17 -

**Environmental Division** 

Canada Toll Free: 1 800 668 9878													Vancouver										
Report To	Contact and company name below will appear on the final report	<del></del>	Report Format	/ Distribution		Select Service Level Below - Contact your AM to									Work Order Reference								
Company:	Regional District of Kitimat-Stikine	Select Report	Select Report Format:   PDF  EXCEL  EDD (DIGITAL)					Regular [R] Standard TAT if received by 3.							- VACULUUU :								
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Street:	4545 Lazelle Avenue	Email 1 or Fax	Email 1 or Fax enviro.dept@rdks.bc.ca					Date and Time Required for all E&P TATs:														1	
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#### **ALS Canada Ltd.**



### **CERTIFICATE OF ANALYSIS**

**Work Order** : **VA23B4947** Page : 1 of 3

Terrace BC Canada V8G 4E1

Amendment : 1

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

Address : # 300 - 4545 Lazelle Avenue Address : 8081 Lougheed Highway

Burnaby BC Canada V5A 1W9

 Telephone
 : -- Telephone
 : +1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 29-Jun-2023 12:45

PO : ---- Date Analysis Commenced : 01-Jul-2023

C-O-C number : ---- Issue Date : 18-Aug-2023 10:31
Sampler : ----

Quote number : VA22-RDKS100-001

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**

Site

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

Brieanna Allen Production/Validation Manager Inorganics, Burnaby, British Columbia
Tracy Harley Supervisor - Water Quality Instrumentation Inorganics, Burnaby, British Columbia

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Work Order : VA23B4947 Amendment 1

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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
μS/cm	microsiemens per centimetre
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.

#### Accreditation

Accreditation	Description	Laboratory	Address
А	CALA ISO/IEC 17025:2017	VA ALS Environmental - Vancouver	8081 Lougheed Highway, Burnaby, BC

Applicable accreditations are indicated in the Method/Lab column as superscripts.

#### **Workorder Comments**

Amended COA(1): Conductivity data has been added for all samples.

#### **Qualifiers**

Qualifier	Description
BODP	BOD dilution results differed by more than 30% RPD. Precision of reported BOD
	result may be less than usual.

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Work Order : VA23B4947 Amendment 1

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# Analytical Results

Sub-Matrix: Water				Cli	ient sample ID	Exfiltration	DUP	 	
(Matrix: Water)						Lagoons 3 & 4			
				Client samp	ling date / time	28-Jun-2023 11:20	28-Jun-2023 11:15	 	
Analyte	CAS Number	Method/Lab	)	LOR	Unit	VA23B4947-001	VA23B4947-002	 	
						Result	Result	 	
Physical Tests									
Conductivity	E	100/VA	Α	2.0	μS/cm	355	358	 	
рН	E	108/VA	Α	0.10	pH units	8.48	8.28	 	
Solids, total suspended [TSS]	E	160/VA	Α	3.0	mg/L	45.8	46.2	 	
pH @ 15°C (WSER)	E	E108A/VA	Α	0.10	pH units	7.60	7.59	 	
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7 E	E298/VA	Α	0.0050	mg/L	0.895	0.921	 	
Ammonia, un-ionized (as N), 15°C (WSER)	7664-41-7 E	C298/VA		0.0010	mg/L	0.0096	0.0097	 	
Kjeldahl nitrogen, total [TKN]	E	E318/VA	Α	0.050	mg/L	7.85	7.27	 	
Nitrate (as N)	14797-55-8 E	E235.NO3-L/V	Α	0.0050	mg/L	3.16	1.22	 	
Nitrite (as N)	14797-65-0 E	E235.NO2-L/V	Α	0.0010	mg/L	4.00	5.59	 	
Nitrogen, total	7727-37-9 E	366/VA	Α	0.030	mg/L	11.6	11.3	 	
Phosphorus, total	7723-14-0 E	372-U/VA	Α	0.0020	mg/L	3.98	4.09	 	
Aggregate Organics									
Biochemical oxygen demand [BOD]	E	550/VA	Α	2.0	mg/L	105 BODP	98.4 BODP	 	
Carbonaceous biochemical oxygen demand [CBOD]	E	E555/VA	Α	2.0	mg/L	16.2	16.5	 	

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**

:VA23B4947 **Work Order** Page : 1 of 9

Amendment

Client Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

> :# 300 - 4545 Lazelle Avenue Address : 8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

Issue Date

: 18-Aug-2023 10:31

Telephone Telephone : +1 604 253 4188 **Date Samples Received** Project : Queensway Sewer : 29-Jun-2023 12:45 PO

C-O-C number Sampler Site

Quote number : VA22-RDKS100-001

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

Address

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**

• Quality Control Sample Frequency Outliers occur - please see following pages for full details.

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Work Order : VA23B4947 Amendment 1
Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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					Ev	/aluation: ≭ = l	Holding time excee	edance ; 🔻	= Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	is	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] DUP	E550	28-Jun-2023					01-Jul-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Exfiltration Lagoons 3 & 4	E550	28-Jun-2023					01-Jul-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d] DUP	E555	28-Jun-2023					01-Jul-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d] Exfiltration Lagoons 3 & 4	E555	28-Jun-2023					01-Jul-2023	3 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)  DUP	E298	28-Jun-2023	03-Jul-2023	28 days	5 days	✓	04-Jul-2023	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Exfiltration Lagoons 3 & 4	E298	28-Jun-2023	03-Jul-2023	28 days	5 days	1	04-Jul-2023	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE DUP	E235.NO3-L	28-Jun-2023	01-Jul-2023	3 days	3 days	4	07-Jul-2023	3 days	9 days	<b>*</b> EHT

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Project : Queensway Sewer



Matrix: Water Evaluation: **x** = Holding time exceedance; ✓ = Within Holding Time Extraction / Preparation Analysis Analyte Group Method Sampling Date Container / Client Sample ID(s) **Holding Times** Preparation **Holding Times** Eval Analysis Date Eval Rec Actual Rec Actual Date Anions and Nutrients : Nitrate in Water by IC (Low Level) HDPE E235.NO3-L 28-Jun-2023 01-Jul-2023 07-Jul-2023 3 days 3 days 3 days × Exfiltration Lagoons 3 & 4 9 days EHT Anions and Nutrients : Nitrite in Water by IC (Low Level) **HDPE** DUP E235.NO2-L 28-Jun-2023 01-Jul-2023 3 days 3 days 1 07-Jul-2023 3 days 9 days EHT Anions and Nutrients : Nitrite in Water by IC (Low Level) HDPE E235.NO2-L 28-Jun-2023 01-Jul-2023 3 days 1 07-Jul-2023 Exfiltration Lagoons 3 & 4 3 days 3 days 9 days æ EHT Anions and Nutrients: Total Kjeldahl Nitrogen by Fluorescence (Low Level) Amber glass total (sulfuric acid) E318 ✓ ✓ DUP 28-Jun-2023 03-Jul-2023 28 5 days 04-Jul-2023 28 days 6 days days Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level) Amber glass total (sulfuric acid) E318 28-Jun-2023 03-Jul-2023 5 days 1 04-Jul-2023 ✓ Exfiltration Lagoons 3 & 4 28 days 6 days 28 days Anions and Nutrients: Total Nitrogen by Colourimetry Amber glass total (sulfuric acid) E366 28-Jun-2023 1 1 DUP 03-Jul-2023 28 5 days 05-Jul-2023 28 days 7 days days Anions and Nutrients : Total Nitrogen by Colourimetry Amber glass total (sulfuric acid) Exfiltration Lagoons 3 & 4 E366 28-Jun-2023 03-Jul-2023 5 days 05-Jul-2023 ✓ 28 days 7 days 28 days Anions and Nutrients: Total Phosphorus by Colourimetry (0.002 mg/L) Amber glass total (sulfuric acid) DUP 1 1 E372-U 28-Jun-2023 03-Jul-2023 28 5 days 06-Jul-2023 28 days 8 days days Anions and Nutrients: Total Phosphorus by Colourimetry (0.002 mg/L) Amber glass total (sulfuric acid) E372-U 28-Jun-2023 03-Jul-2023 1 06-Jul-2023 28 days 8 days 1 Exfiltration Lagoons 3 & 4 5 days 28 days

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Work Order : VA23B4947 Amendment 1
Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Matrix: Water					E	valuation: 🗴 =	Holding time exce	edance ; •	✓ = Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	raction / Pi	reparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Physical Tests : Conductivity in Water										
HDPE										
DUP	E100	28-Jun-2023	17-Aug-2023	28	50	*	17-Aug-2023	28 days	50 days	*
				days	days	EHT				EHT
Physical Tests : Conductivity in Water										
HDPE	F400	00 1 0000	47.4 0000				47.4 0000	00.1	50.1	
Exfiltration Lagoons 3 & 4	E100	28-Jun-2023	17-Aug-2023	28	50	*	17-Aug-2023	28 days	50 days	*
				days	days	EHT				EHT
Physical Tests : pH by Meter at 15C (WSER)										
HDPE	E4004	00 1 0000					04 1 1 0000			
DUP	E108A	28-Jun-2023					04-Jul-2023	5 days	6 days	*
										EHT
Physical Tests : pH by Meter at 15C (WSER)										
HDPE	E108A	28-Jun-2023					04 1.1 2022	C da	0 4-11-	×
Exfiltration Lagoons 3 & 4	ETUSA	28-Jun-2023					04-Jul-2023	5 days	6 days	EHT
										ЕПІ
Physical Tests : pH by Meter				I	I			T		
HDPE Exfiltration Lagoons 3 & 4	E108	28-Jun-2023	01-Jul-2023	0.25	73 hrs	×	04-Jul-2023	0.25	138 hrs	×
Exhiliation Lagoons 5 & 4	E106	20-Juli-2023	01-Jul-2023	0.25 hrs	731115	EHTR-FM	04-Jul-2023	0.25 hrs	1301115	EHTR-FM
				1115		LITTIX-I IVI		1115		LITTIX-I IVI
Physical Tests : pH by Meter HDPE				I	<u> </u>					
DUP	E108	28-Jun-2023	01-Jul-2023	0.25	73 hrs	×	04-Jul-2023	0.25	139 hrs	×
DOP	L 100	20-0011-2020	01-3ul-2023	0.25 hrs	751115	EHTR-FM	04-Jul-2023	0.25 hrs	1391115	EHTR-FM
				1113		LITTICTIVI		1113		LITTIC-I IVI
Physical Tests : TSS by Gravimetry  HDPE										
DUP	E160	28-Jun-2023					04-Jul-2023	7 days	7 days	✓
DOF	L 100	20-0011-2020					04-341-2023	1 days	7 days	•
Planta de Toola de La Carta de										
Physical Tests : TSS by Gravimetry  HDPE										
Exfiltration Lagoons 3 & 4	E160	28-Jun-2023					04-Jul-2023	7 days	7 days	✓
Exilia adon Lagoons o a 4	2100	20-0011-2020					04-04I-2020	/ days	, 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).

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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		Evaluati	on: × = QC freque	ency outside spe	ecification; ✓ = 0	QC frequency wit	thin specification
Quality Control Sample Type				ount		Frequency (%)	)
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1020571	1	9	11.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1019688	1	17	5.8	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1019807	1	13	7.6	5.0	✓
Conductivity in Water	E100	1089768	0	2	0.0	5.0	×
Nitrate in Water by IC (Low Level)	E235.NO3-L	1019718	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1019719	1	20	5.0	5.0	✓
pH by Meter	E108	1019714	1	20	5.0	5.0	✓
pH by Meter at 15C (WSER)	E108A	1021931	1	13	7.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1020573	1	5	20.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1020570	1	8	12.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1020574	1	5	20.0	5.0	✓
TSS by Gravimetry	E160	1022537	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1020571	1	9	11.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1019688	1	17	5.8	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1019807	1	13	7.6	5.0	✓
Conductivity in Water	E100	1089768	1	2	50.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1019718	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1019719	1	20	5.0	5.0	✓
pH by Meter	E108	1019714	1	20	5.0	5.0	✓
pH by Meter at 15C (WSER)	E108A	1021931	1	13	7.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1020573	1	5	20.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1020570	1	8	12.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1020574	1	5	20.0	5.0	✓
TSS by Gravimetry	E160	1022537	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1020571	1	9	11.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1019688	1	17	5.8	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1019807	1	13	7.6	5.0	✓
Conductivity in Water	E100	1089768	1	2	50.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1019718	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1019719	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1020573	1	5	20.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1020570	1	8	12.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1020574	1	5	20.0	5.0	✓

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Matrix: Water		Evaluation	n: 🗴 = QC freque	ency outside spe	ecification; ✓ = 0	QC frequency wit	hin specification.
Quality Control Sample Type		Co	unt	Frequency (%)			
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Method Blanks (MB) - Continued							
TSS by Gravimetry	E160	1022537	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1020571	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1019718	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1019719	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1020573	1	5	20.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1020570	1	8	12.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1020574	1	5	20.0	5.0	✓

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Project : Queensway Sewer



# **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
Conductivity in Water	E100	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water
	ALS Environmental -			sample. Conductivity measurements are temperature-compensated to 25°C.
	Vancouver			
pH by Meter	E108	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,
	ALS Environmental -			pH should be measured in the field within the recommended 15 minute hold time.
	Vancouver			
pH by Meter at 15C (WSER)	E108A	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at 15 ± 1°C, and is used to calculate Un-lonized Ammonia for the federal Wastewater
	ALS Environmental -			Systems Effluent Regulation.
	Vancouver			
TSS by Gravimetry	E160	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
	ALS Environmental -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Vancouver			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	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and /or UV detection.
	ALS Environmental -			delection.
	Vancouver			
Nitrate in Water by IC (Low Level)	E235.NO3-L	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and /or UV detection.
	ALS Environmental -			
	Vancouver			
Ammonia by Fluorescence	E298	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).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Vancouver			```
Total Kjeldahl Nitrogen by Fluorescence (Low	E318	Water	Method Fialab 100,	TKN in water is determined by automated continuous flow analysis with membrane
Level)			2018	diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021).
T. 110	Vancouver	<b>NA</b>	ABUA 4500 B 1 ( 1)	
Total Nitrogen by Colourimetry	E366	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	ALS Environmental -			
	Vancouver			

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Project : Queensway Sewer



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	ALS Environmental -			
	Vancouver			
Biochemical Oxygen Demand - 5 day	E550	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.
	ALS Environmental -			
	Vancouver			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	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. Nitrification inhibitor is added to
	ALS Environmental -			samples to prevent nitrogenous compounds from consuming oxygen resulting in only
	Vancouver			carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Un-ionized Ammonia at 15°C, WSER	EC298	Water	WSER 29June2012	Un-ionized Ammonia at 15C is calculated from test results for Total Ammonia and for pH at 15C, as per the federal Wastewater Systems Effluent Regulation, and is expressed in
	ALS Environmental -			units of mg/L "as N".
	Vancouver			· ·
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	ALS Environmental - Vancouver			
Digestion for TKN in water	EP318	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the
	ALS Environmental -		(mod)	analytical method as TKN. This method is unsuitable for samples containing high levels
	Vancouver			of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
	ALS Environmental -			
	Vancouver			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	ALS Environmental -			
			1	

# **ALS Canada Ltd.**



# **QUALITY CONTROL REPORT**

Work Order :VA23B4947

Amendment : 1

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO :---

C-O-C number : ---Sampler : ----

.

Site :---

Quote number : VA22-RDKS100-001

No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 6

Laboratory ; ALS Environmental - Vancouver

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Date Samples Received :29-Jun-2023 12:45

Date Analysis Commenced : 01-Jul-2023

Issue Date : 18-Aug-2023 10:31

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 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

Brieanna Allen Production/Validation Manager Vancouver Inorganics, Burnaby, British Columbia
Tracy Harley Supervisor - Water Quality Instrumentation Vancouver Inorganics, Burnaby, British Columbia

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Work Order: VA23B4947 Amendment 1
Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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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Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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	trix: 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: 1019714)												
VA23B5083-001	Anonymous	рН		E108	0.10	pH units	7.98	7.99	0.125%	4%			
Physical Tests (QC	Lot: 1021931)												
VA23B4717-001	Anonymous	pH @ 15°C (WSER)		E108A	0.10	pH units	7.39	7.38	0.135%	4%			
Physical Tests (QC	Lot: 1022537)												
KS2302287-001	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	11.0	13.0	2.0	Diff <2x LOR			
Anions and Nutrien	ts (QC Lot: 1019718)												
VA23B5083-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	2.14	2.13	0.407%	20%			
Anions and Nutrien	ts (QC Lot: 1019719)												
VA23B5083-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0136	0.0129	4.57%	20%			
Anions and Nutrien	ts (QC Lot: 1020570)												
KS2302259-001	Anonymous	Nitrogen, total	7727-37-9	E366	3.00	mg/L	48.6	50.3	3.47%	20%			
Anions and Nutrien	ts (QC Lot: 1020571)												
VA23B4848-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.500	mg/L	35.5	34.1	4.18%	20%			
Anions and Nutrien	ts (QC Lot: 1020573)												
VA23B4848-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	2.50	mg/L	39.3	39.0	0.681%	20%			
Anions and Nutrien	ts (QC Lot: 1020574)												
VA23B4848-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.200	mg/L	5.72	5.87	2.55%	20%			
Aggregate Organic	s (QC Lot: 1019688)												
KS2302287-001	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR			
Aggregate Organics	s (QC Lot: 1019807)												
VA23B4845-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	<2.0	<2.0	0.0%	30%			

Page : 4 of 6

Work Order: VA23B4947 Amendment 1
Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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: 1022537)					
Solids, total suspended [TSS]	E160	3	mg/L	<3.0	
Physical Tests (QCLot: 1089768)					
Conductivity	E100	1	μS/cm	<1.0	
Anions and Nutrients (QCLot: 1019718)					
Nitrate (as N)	14797-55-8 E235.NO3-L	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1019719)					
Nitrite (as N)	14797-65-0 E235.NO2-L	0.001	mg/L	<0.0010	
Anions and Nutrients (QCLot: 1020570)					
Nitrogen, total	7727-37-9 E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 1020571)					
Ammonia, total (as N)	7664-41-7 E298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1020573)					
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	<0.050	
Anions and Nutrients (QCLot: 1020574)					
Phosphorus, total	7723-14-0 E372-U	0.002	mg/L	<0.0020	
Aggregate Organics (QCLot: 1019688)					
Biochemical oxygen demand [BOD]	E550	2	mg/L	<2.0	
Aggregate Organics (QCLot: 1019807)					
Carbonaceous biochemical oxygen demand [CBOD]	E555	2	mg/L	<2.0	

Page : 5 of 6

Work Order: VA23B4947 Amendment 1
Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer



# 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 Co	ntrol Sample (LCS)	Report	
					Spike	Recovery (%)	Recovery	Limits (%)	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1019714)									
рН		E108		pH units	7 pH units	100	98.0	102	
Physical Tests (QCLot: 1021931)									
pH @ 15°C (WSER)		E108A		pH units	7 pH units	100	98.0	102	
Physical Tests (QCLot: 1022537)									
Solids, total suspended [TSS]		E160	3	mg/L	150 mg/L	92.0	85.0	115	
Physical Tests (QCLot: 1089768)									
Conductivity		E100	1	μS/cm	146.9 μS/cm	95.6	90.0	110	
Anions and Nutrients (QCLot: 1019718)									
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: 1019719)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.7	90.0	110	
Anions and Nutrients (QCLot: 1020570)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	99.0	75.0	125	
Anions and Nutrients (QCLot: 1020571)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	92.9	85.0	115	
Anions and Nutrients (QCLot: 1020573)									
Kjeldahl nitrogen, total [TKN]		E318	0.05	mg/L	4 mg/L	94.4	75.0	125	
Anions and Nutrients (QCLot: 1020574)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	94.3	80.0	120	
Aggregate Organics (QCLot: 1019688)									
Biochemical oxygen demand [BOD]		E550	2	mg/L	198 mg/L	91.2	85.0	115	
Aggregate Organics (QCLot: 1019807)									
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	198 mg/L	89.7	85.0	115	

Page : 6 of 6

Work Order: VA23B4947 Amendment 1
Client: Regional District of Kitimat-Stikine

Project : Queensway Sewer



# 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							
					Spi	ke	Recovery (%)	Recovery	Limits (%)			
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier		
Anions and Nutri	ients (QCLot: 1019718)											
VA23B5083-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.48 mg/L	2.5 mg/L	99.3	75.0	125			
Anions and Nutr	ients (QCLot: 1019719)											
VA23B5083-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.498 mg/L	0.5 mg/L	99.5	75.0	125			
Anions and Nutr	ients (QCLot: 1020570)											
VA23B4848-001	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130			
Anions and Nutr	ients (QCLot: 1020571)											
VA23B4865-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B		
Anions and Nutr	ients (QCLot: 1020573)											
VA23B4865-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	233 mg/L	2.5 mg/L	93.1	70.0	130			
Anions and Nutr	ients (QCLot: 1020574)											
VA23B4865-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130			

#### **Qualifiers**

Qualifier Description

MS-B Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

#### Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

#### Affix ALS barcode label here

(lab use only)

COC Number: 17 -

	<u>www.alsglobal.com</u>				<u> </u>																			
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#### **ALS Canada Ltd.**

Address

Quote number



# **CERTIFICATE OF ANALYSIS**

: 1 of 4

Work Order : VA23B6028 Page

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

: # 300 - 4545 Lazelle Avenue Address : 8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby BC Canada V5A 1W9

 Telephone
 : -- Telephone
 : +1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 13-Jul-2023 13:20

PO : --- Date Analysis Commenced : 13-Jul-2023

C-O-C number : ---- Issue Date : 20-Jul-2023 15:55
Sampler : ----

Site : ----

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:

: VA22-RDKS100-001

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

Lindsay Gung Supervisor - Water Chemistry Inorganics, Burnaby, British Columbia

Page : 2 of 4 Work Order : VA23B6028

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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
μS/cm	microsiemens per centimetre
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
SP	Sample was preserved at the laboratory.

Page : 3 of 4 Work Order : VA23B6028

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# Analytical Results

Sub-Matrix: Effluent			Cl	ient sample ID	Exfiltration	 	 
(Matrix: Water)					Lagoons 3&4		
			Client samp	ling date / time	12-Jul-2023 11:16	 	 
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6028-001	 	 
					Result	 	 
Physical Tests							
Conductivity		E100/VA	2.0	μS/cm	350	 	 
рН		E108/VA	0.10	pH units	7.93	 	 
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	63.8	 	 
pH @ 15°C (WSER)		E108A/VA	0.10	pH units	7.30	 	 
Anions and Nutrients							
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	1.87	 	 
Ammonia, un-ionized (as N), 15°C (WSER)	7664-41-7	EC298/VA	0.0010	mg/L	0.0101	 	 
Kjeldahl nitrogen, total [TKN]		E318/VA	0.050	mg/L	6.39	 	 
Nitrate (as N)	14797-55-8	E235.NO3-L/V	0.0050	mg/L	0.0455	 	 
Nitrite (as N)	14797-65-0	A E235.NO2-L/V A	0.0010	mg/L	0.944	 	 
Nitrogen, total	7727-37-9		0.030	mg/L	9.61	 	 
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	4.43	 	 
Aggregate Organics							
Biochemical oxygen demand [BOD]		E550/VA	2.0	mg/L	85.2	 	 
Carbonaceous biochemical oxygen demand [CBOD]		E555/VA	2.0	mg/L	15.2	 	 

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.

Page : 4 of 4 Work Order : VA23B6028

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# Analytical Results

Sub-Matrix: Water			CI	ient sample ID	Travel Blank	 	 
(Matrix: Water)							
			Client samp	ling date / time	12-Jul-2023 00:00	 	 
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6028-002	 	 
					Result	 	 
Physical Tests							
Conductivity		E100/VA	2.0	μS/cm	<2.0	 	 
рН		E108/VA	0.10	pH units	5.15	 	 
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	<3.0	 	 
pH @ 15°C (WSER)		E108A/VA	0.10	pH units	5.62	 	 
Anions and Nutrients							
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	 	 
Ammonia, un-ionized (as N), 15°C (WSER)	7664-41-7	EC298/VA	0.0010	mg/L	<0.0010	 	 
Kjeldahl nitrogen, total [TKN]		E318/VA	0.050	mg/L	<0.050	 	 
Nitrate (as N)	14797-55-8	E235.NO3-L/V	0.0050	mg/L	<0.0050	 	 
Nitrite (as N)	14797-65-0	A E235.NO2-L/V A	0.0010	mg/L	<0.0010	 	 
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	<0.030	 	 
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	<0.0020 SP	 	 
Aggregate Organics							
Biochemical oxygen demand [BOD]		E550/VA	2.0	mg/L	<2.0	 	 
Carbonaceous biochemical oxygen demand [CBOD]		E555/VA	2.0	mg/L	<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** : **VA23B6028** Page : 1 of 9

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

 Telephone
 :-- Telephone
 : +1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 13-Jul-2023 13:20

PO : ---- Issue Date : 20-Jul-2023 15:56
C-O-C number :--Sampler :---

Quote number : VA22-RDKS100-001

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

Site

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**

<u>No</u> Quality Control Sample Frequency Outliers occur.

