Quinsam Coal
Annual Water Quality Monitoring Report 2018-2019

PREPARED BY: QUINSAM COAL CORPORATION

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GLOSSARY & ACRONYMS

B.C. British Columbia

CALA Calibration

CCR Coarse Coal Reject

COPC Contaminants of Potential Concern

CSR-AL B.C. Contaminated Sites Regulations for Aquatic Life 2019

DL Detection Limit

DO Dissolved Oxygen

ENV Ministry of Environment and Climate Change Strategy

EMS Environmental Monitoring Station

MEMPR Ministry of Energy, Mines and Petroleum Resources

EPT Ephemeroptera, Plecoptera, and Trichoptera

Ha Hectares

Hp Horsepower

IDZ Initial Dilution Zone

km Kilometer

LLE Long Lake Entry

LLSPTS Long Lake Seep Passive Treatment System

Masl Metres above sea level

MDL Mean Detection Limit

MOE Ministry of Environment

PAG Potentially Acid Generating

PAH Polyromantic Hydrocarbons

PEP Provincial Emergency Program

PNC Permit Non-compliance

QA/QC Quality Assurance/Quality Control

QCC Quinsam Coal Corporation

RPD Relative Percent Difference

TDS Total Dissolved Solids

TSS Total Suspended Solids

VIO Vancouver Island Objective for Phosphorus in Streams

WQG British Columbia Ambient Water Quality Guidelines for Protection of Aquatic Life

WQO Water Quality Objectives for Middle Quinsam Lake Sub-Basin

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EXECUTIVE SUMMARY

In accordance with Effluent Permit PE-7008 issued under the *Environmental Management Act*, Quinsam Coal Corporation (QCC) operates water management systems designed to mitigate effects of mining activities on the Middle Quinsam Sub-Basin and Iron River watershed(s). This effluent permit provides the framework for the comprehensive monitoring program along with allowable levels of Parameters of Interest (POI) within water released from the permitted management systems. In addition to surface water quality monitoring within management systems and receiving environments, local groundwater and biological monitoring was conducted at numerous stations for a more comprehensive understanding of effects within the mine footprint.

In 2018 - 2019 the mine has produced coal from the 2-North and 7-South mines. Drilling and blasting through the Long Lake fault zone for access to 7-South Area 5 coal occurred between July 2018 through January 2019. Development work with some coal production from 7-South Area 5 began in February 2019.

The main objective of this report is to inform governing bodies and stakeholders on the effectiveness of the management systems and compliance with the effluent permit for the 2018-2019 monitoring year including:

- Description of mine-site operations and their respective environmental management systems
- Report on environmental performance along with compliance with the Effluent Permit PE-7008
- Provide updates on surface, groundwater and receiving environment water including biological integrity
- Provide insight and recommendations for future monitoring and best environmental practices

Mine discharges released from permitted locations were within allowable levels for the majority of samples obtained this monitoring period. A permit limit exceedance observed for total suspended solids (25 mg/L) occurred at Settling Pond #4, EMS # E207409 on February 1st, 2019 resulting in 28 mg/L. The exceedance was thought to be attributed to freezing conditions at the site, spill report number DGIR 184299.

The permissible annual average rate of discharge at Setting Pond #4 (0.08 m^3/s) was exceeded with an annual average discharge rate of 0.1203 m^3/s. The decant riser was cleared of some build-up by Roto-Rotter in July 2018. In 2018 - 2019 flows remained elevated above the authorized annual average rate of discharge but were reduced by 15.4 % compared to 2017-2018.

The spill reports can be found in Appendix VII including description of the spill, follow up and mitigative techniques.

Numerous water quality guideline (WQG) exceedances across the receiving environment were observed this monitoring year. Majority of the exceedances were anomalous and inconsistent, not thought to be attributed to any point source discharges from the mine. Parameters that were observed to be elevated include concentrations of dissolved aluminum, total arsenic, total copper, both total and dissolved iron, dissolved sulphate and total suspended solids. Slightly acidic water quality was observed mostly in No Name Lake with pH values reported below WQG's of 6.5.