Page : 3 of 9 Work Order : VA23B6028

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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					E	/aluation: × =	Holding time excee	edance ; 🔻	= Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	is	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Exfiltration Lagoons 3&4	E550	12-Jul-2023					13-Jul-2023	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Travel Blank	E550	12-Jul-2023					13-Jul-2023	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]										
Travel Blank	E555	12-Jul-2023					13-Jul-2023	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]										
Exfiltration Lagoons 3&4	E555	12-Jul-2023					15-Jul-2023	3 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Exfiltration Lagoons 3&4	E298	12-Jul-2023	17-Jul-2023	28	5 days	✓	18-Jul-2023	23 days	1 days	✓
				days						
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved)										
Travel Blank	E298	12-Jul-2023	13-Jul-2023	3 days	1 days	✓	15-Jul-2023	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Exfiltration Lagoons 3&4	E235.NO3-L	12-Jul-2023	15-Jul-2023	3 days	3 days	✓	15-Jul-2023	0 days	0 days	✓

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

Analyte Group	Method	Sampling Date	Ev	traction / Pr	enaration			Analys	ie	
Container / Client Sample ID(s)	Metriod	Sampling Date			•	Firel	Analysis Data			Firel
Container / Cheft Sample (b)			Preparation	Rec	g Times Actual	Eval	Analysis Date	Rec	Times Actual	Eval
			Date	Nec	Actual			Nec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)  HDPE							I			
Travel Blank	E235.NO3-L	12-Jul-2023	15-Jul-2023	3 days	3 days	✓	15-Jul-2023	0 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Exfiltration Lagoons 3&4	E235.NO2-L	12-Jul-2023	15-Jul-2023	3 days	3 days	✓	15-Jul-2023	0 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	12-Jul-2023	15-Jul-2023	3 days	3 days	1	15-Jul-2023	0 days	0 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Exfiltration Lagoons 3&4	E318	12-Jul-2023	17-Jul-2023	28 days	5 days	1	18-Jul-2023	23 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (lab preserved) Travel Blank	E318	12-Jul-2023	14-Jul-2023	3 days	2 days	✓	16-Jul-2023	28 days	1 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Exfiltration Lagoons 3&4	E366	12-Jul-2023	17-Jul-2023	28 days	5 days	<b>✓</b>	19-Jul-2023	23 days	2 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved) Travel Blank	E366	12-Jul-2023	13-Jul-2023	3 days	1 days	✓	14-Jul-2023	28 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Exfiltration Lagoons 3&4	E372-U	12-Jul-2023	17-Jul-2023	28 days	5 days	✓	19-Jul-2023	23 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved) Travel Blank	E372-U	12-Jul-2023	13-Jul-2023	3 days	1 days	<b>√</b>	14-Jul-2023	28 days	1 days	✓

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Client : Regional District of Kitimat-Stikine

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

Analyte Group	Method	Sampling Date	Fyf	traction / Pi					nalysis				
Container / Client Sample ID(s)	Wethou	Sampling Date			g Times	Eval	Analysis Date	1	Times	Eval			
Container / Charle Cample (5(c)			Preparation Date	Rec	Actual	Lvai	Allalysis Date	Rec	Actual	Lvai			
Physical Tests : Conductivity in Water			Date	1.00	11111111111			1100					
HDPE													
Exfiltration Lagoons 3&4	E100	12-Jul-2023	15-Jul-2023	28 days	3 days	✓	16-Jul-2023	25 days	1 days	✓			
Physical Tests : Conductivity in Water													
HDPE													
Travel Blank	E100	12-Jul-2023	15-Jul-2023	28 days	3 days	✓	16-Jul-2023	25 days	1 days	✓			
Physical Tests : pH by Meter at 15C (WSER)													
HDPE Exfiltration Lagoons 3&4	E108A	12-Jul-2023					14-Jul-2023	5 days	2 days	✓			
Physical Tests : pH by Meter at 15C (WSER)													
HDPE													
Travel Blank	E108A	12-Jul-2023					14-Jul-2023	5 days	2 days	✓			
Physical Tests : pH by Meter													
HDPE													
Travel Blank	E108	12-Jul-2023	15-Jul-2023	19 hrs	0.25 hrs	# EHTR-FM	16-Jul-2023	-69.41 hrs	19 hrs	UCP			
Physical Tests : pH by Meter													
HDPE													
Exfiltration Lagoons 3&4	E108	12-Jul-2023	15-Jul-2023	19 hrs	0.25 hrs	# EHTR-FM	16-Jul-2023	-73.15 hrs	19 hrs	ucp			
Physical Tests : TSS by Gravimetry													
HDPE Exfiltration Lagoons 3&4	E160	12-Jul-2023					19-Jul-2023	7 days	7 days	✓			
Physical Tests : TSS by Gravimetry													
HDPE Travel Blank	E160	12-Jul-2023					19-Jul-2023	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).

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.

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# **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		Evaluati	on: × = QC freque	ency outside spe	ecification; ✓ =	QC frequency wit	thin specification
Quality Control Sample Type				ount		Frequency (%,	)
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1037795	2	28	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1037971	1	11	9.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1038039	2	27	7.4	5.0	✓
Conductivity in Water	E100	1040560	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1040551	1	13	7.6	5.0	1
Nitrite in Water by IC (Low Level)	E235.NO2-L	1040552	1	15	6.6	5.0	✓
pH by Meter	E108	1040559	1	13	7.6	5.0	✓
pH by Meter at 15C (WSER)	E108A	1038526	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1040076	2	11	18.1	5.0	1
Total Nitrogen by Colourimetry	E366	1037796	2	13	15.3	5.0	1
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1037793	2	19	10.5	5.0	✓
TSS by Gravimetry	E160	1046341	1	17	5.8	5.0	1
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1037795	2	28	7.1	5.0	1
Biochemical Oxygen Demand - 5 day	E550	1037971	1	11	9.0	5.0	1
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1038039	2	27	7.4	5.0	✓
Conductivity in Water	E100	1040560	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1040551	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1040552	1	15	6.6	5.0	✓
pH by Meter	E108	1040559	1	13	7.6	5.0	✓
pH by Meter at 15C (WSER)	E108A	1038526	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1040076	2	11	18.1	5.0	✓
Total Nitrogen by Colourimetry	E366	1037796	2	13	15.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1037793	2	19	10.5	5.0	✓
TSS by Gravimetry	E160	1046341	1	17	5.8	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1037795	2	28	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1037971	1	11	9.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1038039	2	27	7.4	5.0	✓
Conductivity in Water	E100	1040560	1	8	12.5	5.0	1
Nitrate in Water by IC (Low Level)	E235.NO3-L	1040551	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1040552	1	15	6.6	5.0	1
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1040076	2	11	18.1	5.0	✓
Total Nitrogen by Colourimetry	E366	1037796	2	13	15.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1037793	2	19	10.5	5.0	1

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Matrix: Water		Evaluation	n: 🗴 = <i>QC freque</i>	ency outside spe	ecification; ✓ = 0	QC frequency wit	hin specification.
Quality Control Sample Type			Co	ount		Frequency (%)	
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Method Blanks (MB) - Continued							
TSS by Gravimetry	E160	1046341	1	17	5.8	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1037795	2	28	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1040551	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1040552	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1040076	2	11	18.1	5.0	✓
Total Nitrogen by Colourimetry	E366	1037796	2	13	15.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1037793	2	19	10.5	5.0	✓

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# **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
Conductivity in Water	E100	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water
	ALS Environmental -			sample. Conductivity measurements are temperature-compensated to 25°C.
	Vancouver			
pH by Meter	E108	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted
	ALS Environmental -			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.
	Vancouver			pri snould be measured in the held within the recommended 15 minute hold time.
pH by Meter at 15C (WSER)	E108A	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at 15 ± 1°C, and is used to calculate Un-lonized Ammonia for the federal Wastewater
	ALS Environmental -			Systems Effluent Regulation.
	Vancouver			,
TSS by Gravimetry	E160	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
	ALS Environmental -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Vancouver			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	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and /or UV detection.
	ALS Environmental -			
	Vancouver			
Nitrate in Water by IC (Low Level)	E235.NO3-L	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and /or UV detection.
	ALS Environmental -			
	Vancouver			
Ammonia by Fluorescence	E298	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).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Vancouver			
Total Kjeldahl Nitrogen by Fluorescence (Low	E318	Water	Method Fialab 100,	TKN in water is determined by automated continuous flow analysis with membrane
Level)			2018	diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021).
Total Nitragan by Calaurimastmy	Vancouver	\\/otor	ADUA 4500 D 1 (=====1)	
Total Nitrogen by Colourimetry	E366	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	ALS Environmental -			
	Vancouver			

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Client : Regional District of Kitimat-Stikine

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Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
•	ALS Environmental -			
	Vancouver			
Biochemical Oxygen Demand - 5 day	E550	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.
	ALS Environmental -			
	Vancouver			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	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. Nitrification inhibitor is added to
	ALS Environmental - Vancouver			samples to prevent nitrogenous compounds from consuming oxygen resulting in only carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Un-ionized Ammonia at 15°C, WSER	EC298	Water	WSER 29June2012	Un-ionized Ammonia at 15C is calculated from test results for Total Ammonia and for pH at 15C, as per the federal Wastewater Systems Effluent Regulation, and is expressed in
	ALS Environmental -			units of mg/L "as N".
	Vancouver			
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	ALS Environmental - Vancouver			
Digestion for TKN in water	EP318	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the
	ALS Environmental - Vancouver			analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
	ALS Environmental - Vancouver			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	ALS Environmental - Vancouver			

# **ALS Canada Ltd.**



# **QUALITY CONTROL REPORT**

Work Order :VA23B6028

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO :--C-O-C number :--Sampler :---

Site · ---

Quote number : VA22-RDKS100-001

No. of samples received : 2
No. of samples analysed : 2

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Laboratory ; ALS Environmental - Vancouver

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Date Samples Received : 13-Jul-2023 13:20

Date Analysis Commenced : 13-Jul-2023

Issue Date : 20-Jul-2023 15:55

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

Lindsay Gung Supervisor - Water Chemistry Vancouver Inorganics, Burnaby, British Columbia

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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: 1038526)										
VA23B6028-001	Exfiltration Lagoons 3&4	pH @ 15°C (WSER)		E108A	0.10	pH units	7.30	7.34	0.546%	4%	
Physical Tests (QC	Lot: 1040559)										
VA23B5993-001	Anonymous	pH		E108	0.10	pH units	7.92	7.93	0.126%	4%	
Physical Tests (QC	Lot: 1040560)										
VA23B5993-001	Anonymous	Conductivity		E100	2.0	μS/cm	114	117	2.51%	10%	
Physical Tests (QC	Lot: 1046341)										
VA23B5922-002	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	12.2	12.4	0.2	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 1037793)										
FJ2301698-009	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 1037795)										
FJ2301698-009	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 1037796)										
VA23B5933-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.600	mg/L	8.44	8.31	1.58%	20%	
Anions and Nutrient	s (QC Lot: 1040076)										
KS2302505-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	0.050	mg/L	0.887	0.901	1.55%	20%	
Anions and Nutrient	s (QC Lot: 1040551)										
VA23B5993-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 1040552)										
VA23B5993-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	
Anions and Nutrient	s (QC Lot: 1042817)										
VA23B6008-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.200	mg/L	6.01	6.43	6.83%	20%	
<b>Anions and Nutrient</b>	s (QC Lot: 1042818)										
VA23B5979-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0977	0.0918	6.21%	20%	
Anions and Nutrient	s (QC Lot: 1042819)										
VA23B6008-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	2.50	mg/L	31.8	32.4	1.75%	20%	
Anions and Nutrient	s (QC Lot: 1042820)										
VA23B5979-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.600	mg/L	15.7	15.4	1.79%	20%	
Aggregate Organics	(QC Lot: 1037971)										
VA23B6033-001	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	
Aggregate Organics	(QC Lot: 1038039)										

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Client : Regional District of Kitimat-Stikine

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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	Qualifie	
Aggregate Organics (QC Lot: 1038039) - continued												
VA23B6016-006	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	<2.0	<2.0	0.0%	30%		
Aggregate Organics (QC Lot: 1040471)												
VA23B5931-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	<2.0	<2.0	0.0%	30%		

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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: 1040560)					
Conductivity	E100	1	μS/cm	<1.0	
Physical Tests (QCLot: 1046341)					
Solids, total suspended [TSS]	E160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 1037793)					
Phosphorus, total	7723-14-0 E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1037795)					
Ammonia, total (as N)	7664-41-7 E298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1037796)					
Nitrogen, total	7727-37-9 E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 1040076)		0.05		.0.050	
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	<0.050	
unions and Nutrients (QCLot: 1040551)	14797-55-8 E235.NO3-L	0.005		10.0050	
Nitrate (as N)	14/9/-55-6 EZ55.NO5-L	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1040552)  Nitrite (as N)	14797-65-0   E235.NO2-L	0.001	mg/L	<0.0010	
	14737-03-0 L233.NOZ-E	0.001	IIIg/L	10.0010	
Anions and Nutrients (QCLot: 1042817)  Phosphorus, total	7723-14-0 E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1042818)			1		
Ammonia, total (as N)	7664-41-7   E298	0.005	mg/L	<0.0050	
nions and Nutrients (QCLot: 1042819)					
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	<0.050	
nions and Nutrients (QCLot: 1042820)					
Nitrogen, total	7727-37-9 E366	0.03	mg/L	<0.030	
aggregate Organics (QCLot: 1037971)					
Biochemical oxygen demand [BOD]	E550	2	mg/L	<2.0	
Aggregate Organics (QCLot: 1038039)					
Carbonaceous biochemical oxygen demand [CBOD]	E555	2	mg/L	<2.0	
aggregate Organics (QCLot: 1040471)					
Carbonaceous biochemical oxygen demand [CBOD]	E555	2	mg/L	<2.0	

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Client : Regional District of Kitimat-Stikine



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 Work Order :
 VA23B6028

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## 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.

Analyte  Physical Tests (QCLot: 1038526) pH @ 15°C (WSER)  Physical Tests (QCLot: 1040559) pH  Physical Tests (QCLot: 1040560)  Conductivity  Physical Tests (QCLot: 1046341)  Solids, total suspended [TSS]  Anions and Nutrients (QCLot: 1037793)  Phosphorus, total	CAS Number Method E108A E100		LOR	Unit pH units	Spike Concentration 7 pH units	Recovery (%) LCS	Recovery Low	Limits (%) High	Qualifier
Physical Tests (QCLot: 1038526) pH @ 15°C (WSER)  Physical Tests (QCLot: 1040559) pH  Physical Tests (QCLot: 1040560)  Conductivity  Physical Tests (QCLot: 1046341)  Solids, total suspended [TSS]  Anions and Nutrients (QCLot: 1037793)	E108A E108			pH units			Low	High	Qualifier
PH @ 15°C (WSER)  Physical Tests (QCLot: 1040559) pH  Physical Tests (QCLot: 1040560)  Conductivity  Physical Tests (QCLot: 1046341)  Solids, total suspended [TSS]  Anions and Nutrients (QCLot: 1037793)	E108				7 pH units	101			
Physical Tests (QCLot: 1040559) pH  Physical Tests (QCLot: 1040560) Conductivity  Physical Tests (QCLot: 1046341) Solids, total suspended [TSS]  Anions and Nutrients (QCLot: 1037793)	E108				7 pH units	101			
Physical Tests (QCLot: 1040560) Conductivity Physical Tests (QCLot: 1046341) Solids, total suspended [TSS] Anions and Nutrients (QCLot: 1037793)	E100			n I I unito		101	98.0	102	
Conductivity  Physical Tests (QCLot: 1046341)  Solids, total suspended [TSS]  Anions and Nutrients (QCLot: 1037793)	E100			n L Lunita					
Conductivity  Physical Tests (QCLot: 1046341)  Solids, total suspended [TSS]  Anions and Nutrients (QCLot: 1037793)				pH units	7 pH units	100	98.0	102	
Physical Tests (QCLot: 1046341) Solids, total suspended [TSS] Anions and Nutrients (QCLot: 1037793)									
Solids, total suspended [TSS]  Anions and Nutrients (QCLot: 1037793)	le co		1	μS/cm	146.9 μS/cm	98.4	90.0	110	
Anions and Nutrients (QCLot: 1037793)	= 400								
	E160		3	mg/L	150 mg/L	88.7	85.0	115	
								I	
Phosphorus, total									
	7723-14-0 E372-U		0.002	mg/L	0.05 mg/L	90.9	80.0	120	
Anions and Nutrients (QCLot: 1037795)									
Ammonia, total (as N)	7664-41-7 E298		0.005	mg/L	0.2 mg/L	90.0	85.0	115	
Anions and Nutrients (QCLot: 1037796)									
Nitrogen, total	7727-37-9 E366		0.03	mg/L	0.5 mg/L	99.8	75.0	125	
Anions and Nutrients (QCLot: 1040076)									
Kjeldahl nitrogen, total [TKN]	E318		0.05	mg/L	4 mg/L	97.3	75.0	125	
Anions and Nutrients (QCLot: 1040551)									
Nitrate (as N)	14797-55-8 E235.NO	3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	
Anions and Nutrients (QCLot: 1040552)									
Nitrite (as N)	14797-65-0 E235.NO	2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	
Anions and Nutrients (QCLot: 1042817)									
Phosphorus, total	7723-14-0 E372-U		0.002	mg/L	0.05 mg/L	91.9	80.0	120	
Anions and Nutrients (QCLot: 1042818)									
Ammonia, total (as N)	7664-41-7 E298		0.005	mg/L	0.2 mg/L	92.5	85.0	115	
Anions and Nutrients (QCLot: 1042819)									
Kjeldahl nitrogen, total [TKN]	E318		0.05	mg/L	4 mg/L	98.4	75.0	125	
Anions and Nutrients (QCLot: 1042820)									
Nitrogen, total	7727-37-9 E366		0.03	mg/L	0.5 mg/L	97.5	75.0	125	
								l	
Aggregate Organics (QCLot: 1037971)									
Biochemical oxygen demand [BOD]	E550		2	mg/L	198 mg/L	95.8	85.0	115	
Aggregate Organics (QCLot: 1038039)									

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Sub-Matrix: Water					Laboratory Co	ontrol Sample (LCS)	Report	
				Spike	Recovery (%)	Recovery	Limits (%)	
Analyte	CAS Number Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Aggregate Organics (QCLot: 1038039) - contir	ued							
Carbonaceous biochemical oxygen demand [CBOD]	E555	2	mg/L	198 mg/L	98.3	85.0	115	
Aggregate Organics (QCLot: 1040471)								
Carbonaceous biochemical oxygen demand [CBOD]	E555	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	e (MS) Report		
					Spi	ke	Recovery (%)	Recovery	Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutri	ents (QCLot: 1037793)									
KS2302493-013	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0448 mg/L	0.05 mg/L	89.6	70.0	130	
Anions and Nutri	ents (QCLot: 1037795)									
KS2302493-013	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0945 mg/L	0.1 mg/L	94.5	75.0	125	
Anions and Nutri	ents (QCLot: 1037796)									
VA23B5970-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.387 mg/L	0.4 mg/L	96.7	70.0	130	
Anions and Nutri	ents (QCLot: 1040076)									
VA23B5835-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	24.1 mg/L	2.5 mg/L	96.6	70.0	130	
Anions and Nutri	ents (QCLot: 1040551)									
VA23B5993-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.64 mg/L	2.5 mg/L	106	75.0	125	
Anions and Nutri	ents (QCLot: 1040552)									
VA23B5993-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.526 mg/L	0.5 mg/L	105	75.0	125	
Anions and Nutr	ents (QCLot: 1042817)									
VA23B6016-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	
Anions and Nutri	ents (QCLot: 1042818)									
VA23B5996-007	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0956 mg/L	0.1 mg/L	95.6	75.0	125	
Anions and Nutri	ents (QCLot: 1042819)									
VA23B6021-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	2.51 mg/L	2.5 mg/L	100	70.0	130	
Anions and Nutri	ents (QCLot: 1042820)									
VA23B6008-001	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	20 mg/L	ND	70.0	130	

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 Work Order
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 VA23B6028

Client : Regional District of Kitimat-Stikine



# ALS

## Chain of Custody (COC) / Analytical Request Form

## Affix ALS barcode label here

(lab use only)

COC Number: 17 -

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SAMPLE CONDITION AS RECEIVED (lab use only) Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below Drinking Water (DW) Samples<sup>1</sup> (client use) (electronic COC only) Frozen SIF Observations No Are samples taken from a Regulated DW System? Federal Wastewater Systems Effluent Regulations (JUN, 2012) ce Packs) 📈 ice Cubes 🔲 Custody seal intact YES VES NO Cooling Initiated Are samples for human consumption/ use? Queensway Sewer Custom Criteria for RDKS INITIAL COOLER TEMPERATURES °C FINAL COOLER TEMPERATURES °C YES I NO SHIPMENT RELEASE (cilent use) INITIAL SHIPMENT RECEPTION (lab use only) FINAL SHIPMENT RECEPTION (lab use only) Released by: Received by: Received by:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

HITE - LABORATORY COPY YELLOW - CLIENT COI

SECT COAT FROM

## **ALS Canada Ltd.**

Address

Telephone

Site



## **CERTIFICATE OF ANALYSIS**

Telephone

**Work Order** : VA23B9013 Page : 1 of 5

Client Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

**Account Manager** Contact : Nicole Lavoie : Amber Springer

> : # 300 - 4545 Lazelle Avenue Address : 8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby BC Canada V5A 1W9

: +1 604 253 4188 **Project** Date Samples Received : Queensway Sewer : 16-Aug-2023 12:30

PO **Date Analysis Commenced** : 17-Aug-2023

C-O-C number Issue Date : 23-Aug-2023 10:22 Sampler

Quote number : VA22-RDKS100-001

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
- Surrogate Control Limits

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
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Leon Yang	Analsyt	Inorganics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia

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Work Order : VA23B9013

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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
μg/L	micrograms per litre
μS/cm	microsiemens per centimetre
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.

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## Analytical Results

Sub-Matrix: Effluent			CI	ient sample ID	Exfiltration Lagoons 3 & 4	 	 
(Matrix: Water)					Lagoons 5 & 4		
			Client samp	ling date / time	15-Aug-2023 11:46	 	 
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9013-001	 	 
					Result	 	 
Physical Tests							
Conductivity		E100/VA	2.0	μS/cm	474	 	 
рН		E108/VA	0.10	pH units	7.20	 	 
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	22.9	 	 
pH @ 15°C (WSER)		E108A/VA	0.10	pH units	7.43	 	 
Anions and Nutrients							
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	12.9	 	 
Ammonia, un-ionized (as N), 15°C (WSER)	7664-41-7	EC298/VA	0.0010	mg/L	0.0940	 	 
Kjeldahl nitrogen, total [TKN]		E318/VA	0.050	mg/L	16.3	 	 
Nitrate (as N)	14797-55-8	E235.NO3-L/V	0.0050	mg/L	<0.0050	 	 
Nitrite (as N)	14797-65-0	A E235.NO2-L/V Δ	0.0010	mg/L	<0.0010	 	 
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	16.2	 	 
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	5.29	 	 
Aggregate Organics							
Biochemical oxygen demand [BOD]		E550/VA	2.0	mg/L	50.4	 	 
Carbonaceous biochemical oxygen demand [CBOD]		E555/VA	2.0	mg/L	11.7	 	 
Volatile Organic Compounds [Fuels]							
Benzene	71-43-2	E611A/VA	0.50	μg/L	<0.50	 	 
Ethylbenzene	100-41-4	E611A/VA	0.50	μg/L	<0.50	 	 
Methyl-tert-butyl ether [MTBE]	1634-04-4		0.50	μg/L	<0.50	 	 
Styrene		E611A/VA	0.50	μg/L	<0.50	 	 
Toluene		E611A/VA	0.50	μg/L	<0.50	 	 
Xylene, m+p-	179601-23-1		0.40	μg/L	<0.40	 	 
Xylene, o-		E611A/VA	0.30	μg/L	<0.30	 	 
Xylenes, total	1330-20-7		0.50	μg/L	<0.50	 	 
Hydrocarbons							
EPH (C10-C19)		E601A/VA	250	μg/L	<250	 	 
EPH (C19-C32)		E601A/VA	250	μg/L	<250	 	 

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Work Order : VA23B9013

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## Analytical Results

Sub-Matrix: Effluent (Matrix: Water)			Cli	ient sample ID	Exfiltration Lagoons 3 & 4	 	 
			Client samp	ling date / time	15-Aug-2023 11:46	 	 
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9013-001	 	 
					Result	 	 
Hydrocarbons							
VHw (C6-C10)	[	E581.VH+F1/	100	μg/L	<100	 	 
VPHw		VA EC580A/VA	100	μg/L	<100	 	 
Hydrocarbons Surrogates							
Bromobenzotrifluoride, 2- (EPH surrogate)	392-83-6 l	E601A/VA	1.0	%	108	 	 
Dichlorotoluene, 3,4-		E581.VH+F1/ VA	1.0	%	115	 	 
Volatile Organic Compounds Surrogates							
Bromofluorobenzene, 4-	460-00-4 <b>l</b>		1.0	%	90.8	 	 
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%	105	 	 

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.

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## Analytical Results

Sub-Matrix: Water			CI	ient sample ID	Travel Blank	 	 
(Matrix: Water)							
			Client samp	ling date / time	15-Aug-2023 00:00	 	 
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9013-002	 	 
					Result	 	 
Physical Tests							
Conductivity		E100/VA	2.0	μS/cm	<2.0	 	 
рН		E108/VA	0.10	pH units	5.21	 	 
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	<3.0	 	 
pH @ 15°C (WSER)		E108A/VA	0.10	pH units	5.93	 	 
Anions and Nutrients							
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	 	 
Ammonia, un-ionized (as N), 15°C (WSER)	7664-41-7	EC298/VA	0.0010	mg/L	<0.0010	 	 
Kjeldahl nitrogen, total [TKN]		E318/VA	0.050	mg/L	<0.050	 	 
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	<0.0050	 	 
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	 	 
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	<0.030	 	 
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	<0.0020	 	 
Aggregate Organics							
Biochemical oxygen demand [BOD]		E550/VA	2.0	mg/L	<2.0	 	 
Carbonaceous biochemical oxygen demand [CBOD]		E555/VA	2.0	mg/L	<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 : VA23B9013 Page : 1 of 11

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

Telephone :---- Telephone :+1 604 253 4188
Project :Queensway Sewer Date Samples Received :16-Aug-2023 12:30

PO : ---- Issue Date : 23-Aug-2023 10:22 C-O-C number : ---- Sampler : ----

Quote number : VA22-RDKS100-001

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

Site

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**

<u>No</u> Quality Control Sample Frequency Outliers occur.

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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					Ev	/aluation: <b>≭</b> =	Holding time excee	edance ; 🛚	/ = Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Exfiltration Lagoons 3 & 4	E550	15-Aug-2023					17-Aug-2023	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Travel Blank	E550	15-Aug-2023					17-Aug-2023	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]										
Exfiltration Lagoons 3 & 4	E555	15-Aug-2023					17-Aug-2023	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]		45.4 0000					47.4 0000			,
Travel Blank	E555	15-Aug-2023					17-Aug-2023	3 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)	E298	15-Aug-2023	20-Aug-2023		5 days	<b>√</b>	21-Aug-2023	28 days	6 days	1
Exfiltration Lagoons 3 & 4	L290	13-Aug-2023	20-Aug-2023	28 days	5 uays	•	21-Aug-2023	20 uays	0 uays	•
				uays						
Anions and Nutrients : Ammonia by Fluorescence							I			
Amber glass total (lab preserved)  Travel Blank	E298	15-Aug-2023	18-Aug-2023	3 days	3 days	<b>√</b>	18-Aug-2023	28 days	0 days	<b>✓</b>
Havor Blank		107 tug-2020	10-7 lug-2020	Judys	Jauys	•	157/149-2020	20 days	Judys	•
Anisma and Nutriente - Nitrate in Weter by IC // any Level										
Anions and Nutrients : Nitrate in Water by IC (Low Level)  HDPE										
Exfiltration Lagoons 3 & 4	E235.NO3-L	15-Aug-2023	17-Aug-2023	3 days	2 days	<b>√</b>	17-Aug-2023	3 days	2 days	✓
		2 : 9 = 2 = 2	, 2020	3,0				3 44,0		

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

Analyte Group  Container / Client Sample ID(s)  Anions and Nutrients: Nitrate in Water by IC (Low Level)  HDPE  Travel Blank  E235.NO3-	Sampling Date  15-Aug-2023	Preparation Date	Holding Rec	g Times Actual	Eval	Analysis Date	Analys  Holding  Rec		Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level) HDPE	_ 15-Aug-2023	1			Eval	Analysis Date			Eval
HDPE	_ 15-Aug-2023	Date	Rec	Actual			Rec	Actual	
HDPE	_ 15-Aug-2023						7100	Actual	
	_ 15-Aug-2023								
Travel Blank E235.NO3-	_ 15-Aug-2023								
		17-Aug-2023	3 days	2 days	✓	17-Aug-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)									
HDPE									
Exfiltration Lagoons 3 & 4 E235.NO2-	_ 15-Aug-2023	17-Aug-2023	3 days	2 days	✓	17-Aug-2023	3 days	2 days	✓
			0,	, -		g	0, -	,-	
Anions and Nutrients : Nitrite in Water by IC (Low Level)				I					
HDPE	45 A	47 4 0000	0 4-11-	0 4	<b>√</b>	47 4 2022	0 -1	0 -1	✓
Travel Blank E235.NO2-	_ 15-Aug-2023	17-Aug-2023	3 days	2 days	•	17-Aug-2023	3 days	2 days	<b>∀</b>
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)									
Amber glass total (sulfuric acid)									
Exfiltration Lagoons 3 & 4 E318	15-Aug-2023	20-Aug-2023	28	5 days	✓	21-Aug-2023	28 days	6 days	✓
			days						
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)									
Amber glass total (lab preserved)			T						
Travel Blank E318	15-Aug-2023	18-Aug-2023	3 days	3 days	✓	19-Aug-2023	28 days	1 days	✓
		ŭ				Ü	,	,	
A transfer of the state of the									
Anions and Nutrients : Total Nitrogen by Colourimetry					I	1			
Amber glass total (sulfuric acid)  Exfiltration Lagoons 3 & 4  E366	15-Aug-2023	20 Aug 2022	00	5 days	<b>√</b>	21-Aug-2023	28 days	G days	✓
Exfiltration Lagoons 3 & 4 E366	13-Aug-2023	20-Aug-2023	28	5 uays	•	21-Aug-2023	20 uays	0 uays	•
			days						
Anions and Nutrients : Total Nitrogen by Colourimetry									
Amber glass total (lab preserved)									
Travel Blank E366	15-Aug-2023	18-Aug-2023	3 days	3 days	✓	18-Aug-2023	28 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)									
Amber glass total (sulfuric acid)			T						
Exfiltration Lagoons 3 & 4	15-Aug-2023	20-Aug-2023	28	5 days	✓	22-Aug-2023	28 days	7 days	✓
		Ů	days			, and the second		-	
Anione and Nutriento : Total Dhaanhama hu Calaurimatus (0.002 mall )			-,-						
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)						I			
Amber glass total (lab preserved)  Travel Blank E372-U	15-Aug-2023	10 Aug 2022	2 days	3 days	✓	21-Aug-2023	20 days	2 days	✓
Travel Blank E372-U	10-Aug-2023	18-Aug-2023	3 days	o uays	<b>,</b> ,	21-Mug-2023	28 days	o uays	▼

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Matrix: Water					E	valuation: ≭ =	Holding time exce	edance ; •	✓ = Within	Holding Tim
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation Date	Holdin Rec	g Times Actual	Eval	Analysis Date	Holding Rec	g Times Actual	Eval
Hydrocarbons : BC PHCs - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Exfiltration Lagoons 3 & 4	E601A	15-Aug-2023	22-Aug-2023	14 days	7 days	1	22-Aug-2023	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Exfiltration Lagoons 3 & 4	E581.VH+F1	15-Aug-2023	20-Aug-2023	14 days	5 days	1	21-Aug-2023	14 days	6 days	<b>√</b>
Physical Tests : Conductivity in Water				_						
HDPE Exfiltration Lagoons 3 & 4	E100	15-Aug-2023	17-Aug-2023	28 days	2 days	✓	17-Aug-2023	28 days	2 days	<b>4</b>
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	15-Aug-2023	17-Aug-2023	28 days	2 days	<b>✓</b>	17-Aug-2023	28 days	2 days	<b>√</b>
Physical Tests : pH by Meter at 15C (WSER)										
HDPE Exfiltration Lagoons 3 & 4	E108A	15-Aug-2023					17-Aug-2023	5 days	2 days	<b>4</b>
Physical Tests : pH by Meter at 15C (WSER)										
HDPE Travel Blank	E108A	15-Aug-2023					17-Aug-2023	5 days	2 days	<b>*</b>
Physical Tests : pH by Meter										
HDPE Travel Blank	E108	15-Aug-2023	17-Aug-2023	0.25 hrs	38 hrs	# EHTR-FM	17-Aug-2023	0.25 hrs	38 hrs	* EHTR-FM
Physical Tests : pH by Meter										
HDPE Exfiltration Lagoons 3 & 4	E108	15-Aug-2023	17-Aug-2023	0.25 hrs	41 hrs	* EHTR-FM	17-Aug-2023	0.25 hrs	42 hrs	# EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Exfiltration Lagoons 3 & 4	E160	15-Aug-2023					21-Aug-2023	7 days	6 days	✓

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

Analyte Group	Method	Sampling Date	Ext	raction / Pi	reparation		Analysis			
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding Times		Eval
			Date	Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE										
Travel Blank	E160	15-Aug-2023					21-Aug-2023	7 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Exfiltration Lagoons 3 & 4	E611A	15-Aug-2023	20-Aug-2023	14	5 days	✓	21-Aug-2023	14 days	6 days	✓
				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).

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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		·	ion: × = QC frequ		1		
Quality Control Sample Type	A da the ad	001-4#	QC	ount Regular	Antival	Frequency (%)	) Evaluation
Analytical Methods	Method	QC Lot #		Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)						,	
Ammonia by Fluorescence	E298	1091786	2	11	18.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1089756	1	20	5.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1091072	1	12	8.3	5.0	✓
BTEX by Headspace GC-MS	E611A	1094506	1	4	25.0	5.0	✓
Conductivity in Water	E100	1089123	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1089125	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1089126	1	12	8.3	5.0	✓
pH by Meter	E108	1089122	1	12	8.3	5.0	✓
pH by Meter at 15C (WSER)	E108A	1089242	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1091791	2	11	18.1	5.0	✓
Total Nitrogen by Colourimetry	E366	1091784	2	3	66.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1091785	2	5	40.0	5.0	✓
TSS by Gravimetry	E160	1095645	1	13	7.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1094505	1	4	25.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1091786	2	11	18.1	5.0	1
BC PHCs - EPH by GC-FID	E601A	1096413	1	9	11.1	5.0	1
Biochemical Oxygen Demand - 5 day	E550	1089756	1	20	5.0	5.0	1
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1091072	1	12	8.3	5.0	1
BTEX by Headspace GC-MS	E611A	1094506	1	4	25.0	5.0	1
Conductivity in Water	E100	1089123	1	12	8.3	5.0	1
Nitrate in Water by IC (Low Level)	E235.NO3-L	1089125	1	12	8.3	5.0	1
Nitrite in Water by IC (Low Level)	E235.NO2-L	1089126	1	12	8.3	5.0	1
pH by Meter	E108	1089122	1	12	8.3	5.0	1
pH by Meter at 15C (WSER)	E108A	1089242	1	3	33.3	5.0	1
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1091791	2	11	18.1	5.0	1
Total Nitrogen by Colourimetry	E366	1091784	2	3	66.6	5.0	1
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1091785	2	5	40.0	5.0	1
TSS by Gravimetry	E160	1095645	1	13	7.6	5.0	1
VH and F1 by Headspace GC-FID	E581.VH+F1	1094505	1	4	25.0	5.0	1
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1091786	2	11	18.1	5.0	✓
BC PHCs - EPH by GC-FID	E601A	1096413	1	9	11.1	5.0	<b>√</b>
Biochemical Oxygen Demand - 5 day	E550	1089756	1	20	5.0	5.0	<b>√</b>
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1091072	1	12	8.3	5.0	<b>√</b>

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Client : Regional District of Kitimat-Stikine



Matrix: Water		Evaluatio	n: × = QC freque	ency outside spe	ecification; ✓ = 0	QC frequency wit	hin specification
Quality Control Sample Type			Co	ount		Frequency (%)	
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Method Blanks (MB) - Continued							
BTEX by Headspace GC-MS	E611A	1094506	1	4	25.0	5.0	✓
Conductivity in Water	E100	1089123	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1089125	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1089126	1	12	8.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1091791	2	11	18.1	5.0	✓
Total Nitrogen by Colourimetry	E366	1091784	2	3	66.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1091785	2	5	40.0	5.0	✓
TSS by Gravimetry	E160	1095645	1	13	7.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1094505	1	4	25.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1091786	2	11	18.1	5.0	✓
BTEX by Headspace GC-MS	E611A	1094506	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1089125	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1089126	1	12	8.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1091791	2	11	18.1	5.0	✓
Total Nitrogen by Colourimetry	E366	1091784	2	3	66.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1091785	2	5	40.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1094505	1	4	25.0	5.0	✓

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## **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
Conductivity in Water	E100	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water
	ALS Environmental -			sample. Conductivity measurements are temperature-compensated to 25°C.
	Vancouver			
pH by Meter	E108	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,
	ALS Environmental -			pH should be measured in the field within the recommended 15 minute hold time.
	Vancouver			
pH by Meter at 15C (WSER)	E108A	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at 15 ± 1°C, and is used to calculate Un-lonized Ammonia for the federal Wastewater
	ALS Environmental -			Systems Effluent Regulation.
	Vancouver			
TSS by Gravimetry	E160	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
	ALS Environmental -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Vancouver			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	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	ALS Environmental -			
	Vancouver			
Nitrate in Water by IC (Low Level)	E235.NO3-L	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and /or UV detection.
	ALS Environmental -			
	Vancouver			
Ammonia by Fluorescence	E298	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).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Vancouver			
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde).
,	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021).
	Vancouver			
Total Nitrogen by Colourimetry	E366	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	ALS Environmental -			
	Vancouver			

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Client : Regional District of Kitimat-Stikine



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U  ALS Environmental -  Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Vancouver	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.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555 ALS Environmental - Vancouver	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. Nitrification inhibitor is added to samples to prevent nitrogenous compounds from consuming oxygen resulting in only carbonaceous oxygen demand being reported by this method.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
VH and F1 by Headspace GC-FID	E581.VH+F1  ALS Environmental -  Vancouver	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.  Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BC PHCs - EPH by GC-FID	E601A  ALS Environmental -  Vancouver	Water	BC MOE Lab Manual	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A  ALS Environmental -  Vancouver	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Un-ionized Ammonia at 15°C, WSER	EC298  ALS Environmental -  Vancouver	Water	WSER 29June2012	Un-ionized Ammonia at 15C is calculated from test results for Total Ammonia and for pH at 15C, as per the federal Wastewater Systems Effluent Regulation, and is expressed in units of mg/L "as N".
VPH: VH-BTEX-Styrene	EC580A  ALS Environmental -  Vancouver	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

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Client : Regional District of Kitimat-Stikine



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	ALS Environmental - Vancouver			
Digestion for TKN in water	EP318	Water	APHA 4500-Norg D	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the
	ALS Environmental - Vancouver		(mag)	analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
	ALS Environmental - Vancouver			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	ALS Environmental - Vancouver			
VOCs Preparation for Headspace Analysis	EP581	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the
	ALS Environmental - Vancouver			GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.
	ALS Environmental - Vancouver			O 1- 1/4-1- 1/4-1- 1/1-1-1-1-1

## **ALS Canada Ltd.**



## **QUALITY CONTROL REPORT**

Page

**Account Manager** 

Work Order :VA23B9013

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Project : Queensway Sewer Date Samples Received : 16-Aug-2023 12:30

Date Analysis Commenced : 17-Aug-2023

Issue Date : 23-Aug-2023 10:22

: 1 of 10

: Amber Springer

Telephone

PO :----

C-O-C number : ---Sampler : ----

Site · ----

Quote number : VA22-RDKS100-001

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	
Cindy Tang	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia	
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia	
Kate Dimitrova	Supervisor - Inorganic	Vancouver Inorganics, Burnaby, British Columbia	
Kim Jensen	Department Manager - Metals	Vancouver Inorganics, Burnaby, British Columbia	
Leon Yang	Analsyt	Vancouver Inorganics, Burnaby, British Columbia	
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## 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							Labora	ntory Duplicate (D	UP) 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: 1089122)										
VA23B9030-003	Anonymous	pH		E108	0.10	pH units	7.66	7.70	0.521%	4%	
Physical Tests (QC	Lot: 1089123)										
VA23B9030-003	Anonymous	Conductivity		E100	2.0	μS/cm	2780	2780	0.00%	10%	
Physical Tests (QC	Lot: 1089242)										
VA23B9013-001	Exfiltration Lagoons 3 & 4	pH @ 15°C (WSER)		E108A	0.10	pH units	7.43	7.47	0.537%	4%	
Physical Tests (QC	Lot: 1095645)										
VA23B8818-001	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	8.7	9.1	0.4	Diff <2x LOR	
Anions and Nutrien	ts (QC Lot: 1089125)										
VA23B9030-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1089126)										
VA23B9030-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1091784)										
VA23B8768-001	Anonymous	Nitrogen, total	7727-37-9	E366	15.0	mg/L	117	120	3.12	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1091785)										
VA23B9013-002	Travel Blank	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1091786)										
VA23B8784-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	7.5 µg/L	0.0070	0.0005	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1091791)										
VA23B8768-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	10.0	mg/L	145	144	1.01%	20%	
Anions and Nutrient	ts (QC Lot: 1094140)										
VA23B9013-001	Exfiltration Lagoons 3 & 4	Nitrogen, total	7727-37-9	E366	0.600	mg/L	16.2	16.4	1.62%	20%	
Anions and Nutrient	ts (QC Lot: 1094141)										
VA23B9013-001	Exfiltration Lagoons 3 & 4	Phosphorus, total	7723-14-0	E372-U	0.200	mg/L	5.29	5.24	0.817%	20%	
Anions and Nutrient	ts (QC Lot: 1094142)										
VA23B9013-001	Exfiltration Lagoons 3 & 4	Ammonia, total (as N)	7664-41-7	E298	0.250	mg/L	12.9	12.2	5.26%	20%	
Anions and Nutrien	ts (QC Lot: 1094143)										
VA23B9013-001	Exfiltration Lagoons 3 & 4	Kjeldahl nitrogen, total [TKN]		E318	0.250	mg/L	16.3	16.2	0.682%	20%	
Aggregate Organics	(QC Lot: 1 <u>089756)</u>										
FJ2302021-002	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	
Aggregate Organics	(QC Lot: 1091072)										

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Client : Regional District of Kitimat-Stikine



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
Aggregate Organics	(QC Lot: 1091072) - co	ntinued									
VA23B9013-002	Travel Blank	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	<2.0	<2.0	0.0%	30%	
Volatile Organic Cor	mpounds (QC Lot: 1094	506)									
VA23B9013-001	Exfiltration Lagoons 3 & 4	Benzene	71-43-2	E611A	0.50	μg/L	<0.50	<0.50	0	Diff <2x LOR	
		Ethylbenzene	100-41-4	E611A	0.50	μg/L	<0.50	<0.50	0	Diff <2x LOR	
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	μg/L	<0.50	<0.50	0	Diff <2x LOR	
		Styrene	100-42-5	E611A	0.50	μg/L	<0.50	<0.50	0	Diff <2x LOR	
		Toluene	108-88-3	E611A	0.50	μg/L	<0.50	<0.50	0	Diff <2x LOR	
		Xylene, m+p-	179601-23-1	E611A	0.40	μg/L	<0.40	<0.40	0	Diff <2x LOR	
		Xylene, o-	95-47-6	E611A	0.30	μg/L	<0.30	<0.30	0	Diff <2x LOR	
Hydrocarbons (QC	Lot: 1094505)										
VA23B9013-001	Exfiltration Lagoons 3 & 4	VHw (C6-C10)		E581.VH+F1	100	μg/L	<100	<100	0.0%	30%	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

## 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

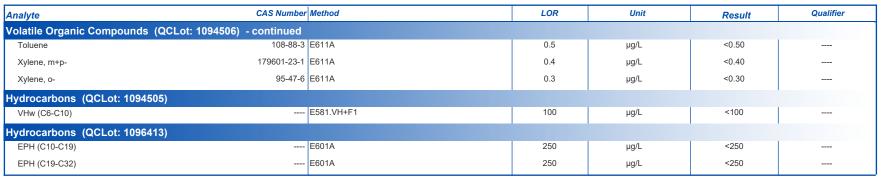
Analyte	CAS Number Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1089123)					
Conductivity	E100	1	μS/cm	<1.0	
Physical Tests (QCLot: 1095645)					
Solids, total suspended [TSS]	E160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 1089125)					
Nitrate (as N)	14797-55-8 E235.NO3-L	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1089126)					
Nitrite (as N)	14797-65-0 E235.NO2-L	0.001	mg/L	<0.0010	
nions and Nutrients (QCLot: 1091784)					
Nitrogen, total	7727-37-9 E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 1091785)					
Phosphorus, total	7723-14-0 E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1091786)					
Ammonia, total (as N)	7664-41-7 E298	0.005	mg/L	<0.0050	
nions and Nutrients (QCLot: 1091791)					
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	<0.050	
Anions and Nutrients (QCLot: 1094140)					
Nitrogen, total	7727-37-9 E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 1094141)					
Phosphorus, total	7723-14-0 E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1094142)					
Ammonia, total (as N)	7664-41-7 E298	0.005	mg/L	<0.0050	
nions and Nutrients (QCLot: 1094143)					
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	<0.050	
Aggregate Organics (QCLot: 1089756)					
Biochemical oxygen demand [BOD]	E550	2	mg/L	<2.0	
aggregate Organics (QCLot: 1091072)					
Carbonaceous biochemical oxygen demand [CBOD]	E555	2	mg/L	<2.0	
olatile Organic Compounds (QCLot: 1094506					
Benzene	71-43-2 E611A	0.5	μg/L	<0.50	
Ethylbenzene	100-41-4 E611A	0.5	μg/L	<0.50	
Methyl-tert-butyl ether [MTBE]	1634-04-4 E611A	0.5	μg/L	<0.50	
Styrene	100-42-5 E611A	0.5	μg/L	<0.50	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

#### Sub-Matrix: Water





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 Work Order
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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## 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 Co.	ntrol Sample (LCS)	Report	
				Spike	Recovery (%)	Recovery	/ Limits (%)	
Analyte	CAS Number Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1089122)								
рН	E108		pH units	7 pH units	100	98.0	102	
Physical Tests (QCLot: 1089123)								
Conductivity	E100	1	μS/cm	146.9 μS/cm	103	90.0	110	
Physical Tests (QCLot: 1089242)								
pH @ 15°C (WSER)	E108A		pH units	7 pH units	100	98.0	102	
Physical Tests (QCLot: 1095645)								
Solids, total suspended [TSS]	E160	3	mg/L	150 mg/L	88.8	85.0	115	
Anions and Nutrients (QCLot: 1089125)								
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: 1089126)								
Nitrite (as N)	14797-65-0 E235.NO2-L	0.001	mg/L	0.5 mg/L	97.6	90.0	110	
Anions and Nutrients (QCLot: 1091784)								
Nitrogen, total	7727-37-9 E366	0.03	mg/L	0.5 mg/L	98.3	75.0	125	
Anions and Nutrients (QCLot: 1091785)								
Phosphorus, total	7723-14-0 E372-U	0.002	mg/L	0.05 mg/L	93.0	80.0	120	
Anions and Nutrients (QCLot: 1091786)								
Ammonia, total (as N)	7664-41-7 E298	0.005	mg/L	0.2 mg/L	93.1	85.0	115	
Anions and Nutrients (QCLot: 1091791)								
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	4 mg/L	100	75.0	125	
Anions and Nutrients (QCLot: 1094140)							•	
Nitrogen, total	7727-37-9 E366	0.03	mg/L	0.5 mg/L	102	75.0	125	
Anions and Nutrients (QCLot: 1094141)							•	
Phosphorus, total	7723-14-0 E372-U	0.002	mg/L	0.05 mg/L	90.1	80.0	120	
Anions and Nutrients (QCLot: 1094142)								
Ammonia, total (as N)	7664-41-7 E298	0.005	mg/L	0.2 mg/L	95.8	85.0	115	
Anions and Nutrients (QCLot: 1094143)								
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	4 mg/L	98.0	75.0	125	
Aggregate Organics (QCLot: 1089756)								1
Biochemical oxygen demand [BOD]	E550	2	mg/L	198 mg/L	91.8	85.0	115	
Aggregate Organics (QCLot: 1091072)								1
riggiogato Organios (docot. 1001012)								