Sulphate concentrations at depth in Long Lake have continued to be a focal point for receiving environment water quality as elevated levels have persisted throughout past monitoring. In 2018, average concentrations at 9 metre during spring and summer and 1 metre from bottom during spring, summer and fall were above WQG's of 128 mg/L using a background hardness concentration of 30 mg/L. In Middle Quinsam Lake sulphate remained well below average WQG's.

Hypolimnetic dissolved oxygen was not observed in Long Lake. As a result, total manganese was not elevated above guidelines. In Lower Quinsam Lake hypolimnetic D.O. occurred during summer and fall resulting in elevated total and dissolved iron at 1mb.

The Long Lake Seep Passive Treatment System has been effective at reducing sulphate concentrations from mine pool water pumped to surface however; it has been difficult to determine whether this system has a positive effect with respect to sulphate concentrations within Long Lake and seep discharge. In January 2018, the treatment system pump failed, and the treatment system did not operate until August and began discharging in September. The system has been operating intermittently since then with some system interruptions such as frozen values that required the system to be shut down until it was repaired. The treatment system has been discharging to 2-South pit, and flows (when discharge is occurring from 2-South) to 3-South pit where it is pumped to Settling Pond #1 in the fall and winter or back up to 2S in the summer. This aids in maintaining a water cover over 2S PAG-CCR and reduces the need to discharge to the receiving environment

from Settling Pond #1 during the dry season. This system ensures all mine related discharge water is released through the authorized works where permit limits are maintained.

Groundwater monitoring provides an understanding of cumulative mine related effluence on groundwater. Parameters of interest are compared to source terms derived for mine water within the mine footprint (in-situ) and B.C. Contaminated Sites Regulations for Aquatic Life (CSR-AL) are used to compare groundwater quality outside of the mine footprint (ex-situ). Arsenic iron, manganese, sulphate and sulphide are key parameters to monitor as they directly related to coal mining operations at Quinsam Coal. Currently, no inputs are known to have significant detrimental effects on receiving environments, but future monitoring will be an effective tool to identify and determine changes in the groundwater and observe long term trends.

1.0 INTRODUCTION

The Quinsam Mine is located in the Quinsam River Watershed, approximately 28 kilometers (km) by road southwest of Campbell River. The land reserved by the Quinsam mining operation consists of approximately 283 hectares (ha) and is owned and operated by Quinsam Coal Corporation (QCC). Active mining operations with coal production occurred from both 2-North and 7-South mining areas has been ongoing for 2018-2019.

The Quinsam Mine produces High Volatile “A” Bituminous thermal coal. Coal is processed at an onsite preparation plant, transported by B-train highway trucks to the Middle Point Barge Terminal north of Campbell River. Coal is then shipped via barge, to local customers and to Texada Island where it is then loaded onto a ship and sent to local companies or exported abroad.

Due to the mine’s location, adjacent to Middle Quinsam Lake, the Quinsam River, No Name Lake, and Long Lake, which drain into Lower Quinsam Lake, the operational permits issued by the Ministry of Environment (MOE) and Climate Change Strategy (ENV) as well as the Ministry of Energy, Mines and Petroleum Resources (EMPR) established stringent effluent quality standards. Accordingly, QCC has maintained an environmental management system defined by the requirements of Effluent Permit PE-7008 and defined in the C-172 Mines Act permit. The mine has collaborated with regulators and stakeholders on key management aspects to minimize mine related effects in the receiving environment.

Sulphate concentrations in surface waters of the receiving environment (e.g. Long Lake) continued to be a focus for the QCC monitoring program. Although PE-7008 lists only one sulphate limit for effluent (500 mg/L at 7SSD), sulphate is routinely monitored at designated sites on the mine site and in the receiving environment. Quinsam continues to assess sources of sulphate and management options to mitigate concentrations in mine related discharge(s).

On-Site Water Quality and Activities

The North, South, and 7-South water management systems represent the cumulative mine related discharges to the Quinsam watershed. As such, strategic operation of management structures is designed for discharge waters to meet permit requirements and be of suitable quality for discharge into the receiving environment. Permit limits for parameters of interest have been established and are closely monitored to ensure environmental protection.

Bioassays

Rainbow Trout 96-hour bioassays were performed on water collected from Settling Ponds #1 (at BDS) and Settling Pond #4 and 7SSD. Each of these tests passed with 100% survival rates.