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Client : Regional District of Kitimat-Stikine



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report					
					Spike	Recovery (%)	Recovery	Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier	
Aggregate Organics (QCLot: 1091072) - conf	tinued									
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	198 mg/L	89.4	85.0	115		
Volatile Organic Compounds (QCLot: 109450										
Benzene	71-43-2	E611A	0.5	μg/L	100 μg/L	99.3	70.0	130		
Ethylbenzene	100-41-4	E611A	0.5	μg/L	100 μg/L	98.6	70.0	130		
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	μg/L	100 μg/L	106	70.0	130		
Styrene	100-42-5	E611A	0.5	μg/L	100 μg/L	92.6	70.0	130		
Toluene	108-88-3	E611A	0.5	μg/L	100 μg/L	95.3	70.0	130		
Xylene, m+p-	179601-23-1	E611A	0.4	μg/L	200 μg/L	105	70.0	130		
Xylene, o-	95-47-6	E611A	0.3	μg/L	100 μg/L	98.6	70.0	130		
Hydrocarbons (QCLot: 1094505)										
VHw (C6-C10)		E581.VH+F1	100	μg/L	6310 μg/L	83.4	70.0	130		
Hydrocarbons (QCLot: 1096413)										
EPH (C10-C19)	<del></del>	E601A	250	μg/L	6491 µg/L	111	70.0	130		
EPH (C19-C32)		E601A	250	μg/L	3363 µg/L	109	70.0	130		

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## 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											
					Spi		Recovery (%)	Recovery									
Laboratory sample D	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier							
Anions and Nutr	ients (QCLot: 1089125)																
VA23B9030-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.56 mg/L	2.5 mg/L	102	75.0	125								
Anions and Nutr	ients (QCLot: 1089126)																
VA23B9030-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.492 mg/L	0.5 mg/L	98.5	75.0	125								
Anions and Nutr	ients (QCLot: 1091784)																
VA23B9013-002	Travel Blank	Nitrogen, total	7727-37-9	E366	0.394 mg/L	0.4 mg/L	98.4	70.0	130								
Anions and Nutr	ients (QCLot: 1091785)																
YL2301039-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0444 mg/L	0.05 mg/L	88.9	70.0	130								
Anions and Nutr	ients (QCLot: 1091786)																
VA23B9013-002	Travel Blank	Ammonia, total (as N)	7664-41-7	E298	0.0981 mg/L	0.1 mg/L	98.1	75.0	125								
Anions and Nutr	ients (QCLot: 1091791)																
VA23B8784-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	2.49 mg/L	2.5 mg/L	99.5	70.0	130								
Anions and Nutr	ients (QCLot: 1094140)																
VA23B9013-001	Exfiltration Lagoons 3 & 4	Nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130								
Anions and Nutr	ients (QCLot: 1094141)																
VA23B9013-001	Exfiltration Lagoons 3 & 4	Phosphorus, total	7723-14-0	E372-U	ND mg/L	5 mg/L	ND	70.0	130								
Anions and Nutr	ients (QCLot: 1094142)																
VA23B9093-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B							
Anions and Nutr	ients (QCLot: 1094143)																
VA23B9093-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	12.9 mg/L	2.5 mg/L	104	70.0	130								
Volatile Organic	Compounds (QCLot: 1	094506)															
YL2301046-001	Anonymous	Benzene	71-43-2	E611A	102 μg/L	100 μg/L	102	60.0	140								
		Ethylbenzene	100-41-4	E611A	98.6 μg/L	100 μg/L	98.6	60.0	140								
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	105 μg/L	100 μg/L	105	60.0	140								
		Styrene	100-42-5	E611A	94.5 μg/L	100 μg/L	94.5	60.0	140								
		Toluene	108-88-3	E611A	95.9 μg/L	100 μg/L	95.9	60.0	140								
		Xylene, m+p-	179601-23-1	E611A	208 μg/L	200 μg/L	104	60.0	140								
		Xylene, o-	95-47-6	E611A	99.3 µg/L	100 μg/L	99.3	60.0	140								

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Sub-Matrix: Water						Matrix Spike (MS) Report									
						ike	Recovery (%)	Recovery							
Laboratory sample	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier					
ID	CL et: 1004E0E) contin	wed													
Hydrocarbons (QCLot: 1094505) - continued															
YL2301050-001	Anonymous	VHw (C6-C10)		E581.VH+F1	4950 μg/L	6310 µg/L	78.5	60.0	140						

## **Qualifiers**

Qualifier Description

MS-B Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

## Chain of Custody (COC) / Analytical Request Form

## Affix ALS barcode label here

COC Number: 17 -

EINAL SHIPMENT RECEPTION (lab use only)

(ALS)	Environmental www.alsqlobal.com	Canada To	II Free: 1 800 6	68 9878	<u> </u>	(lab u	se onl	ly)						Γ.	age	,		÷	•				
Report To	Contact and company name below will app	Report Format / Distribution				Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)																	
Company:	Regional District of Kitimat-Stikine	Select Report Format:  PDF  EXCEL  EDD (DIGITAL)				Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply											-						
Contact:	Nicole Lavoie	<b>-</b>   ' '	(QC) Report with F	_		8 4 day [P4-20%]										П							
Phone:	250-615-6100		<b></b> '	ilts to Criteria on Report	• –		TINC G 28			5%]		SE SE						tatutor	v hol	iday N	E2 -2(	nnov.	_
	Company address below will appear on the fin	ai report	Select Distribut	ion: 🗹 EMAIL	☐ MAIL ☐	FAX				60%]	_	🖁						may a			_4 -20	JU 70	
Street:	4545 Lazelle Avenue		Email 1 or Fax	enviro.dept@rdks	s.bc.ca	<del></del>	Date and Time Required for all E&P TATs:																
City/Province:	Terrace/BC		Email 2	ckerr@rdks.bc.ca		s,bc,ca	For tests that can not be performed according to the service level selected, you will be contacted.																
Postal Code:	V8G4E1		Email 3	pmiller@rdks.bc.c			) Analysis Request																
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Contact:	Nicole Lavoie	<del></del>	Email 2	enviro.dept@rdks			1		9/L)	22	Demand	*		1:								루	
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						╁	SAMPLE CONDITION AS RECE						Telephone: +1 604 253 4199										
Drinking	Water (DW) Samples <sup>1</sup> (client use)	Special Instructions / S	pecify Criteria to add on report by clicking on the drop-down list below (electronic COC only)				Froz			_	SAMP		Obse			<u>'E</u> Yes−		_,					,
Are samples tak	en from a Regulated DW System?	Federal Wastewater S			012)		-1		~~	TLLI Joan Cui	hae T					Yes				No		늗	ĺ
	ES 2-NO	, Julian Francisco	Joseph Emeric Regulations (1004, 2012)				lce Packs <sup>™</sup> lce Cubes □ Custody seal intact Yes □ No Cooling Initiated □									1							
Are samples for	human consumption/ use?	Queensway Sewer Cu	stom Criteria for I	RDKS							TEMPE	RATUR	ES °C		ī	F	INAL C	COOLER	RTEM	PERATU	JRES '	°C	_
	FS [7] NO						INITIAL COOLER TEMPERATURES °C					1	17	_		ΤŢ				_			

INITIAL SHIPMENT RECEPTION (lab use only)

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

Received by

Time:

iken from a Regulated Drinking Water (DW). System, please submit using an Authorized DW COC form.

SHIPMENT RELEASE (client use)

Released by:

## **ALS Canada Ltd.**



## **CERTIFICATE OF ANALYSIS**

: 1 of 3

Work Order : VA23C2499 Page

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

Address : # 300 - 4545 Lazelle Avenue Address : 8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby BC Canada V5A 1W9

Telephone : ---- : +1 604 253 4188

Project : Queensway Sewer Date Samples Received : 21-Sep-2023 12:15
PO Date Analysis Commenced : 22-Sep-2023

PO : --- Date Analysis Commenced : 22-Sep-2023

C-O-C number : --- Issue Date : 03-Oct-2023 16:26

Sampler : ---Site : ----

Quote number : VA22-RDKS100-001

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
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

Page : 2 of 3

Work Order : VA23C2499

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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
μS/cm	microsiemens per centimetre
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.

#### **Workorder Comments**

Sample(s)001 & 002: EPH and B.TEX vials Containers were not received at laboratory, but requested on Chain of Custody / analytical request form; subsample cannot be obtained from other containers to meet request. The requested analysis cannont be performed.

Page : 3 of 3 Work Order : VA23C2499

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



## Analytical Results

Sub-Matrix: Water	Exfiltration	Travel Blank	 					
(Matrix: Water)					Lagoons 3 & 4			
			Client samp	ling date / time	19-Sep-2023 12:30	19-Sep-2023 00:00	 	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C2499-001	VA23C2499-002	 	
					Result	Result	 	
Physical Tests								
Conductivity		E100/VA	2.0	μS/cm	546	<2.0	 	
рН		E108/VA	0.10	pH units	7.95	5.55	 	
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	23.5	<3.0	 	
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	23.8	<0.0050	 	
Kjeldahl nitrogen, total [TKN]		EC318/VA	0.050	mg/L	26.9	<0.050	 	
Nitrate (as N)	14797-55-8	E235.NO3-L/V	0.0050	mg/L	0.0207	<0.0050	 	
Nitrite (as N)	14797-65-0	A E235.NO2-L/V A	0.0010	mg/L	0.0719	<0.0010	 	
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	27.0	<0.030	 	
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	5.86	<0.0020	 	
Nitrate + Nitrite (as N)		EC235.N+N/V A	0.0032	mg/L	0.0926	<0.0051	 	
Aggregate Organics								
Biochemical oxygen demand [BOD]		E550/VA	2.0	mg/L	119	<2.0	 	
Carbonaceous biochemical oxygen demand [CBOD]		E555/VA	2.0	mg/L	14.0	<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** : **VA23C2499** Page : 1 of 9

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

 Telephone
 :-- Telephone
 :+1 604 253 4188

 Project
 :Queensway Sewer
 Date Samples Received
 : 21-Sep-2023 12:15

PO :--- Issue Date : 03-Oct-2023 16:27
C-O-C number :---

Quote number : VA22-RDKS100-001

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

Sampler Site

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**

• Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Page : 3 of 9 Work Order : VA23C2499

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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					E	/aluation: <b>≭</b> =	Holding time excee	edance ; 🛚	= Within	Holding Time
Analyte Group	Method	Sampling Date	Ext	traction / Pr	reparation			Analys	is	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Exfiltration Lagoons 3 & 4	E550	19-Sep-2023					22-Sep-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Travel Blank	E550	19-Sep-2023					22-Sep-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]										
Exfiltration Lagoons 3 & 4	E555	19-Sep-2023					22-Sep-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]		40.0 0000								,
Travel Blank	E555	19-Sep-2023					22-Sep-2023	3 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)	E298	19-Sep-2023	27-Sep-2023		8 days	<b>√</b>	29-Sep-2023	20 days	10 days	1
Exfiltration Lagoons 3 & 4	E290	19-3ep-2023	27-Sep-2023	28 days	o days	•	29-Sep-2023	20 days	10 days	•
				uays						
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) Travel Blank	E298	19-Sep-2023	22-Sep-2023	3 days	3 days	<b>√</b>	29-Sep-2023	28 days	7 days	<b>√</b>
Havel Dialik	L230	19-06p-2020	22-06p-2020	Juays	Juays	•	20-06p-2020	20 days	, uays	•
Anisma and Nickinstan Nickesta in Westernhau (C.// and Laur)										
Anions and Nutrients : Nitrate in Water by IC (Low Level)  HDPE										
Exfiltration Lagoons 3 & 4	E235.NO3-L	19-Sep-2023	22-Sep-2023	3 days	3 days	<b>√</b>	22-Sep-2023	3 days	3 days	✓
Extra datori Edgoorio o d T		.5 Cop 2020	22-00p-2020	Judys	Judys	,	22-00p-2020	Jaays	Judys	•

Page : 4 of 9 Work Order : VA23C2499

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

Analyte Group	Method	Sampling Date	Date Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding	Times	Eval
			Date	Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	19-Sep-2023	22-Sep-2023	3 days	3 days	✓	22-Sep-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Exfiltration Lagoons 3 & 4	E235.NO2-L	19-Sep-2023	22-Sep-2023	3 days	3 days	✓	22-Sep-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	19-Sep-2023	22-Sep-2023	3 days	3 days	✓	22-Sep-2023	3 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Exfiltration Lagoons 3 & 4	E366	19-Sep-2023	27-Sep-2023	28 days	8 days	✓	27-Sep-2023	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved) Travel Blank	E366	19-Sep-2023	22-Sep-2023	3 days	3 days	<b>√</b>	25-Sep-2023	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Exfiltration Lagoons 3 & 4	E372-U	19-Sep-2023	27-Sep-2023	28 days	8 days	✓	29-Sep-2023	28 days	10 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved) Travel Blank	E372-U	19-Sep-2023	22-Sep-2023	3 days	3 days	✓	25-Sep-2023	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE Exfiltration Lagoons 3 & 4	E100	19-Sep-2023	22-Sep-2023	28 days	3 days	✓	22-Sep-2023	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	19-Sep-2023	22-Sep-2023	28 days	3 days	✓	22-Sep-2023	28 days	3 days	✓

Page : 5 of 9 Work Order : VA23C2499

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	is	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	Times	Eval
			Date	Rec	Actual			Rec	Actual	
Physical Tests : pH by Meter										
HDPE Travel Blank	E108	19-Sep-2023	22-Sep-2023	0.25	70 hrs	* EHTR-FM	22-Sep-2023	0.25	71 hrs	* EHTR-FM
Physical Tests : pH by Meter				hrs		ENTR-FIVI		hrs		ENTR-FIVE
HDPE Exfiltration Lagoons 3 & 4	E108	19-Sep-2023	22-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM	22-Sep-2023	0.25 hrs	73 hrs	* EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE Exfiltration Lagoons 3 & 4	E160	19-Sep-2023					26-Sep-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Travel Blank	E160	19-Sep-2023					26-Sep-2023	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).

Page : 6 of 9 Work Order : VA23C2499

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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.

Acadystical Methods   Method   QC Lof #   QC   Regular   Actual   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   Expected   Evaluation   E	Matrix: Water		Evaluati	on: × = QC freque	ency outside sp	ecification; ✓ = 0	QC frequency wit	thin specification
Ammonia by Fluorescence   E288   1155417   2   21   9.5   5.0	Quality Control Sample Type				ount		Frequency (%,	)
Ammonia by Fluorescence   E208   1158417   2   21   9.5   5.0	Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Bitchemical Oxygen Demand - 5 day	Laboratory Duplicates (DUP)							
Bischemial Orygen Demand (Carbonaceous) - 5 day	Ammonia by Fluorescence	E298	1155417	2	21	9.5	5.0	✓
Conductivity in Water	Biochemical Oxygen Demand - 5 day	E550	1148765	1	20	5.0	5.0	✓
All Fall Series   Continues	Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1149334	1	19	5.2	5.0	✓
Nitrie in Water by IC (Low Level)  E235.NO2-L  1148897  1 10 10.0 5.0     Pi by Meter	Conductivity in Water	E100	1148692	1	14	7.1	5.0	✓
E108	Nitrate in Water by IC (Low Level)	E235.NO3-L	1148696	1	12	8.3	5.0	✓
Total Pitrogen by Colourimetry  E388	Nitrite in Water by IC (Low Level)	E235.NO2-L	1148697	1	10	10.0	5.0	<b>√</b>
Total Phosphorus by Colourimetry (0.002 mg/L)  E372-U  E180 1155416  E180 1155108  E180 1155108  E180 1155108  E180 1155108  E180 1155108  E180 1155108  E288 1155117  E2 21 9.5 5.0 ✓  E180 E555 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149334 1 19 5.2 5.0 ✓  E355 1149896 1 1 12 8.3 5.0 ✓  E355 1149897 1 10 10 10.0 5.0 ✓  F101al Nitrogen by Colourimetry (0.002 mg/L) E366 1155419 2 10 20.0 5.0 ✓  Total Phosphorus by Colourimetry (0.002 mg/L) E372-U 1155416 2 15 13.3 5.0 ✓  TSS by Gravimetry E255 1149334 1 19 5.2 5.0 ✓  E358 NG Gravimetry E550 1148765 1 20 5.0 5.0 ✓  E358 NG Gravimetry E550 1148765 1 20 5.0 5.0 ✓  E555 1149334 1 19 5.2 5.0 ✓  E555 1149334 1 19 5.2 5.0 ✓  E556 1148765 1 20 5.0 5.0 ✓  E557 1148896 1 155417 2 21 9.5 5.0 ✓  E558 Dischemical Cxygen Demand - 5 day E550 1148765 1 20 5.0 5.0 ✓  E558 NG Gravimetry E550 1148896 1 12 8.3 5.0 ✓  Conductivity in Water E550 1148896 1 12 8.3 5.0 ✓  E358 NG Gravimetry (0.002 mg/L) E358 NG L 1148896 1 12 8.3 5.0 ✓  Total Phosphorus by Colourimetry (0.002 mg/L) E358 NG L 1148896 1 12 8.3 5.0 ✓  Total Phosphorus by Colourimetry (0.002 mg/L) E358 NG L 1148896 1 1 10 10.0 5.0 ✓  E358 NG Gravimetry E550 1148966 1 1 10 10.0 5.0 ✓  Total Phosphorus by Colourimetry (0.002 mg/L) E358 NG L 1148896 1 12 8.3 5.0 ✓  E368 1155417 2 2 10 20.0 5.0 ✓  Total Phosphorus by Colourimetry (0.002 mg/L) E358 NG L 1148896 1 12 8.3 5.0 ✓  Total Phosphorus by Colourimetry (0.002 mg/L) E358 NG L 1148896 1 10 10 10.0 5.0 ✓  Total Phosphorus by Colourimetry (0.002 mg/L) E358 NG L 1148896 1 10 10 10.0 5.0 ✓  Total Phospho	pH by Meter	E108	1148691	1	17	5.8	5.0	✓
TSS by Gravimetry    E160	Total Nitrogen by Colourimetry	E366	1155419	2	10	20.0	5.0	<b>√</b>
Laboratory Control Samples (LCS)         E298         1155417         2         21         9.5         5.0         ✓           Ammonia by Fluorescence         E298         1155417         2         21         9.5         5.0         ✓           Blochemical Oxygen Demand (Carbonaceous) - 5 day         E555         1149334         1         19         5.2         5.0         ✓           Conductivity in Water         E100         1148692         1         14         7.1         5.0         ✓           Nitrite in Water by IC (Low Level)         E235.NO24.         1148696         1         12         8.3         5.0         ✓           Nitrite in Water by IC (Low Level)         E235.NO24.         1148697         1         10         10.0         5.0         ✓           Nitrite in Water by IC (Low Level)         E235.NO24.         1148697         1         10         10.0         5.0         ✓           Nitrite in Water by IC (Low Level)         E366         1155419         2         10         20.0         5.0         ✓           Total Pitrogen by Colourimetry         E366         1155416         2         15         13.3         5.0         ✓           Total Witrogen by Colourimetry (0.002 mg/L)	Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1155416	2	15	13.3	5.0	✓
Ammonia by Fluorescence  E298 1155417 2 21 9.5 5.0 ✓  Biochemical Oxygen Demand - 5 day  E550 1148765 1 20 5.0 5.0 ✓  Biochemical Oxygen Demand (Carbonaceous) - 5 day  E550 1149834 1 19 5.2 5.0 ✓  Conductivity in Water  E100 1148692 1 14 7.1 5.0 ✓  Nitira in Water by IC (Low Level)  E235,NO3-L 1148696 1 12 8.3 5.0 ✓  Nithita in Water by IC (Low Level)  E235,NO3-L 1148696 1 12 8.3 5.0 ✓  PH by Meter  E108 1148691 1 17 5.8 5.0 ✓  PH by Meter  E108 1148691 1 17 5.8 5.0 ✓  PH by Meter E108 1148691 1 17 5.8 5.0 ✓  PH by Meter E108 1148691 1 17 5.8 5.0 ✓  PH by Meter E108 1155419 2 10 20.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E372-U 1155416 2 15 13.3 5.0 ✓  TSS by Gravimetry  E100 1155106 1 16 6.2 5.0 ✓  Method Blanks (MS)  Ammonia by Fluorescence  E298 1155417 2 21 9.5 5.0 ✓  Biochemical Oxygen Demand - 5 day  E550 1148765 1 20 5.0 5.0 ✓  Biochemical Oxygen Demand - 1 14 7.1 5.0 ✓  Nitrate in Water by IC (Low Level)  E235,NO3-L 1148696 1 12 8.3 5.0 ✓  Nitrate in Water by IC (Low Level)  E235,NO3-L 1148696 1 10 10 10.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E350 1148765 1 20 5.0 5.0 ✓  Nitrate in Water by IC (Low Level)  E235,NO3-L 1148696 1 12 8.3 5.0 ✓  Nitrate in Water by IC (Low Level)  E335,NO3-L 1148697 1 10 10.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148697 1 10 10.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148697 1 10 20.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148697 1 10 20.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148697 1 10 20.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148696 1 155106 1 16 6.2 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148696 1 12 8.3 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148696 1 12 8.3 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148696 1 12 8.3 5.0 ✓	TSS by Gravimetry	E160	1155106	1	16	6.2	5.0	<b>√</b>
Ammonia by Fluorescence  E298 1155417 2 21 9.5 5.0 ✓  Biochemical Oxygen Demand - 5 day  E550 1148765 1 20 5.0 5.0 ✓  Biochemical Oxygen Demand (Carbonaceous) - 5 day  E550 1149834 1 19 5.2 5.0 ✓  Conductivity in Water  E100 1148692 1 14 7.1 5.0 ✓  Nitira in Water by IC (Low Level)  E235,NO3-L 1148696 1 12 8.3 5.0 ✓  Nithita in Water by IC (Low Level)  E235,NO3-L 1148696 1 12 8.3 5.0 ✓  PH by Meter  E108 1148691 1 17 5.8 5.0 ✓  PH by Meter  E108 1148691 1 17 5.8 5.0 ✓  PH by Meter E108 1148691 1 17 5.8 5.0 ✓  PH by Meter E108 1148691 1 17 5.8 5.0 ✓  PH by Meter E108 1155419 2 10 20.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E372-U 1155416 2 15 13.3 5.0 ✓  TSS by Gravimetry  E100 1155106 1 16 6.2 5.0 ✓  Method Blanks (MS)  Ammonia by Fluorescence  E298 1155417 2 21 9.5 5.0 ✓  Biochemical Oxygen Demand - 5 day  E550 1148765 1 20 5.0 5.0 ✓  Biochemical Oxygen Demand - 1 14 7.1 5.0 ✓  Nitrate in Water by IC (Low Level)  E235,NO3-L 1148696 1 12 8.3 5.0 ✓  Nitrate in Water by IC (Low Level)  E235,NO3-L 1148696 1 10 10 10.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E350 1148765 1 20 5.0 5.0 ✓  Nitrate in Water by IC (Low Level)  E235,NO3-L 1148696 1 12 8.3 5.0 ✓  Nitrate in Water by IC (Low Level)  E335,NO3-L 1148697 1 10 10.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148697 1 10 10.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148697 1 10 20.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148697 1 10 20.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148697 1 10 20.0 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148696 1 155106 1 16 6.2 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148696 1 12 8.3 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148696 1 12 8.3 5.0 ✓  Total Nitrogen by Colourinetry (0.002 mg/L)  E335,NO3-L 1148696 1 12 8.3 5.0 ✓	Laboratory Control Samples (LCS)							
Eisohemical Oxygen Demand - 5 day   E550	Ammonia by Fluorescence	E298	1155417	2	21	9.5	5.0	1
Biochemical Oxygen Demand (Carbonaceous) - 5 day   E555   1149334   1   19   5.2   5.0   ✓ Conductivity in Water   E100   1148692   1   14   7.1   5.0   ✓ Mitrate in Water by IC (Low Level)   E235.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E235.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E235.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E235.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E372-U   1155419   2   10   20.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E372-U   1155416   2   15   13.3   5.0   ✓ Mitrate in Water by IC (Low Level)   E372-U   1155416   2   15   13.3   5.0   ✓ Mitrate in Water by IC (Low Level)   E235.NO3-L   1148765   1   20   5.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E235.NO3-L   1148697   1   14   7.1   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148697   1   10   10.0   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1155416   2   15   13.3   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1155416   2   15   13.3   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1155416   2   15   13.3   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1155416   2   15   13.3   5.0   ✓ Mitrate in Water by IC (Low Level)   E335.NO3-L   1148	Biochemical Oxygen Demand - 5 day		1148765	1	20	5.0	5.0	
E100	Biochemical Oxygen Demand (Carbonaceous) - 5 day		1149334	1	19	5.2	5.0	
Nitrate in Water by IC (Low Level)  E235.NO3-L  1148696  1 12 8.3 5.0 ✓  Nitrite in Water by IC (Low Level)  E235.NO2-L  1148697  1 10 10.0 5.0 ✓  Ph by Meter  E108  1148697  Total Nitrogen by Colourimetry  E366  1155419  E372-U  1155416  E372-U  1155416  E372-U  1155416  E372-U  1155416  E372-U  1155416  E372-U  E3	Conductivity in Water		1148692	1	14	7.1	5.0	
Nitrite in Water by IC (Low Level)	Nitrate in Water by IC (Low Level)	E235.NO3-L	1148696	1	12	8.3	5.0	<u> </u>
E108	Nitrite in Water by IC (Low Level)	E235.NO2-L	1148697	1	10	10.0	5.0	<u> </u>
Total Nitrogen by Colourimetry (0.002 mg/L) E366 1155419 2 10 20.0 5.0 ✓ Total Phosphorus by Colourimetry (0.002 mg/L) E372-U 1155416 2 15 13.3 5.0 ✓ TSS by Gravimetry E160 1155106 1 16 6.2 5.0 ✓  Method Blanks (MB)  Method Blanks (MB)  Method Blanks (MB)  Biochemical Oxygen Demand - 5 day E550 1148765 1 20 5.0 5.0 ✓ Biochemical Oxygen Demand (Carbonaceous) - 5 day E555 1149334 1 19 5.2 5.0 ✓ Conductivity in Water E100 1148692 1 14 7.1 5.0 ✓ Nitrate in Water by IC (Low Level) E235.NO3-L 1148696 1 12 8.3 5.0 ✓ Nitrite in Water by IC (Low Level) E356 115419 2 10 20.0 5.0 ✓ Total Phosphorus by Colourimetry (0.002 mg/L) E372-U 1155416 2 15 13.3 5.0 ✓ TSS by Gravimetry E235.NO3-L 1155106 1 16 6.2 5.0 ✓  Matrix Spikse (MS)  Ammonia by Fluorescence E298 1155417 1 21 4.7 5.0 ✓  Nitrate in Water by IC (Low Level) 1 16 6.2 5.0 ✓  Matrix Spikse (MS)  Ammonia by Fluorescence E298 1155417 1 21 4.7 5.0 ✓  E325.NO3-L 1148696 1 12 8.3 5.0 ✓  Mitritate in Water by IC (Low Level) 1 155416 1 12 8.3 5.0 ✓  Mitritate in Water by IC (Low Level) 1 155416 1 16 6.2 5.0 ✓  Matrix Spikse (MS)	pH by Meter	E108	1148691	1	17	5.8	5.0	<b>√</b>
TSS by Gravimetry E160 1155106 1 16 6.2 5.0 ✓  Method Blanks (MB)  Ammonia by Fluorescence E298 1155417 2 21 9.5 5.0 ✓  Biochemical Oxygen Demand - 5 day E550 1148765 1 20 5.0 5.0 ✓  Biochemical Oxygen Demand (Carbonaceous) - 5 day E555 1149334 1 19 5.2 5.0 ✓  Conductivity in Water Water by IC (Low Level) E235.NO3-L 1148696 1 12 8.3 5.0 ✓  Total Nitrogen by Colourimetry (0.002 mg/L) E372-U 1155416 2 15 13.3 5.0 ✓  TSS by Gravimetry E298 1155417 1 21 4.7 5.0 ✓  Matrix Spikes (MS)  Ammonia by Fluorescence E298 1155417 1 21 4.7 5.0 ✓  Mitrate in Water by IC (Low Level) 1 148696 1 1 12 8.3 5.0 ✓  E355.NO3-L 1148696 1 1 12 8.3 5.0 ✓  Total Phosphorus by Colourimetry (0.002 mg/L) E372-U 1155416 2 15 13.3 5.0 ✓  TSS by Gravimetry E298 1155417 1 21 4.7 5.0 ✓  Matrix Spikes (MS)  Ammonia by Fluorescence E298 1155417 1 21 4.7 5.0 ✓  Mitrate in Water by IC (Low Level) 1 148696 1 12 8.3 5.0 ✓	Total Nitrogen by Colourimetry	E366	1155419	2	10	20.0	5.0	
Method Blanks (MB)           Ammonia by Fluorescence         E298         1155417         2         21         9.5         5.0         ✓           Biochemical Oxygen Demand - 5 day         E550         1148765         1         20         5.0         5.0         ✓           Biochemical Oxygen Demand (Carbonaceous) - 5 day         E555         1149334         1         19         5.2         5.0         ✓           Conductivity in Water         E100         1148692         1         14         7.1         5.0         ✓           Nitrate in Water by IC (Low Level)         E235.NO3-L         1148696         1         12         8.3         5.0         ✓           Nitritie in Water by IC (Low Level)         E358.NO2-L         1148697         1         10         10.0         5.0         ✓           Total Phosphorus by Colourimetry         E366         1155419         2         10         20.0         5.0         ✓           TSS by Gravimetry         E160         1155416         2         15         13.3         5.0         ✓           TSS by Gravimetry         E160         1155106         1         16         6.2         5.0         ✓           Matrix Spike	Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1155416	2	15	13.3	5.0	<b>√</b>
Ammonia by Fluorescence       E298       1155417       2       21       9.5       5.0       ✓         Biochemical Oxygen Demand - 5 day       E550       1148765       1       20       5.0       5.0       ✓         Biochemical Oxygen Demand (Carbonaceous) - 5 day       E555       1149334       1       19       5.2       5.0       ✓         Conductivity in Water       E100       1148692       1       14       7.1       5.0       ✓         Nitrate in Water by IC (Low Level)       E235.NO3-L       1148696       1       12       8.3       5.0       ✓         Nitrite in Water by IC (Low Level)       E235.NO2-L       1148697       1       10       10.0       5.0       ✓         Total Nitrogen by Colourimetry       E366       1155419       2       10       20.0       5.0       ✓         TSS by Gravimetry       E160       1155416       2       15       13.3       5.0       ✓         Matrix Spikes (MS)       E298       1155417       1       21       4.7       5.0       ✓         Nitrate in Water by IC (Low Level)       E235.NO3-L       1148696       1       12       8.3       5.0       ✓	TSS by Gravimetry	E160	1155106	1	16	6.2	5.0	<b>√</b>
Biochemical Oxygen Demand - 5 day  E550  1148765  1 20 5.0 5.0 ✓  Biochemical Oxygen Demand (Carbonaceous) - 5 day  E555  1149334  1 19 5.2 5.0 ✓  Conductivity in Water  E100  1148692  1 14 7.1 5.0 ✓  Nitrate in Water by IC (Low Level)  E235.NO3-L  1148696  1 12 8.3 5.0 ✓  Nitrite in Water by IC (Low Level)  E235.NO2-L  1148697  1 10 10.0 5.0 ✓  Total Nitrogen by Colourimetry  E366  1155419  2 10 20.0 5.0 ✓  Total Phosphorus by Colourimetry (0.002 mg/L)  E372-U  1155416  2 15 13.3 5.0 ✓  TSS by Gravimetry  E160  1155106  1 16 6.2 5.0 ✓  Matrix Spikes (MS)  Ammonia by Fluorescence  E298  1155417  1 21 4.7 5.0 ★  Nitrate in Water by IC (Low Level)  E235.NO3-L  1148696  1 12 8.3 5.0 ✓   **  Nitrate in Water by IC (Low Level)  1148696  1 12 8.3 5.0 ✓  **  **  Nitrate in Water by IC (Low Level)  1148696  1 12 8.3 5.0 ✓  **  **  **  **  **  **  **  **  **	Method Blanks (MB)							
Biochemical Oxygen Demand (Carbonaceous) - 5 day  E555  1149334  1  19  5.2  5.0  ✓ Conductivity in Water  R100  1148692  1  14  7.1  5.0  ✓ Nitrate in Water by IC (Low Level)  Nitrite in Water by IC (Low Level)  E235.NO3-L  1148696  1  12  8.3  5.0  ✓ Nitrite in Water by IC (Low Level)  1148697  1  10  10.0  5.0  ✓ Total Nitrogen by Colourimetry  E366  1155419  2  10  20.0  5.0  ✓ Total Phosphorus by Colourimetry (0.002 mg/L)  E372-U  1155416  2  15  13.3  5.0  ✓ TSS by Gravimetry  E160  1155106  1  16  6.2  5.0  ✓ Matrix Spikes (MS)  Ammonia by Fluorescence  E298  1155417  1  21  4.7  5.0  ★ Nitrate in Water by IC (Low Level)  E235.NO3-L  1148696  1  12  8.3  5.0  ✓   ★ Nitrate in Water by IC (Low Level)  1148696  1  12  8.3  5.0  ✓  ★ Nitrate in Water by IC (Low Level)  1148696  1  12  8.3  5.0  ✓  ★ Nitrate in Water by IC (Low Level)	Ammonia by Fluorescence	E298	1155417	2	21	9.5	5.0	1
Conductivity in Water       E100       1148692       1       14       7.1       5.0       ✓         Nitrate in Water by IC (Low Level)       E235.NO3-L       1148696       1       12       8.3       5.0       ✓         Nitrite in Water by IC (Low Level)       E235.NO2-L       1148697       1       10       10.0       5.0       ✓         Total Nitrogen by Colourimetry       E366       1155419       2       10       20.0       5.0       ✓         Total Phosphorus by Colourimetry (0.002 mg/L)       E372-U       1155416       2       15       13.3       5.0       ✓         TSS by Gravimetry       E160       1155106       1       16       6.2       5.0       ✓         Matrix Spikes (MS)         Ammonia by Fluorescence       E298       1155417       1       21       4.7       5.0       ★         Nitrate in Water by IC (Low Level)       E235.NO3-L       1148696       1       12       8.3       5.0       ✓	Biochemical Oxygen Demand - 5 day	E550	1148765	1	20	5.0	5.0	<b>√</b>
Nitrate in Water by IC (Low Level)       E235.NO3-L       1148696       1       12       8.3       5.0       ✓         Nitrite in Water by IC (Low Level)       E235.NO2-L       1148697       1       10       10.0       5.0       ✓         Total Nitrogen by Colourimetry       E366       1155419       2       10       20.0       5.0       ✓         Total Phosphorus by Colourimetry (0.002 mg/L)       E372-U       1155416       2       15       13.3       5.0       ✓         TSS by Gravimetry       E160       1155106       1       16       6.2       5.0       ✓         Matrix Spikes (MS)         Ammonia by Fluorescence       E298       1155417       1       21       4.7       5.0       ✓         Nitrate in Water by IC (Low Level)       E235.NO3-L       1148696       1       12       8.3       5.0       ✓	Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1149334	1	19	5.2	5.0	<b>√</b>
Nitrite in Water by IC (Low Level)       E235.NO2-L       1148697       1       10       10.0       5.0       ✓         Total Nitrogen by Colourimetry       E366       1155419       2       10       20.0       5.0       ✓         Total Phosphorus by Colourimetry (0.002 mg/L)       E372-U       1155416       2       15       13.3       5.0       ✓         TSS by Gravimetry       E160       1155106       1       16       6.2       5.0       ✓         Matrix Spikes (MS)         Ammonia by Fluorescence       E298       1155417       1       21       4.7       5.0       ★         Nitrate in Water by IC (Low Level)       E235.NO3-L       1148696       1       12       8.3       5.0       ✓	Conductivity in Water	E100	1148692	1	14	7.1	5.0	<b>√</b>
Total Nitrogen by Colourimetry  E366  1155419  2 10 20.0  5.0  ✓  Total Phosphorus by Colourimetry (0.002 mg/L)  E372-U  1155416  2 15 13.3  5.0  ✓  TSS by Gravimetry  E160  1155106  1 16 6.2 5.0  ✓  Matrix Spikes (MS)  Ammonia by Fluorescence  E298  1155417  1 21 4.7  5.0  ★  Nitrate in Water by IC (Low Level)  E235.NO3-L  1148696  1 12 8.3 5.0  ✓	Nitrate in Water by IC (Low Level)	E235.NO3-L	1148696	1	12	8.3	5.0	<b>√</b>
Total Phosphorus by Colourimetry (0.002 mg/L)  E372-U  1155416  2  15  13.3  5.0  ✓ TSS by Gravimetry  E160  1155106  1  16  6.2  5.0  ✓ Matrix Spikes (MS)  Ammonia by Fluorescence  E298  1155417  1  21  4.7  5.0  ▼ Nitrate in Water by IC (Low Level)  E235.NO3-L  1148696  1  12  8.3  5.0  ✓	Nitrite in Water by IC (Low Level)	E235.NO2-L	1148697	1	10	10.0	5.0	<b>√</b>
TSS by Gravimetry  E160  1155106  1 16 6.2 5.0  ✓  Matrix Spikes (MS)  Ammonia by Fluorescence  E298  1155417  1 21 4.7 5.0  ▼  Nitrate in Water by IC (Low Level)  E235.NO3-L  1148696  1 12 8.3 5.0  ✓	Total Nitrogen by Colourimetry	E366	1155419	2	10	20.0	5.0	<b>√</b>
TSS by Gravimetry  E160  1155106  1 16 6.2 5.0  ✓  Matrix Spikes (MS)  Ammonia by Fluorescence  E298  1155417  1 21 4.7 5.0  ▼  Nitrate in Water by IC (Low Level)  E235.NO3-L  1148696  1 12 8.3 5.0  ✓	Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1155416	2	15	13.3	5.0	✓
Ammonia by Fluorescence         E298         1155417         1         21         4.7         5.0         ★           Nitrate in Water by IC (Low Level)         E235.NO3-L         1148696         1         12         8.3         5.0         ✓	TSS by Gravimetry	E160	1155106	1	16	6.2	5.0	✓
Ammonia by Fluorescence         E298         1155417         1         21         4.7         5.0         ★           Nitrate in Water by IC (Low Level)         E235.NO3-L         1148696         1         12         8.3         5.0         ✓	Matrix Spikes (MS)							
Nitrate in Water by IC (Low Level) E235.NO3-L 1148696 1 12 8.3 5.0 ✓	Ammonia by Fluorescence	E298	1155417	1	21	4.7	5.0	3c
	Nitrate in Water by IC (Low Level)		1148696	1	12	8.3	5.0	
	Nitrite in Water by IC (Low Level)		1148697	1	10	10.0	5.0	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Matrix: Water Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification										
Quality Control Sample Type			Co	unt	Frequency (%)					
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation			
Matrix Spikes (MS) - Continued										
Total Nitrogen by Colourimetry	E366	1155419	1	10	10.0	5.0	✓			
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1155416	2	15	13.3	5.0	<b>√</b>			

Page : 8 of 9 Work Order : VA23C2499

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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
Conductivity in Water	E100	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water
	ALS Environmental -			sample. Conductivity measurements are temperature-compensated to 25°C.
	Vancouver			
pH by Meter	E108	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,
	ALS Environmental -			pH should be measured in the field within the recommended 15 minute hold time.
	Vancouver			
TSS by Gravimetry	E160	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
	ALS Environmental -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Vancouver			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	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	ALS Environmental -			
	Vancouver			
Nitrate in Water by IC (Low Level)	E235.NO3-L	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and /or UV detection.
	ALS Environmental -			
	Vancouver			
Ammonia by Fluorescence	E298	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).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Vancouver			
Total Nitrogen by Colourimetry	E366	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is
	ALS Environmental -		,	approved under US EPA 40 CFR Part 136 (May 2021).
	Vancouver			
Total Phosphorus by Colourimetry (0.002	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated
mg/L)				persulfate digestion of the sample.
	ALS Environmental -			
B: 1 : 10 B 1 5 1	Vancouver	<b>147</b> 4	4 DUI 4 50 (0 D ( 1)	
Biochemical Oxygen Demand - 5 day	E550	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.
	ALS Environmental -			
	Vancouver			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Biochemical Oxygen Demand (Carbonaceous)	E555	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen
- 5 day				depletion is measured using a dissolved oxygen meter. Nitrification inhibitor is added to
	ALS Environmental -			samples to prevent nitrogenous compounds from consuming oxygen resulting in only
	Vancouver			carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when
				free chlorine is present in samples.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as
				N) + Nitrate (as N).
	ALS Environmental -			
	Vancouver			
Total Kjeldahl Nitrogen (Calculation)	EC318	Water	BC MOE	Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total
			LABORATORY	Nitrogen - [Nitrite (as N) + Nitrate (as N)].
	ALS Environmental -		MANUAL (2005)	
	Vancouver			
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	ALS Environmental -			
	Vancouver			
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion.
				Nitrogen compounds are converted to nitrate in this digestion.
	ALS Environmental -			
	Vancouver			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	ALS Environmental -			
	Vancouver			

## **ALS Canada Ltd.**



# **QUALITY CONTROL REPORT**

Work Order :VA23C2499

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO :---C-O-C number :--Sampler :---

Site · ----

Quote number : VA22-RDKS100-001

No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 6

Laboratory Department

Laboratory ; ALS Environmental - Vancouver

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

 Telephone
 : +1 604 253 4188

 Date Samples Received
 : 21-Sep-2023 12:15

 Date Analysis Commenced
 : 22-Sep-2023

Issue Date : 03-Oct-2023 16:27

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

Position

- 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

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.

Signatorios	7 GORIGIT	Editory Dopartmont
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

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Work Order: VA23C2499

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

### **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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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### 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: 1148691)											
VA23C2205-004	Anonymous	рН		E108	0.10	pH units	7.31	7.32	0.137%	4%		
Physical Tests (QC	Lot: 1148692)											
VA23C2205-004	Anonymous	Conductivity		E100	2.0	μS/cm	56.0	55.7	0.537%	10%		
Physical Tests (QC	Lot: 1155106)											
KS2303575-001	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR		
Anions and Nutrien	ts (QC Lot: 1148696)											
KS2303561-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR		
Anions and Nutrien	ts (QC Lot: 1148697)											
KS2303561-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR		
<b>Anions and Nutrien</b>	ts (QC Lot: 1148825)											
VA23C2499-002	Travel Blank	Nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR		
Anions and Nutrien	ts (QC Lot: 1148826)											
VA23C1990-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0128	0.0123	0.0006	Diff <2x LOR		
<b>Anions and Nutrien</b>	ts (QC Lot: 1148827)											
VA23C2499-002	Travel Blank	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR		
Anions and Nutrien	ts (QC Lot: 1155416)											
FJ2302442-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.200	mg/L	4.68	4.88	4.20%	20%		
Anions and Nutrien	ts (QC Lot: 1155417)											
FJ2302442-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0928	0.0931	0.394%	20%		
Anions and Nutrien	ts (QC Lot: 1155419)											
KS2303575-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.170	0.171	0.001	Diff <2x LOR		
Aggregate Organics	(QC Lot: 1148765)											
VA23C2329-001	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	2.4	<2.0	0.4	Diff <2x LOR		
Aggregate Organics	s (QC Lot: 1149334)											
VA23C2499-002	Travel Blank	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	<2.0	<2.0	0.0%	30%		
	+	<del> </del>										

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

### 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 Me	ethod	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1148692)						
Conductivity	E1	100	1	μS/cm	1.1	
Physical Tests (QCLot: 1155106)						
Solids, total suspended [TSS]	E1	160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 1148696)						
Nitrate (as N)	14797-55-8 E2	235.NO3-L	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1148697)						
Nitrite (as N)	14797-65-0 E2	235.NO2-L	0.001	mg/L	<0.0010	
Anions and Nutrients (QCLot: 1148825)						
Nitrogen, total	7727-37-9 E3	366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 1148826)						
Phosphorus, total	7723-14-0 E3	372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1148827)						
Ammonia, total (as N)	7664-41-7 E2	298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1155416)						
Phosphorus, total	7723-14-0 E3	372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1155417)						
Ammonia, total (as N)	7664-41-7 E2	298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1155419)						
Nitrogen, total	7727-37-9 E3	366	0.03	mg/L	<0.030	
Aggregate Organics (QCLot: 1148765)						
Biochemical oxygen demand [BOD]	E5	550	2	mg/L	<2.0	
Aggregate Organics (QCLot: 1149334)						
Carbonaceous biochemical oxygen demand [CBOD]	E5	555	2	mg/L	<2.0	

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Client

Regional District of Kitimat-Stikine

Project Queensway Sewer



## 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: 1148691)									
рН		E108		pH units	7 pH units	100	98.0	102	
Physical Tests (QCLot: 1148692)									
Conductivity		E100	1	μS/cm	146.9 μS/cm	96.1	90.0	110	
Physical Tests (QCLot: 1155106)									
Solids, total suspended [TSS]		E160	3	mg/L	150 mg/L	92.5	85.0	115	
Anions and Nutrients (QCLot: 1148696)									
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: 1148697)	4.555.05.0	5005 NO. 1	0.004						
Nitrite (as N)	14/9/-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.3	90.0	110	
Anions and Nutrients (QCLot: 1148825)	7707.07.0	F000	0.00				75.0	405	
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	96.2	75.0	125	
Anions and Nutrients (QCLot: 1148826)	7723-14-0	E070 II	0.000				00.0	100	
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	96.5	80.0	120	
Anions and Nutrients (QCLot: 1148827)	7664-41-7	E000	0.005	"	- "		05.0	445	
Ammonia, total (as N)	7004-41-7	E298	0.005	mg/L	0.2 mg/L	87.0	85.0	115	
Anions and Nutrients (QCLot: 1155416)	7723-14-0	E270 II	0.002		0.05 #	00.0	00.0	400	1
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	90.9	80.0	120	
Anions and Nutrients (QCLot: 1155417) Ammonia, total (as N)	7664-41-7	E200	0.005	m a /l	0.0 "	405	85.0	115	
	7004-41-7	E290	0.005	mg/L	0.2 mg/L	105	65.0	115	
Anions and Nutrients (QCLot: 1155419)	7727-37-9	F266	0.03	m a /l	0.5 "	00.0	75.0	125	
Nitrogen, total	1121-31-9	E300	0.03	mg/L	0.5 mg/L	98.0	75.0	125	
Aggregate Organics (QCLot: 1148765) Biochemical oxygen demand [BOD]		E550	2	mg/L	198 mg/L	104	85.0	115	
			_	9,2	190 Hig/L	104	33.3		
Aggregate Organics (QCLot: 1149334) Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	198 mg/L	96.5	85.0	115	
Carbonaccous biochemical oxygen demand [CBOD]		2000	_	mg/L	190 Hig/L	90.5	00.0	110	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

### 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									
					Spi	ke	Recovery (%)	Recovery	Limits (%)					
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier				
Anions and Nutri	ents (QCLot: 1148696)													
VA23C2041-022	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	124 mg/L	125 mg/L	99.0	75.0	125					
Anions and Nutri	ents (QCLot: 1148697)													
VA23C2041-022	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	23.8 mg/L	25 mg/L	95.1	75.0	125					
Anions and Nutri	ents (QCLot: 1148826)													
VA23C1990-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0484 mg/L	0.05 mg/L	96.9	70.0	130					
Anions and Nutri	ents (QCLot: 1155416)													
FJ2302442-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0456 mg/L	0.05 mg/L	91.3	70.0	130					
Anions and Nutri	ents (QCLot: 1155417)													
FJ2302442-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.102 mg/L	0.1 mg/L	102	75.0	125					
Anions and Nutri	ents (QCLot: 1155419)													
KS2303575-002	Anonymous	Nitrogen, total	7727-37-9	E366	0.392 mg/L	0.4 mg/L	98.0	70.0	130					

### Request Form

## Affix ALS barcode label here

(lab use only)

Page

of

# ALS) Environmental

Canada Toll Free: 1 800 668 9878

	www.alsglobal.com																						
Report To	Contact and company name below will appear on the final report		Report Format	t / Distribution			Select	Servi	ce Lev	rel Bel	low - 0	Contac	t you	AM to	conf	irm all	E&P 1	TATs (s	surcha	irges n	nay ap	ply)	
Company:	Regional District of Kitimat-Stikine	Select Report F	ormat: 📝 PDF	☑ EXCEL ☑ EL	DD (DIGITAL)		Reg	jular j	[R]	☑ St	andard	TAT if	receive	d by 3 p	pm - bu	ısiness	days - 1	no surch	narges a	pply			$\neg$
Contact:	Nicole Lavoie	Quality Control	(QC) Report with F	Report 🗹 YES	NO .	r ays)	4 day	[P4-2	20%]			NCY	1 Bu	sines	s day	[E1	100%	<u></u>					
Phone:	250-615-6100	Compare Resu	its to Criteria on Report	- provide details belo	ow if box checked	ORIT	3 day	[P3-2	25%]			ERGE						atutory	v holic	day [F	2 -200	)%	]
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Street:	4545 Lazelle Avenue	Email 1 or Fax	enviro.dept@rdks	.bc.ca			Date and	i Time	Requir	ed for	all E&	PTAT	: .										
City/Province:	Terrace/BC	Email 2	ckerr@rdks.bc.ca	; jkunjumon@rdk	s.bc.ca	For tes	ts that c	an not b	e perfo	rmed a	ccordin	g to the	service	ea levet	elected,	you wil)	be con	tacted.					
Postal Code:	V8G4E1	Email 3	pmiller@rdks.bc.c	a; jlacroix@rdks.	bc.ca								Ana	lysis	Requ	est							
nvoice To	Same as Report To		Invoice Di			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below							- 1	etail									
	Copy of Invoice with Report	Select Invoice [	Select Invoice Distribution:				P	P	P							P	Р			$\neg$		provide further detai	
Company:	Regional District of Kitimat-Stikine	Email 1 or Fax	Email 1 or Fax anne-maries@rdks.bc.ca					_	E I	and.							1			$\Box$	.   :	ŧΙ	
Contact:	Nicole Lavoie	Email 2	Email 2 enviro.dept@rdks.bc.ca			]		.)g/L	0.002	Demano					- 1		l		1	ı	- 1:	후 로	.
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Job #:	Queensway Sewer	Major/Minor Code:		Routing Code:		1		Colourimetry	louri	<u>R</u>					l		1	1			- 1.	leas	SS.
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ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TSS (by	Fotal Am	Fotal Nit	Total Ph	Carbona	Но.	BOD (5	Specific	Nitrate, 1	Z Z	втехмрн	EPH			1	SAMPLES ON HOLD	Sample	NUMBER
	Exfiltration Lagoons 3 & 4		19-Sep-23	12:30	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	- 1		一		$\overline{}$	
	Travel Blank		19-Sep-23	- ,	Water	R	R	R	R	R	Ŗ	·R	R	R	R	R	R		$\overline{}$	$\neg$	1	十	$\dashv$
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Drinking	Water (DW) Samples <sup>1</sup> (client use)  Special Instructions /		idd on∤ stronic Cou,		j	Froze				SAN	APLE						(lab ı	use on					
Are samples tak	en from a Regulated DW System? Federal Wastewater S			012)	•	4	en acks	کها،	. <b>L.I</b>	uhan				ations	_	Yes	느	J		No		닏	= E
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_	re samples for human consumption/ use? Queensway Sewer Custom Criteria for					000		ITIAL C		R TEM	PERA	TURES	°C	—т		Ē.	MAL C	OOLER	TEMO	CDATIII	) FO MO		
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# **ALS Canada Ltd.**



## **CERTIFICATE OF ANALYSIS**

**Work Order** : **VA23C4565** Page : 1 of 3

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

Address : # 300 - 4545 Lazelle Avenue Address : 8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby BC Canada V5A 1W9

Telephone : ---- : +1 604 253 4188

Project : Queensway Sewer Date Samples Received : 13-Oct-2023 13:30

PO : --- Date Analysis Commenced : 14-Oct-2023 C-O-C number : --- Issue Date : 24-Oct-2023 12:51

Sampler : ---Site : ----

Quote number : VA22-RDKS100-001

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
Courtney Cox	Analsyt	Inorganics, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia

Page : 2 of 3

Work Order : VA23C4565

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### **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
μS/cm	microsiemens per centimetre
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
BODP	BOD dilution results differed by more than 30% RPD. Precision of reported BOD
	result may be less than usual.

Page : 3 of 3

Work Order : VA23C4565

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# Analytical Results

Sub-Matrix: Water			CI	ient sample ID	F1	Field Blank	 	
(Matrix: Water)								
			Client samp	ling date / time	12-Oct-2023 10:20	12-Oct-2023 10:20	 	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C4565-001	VA23C4565-002	 	
					Result	Result	 	
Physical Tests								
Conductivity		E100/VA	2.0	μS/cm	572	<2.0	 	
рН		E108/VA	0.10	pH units	7.70	6.26	 	
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	37.0	<3.0	 	
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	29.6	<0.0050	 	
Kjeldahl nitrogen, total [TKN]		E318/VA	0.050	mg/L	29.7	<0.050	 	
Nitrate (as N)	14797-55-8	E235.NO3-L/V	0.0050	mg/L	0.0812	<0.0050	 	
Nitrite (as N)	14797-65-0	A E235.NO2-L/V A	0.0010	mg/L	0.427	<0.0010	 	
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	29.0	<0.030	 	
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	5.64	<0.0020	 	
Aggregate Organics								
Biochemical oxygen demand [BOD]		E550/VA	2.0	mg/L	163	<2.0	 	
Carbonaceous biochemical oxygen demand [CBOD]		E555/VA	2.0	mg/L	21.5 BODP	<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** : **VA23C4565** Page : 1 of 9

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

 Telephone
 :-- Telephone
 :+1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 13-Oct-2023 13:30

PO :---- Issue Date : 24-Oct-2023 12:52 C-O-C number :---- Sampler :----

Quote number : VA22-RDKS100-001

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

Site

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**

### outhers . Quanty Control Sample.

- 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.

Page : 3 of 9 Work Order : VA23C4565

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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					Ev	/aluation: × =	Holding time exce	edance ; •	= Within	Holding Time
Analyte Group : Analytical Method	Method	Sampling Date	Ext	traction / Pr	reparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
F1	E550	12-Oct-2023					15-Oct-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Field Blank	E550	12-Oct-2023					15-Oct-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d] F1	E555	12-Oct-2023					15-Oct-2023	2 days	3 days	<b>√</b>
FI	E333	12-06-2023					15-001-2023	3 days	3 days	•
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day HDPE [BOD HT 3d]				<u> </u>	<u> </u>		I			
Field Blank	E555	12-Oct-2023					15-Oct-2023	3 days	3 days	✓
									,	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
F1	E298	12-Oct-2023	19-Oct-2023	28	7 days	✓	21-Oct-2023	28 days	9 days	✓
				days						
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved)										
Field Blank	E298	12-Oct-2023	14-Oct-2023	3 days	2 days	✓	16-Oct-2023	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
F1	E235.NO3-L	12-Oct-2023	15-Oct-2023	3 days	3 days	✓	15-Oct-2023	3 days	3 days	✓

Page : 4 of 9 Work Order : VA23C4565

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

Matrix: Water						valuation. × –	Holding time excee	euance , v	- vvitriiii	Holding Time
Analyte Group : Analytical Method	Method	Sampling Date	Ex	traction / Pr	eparation			Analys	is	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	Times	Eval
			Date	Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Field Blank	E235.NO3-L	12-Oct-2023	15-Oct-2023	3 days	3 days	✓	15-Oct-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
F1	E235.NO2-L	12-Oct-2023	15-Oct-2023	3 days	3 days	1	15-Oct-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Field Blank	E235.NO2-L	12-Oct-2023	15-Oct-2023	3 days	3 days	✓	15-Oct-2023	3 days	3 days	✓
					,				,	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)							l			
Amber glass total (sulfuric acid)							I			
F1	E318	12-Oct-2023	19-Oct-2023	28	7 days	✓	20-Oct-2023	28 days	8 days	✓
			.0 001 2020	days	. aays		20 001 2020	20 44,0	o aayo	
Asiana and National a Tatal Waldald Nikosana ba Flancasana (Landana)				dayo						
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)  Amber glass total (lab preserved)				I	<u> </u>		I			
Field Blank	E318	12-Oct-2023	14-Oct-2023	3 days	2 days	<b>√</b>	17-Oct-2023	28 days	3 days	<b>√</b>
ricid Dialik	2010	12-001-2020	14-001-2020	0 days	2 days	·	17-000-2020	20 days	o days	•
Anions and Nutrients : Total Nitrogen by Colourimetry					I	<u> </u>				
Amber glass total (sulfuric acid) F1	E366	12-Oct-2023	19-Oct-2023	28	7 days	<b>√</b>	20-Oct-2023	28 days	0 days	✓
FI	L300	12-061-2025	19-001-2023		1 uays	•	20-06-2023	20 uays	o uays	•
				days						
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved)	F366	12 Oct 2022	14 Oct 2022	2 days	O days	<b>√</b>	16 Oct 2022	00 day	O daye	✓
Field Blank	E366	12-Oct-2023	14-Oct-2023	3 days	2 days	•	16-Oct-2023	28 days	∠ days	•
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)						I				
Amber glass total (sulfuric acid)	5070 11	40.0.4.0055	40.0.4.0055				00.0.1.0055	00.1		,
F1	E372-U	12-Oct-2023	19-Oct-2023	28	7 days	✓	20-Oct-2023	28 days	8 days	✓
				days						
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved)										
Field Blank	E372-U	12-Oct-2023	14-Oct-2023	3 days	2 days	✓	16-Oct-2023	28 days	2 days	✓
				1						

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

iviatrix. water						valuation. •• –	noiding time exce	cuarice, .	_ vviti iii	Tioluling Tilli
Analyte Group : Analytical Method	Method	Sampling Date	Ext	raction / P	reparation			Analys	is	
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Physical Tests : Conductivity in Water										
HDPE										
F1	E100	12-Oct-2023	15-Oct-2023	28	3 days	✓	15-Oct-2023	28 days	3 days	✓
				days						
Physical Tests : Conductivity in Water										
HDPE										
Field Blank	E100	12-Oct-2023	15-Oct-2023	28	3 days	✓	15-Oct-2023	28 days	3 days	✓
				days						
Physical Tests : pH by Meter										
HDPE										
F1	E108	12-Oct-2023	15-Oct-2023	0.25	73 hrs	*	15-Oct-2023	0.25	74 hrs	×
				hrs		EHTR-FM		hrs		EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Field Blank	E108	12-Oct-2023	15-Oct-2023	0.25	73 hrs	*	15-Oct-2023	0.25	74 hrs	*
				hrs		EHTR-FM		hrs		EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE										_
F1	E160	12-Oct-2023					19-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE										
Field Blank	E160	12-Oct-2023					19-Oct-2023	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).

Page : 6 of 9 Work Order : VA23C4565

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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.

Quality Control Sample Type			C	ount		)	
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1185373	2	26	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1186074	1	8	12.5	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1186072	1	9	11.1	5.0	✓
Conductivity in Water	E100	1186252	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1186257	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1186258	1	20	5.0	5.0	✓
pH by Meter	E108	1186251	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1185374	2	11	18.1	5.0	✓
Total Nitrogen by Colourimetry	E366	1185372	2	14	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1185371	2	28	7.1	5.0	✓
TSS by Gravimetry	E160	1193373	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1185373	2	26	7.6	5.0	1
Biochemical Oxygen Demand - 5 day	E550	1186074	1	8	12.5	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1186072	1	9	11.1	5.0	✓
Conductivity in Water	E100	1186252	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1186257	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1186258	1	20	5.0	5.0	✓
pH by Meter	E108	1186251	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1185374	2	11	18.1	5.0	✓
Total Nitrogen by Colourimetry	E366	1185372	2	14	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1185371	2	28	7.1	5.0	✓
TSS by Gravimetry	E160	1193373	1	20	5.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1185373	2	26	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1186074	1	8	12.5	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1186072	1	9	11.1	5.0	✓
Conductivity in Water	E100	1186252	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1186257	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1186258	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1185374	2	11	18.1	5.0	✓
Total Nitrogen by Colourimetry	E366	1185372	2	14	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1185371	2	28	7.1	5.0	✓
TSS by Gravimetry	E160	1193373	1	20	5.0	5.0	1

Page : 7 of 9 Work Order : VA23C4565

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Matrix: <b>Water</b> Evaluation: <b>×</b> = <i>QC frequency outside specification</i> ; ✓ = <i>QC frequency within specification</i> .									
Quality Control Sample Type					Frequency (%)				
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation		
Matrix Spikes (MS) - Continued									
Ammonia by Fluorescence	E298	1185373	2	26	7.6	5.0	✓		
Nitrate in Water by IC (Low Level)	E235.NO3-L	1186257	1	20	5.0	5.0	✓		
Nitrite in Water by IC (Low Level)	E235.NO2-L	1186258	1	20	5.0	5.0	✓		
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1185374	2	11	18.1	5.0	✓		
Total Nitrogen by Colourimetry	E366	1185372	2	14	14.2	5.0	✓		
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1185371	2	28	7.1	5.0	✓		

Page : 8 of 9 Work Order : VA23C4565

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# **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
Conductivity in Water	E100	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is
	ALS Environmental -			measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
	Vancouver			sample. Conductivity measurements are temperature-compensated to 25 C.
pH by Meter	E108	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted
prosperior	L 100		7 11 111 1000 11 (11104)	at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results,
	ALS Environmental -			pH should be measured in the field within the recommended 15 minute hold time.
	Vancouver			
TSS by Gravimetry	E160	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
	ALS Environmental -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Vancouver			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	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	ALS Environmental -			
	Vancouver			
Nitrate in Water by IC (Low Level)	E235.NO3-L	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	ALS Environmental -			
	Vancouver			
Ammonia by Fluorescence	E298	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).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Vancouver			
Total Kjeldahl Nitrogen by Fluorescence (Low	E318	Water	Method Fialab 100,	TKN in water is determined by automated continuous flow analysis with membrane
Level)			2018	diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021).
	Vancouver			
Total Nitrogen by Colourimetry	E366	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is
	ALS Environmental -			approved under US EPA 40 CFR Part 136 (May 2021).
	Vancouver			
Total Phosphorus by Colourimetry (0.002	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated
mg/L)				persulfate digestion of the sample.
	ALS Environmental -			
	Vancouver			

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Biochemical Oxygen Demand - 5 day	E550  ALS Environmental -  Vancouver	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.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555 ALS Environmental - Vancouver	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. Nitrification inhibitor is added to samples to prevent nitrogenous compounds from consuming oxygen resulting in only carbonaceous oxygen demand being reported by this method.  Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298  ALS Environmental -  Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318  ALS Environmental -  Vancouver	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Nitrogen in water	EP366  ALS Environmental -  Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion.  Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372  ALS Environmental -  Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

## **ALS Canada Ltd.**



# **QUALITY CONTROL REPORT**

Work Order :VA23C4565

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO :---C-O-C number :--Sampler :----

Site · ----

Quote number : VA22-RDKS100-001

No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 6

Laboratory ; ALS Environmental - Vancouver

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Date Samples Received : 13-Oct-2023 13:30

Date Analysis Commenced : 14-Oct-2023

Issue Date : 24-Oct-2023 12:51

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
Courtney Cox	Analsyt	Vancouver Inorganics, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Vancouver Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### **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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 Work Order
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 VA23C4565

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### 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: 1186251)												
VA23C4484-003	Anonymous	pH		E108	0.10	pH units	7.20	7.21	0.139%	4%			
Physical Tests (QC	Lot: 1186252)												
VA23C4484-003	Anonymous	Conductivity		E100	2.0	μS/cm	3410	3400	0.294%	10%			
Physical Tests (QC	Lot: 1193373)												
VA23C4493-004	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	152	149	1.72%	20%			
Anions and Nutrien	ts (QC Lot: 1185371)												
FJ2302707-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0077	0.0076	0.00004	Diff <2x LOR			
Anions and Nutrien	ts (QC Lot: 1185372)												
VA23C4504-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR			
Anions and Nutrien	ts (QC Lot: 1185373)												
FJ2302707-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0074	0.0072	0.0002	Diff <2x LOR			
Anions and Nutrien	ts (QC Lot: 1185374)												
FJ2302707-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	0.050	mg/L	0.147	0.119	0.028	Diff <2x LOR			
Anions and Nutrien	ts (QC Lot: 1186257)												
VA23C4484-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0500	mg/L	4.32	4.30	0.385%	20%			
Anions and Nutrien	ts (QC Lot: 1186258)												
VA23C4484-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR			
Anions and Nutrien	ts (QC Lot: 1194321)												
KS2304017-007	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR			
Anions and Nutrien	ts (QC Lot: 1194323)												
KS2303950-005	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0250	mg/L	1.22	1.23	1.01%	20%			
Anions and Nutrien	ts (QC Lot: 1194327)												
KS2303950-005	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.200	mg/L	2.29	2.27	0.653%	20%			
Anions and Nutrien	ts (QC Lot: 1194328)												
VA23C4507-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	0.050	mg/L	0.150	0.137	0.012	Diff <2x LOR			
Aggregate Organics	(QC Lot: 1186072)												
WR2301298-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	<2.0	<2.0	0.0%	30%			
Aggregate Organics	(QC Lot: 1186074)												
VA23C4379-003	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR			

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 VA23C4565

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# 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: 1186252)						
Conductivity		E100	1	μS/cm	<1.0	
Physical Tests (QCLot: 1193373)						
Solids, total suspended [TSS]		E160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 1185371)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1185372)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 1185373)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1185374)						
Kjeldahl nitrogen, total [TKN]		E318	0.05	mg/L	<0.050	
Anions and Nutrients (QCLot: 1186257)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1186258)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	
Anions and Nutrients (QCLot: 1194321)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 1194323)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1194327)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1194328)						
Kjeldahl nitrogen, total [TKN]		E318	0.05	mg/L	<0.050	
Aggregate Organics (QCLot: 1186072)						
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	<2.0	
Aggregate Organics (QCLot: 1186074)						
Biochemical oxygen demand [BOD]		E550	2	mg/L	<2.0	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



# 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 Me	ethod	LOR	Unit	Concentration	LCS	Low	High	Qualifier		
Physical Tests (QCLot: 1186251)											
pH	E1	108		pH units	7 pH units	100	98.0	102			
Physical Tests (QCLot: 1186252)											
Conductivity	E1	100	1	μS/cm	146.9 μS/cm	98.3	90.0	110			
Physical Tests (QCLot: 1193373)											
Solids, total suspended [TSS]	E1	160	3	mg/L	150 mg/L	90.9	85.0	115			
Anions and Nutrients (QCLot: 1185371)											
Phosphorus, total	7723-14-0 E3	372-U	0.002	mg/L	0.05 mg/L	90.8	80.0	120			
Anions and Nutrients (QCLot: 1185372)											
Nitrogen, total	7727-37-9 E3	366	0.03	mg/L	0.5 mg/L	96.1	75.0	125			
Anions and Nutrients (QCLot: 1185373)											
Ammonia, total (as N)	7664-41-7 E2	298	0.005	mg/L	0.2 mg/L	97.0	85.0	115			
Anions and Nutrients (QCLot: 1185374)											
Kjeldahl nitrogen, total [TKN]	E3	318	0.05	mg/L	4 mg/L	103	75.0	125			
Anions and Nutrients (QCLot: 1186257)											
Nitrate (as N)	14797-55-8 E2	235.NO3-L	0.005	mg/L	2.5 mg/L	105	90.0	110			
Anions and Nutrients (QCLot: 1186258)											
Nitrite (as N)	14797-65-0 E2	235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110			
Anions and Nutrients (QCLot: 1194321)											
Nitrogen, total	7727-37-9 E3	366	0.03	mg/L	0.5 mg/L	95.5	75.0	125			
Anions and Nutrients (QCLot: 1194323)											
Ammonia, total (as N)	7664-41-7 E2	298	0.005	mg/L	0.2 mg/L	109	85.0	115			
Anions and Nutrients (QCLot: 1194327)											
Phosphorus, total	7723-14-0 E3	372-U	0.002	mg/L	0.05 mg/L	91.9	80.0	120			
Anions and Nutrients (QCLot: 1194328)											
Kjeldahl nitrogen, total [TKN]	E3	318	0.05	mg/L	4 mg/L	92.6	75.0	125			
Aggregate Organics (QCLot: 1186072)	lee		0		100 #	101	05.0	445			
Carbonaceous biochemical oxygen demand [CBOD]	E5	555	2	mg/L	198 mg/L	104	85.0	115			
Aggregate Organics (QCLot: 1186074)							0.7.0				
Biochemical oxygen demand [BOD]	E5	550	2	mg/L	198 mg/L	104	85.0	115			

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### 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 Spik	re (MS) Report		
					Spi	ike	Recovery (%)	Recovery	Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutri	ients (QCLot: 1185371)									
VA23C4493-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	
Anions and Nutri	ients (QCLot: 1185372)									
VA23C4504-002	Anonymous	Nitrogen, total	7727-37-9	E366	0.413 mg/L	0.4 mg/L	103	70.0	130	
Anions and Nutr	ients (QCLot: 1185373)									
VA23C4114-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.100 mg/L	0.1 mg/L	100	75.0	125	
Anions and Nutri	ients (QCLot: 1185374)									
VA23C4504-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	2.58 mg/L	2.5 mg/L	103	70.0	130	
Anions and Nutri	ients (QCLot: 1186257)									
VA23C4484-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	12.8 mg/L	12.5 mg/L	102	75.0	125	
Anions and Nutri	ients (QCLot: 1186258)									
VA23C4484-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.56 mg/L	2.5 mg/L	102	75.0	125	
Anions and Nutri	ients (QCLot: 1194321)									
VA23C4519-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.403 mg/L	0.4 mg/L	101	70.0	130	
Anions and Nutr	ients (QCLot: 1194323)									
KS2304017-007	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.110 mg/L	0.1 mg/L	110	75.0	125	
Anions and Nutri	ients (QCLot: 1194327)									
KS2304017-007	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0468 mg/L	0.05 mg/L	93.6	70.0	130	
Anions and Nutri	ients (QCLot: 1194328)									
VA23C4565-001	F1	Kjeldahl nitrogen, total [TKN]		E318	ND mg/L	2.5 mg/L	ND	70.0	130	

# ALS Environmental

# Chain of Custody (COC) / Analytical Request Form

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

### Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page

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ontact: Nico hone: 250 Con treet: 454 ity/Province: Terr ostal Code: V8C ivoice To Sar Cop ompany: Reg ontact: Nico LS Account # / Qu ob #: Qu of AFE: SD: ALS Lab Work On ALS Sample # (lab use only)	45 Lazelle Avenue  rrace/BC  G4E1  me as Report To  YES NO  py of Invoice with Report YES NO  gional District of Kitimat-Stikine  pole Lavoie  Project Information  tuote #: VA22-RDKS100-001  reensway Sewer  Project Information  tuote #: VA22-RDKS100-001  Reensway Sewer  Project Information Note of the report	Quality Control Compare Resu Select Distributi Email 1 or Fax Email 2 Email 3  Select Invoice D Email 1 or Fax Email 2 Email 2	ormat: PDF (QC) Report with F (the to Criteria on Report ion: EMAIL enviro.dept@rdks ckerr@rdks.bc.ca pmillier@rdks.bc.ca Invoice Di Distribution: E El anne-maries@rdk enviro.dept@rdks land Gas Require  Date (dd-mmm-yy)	Report YES - provide details belo - mail  bc.ca ; jkunjumon@rdk a; jlacroix@rdks. stribution mail  mail  mail  sbc.ca	NO w if box checked FAX s.bc.ca bc.ca	Gravimetry) en lauriness Days)	4 day [F 3 day [F 2 day [F ate and Ti	ar [R] 4-20% 3-25% 2-50% me Required to be per discrete FP	S S S S S S S S S S S S S S S S S S S	r all E&	EWERGENCY P TATs	receive  1 Bu: Same (Labo : service	ed by 3 usines e Day, prator e level se	pm - b ss day , Wee ry ope elected, Requ	business y [E1 - ekend ening	s days - - 100% I or Sta I fees I	no surc  [6]  Eatutor  may a  Intacted.	charges ry holi	apply	E2 -20	-
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Contreet: 454 Sity/Province: Terrostal Code: V8C Invoice To Sar Company: Reg Contact: Nico SLS Account # / Que CO / AFE: SD: ALS Lab Work On ALS Sample # (lab use only) F1	mpany address below will appear on the final report  45 Lazelle Avenue  rrace/BC  G4E1  me as Report To	Select Distributi Email 1 or Fax Email 2 Email 3  Select Invoice DEmail 1 or Fax Email 2 Oil AFE/Cost Center: Major/Minor Code: Requisitioner: Location:	enviro.dept@rdks.bc.ca pmiller@rdks.bc.ca pmiller@rdks.bc.ca Invoice Di Distribution:	MAIL D.  .bc.ca .jkunjumon@rdk .a; jlacroix@rdks. stribution MAIL MAIL Sbc.ca .bc.ca d Fields (client of PO# Routing Code:  Sampler:	s.bc.ca bc.ca  ] FAX	Gravimetry)	2 day [F	2-50% me Require FP dicate FP dicate FP dicate FP dicate FP Dicate	Biochemical Oxygen Demand	occordin	P TATs g to the erved (F	Ana P) or Fil	e level se alysis ltered a	ry ope	ening d, you w! uest	fees i	may a				provide further detail
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Costal Code: V8C convoice To Sar Cop Company: Reg Contact: Nico Cop Company: Reg Contact: Nico Contact: Nico Contact: Nico Contact: Nico Contact: Que Co / AFE: SD:  ALS Lab Work Or ALS Sample # (lab use only)	rrace/BC G4E1 me as Report To	Email 2 Email 3 Select Invoice Email 1 or Fax Email 2 Oil AFE/Cost Center: Major/Minor Code: Requisitioner: Location:	ckerr@rdks.bc.ca pmiller@rdks.bc.ca pmiller@rdks.bc.ca Invoice Di Distribution:	; jkunjumon@rdk a; jlacroix@rdks. stribution  MAIL	FAX	Gravimetry)	p p ( //www.co o valentimoloc) val	(by Colourimetry 0.002 mg	Biochemical Oxygen Demand	occordin	g to the	Ana P) or Fil	alysis Itered a	Requ	uest						ardous (please provide further detail
Postal Code: V8C nvoice To Sar Cop Company: Reg Contact: Nic ALS Account # / Qu Dob #: Que PO / AFE: SD: ALS Lab Work Or ALS Sample # (lab use only)	Me as Report To	Email 3  Select Invoice DEmail 1 or Fax Email 2  Oil AFE/Cost Center: Major/Minor Code: Requisitioner: Location:	pmilier@rdks.bc.c Invoice Di Distribution: ☑ El anne-maries@rdk enviro.dept@rdks and Gas Require	a; jlacroix@rdks. stribution  MAIL	FAX	Gravimetry)	D. ( Name() O ampliation of Artificial or Artificial or Artification of Artificial or	(by Colourimetry 0.002 mg	Biochemical Oxygen Demand		erved (F	Ana  P) or Fill  Books	alysis Itered a	Requ	uest						ardous (please provide further detail
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	from a Regulated DW System? Federal Wastewater Sys	stems Effluent R	egulations (JUN, 2	012)			acks				Custo	dy se	al inta	act	Yes		J		No		ı
☐ YES	☑ NO			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Cooli	ng Initiat														
Are samples for hum	nan consumption/ use? Queensway Sewer Cust	om Criteria for F	RDKS			7,			ER TEN	IPERA	TURES	°C	$\Box$	=	F	FINAL C	OOLEF	₹ TEMP	PERATU	IRES °C	<u>c</u>
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	SHIPMENT RELEASE (client use)		INITIAL SHIPMEN	IT RECEPTION (	lab use only)					F	INAL		Row	4 10 1	130ct	2	<u>~</u> .	ነሮ 1ጋ	30	o ice	.,
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## **ALS Canada Ltd.**

Address

Site



## **CERTIFICATE OF ANALYSIS**

Work Order : VA23C7867 Page

Terrace BC Canada V8G 4E1

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

: # 300 - 4545 Lazelle Avenue Address : 8081 Lougheed Highway

Burnaby BC Canada V5A 1W9

: 1 of 3

 Telephone
 : -- Telephone
 : +1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 18-Nov-2023 12:50

PO : 19-Nov-2023

C-O-C number : ---- Issue Date : 27-Nov-2023 17:14
Sampler : ----

Quote number : VA22-RDKS100-001

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
Brieanna Allen	Production/Validation Manager	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia

Page : 2 of 3

Work Order : VA23C7867

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### **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
μS/cm	microsiemens per centimetre
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.

Page : 3 of 3

Work Order : VA23C7867

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### Analytical Results

Sub-Matrix: Water			Cli	ient sample ID	F1	DUP	 	
(Matrix: Water)								
			Client samp	ling date / time	17-Nov-2023 10:40	17-Nov-2023 12:00	 	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7867-001	VA23C7867-002	 	
					Result	Result	 	
Physical Tests								
Conductivity		E100/VA	2.0	μS/cm	613	615	 	
рН		E108/VA	0.10	pH units	8.08	8.09	 	
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	8.0	9.2	 	
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	32.3	34.3	 	
Kjeldahl nitrogen, total [TKN]		E318/VA	0.050	mg/L	35.6	35.8	 	
Nitrate (as N)	14797-55-8	E235.NO3-L/V	0.0050	mg/L	0.186	0.184	 	
Nitrite (as N)	14797-65-0	A E235.NO2-L/V A	0.0010	mg/L	0.634	0.637	 	
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	36.7	37.9	 	
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	5.27	5.61	 	
Aggregate Organics								
Biochemical oxygen demand [BOD]		E550/VA	2.0	mg/L	66.3	60.1	 	
Carbonaceous biochemical oxygen demand [CBOD]		E555/VA	2.0	mg/L	6.1	5.9	 	

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** : **VA23C7867** Page : 1 of 9

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

 Telephone
 :-- Telephone
 : +1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 18-Nov-2023 12:50

PO : ---- Issue Date : 27-Nov-2023 17:14
C-O-C number : ---Sampler ----

Quote number : VA22-RDKS100-001

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

Site

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**

#### duners . Quanty Control Sample.

- 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.

Page : 3 of 9 Work Order : VA23C7867

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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					Ev	/aluation: × =	Holding time excee	edance ; 🛚	/ = Within	Holding Time
Analyte Group : Analytical Method	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
DUP	E550	17-Nov-2023					19-Nov-2023	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
F1	E550	17-Nov-2023					19-Nov-2023	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]										
DUP	E555	17-Nov-2023					19-Nov-2023	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day				ı	I					
HDPE [BOD HT 3d] F1	E555	17-Nov-2023					19-Nov-2023	3 days	2 days	✓
FI	E333	17-1100-2023					19-1100-2023	3 days	2 days	•
Anions and Nutrients : Ammonia by Fluorescence					I					
Amber glass total (sulfuric acid) F1	E298	17-Nov-2023	23-Nov-2023	28	6 days	<b>√</b>	25-Nov-2023	28 days	8 days	1
		17 1107 2020	20-1404-2020	days	o days	·	20-1101-2020	20 days	o days	
Anions and Nutrients : Ammonia by Fluorescence				uayo						
Amber glass total (lab preserved)										
DUP	E298	17-Nov-2023	20-Nov-2023	3 days	3 days	✓	23-Nov-2023	28 days	3 days	✓
			3 <b></b>	, .	,0		, = <b></b>		, .	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
DUP	E235.NO3-L	17-Nov-2023	19-Nov-2023	3 days	2 days	✓	19-Nov-2023	3 days	2 days	✓
				,	,				,	

Page : 4 of 9 Work Order : VA23C7867

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

Analysis Onesia - Analysis - I Mash - I	Mattand	0		traction / Pr		aldation.	l loiding time excel			Troiding Time
Analyte Group : Analytical Method	Method	Sampling Date			•			Analys		
Container / Client Sample ID(s)			Preparation		g Times	Eval	Analysis Date		Times	Eval
			Date	Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE F1	E235.NO3-L	17-Nov-2023	19-Nov-2023	3 days	2 days	✓	19-Nov-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE DUP	E235.NO2-L	17-Nov-2023	19-Nov-2023	3 days	2 days	✓	19-Nov-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE F1	E235.NO2-L	17-Nov-2023	19-Nov-2023	3 days	2 days	✓	19-Nov-2023	3 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) F1	E318	17-Nov-2023	23-Nov-2023	28 days	6 days	1	24-Nov-2023	28 days	7 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (lab preserved) DUP	E318	17-Nov-2023	20-Nov-2023	3 days	3 days	✓	22-Nov-2023	28 days	2 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) F1	E366	17-Nov-2023	23-Nov-2023	28 days	6 days	1	24-Nov-2023	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved) DUP	E366	17-Nov-2023	20-Nov-2023	3 days	3 days	✓	22-Nov-2023	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) F1	E372-U	17-Nov-2023	23-Nov-2023	28 days	6 days	✓	24-Nov-2023	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved) DUP	E372-U	17-Nov-2023	20-Nov-2023	3 days	3 days	1	21-Nov-2023	28 days	1 days	✓
DUP	E312-U	17-1100-2023	ZU-INUV-ZUZ3	3 uays	3 uays	•	Z 1-INUV-ZUZ3	20 uays	i uays	•

Page : 5 of 9 Work Order : VA23C7867

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

Width. Witter		_				· araarorn	riolaling time exec	, ,	*********	g
Analyte Group : Analytical Method	Method	Sampling Date	Ext	raction / P	reparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Physical Tests : Conductivity in Water										
HDPE										
DUP	E100	17-Nov-2023	19-Nov-2023	28	2 days	✓	20-Nov-2023	28 days	3 days	✓
				days						
Physical Tests : Conductivity in Water										
HDPE										
F1	E100	17-Nov-2023	19-Nov-2023	28	2 days	✓	20-Nov-2023	28 days	3 days	✓
				days						
Physical Tests : pH by Meter										
HDPE										
DUP	E108	17-Nov-2023	19-Nov-2023	0.25	51 hrs	×	20-Nov-2023	0.25	66 hrs	30
				hrs		EHTR-FM		hrs		EHTR-FN
Physical Tests : pH by Meter										
HDPE										
F1	E108	17-Nov-2023	19-Nov-2023	0.25	53 hrs	*	20-Nov-2023	0.25	67 hrs	*
				hrs		EHTR-FM		hrs		EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE										
DUP	E160	17-Nov-2023					22-Nov-2023	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE										
F1	E160	17-Nov-2023					22-Nov-2023	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).

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### **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.

Quality Control Sample Type			C	ount		Frequency (%)	)
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1244425	2	34	5.8	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1243736	1	12	8.3	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1243738	1	2	50.0	5.0	✓
Conductivity in Water	E100	1244013	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1244001	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1244002	1	19	5.2	5.0	✓
pH by Meter	E108	1244012	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1244426	2	27	7.4	5.0	✓
Total Nitrogen by Colourimetry	E366	1244423	2	26	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1244424	2	34	5.8	5.0	✓
TSS by Gravimetry	E160	1248353	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1244425	2	34	5.8	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1243736	1	12	8.3	5.0	1
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1243738	1	2	50.0	5.0	✓
Conductivity in Water	E100	1244013	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1244001	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1244002	1	19	5.2	5.0	✓
pH by Meter	E108	1244012	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1244426	2	27	7.4	5.0	✓
Total Nitrogen by Colourimetry	E366	1244423	2	26	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1244424	2	34	5.8	5.0	✓
TSS by Gravimetry	E160	1248353	1	19	5.2	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1244425	2	34	5.8	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1243736	1	12	8.3	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1243738	1	2	50.0	5.0	✓
Conductivity in Water	E100	1244013	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1244001	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1244002	1	19	5.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1244426	2	27	7.4	5.0	✓
Total Nitrogen by Colourimetry	E366	1244423	2	26	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1244424	2	34	5.8	5.0	✓
TSS by Gravimetry	E160	1248353	1	19	5.2	5.0	1

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Client : Regional District of Kitimat-Stikine

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Matrix: Water	r Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification										
Quality Control Sample Type			Count			)					
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation				
Matrix Spikes (MS) - Continued											
Ammonia by Fluorescence	E298	1244425	2	34	5.8	5.0	✓				
Nitrate in Water by IC (Low Level)	E235.NO3-L	1244001	1	18	5.5	5.0	✓				
Nitrite in Water by IC (Low Level)	E235.NO2-L	1244002	1	19	5.2	5.0	✓				
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1244426	2	27	7.4	5.0	✓				
Total Nitrogen by Colourimetry	E366	1244423	2	26	7.6	5.0	✓				
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1244424	2	34	5.8	5.0	✓				

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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
Conductivity in Water	E100	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water
	ALS Environmental -			sample. Conductivity measurements are temperature-compensated to 25°C.
	Vancouver			
pH by Meter	E108	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally $20 \pm 5^{\circ}$ C). For high accuracy test results,
	ALS Environmental -			pH should be measured in the field within the recommended 15 minute hold time.
	Vancouver			
TSS by Gravimetry	E160	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
	ALS Environmental -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Vancouver			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	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	ALS Environmental -			
	Vancouver			
Nitrate in Water by IC (Low Level)	E235.NO3-L	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	ALS Environmental -			
	Vancouver			
Ammonia by Fluorescence	E298	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).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Vancouver			
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021).
	Vancouver			
Total Nitrogen by Colourimetry	E366	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is
	ALS Environmental -		·	approved under US EPA 40 CFR Part 136 (May 2021).
	Vancouver			
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
	ALS Environmental -			
	Vancouver			

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Biochemical Oxygen Demand - 5 day	E550	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.
	ALS Environmental -			3 73
	Vancouver			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	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. Nitrification inhibitor is added to
o day	ALS Environmental - Vancouver			samples to prevent nitrogenous compounds from consuming oxygen resulting in only carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	ALS Environmental -			
Digestion for TKN in water	Vancouver EP318	Water	APHA 4500-Norg D	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst,
Digeoder for Travar water	LF310	Water	(mod)	which converts organic nitrogen sources to Ammonia, which is then quantified by the
	ALS Environmental -		(54)	analytical method as TKN. This method is unsuitable for samples containing high levels
	Vancouver			of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
	ALS Environmental -			This egon composition to the to make in the eigenform
	Vancouver			
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	ALS Environmental -			
	Vancouver			

#### **ALS Canada Ltd.**



#### **QUALITY CONTROL REPORT**

Work Order :VA23C7867

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO :--C-O-C number :--Sampler :---

Site · ---

Quote number : VA22-RDKS100-001

No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 6

Laboratory ; ALS Environmental - Vancouver

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :+1 604 253 4188

Date Samples Received : 18-Nov-2023 12:50

Date Analysis Commenced : 19-Nov-2023

Issue Date : 27-Nov-2023 17:14

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

Brieanna Allen Production/Validation Manager Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte Supervisor - Metals ICP Instrumentation Vancouver Inorganics, Burnaby, British Columbia

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Work Order: VA23C7867

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

#### **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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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer

# ALS

#### 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							Labora	tory Duplicate (D	UP) 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: 1244012)										
WR2301489-003	Anonymous	pH		E108	0.10	pH units	7.56	7.59	0.396%	4%	
Physical Tests (QC	Lot: 1244013)										
WR2301489-003	Anonymous	Conductivity		E100	2.0	μS/cm	893	892	0.112%	10%	
Physical Tests (QC	Lot: 1248353)										
VA23C7837-001	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	14.6	15.2	0.6	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1244001)										
WR2301489-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0500	mg/L	<0.0500	<0.0500	0	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1244002)										
WR2301489-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1244423)										
VA23C7267-003	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.364	0.362	0.731%	20%	
Anions and Nutrient	ts (QC Lot: 1244424)										
VA23C7267-003	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0155	0.0151	0.0003	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1244425)										
VA23C7267-003	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0109	0.0124	0.0014	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1244426)										
VA23C7301-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	0.050	mg/L	1.16	1.21	4.93%	20%	
Anions and Nutrient	ts (QC Lot: 1249276)										
VA23C7865-001	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	0.050	mg/L	0.476	0.395	0.081	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1249277)										
VA23C7865-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.150	mg/L	4.34	4.39	1.07%	20%	
Anions and Nutrient	ts (QC Lot: 1249278)										
VA23C7793-016	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0044	0.0045	0.0001	Diff <2x LOR	
Anions and Nutrient	ts (QC Lot: 1249279)										
VA23C7793-016	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0746	0.0752	0.844%	20%	
Aggregate Organics	(QC Lot: 1243736)							<u> </u>			
VA23C7834-001	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	
Aggregate Organics	(QC Lot: 1243738)										
VA23C7867-001	F1	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	6.1	5.9	3.3%	30%	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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: 1244013)					
Conductivity	E100	1	μS/cm	<1.0	
Physical Tests (QCLot: 1248353)					
Solids, total suspended [TSS]	E160	3	mg/L	<3.0	
Anions and Nutrients (QCLot: 1244001)					
Nitrate (as N) 14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1244002)					
Nitrite (as N) 14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	
Anions and Nutrients (QCLot: 1244423)					
Nitrogen, total 7727-37-9	E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 1244424)					
Phosphorus, total 7723-14-0	E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1244425)					
Ammonia, total (as N) 7664-41-7	E298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1244426)					
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	<0.050	
Anions and Nutrients (QCLot: 1249276)					
Kjeldahl nitrogen, total [TKN]	E318	0.05	mg/L	<0.050	
Anions and Nutrients (QCLot: 1249277)					
Nitrogen, total 7727-37-9	E366	0.03	mg/L	<0.030	
Anions and Nutrients (QCLot: 1249278)					
Phosphorus, total 7723-14-0	E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1249279)					
Ammonia, total (as N) 7664-41-7	E298	0.005	mg/L	<0.0050	
Aggregate Organics (QCLot: 1243736)					
Biochemical oxygen demand [BOD]	E550	2	mg/L	<2.0	
Aggregate Organics (QCLot: 1243738)					
Carbonaceous biochemical oxygen demand [CBOD]	E555	2	mg/L	<2.0	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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 Co	ntrol Sample (LCS)	Report	
					Spike	Recovery (%)	Recovery	Limits (%)	
Analyte	CAS Number Meti	hod	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1244012)									
pH	E10	8		pH units	7 pH units	100	98.0	102	
Physical Tests (QCLot: 1244013)									
Conductivity	E100	0	1	μS/cm	146.9 μS/cm	98.5	90.0	110	
Physical Tests (QCLot: 1248353)									
Solids, total suspended [TSS]	E160	0	3	mg/L	150 mg/L	107	85.0	115	
Anions and Nutrients (QCLot: 1244001)									
Nitrate (as N)	14797-55-8 E23	5.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	
Anions and Nutrients (QCLot: 1244002)	44707.05.0 500		0.004				22.2	440	
Nitrite (as N)	14797-65-0 E23	5.NO2-L	0.001	mg/L	0.5 mg/L	99.9	90.0	110	
Anions and Nutrients (QCLot: 1244423)	7707 07 0 500		0.00				75.0	405	
Nitrogen, total	7727-37-9 E36	Ь	0.03	mg/L	0.5 mg/L	109	75.0	125	
Anions and Nutrients (QCLot: 1244424)	7700 44 0 507	0.11	0.000				00.0	400	
Phosphorus, total	7723-14-0 E37	2-0	0.002	mg/L	0.05 mg/L	90.8	80.0	120	
Anions and Nutrients (QCLot: 1244425)	7004 44 7 500		0.005				05.0	445	
Ammonia, total (as N)	7664-41-7 E29	8	0.005	mg/L	0.2 mg/L	97.4	85.0	115	
Anions and Nutrients (QCLot: 1244426)	E318	0	0.05			07.0	75.0	405	
Kjeldahl nitrogen, total [TKN]	E316	8	0.05	mg/L	4 mg/L	97.8	75.0	125	
Anions and Nutrients (QCLot: 1249276) Kjeldahl nitrogen, total [TKN]	E318	0	0.05	m a/l	4 0	00.0	75.0	125	
	E310	0	0.05	mg/L	4 mg/L	98.3	75.0	125	
Anions and Nutrients (QCLot: 1249277)	7727-37-9 E36	6	0.03	ma/l	0.5//	00.4	75.0	125	
Nitrogen, total	1121-31-9 E300	0	0.03	mg/L	0.5 mg/L	99.4	75.0	125	
Anions and Nutrients (QCLot: 1249278) Phosphorus, total	7723-14-0 E37	211	0.002	mg/L	0.05 mall	87.5	80.0	120	
	1123-14-0 231	2-0	0.002	IIIg/L	0.05 mg/L	07.5	00.0	120	
Anions and Nutrients (QCLot: 1249279) Ammonia, total (as N)	7664-41-7 E29	Q	0.005	mg/L	0.2 ma/l	95.9	85.0	115	
Animonia, total (as N)	7004-41-7 [230	0	0.005	mg/L	0.2 mg/L	95.9	03.0	115	
Annual Carrentes (OCI et 4040700)									
Aggregate Organics (QCLot: 1243736) Biochemical oxygen demand [BOD]	E550	0	2	mg/L	198 mg/L	94.3	85.0	115	
				J. –	.55 .11g/L	5 7.0			
Aggregate Organics (QCLot: 1243738) Carbonaceous biochemical oxygen demand [CBOD]	E55	5	2	mg/L	198 mg/L	97.3	85.0	115	
Salasasas biodioiniou oxygon domand [ODOD]	[200	-	-	9, =	130 mg/L	37.0	55.5		

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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						
					Spi	ke	Recovery (%)	Recovery	Limits (%)			
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier		
Anions and Nutri	ients (QCLot: 1244001)											
WR2301489-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	25.5 mg/L	25 mg/L	102	75.0	125			
Anions and Nutri	ients (QCLot: 1244002)											
WR2301489-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	5.03 mg/L	5 mg/L	101	75.0	125			
Anions and Nutri	ients (QCLot: 1244423)											
VA23C7267-004	Anonymous	Nitrogen, total	7727-37-9	E366	0.368 mg/L	0.4 mg/L	92.0	70.0	130			
Anions and Nutrients (QCLot: 1244424)												
VA23C7267-004	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0453 mg/L	0.05 mg/L	90.6	70.0	130			
Anions and Nutrients (QCLot: 1244425)												
VA23C7267-004	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0936 mg/L	0.1 mg/L	93.6	75.0	125			
Anions and Nutri	ients (QCLot: 1244426)											
VA23C7301-002	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	2.42 mg/L	2.5 mg/L	96.6	70.0	130			
Anions and Nutri	ients (QCLot: 1249276)											
VA23C7866-012	Anonymous	Kjeldahl nitrogen, total [TKN]		E318	2.51 mg/L	2.5 mg/L	100	70.0	130			
Anions and Nutri	ients (QCLot: 1249277)											
VA23C7867-001	F1	Nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130			
Anions and Nutri	ients (QCLot: 1249278)											
VA23C7793-017	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0452 mg/L	0.05 mg/L	90.4	70.0	130			
Anions and Nutri	ients (QCLot: 1249279)											
VA23C7793-017	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0913 mg/L	0.1 mg/L	91.3	75.0	125			

## ALS Environmental

### Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here

(lab use only)

COC Number: 17 -

age

of

#### .www.alsglobal.com Report To Contact and company name below will appear on the final report Report Format / Distribution Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply) Select Report Format: PDF EXCEL EDD (DIGITAL) Company: Regional District of Kitimat-Stikine Standard TAT if received by 3 pm - business days - no surcharges apply Regular IRI Contact: Nicole Lavoie 4 day [P4-20%] 1 Business day [E1 - 100%] 250-615-6100 Phone: Compare Results to Criteria on Report - provide details below if box checked 3 day [P3-25%] Same Day, Weekend or Statutory holiday [E2 -200% Company address below will appear on the final report 2 day [P2-50%] (Laboratory opening fees may apply) ] 4545 Lazelle Avenue Email 1 or Fax enviro.dept@rdks.bc.ca Date and Time Required for all E&P TATs: Street: Terrace/BC Email 2 ckerr@rdks.bc.ca; jkunjumon@rdks.bc.ca Dity/Province: or tests that can not be performed according to the service level selected, you will be contacted. Postal Code V8G4E1 Email 3 pmiller@rdks.bc.ca; jlacroix@rdks.bc.ca Analysis Request YES 🔲 NO Invoice To Same as Report To Invoice Distribution Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below detai Copy of Invoice with Report ✓ YES □ NO Select Invoice Distribution: 🗹 EMAIL 🔲 MAIL 🧻 FAX further Regional District of Kitimat-Stikine Company Email 1 or Fax anne-maries@rdks.bc.ca imetry 0.002 mg Colourimetry 0.03mg/L) Contact: Nicole Lavoie enviro.dept@rdks.bc.ca Email 2 Sample is hazardous (please provide **Project Information** Oil and Gas Required Fields (client use) ALS Account # / Quote # VA22-RDKS100-001 AFE/Cost Center: PO# Job #: Queensway Sewer Major/Minor Code: Routing Code: PO / AFE: Requisitioner: SAMPLES ON HOLD LSD: Location: otal Nitrogen (by ALS Lab Work Order # (iab use only): ALS Contact: Sampler: (5 ALS Sample # Sample Identification and/or Coordinates Date Time õ Sample Type Ϋ́ (lab use only) (This description will appear on the report) (dd-mmm-yy) (hh:mm) F1 17-Nov-23 10:40 Water R R R R R R R R R R DUP 17-Nov-23 12:00 Water R R R R Environmental Division Vancouver Terrace Shipping Work Order Reference Ground VA23C7867 Coolers Carboys SFX Telephone: + 1,604 253 4188 CONDITION AS RECEIVED (lab use only) Special instructions / Specify Criteria to add on report by clicking on the drop-d Drinking Water (DW) Samples<sup>1</sup> (client use) (electronic GOC only) SIF Observations No Are samples taken from a Regulated DW System? Federal Wastewater Systems Effluent Regulations (JUN, 2012) Yes Nο YES V NO Cooling Initiated Are samples for human consumption/ use? Queensway Sewer Custom Criteria for RDKS INITIAL COOLER TEMPERATURES °C FINAL COOLER TEMPERATURES °C 6.6 6.8 T YES I NO 2'C 12:50 ice PK Rovd jr 18Nov23 SHIPMENT RELEASE (client use) INITIAL SHIPMENT RECEPTION (Jab use only) FINA Released by: Received by: Received by: Manio WHITE - LABORATORY COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - rep

1. If any water samples are taken from a Regulated Drinking Water (DW). System, please submit using an Authorized DW COC form.

#### **ALS Canada Ltd.**

Address



#### **CERTIFICATE OF ANALYSIS**

: 1 of 3

: 21-Dec-2023

**Work Order** : VA23D0582 Page

Client Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

**Account Manager** Contact : Nicole Lavoie : Amber Springer

: # 300 - 4545 Lazelle Avenue Address : 8081 Lougheed Highway

> Terrace BC Canada V8G 4E1 Burnaby BC Canada V5A 1W9

> > **Date Analysis Commenced**

Telephone Telephone : +1 604 253 4188

**Project** Date Samples Received : Queensway Sewer : 20-Dec-2023 12:55 PO

C-O-C number Issue Date : 29-Dec-2023 09:39

Sampler Site

Quote number : VA22-RDKS100-001

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
Leon Yang	Analyst	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

Page : 2 of 3

Work Order : VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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
μS/cm	microsiemens per centimetre
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.

Page : 3 of 3 Work Order : VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### Analytical Results

Sub-Matrix: Water			Cli	ent sample ID	F1	Travel blank	 	
(Matrix: Water)								
			Client samp	ling date / time	19-Dec-2023 11:45	19-Dec-2023 00:00	 	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23D0582-001	VA23D0582-002	 	
					Result	Result	 	
Physical Tests								
Conductivity		E100/VA	2.0	μS/cm	604	<2.0	 	
рН		E108/VA	0.10	pH units	7.98	5.55	 	
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	5.8	<3.0	 	
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	33.7	<0.0050	 	
Kjeldahl nitrogen, total [TKN]		E318/VA	0.050	mg/L	34.2	<0.050	 	
Nitrate (as N)	14797-55-8	E235.NO3-L/V	0.0050	mg/L	0.490	<0.0050	 	
Nitrite (as N)	14797-65-0	A E235.NO2-L/V A	0.0010	mg/L	0.0720	<0.0010	 	
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	36.4	<0.030	 	
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	5.40	<0.0020	 	
Aggregate Organics								
Biochemical oxygen demand [BOD]		E550/VA	2.0	mg/L	30.1	<2.0	 	
Carbonaceous biochemical oxygen demand [CBOD]		E555/VA	2.0	mg/L	7.3	<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** : **VA23D0582** Page : 1 of 9

Client : Regional District of Kitimat-Stikine Laboratory : ALS Environmental - Vancouver

Contact : Nicole Lavoie Account Manager : Amber Springer

Address :# 300 - 4545 Lazelle Avenue Address :8081 Lougheed Highway

Terrace BC Canada V8G 4E1 Burnaby, British Columbia Canada V5A 1W9

 Telephone
 :--- Telephone
 : +1 604 253 4188

 Project
 : Queensway Sewer
 Date Samples Received
 : 20-Dec-2023 12:55

PO : ---- Issue Date : 29-Dec-2023 09:39 C-O-C number : ---- Sampler ----

Quote number : VA22-RDKS100-001

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

Site

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**

#### Juniers . Quanty Control Sample

- 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.

Page : 3 of 9 Work Order : VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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					Ev	/aluation: <b>≭</b> =	Holding time excee	edance ; •	✓ = Within	Holding Time
Analyte Group : Analytical Method	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
F1	E550	19-Dec-2023					22-Dec-2023	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day					1					
HDPE [BOD HT 3d] Travel blank	E550	19-Dec-2023					00 D 0000	0 4-11-	0 4	1
Travel diank	E350	19-Dec-2023					22-Dec-2023	3 days	3 days	•
A second control of the control of t										
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day HDPE [BOD HT 3d]							 			
F1	E555	19-Dec-2023					22-Dec-2023	3 days	3 days	<b>√</b>
									o aayo	
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d]							I			
Travel blank	E555	19-Dec-2023					22-Dec-2023	3 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
F1	E298	19-Dec-2023	22-Dec-2023	28	3 days	✓	25-Dec-2023	28 days	6 days	✓
				days						
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved)	F000	40 D 0000	00.0	0.1	0.1		05 D 0000	00.1	0.1	
Travel blank	E298	19-Dec-2023	22-Dec-2023	3 days	3 days	✓	25-Dec-2023	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)									I	
HDPE Travel blank	E235.NO3-L	19-Dec-2023	22-Dec-2023	3 days	2 days	<b>√</b>	22-Dec-2023	3 days	2 days	1
Travoi Mariit		10 200-2020	22-000-2020	o days	2 days		22-200-2020	o days	2 days	, ,
	I	1								

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Work Order : VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

Analyte Group : Analytical Method	Method	Sampling Date	Fy	traction / Pr			riolaring time excel	Analys		
Container / Client Sample ID(s)	Wethou	Sampling Date			g Times	Eval	Analysis Date	Holding		Eval
Container / Charle Cample 15(c)			Preparation Date	Rec	Actual	Lvai	Analysis Date	Rec	Actual	Lvai
Anions and Nutrients : Nitrate in Water by IC (Low Level)			Date	7.00	7.00.0.			7.00	710100	
HDPE										
F1	E235.NO3-L	19-Dec-2023	22-Dec-2023	3 days	3 days	✓	22-Dec-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Travel blank	E235.NO2-L	19-Dec-2023	22-Dec-2023	3 days	2 days	✓	22-Dec-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
F1	E235.NO2-L	19-Dec-2023	22-Dec-2023	3 days	3 days	✓	22-Dec-2023	3 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
F1	E318	19-Dec-2023	22-Dec-2023	28	3 days	✓	23-Dec-2023	28 days	4 days	✓
				days						
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (lab preserved)	5040	40.5	00 D 0000			,	00 5 0000	00.1		,
Travel blank	E318	19-Dec-2023	22-Dec-2023	3 days	3 days	✓	23-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry					ı					
Amber glass total (sulfuric acid)	E366	19-Dec-2023	22 Dec 2022	00	2 days	<b>√</b>	23-Dec-2023	28 days	1 days	✓
F1	E300	19-Dec-2023	22-Dec-2023	28	3 days	•	23-Dec-2023	20 days	4 days	•
				days						
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved)  Travel blank	E366	19-Dec-2023	22-Dec-2023	3 days	3 days	✓	23-Dec-2023	28 days	1 dave	✓
Havel blatik	L300	19-Dec-2023	22-Dec-2023	Juays	Juays	,	25-Dec-2025	20 days	1 days	•
Asiana and Nationa a Tatal Pharabana ha Calamina to 70 000 H										
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)  Amber glass total (sulfuric acid)							I			
F1	E372-U	19-Dec-2023	22-Dec-2023	28	3 days	<b>√</b>	28-Dec-2023	28 days	9 davs	✓
		.0 200 2020		days			20 200 2020		2 22,0	*
Anione and Nutrianta - Total Phaenharus by Colourimetry (0.992 mg/l)										
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)  Amber glass total (lab preserved)										
Travel blank	E372-U	19-Dec-2023	22-Dec-2023	3 days	3 days	1	28-Dec-2023	28 days	6 davs	✓
			<b> </b>	,-	, 0			,-	, 0	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



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

										r riolaling Till
Analyte Group : Analytical Method	Method	Sampling Date	Ext	raction / P	reparation		Analysis		sis	
Container / Client Sample ID(s)			Preparation	Holdin	g Times	Eval	Analysis Date Holding Tin		g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Physical Tests : Conductivity in Water										
HDPE										
Travel blank	E100	19-Dec-2023	22-Dec-2023	28	2 days	✓	22-Dec-2023	28 days	3 days	✓
				days						
Physical Tests : Conductivity in Water										
HDPE										
F1	E100	19-Dec-2023	22-Dec-2023	28	3 days	✓	22-Dec-2023	28 days	3 days	✓
				days						
Physical Tests : pH by Meter										
HDPE										
Travel blank	E108	19-Dec-2023	22-Dec-2023	0.25	59 hrs	*	22-Dec-2023	0.25	62 hrs	JC JC
				hrs		EHTR-FM		hrs		EHTR-FM
Physical Tests : pH by Meter										
HDPE										
F1	E108	19-Dec-2023	22-Dec-2023	0.25	62 hrs	*	22-Dec-2023	0.25	66 hrs	*
				hrs		EHTR-FM		hrs		EHTR-FM
Physical Tests : TSS by Gravimetry										
HDPE										
F1	E160	19-Dec-2023					21-Dec-2023	7 days	2 days	✓
Physical Tests : TSS by Gravimetry								1		1
HDPE										
Travel blank	E160	19-Dec-2023					21-Dec-2023	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).

Page : 6 of 9 Work Order : VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



### **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.

Quality Control Sample Type			C	ount	Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1286886	1	18	5.5	5.0	1
Biochemical Oxygen Demand - 5 day	E550	1287114	1	5	20.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1287291	1	8	12.5	5.0	✓
Conductivity in Water	E100	1286393	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1286380	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1286383	1	17	5.8	5.0	✓
pH by Meter	E108	1286392	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1286887	1	7	14.2	5.0	✓
Total Nitrogen by Colourimetry	E366	1286891	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1286885	1	11	9.0	5.0	✓
TSS by Gravimetry	E160	1285904	1	10	10.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1286886	1	18	5.5	5.0	1
Biochemical Oxygen Demand - 5 day	E550	1287114	1	5	20.0	5.0	1
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1287291	1	8	12.5	5.0	1
Conductivity in Water	E100	1286393	1	16	6.2	5.0	1
Nitrate in Water by IC (Low Level)	E235.NO3-L	1286380	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1286383	1	17	5.8	5.0	1
pH by Meter	E108	1286392	1	14	7.1	5.0	1
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1286887	1	7	14.2	5.0	✓
Total Nitrogen by Colourimetry	E366	1286891	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1286885	1	11	9.0	5.0	✓
TSS by Gravimetry	E160	1285904	1	10	10.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1286886	1	18	5.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	1287114	1	5	20.0	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1287291	1	8	12.5	5.0	✓
Conductivity in Water	E100	1286393	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1286380	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1286383	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1286887	1	7	14.2	5.0	✓
Total Nitrogen by Colourimetry	E366	1286891	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1286885	1	11	9.0	5.0	✓
TSS by Gravimetry	E160	1285904	1	10	10.0	5.0	1

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 :
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 Work Order
 :
 VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Matrix: Water	ency outside spe	ecification; ✓ = 0	QC frequency wit	hin specification.			
Quality Control Sample Type					Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Matrix Spikes (MS) - Continued							
Ammonia by Fluorescence	E298	1286886	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1286380	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1286383	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1286887	1	7	14.2	5.0	✓
Total Nitrogen by Colourimetry	E366	1286891	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1286885	1	11	9.0	5.0	✓

Page : 8 of 9
Work Order : VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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
Conductivity in Water	E100	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water
	ALS Environmental -			sample. Conductivity measurements are temperature-compensated to 25°C.
	Vancouver			
pH by Meter	E108	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,
	ALS Environmental -			pH should be measured in the field within the recommended 15 minute hold time.
	Vancouver			
TSS by Gravimetry	E160	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
	ALS Environmental -			filtered solids. Samples containing very high dissolved solid content (i.e. seawaters,
	Vancouver			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	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	ALS Environmental -			
	Vancouver			
Nitrate in Water by IC (Low Level)	E235.NO3-L	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
	ALS Environmental -			
	Vancouver			
Ammonia by Fluorescence	E298	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).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021)
	Vancouver			
Total Kjeldahl Nitrogen by Fluorescence (Low	E318	Water	Method Fialab 100,	TKN in water is determined by automated continuous flow analysis with membrane
Level)			2018	diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde).
	ALS Environmental -			This method is approved under US EPA 40 CFR Part 136 (May 2021).
	Vancouver			
Total Nitrogen by Colourimetry	E366	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is
	ALS Environmental -			approved under US EPA 40 CFR Part 136 (May 2021).
	Vancouver			
Total Phosphorus by Colourimetry (0.002	E372-U	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated
mg/L)				persulfate digestion of the sample.
	ALS Environmental -			
	Vancouver			

 Page
 :
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 Work Order
 :
 VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Biochemical Oxygen Demand - 5 day	E550  ALS Environmental -	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.
	Vancouver			Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	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. Nitrification inhibitor is added to
	ALS Environmental - Vancouver			samples to prevent nitrogenous compounds from consuming oxygen resulting in only carbonaceous oxygen demand being reported by this method.
				Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
	ALS Environmental - Vancouver			
Digestion for TKN in water	EP318  ALS Environmental -  Vancouver	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Digestion for Total Nitrogen in water	EP366  ALS Environmental -  Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
	ALS Environmental - Vancouver			

#### **ALS Canada Ltd.**



#### **QUALITY CONTROL REPORT**

Work Order :VA23D0582

Client : Regional District of Kitimat-Stikine

Contact : Nicole Lavoie

Address :# 300 - 4545 Lazelle Avenue

Terrace BC Canada V8G 4E1

Telephone

Project : Queensway Sewer

PO :--C-O-C number :--Sampler :---

Site · ----

Quote number : VA22-RDKS100-001

No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 6

Laboratory ; ALS Environmental - Vancouver

Account Manager : Amber Springer

Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

 Telephone
 : +1 604 253 4188

 Date Samples Received
 : 20-Dec-2023 12:55

 Date Analysis Commenced
 : 21-Dec-2023

Issue Date : 29-Dec-2023 09:39

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
Leon Yang	Analyst	Vancouver Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

Page : 2 of 6
Work Order : VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### **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.

Page : 3 of 6 Work Order : VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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: 1285904)										
VA23D0511-009	Anonymous	Solids, total suspended [TSS]		E160	3.0	mg/L	125	132	5.14%	20%	
Physical Tests (QC	Lot: 1286392)										
VA23D0556-001	Anonymous	pН		E108	0.10	pH units	8.26	8.25	0.121%	4%	
Physical Tests (QC	Lot: 1286393)										
VA23D0556-001	Anonymous	Conductivity		E100	1.0	μS/cm	422	421	0.237%	10%	
Anions and Nutrien	ts (QC Lot: 1286380)										
VA23D0556-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	
Anions and Nutrien	ts (QC Lot: 1286383)										
VA23D0556-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0046	0.0049	0.0003	Diff <2x LOR	
Anions and Nutrien	ts (QC Lot: 1286885)										
VA23D0674-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0021	<0.0020	0.0001	Diff <2x LOR	
Anions and Nutrien	ts (QC Lot: 1286886)										
VA23D0650-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.100	mg/L	5.65	5.61	0.755%	20%	
Anions and Nutrien	ts (QC Lot: 1286887)										
VA23D0582-001	F1	Kjeldahl nitrogen, total [TKN]		E318	0.500	mg/L	34.2	33.8	1.31%	20%	
Anions and Nutrien	ts (QC Lot: 1286891)										
VA23D0297-001	Anonymous	Nitrogen, total	7727-37-9	E366	1.50	mg/L	43.0	44.8	4.09%	20%	
Aggregate Organic	s (QC Lot: 1287114)										
VA23D0666-003	Anonymous	Biochemical oxygen demand [BOD]		E550	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	
Aggregate Organic	s (QC Lot: 1287291)										
KS2304883-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]		E555	2.0	mg/L	<2.0	<2.0	0.0%	30%	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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: 1285904)						
Solids, total suspended [TSS]		E160	3	mg/L	<3.0	
Physical Tests (QCLot: 1286393)						
Conductivity		E100	1	μS/cm	1.1	
Anions and Nutrients (QCLot: 1286380)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1286383)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	
Anions and Nutrients (QCLot: 1286885)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	
Anions and Nutrients (QCLot: 1286886)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	
Anions and Nutrients (QCLot: 1286887)						
Kjeldahl nitrogen, total [TKN]		E318	0.05	mg/L	<0.050	
Anions and Nutrients (QCLot: 1286891)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	
Aggregate Organics (QCLot: 1287114)						
Biochemical oxygen demand [BOD]		E550	2	mg/L	<2.0	
Aggregate Organics (QCLot: 1287291)					·	
Carbonaceous biochemical oxygen demand [CBOD]		E555	2	mg/L	<2.0	

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Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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: 1285904)										
Solids, total suspended [TSS]		E160	3	mg/L	150 mg/L	91.3	85.0	115		
Physical Tests (QCLot: 1286392)										
рН		E108		pH units	7 pH units	100	98.0	102		
Physical Tests (QCLot: 1286393)										
Conductivity		E100	1	μS/cm	146.9 μS/cm	101	90.0	110		
Anions and Nutrients (QCLot: 1286380)	44707.55.0	Eggs NOO I	0.005		"		00.0	440	1	
Nitrate (as N)	14/9/-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110		
Anions and Nutrients (QCLot: 1286383)	14777.05.0	5005 NO. 1	0.004						1	
Nitrite (as N)	14/9/-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	103	90.0	110		
Anions and Nutrients (QCLot: 1286885)	7700 44 0	E070 II	0.000				00.0	100	1	
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	98.3	80.0	120		
Anions and Nutrients (QCLot: 1286886)	7004 44 7	E000	0.005				05.0	445	1	
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115		
Anions and Nutrients (QCLot: 1286887)		E0.40	0.05						1	
Kjeldahl nitrogen, total [TKN]		E318	0.05	mg/L	4 mg/L	92.1	75.0	125		
Anions and Nutrients (QCLot: 1286891)										
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	106	75.0	125		
Aggregate Organics (QCLot: 1287114) Biochemical oxygen demand [BOD]		E550	2	mg/L	198 mg/L	102	85.0	115		
		2000		mg/L	190 Hig/L	102	00.0	110		
Aggregate Organics (QCLot: 1287291)	<u></u>	E555	2	mg/L	198 mg/L	103	85.0	115		
Carbonaceous biochemical oxygen demand [CBOD]		2000	_	IIIg/L	190 HIG/L	103	00.0	113		

Page : 6 of 6 Work Order : VA23D0582

Client : Regional District of Kitimat-Stikine

Project : Queensway Sewer



#### 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												
					Spi	ke	Recovery (%)	Recovery	Limits (%)					
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier				
Anions and Nutrients (QCLot: 1286380)														
VA23D0556-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	13.1 mg/L	12.5 mg/L	105	75.0	125					
Anions and Nutri	ents (QCLot: 1286383)													
VA23D0556-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.72 mg/L	2.5 mg/L	109	75.0	125					
<b>Anions and Nutri</b>	Anions and Nutrients (QCLot: 1286885)													
VA23D0674-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0488 mg/L	0.05 mg/L	97.6	70.0	130					
Anions and Nutri	ents (QCLot: 1286886)													
VA23D0650-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125					
<b>Anions and Nutri</b>	ents (QCLot: 1286887)													
VA23D0582-002	Travel blank	Kjeldahl nitrogen, total [TKN]		E318	2.18 mg/L	2.5 mg/L	87.2	70.0	130					
Anions and Nutri	ents (QCLot: 1286891)													
VA23D0488-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.387 mg/L	0.4 mg/L	96.7	70.0	130					

#### Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

#### Affix ALS barcode label here

(lab use only)

COC Number: 17

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**Table 5: Sample Lab Chemistry and Field Collected Data** 

			TSS			l	.aboratory	/ Chemistr	у						Field Collected Data				
Date (2023)	Sample Type	TSS mg/L	(WSER) mg/L	<b>CBOD</b> ₅ mg/L	<b>BOD</b> ₅ mg/L	<b>SPC</b> μS/cm	<b>TKN</b> mg/L	<b>NH₃</b> mg/L	<b>NO₃</b> mg/L	<b>NO₂</b> mg/L	<b>N-Total</b> mg/L	pH -	<b>P-Total</b> mg/L	<b>DO</b> mg/L	<b>SPC</b> μS/cm	pH -	<b>Temp</b> °C		
Jan-16	Grab	6.9	6.9	6.7	8.4	NC	NC	38.9	NC	NC	39.6	8.03	5.35	2.5	NC	NC	3.9		
Feb-13	Grab	4.6	4.6	7.5	7.4	NC	NC	31.9	NC	NC	32.6	8.18	4.05	7.4	NC	NC	1.9		
Mar-13	Grab	10.9	10.9	8	8.2	NC	NC	30.9	NC	NC	35.8	8.15	4.07	3.7	NC	NC	4.7		
Apr-11	Grab	5.8	5.8	9.3	14.7	NC	NC	30.8	NC	NC	31.6	8.1	4.25	7.5	NC	NC	8.1		
May-31	None	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC		
Jun-14	Grab	70.1	70.1	33.1	76.5	379	12.1	6.42	0.432	15.2	26.3	7.48	4.2	0.15	417.6	NC	19.1		
Jun-14*	Dup	78.8	78.8	34.3	79.7	378	13.1	6.56	0.433	15.2	25.9	6.99	4.16	NC	NC	NC	NC		
Jun-28	Grab	45.8	45.8	16.2	105	355	7.85	0.895	3.16	4	11.6	8.48	3.98	1.9	NC	6.43	20.4		
Jun-28	Dup	46.2	46.2	16.5	98.4	358	7.27	0.921	1.22	5.59	11.3	8.28	4.09	NC	NC	NC	NC		
Jul-12	Grab	63.8	OMIT	15.2	85.2	350	6.39	1.87	0.0455	0.944	9.61	7.93	4.43	0.14	NC	6.87	19.9		
Aug-15	Grab	22.9	22.9	11.7	50.4	474	16.3	12.9	0.005	0.001	16.2	7.2	5.29	0.13	464.7	6.88	17.9		
Sep-19	Grab	23.5	23.5	14	119	546	26.9	23.8	0.0207	0.0719	27	7.95	5.86	0.07	563	7.02	13.5		
Oct-12	Grab	37	OMIT	21.5	163	572	29.7	29.6	0.0812	0.427	29	7.7	5.64	2.01	586	7.21	13.6		
Nov-17	Grab	8	8	6.1	66.3	613	35.6	32.3	0.186	0.634	36.7	8.08	5.27	6.42	628	7.33	4.7		
Nov-17	Dup	9.2	9.2	5.9	60.1	615	35.8	34.3	0.184	0.637	37.9	8.09	5.61	NC	NC	NC	NC		
Dec-19	Grab	5.8	5.8	7.3	30.1	604	34.2	33.7	0.49	0.072	36.4	7.98	5.4	8.98	643	7.9	3.6		
	Average	29.3	26.0	14.2	64.8	476.7	20.5	21.1	0.6	3.9	27.2	7.9	4.8	3.4	550.4	7.1	10.9		

\*Extra Sample Collected in June

TSS = Total Suspended Solids

SPC = Specific Conductance

TKN = Total Kjeldahl Nitrogen

NO3 = Nitrate

CBOD5 = Carbonaceous Biochemical Oxygen Demand

BOD5 = Biochemical Oxygen Demand

NH3 = Ammonia as Total Nitrogen

N02 = Nitrite

P-Total = Total Phosphorous

NH3 = Ammonia (as total N)

N-Total = Total Nitrogen

DO = Dissolved Oxygen

Exceedance to the MWR

**Exceedance to the WSER** 