Receiving Water Quality

Water quality attainment in the Middle Quinsam Sub-Basin remains a key management objective at QCC. Comparison to provincial WQGs and Middle Quinsam Sub-Basin water quality objectives (WQOs) is used to evaluate receiving water quality, aquatic health, and overall operational performance.

Monitoring sulphate concentrations continues to act as an essential practice to evaluate mine impacts as it is a key parameter traced back to coal mining. Sulphate concentrations are compared to an average WQG of 128 mg/L, are calculated using a background hardness of 30 mg/L for the Middle Quinsam Sub-Basin. Sulphate results averaged over five weekly samples collected over 30 days (5 in 30) were compared to the WQG. Other parameters of interest for the receiving environment are total arsenic, copper, iron, manganese, and zinc and dissolved iron and aluminum. Elevated dissolved aluminum and total copper, and zinc concentrations are associated with high rainfall events (elevated TSS) and may not be associated with mine related discharges; however, elevated concentrations are considered in the context of aquatic effects. Monitoring at sites upstream of mine influences (e.g., IR1 in the Iron River) indicates naturally elevated concentrations of dissolved aluminum during high flow events. These metals and other parameters that are higher than WQGs or WQOs are discussed below. Total phosphorous concentrations are compared to the Vancouver Island Objective (VIO) for streams (a maximum of 0.01 mg/L and average of 0.005 mg/L.

Groundwater Quality

QCC maintains a comprehensive groundwater monitoring program to characterize water quality associated with mining development. There numerous groundwater wells including underground sumps located in-situ (disturbance footprint) and ex-situ (outside of mine workings) that are monitored. In the absence of groundwater well samples, underground sump samples are used for comparison. Results for ex-situ wells are compared to Contaminated Sites Regulations for Protection of Aquatic Life (CSR-AL) and those for in-situ wells and sumps are compared to source terms derived for particular mining areas. Groundwater quality is influenced by bedrock chemistry,

an example being the presence of realgar (arsenic sulphide) in the Dunsmuir Sandstone overlying the No. 4 coal zone, resulting in dissolved arsenic in the south area groundwater being naturally higher than the CSR-AL. Parameters of interest for groundwater are those with concentrations higher than the CSR-AL: arsenic, chloride, fluoride, sulphide as (H_2S) and sulphate. Overall, in-situ groundwater at Quinsam Coal is generally within the water quality prediction scenarios and ex-situ groundwater typically trends below most CSR-AL. Two exceptions to this, is groundwater influenced by host geological formations (e.g. Dunsmuir Member sandstones, Cumberland Member No.1 Coal seam and mudstones) with naturally elevated concentrations of parameters of interest and by weathering processes (i.e. mine wall oxidation and flushing) of disturbed materials within the mine footprint.

Receiving Water Sediment and Biota

QCC conducted a comprehensive biological monitoring program in 2016, as stipulated in Section 4.2.4 and 4.2.7 of the effluent permit. The August through October program involved sediment and benthic invertebrate monitoring at 23 locations in the watershed (at five lakes, one wetland, and three locations on the Quinsam River). In the four lakes exposed to mine influences, samples were collected at inlets, deep sites, seeps, and outlets.

Sediment results were compared to generic Canadian Council of Ministers of Environment (CCME) Interim Sediment Quality Guidelines (ISQG) and Probable Effect Levels (PEL) and to site-specific sediment quality objectives (SQOs) developed for Long Lake that reflect the naturally elevated background levels of some metals. The SQOs were derived from studies completed prior to mining influence in Long Lake (pre-1987). Where background levels are lower than ISQG's, the ISQGs are used for comparison. Primary parameters of interest for sediment are arsenic, iron, manganese and total polycyclic aromatic hydrocarbons (PAH), identified based on concentrations, relative toxicity, and findings in previous reports. Most of the elevated concentrations are related to geology (host rock formations), although mining has contributed inputs. The next round of sediment sampling is scheduled for 2020-2021.

Water quality in the Middle Quinsam Sub-Basin and Iron River largely meets WQGs and WQOs and is considered a healthy aquatic ecosystem. Throughout the monitoring period, Quinsam has demonstrated that mine water management system(s) and procedure(s) are an effective tool in reducing parameters of interest loading in the receiving environment.

Benthic invertebrate samples from lakes and the wetland were analyzed for community metrics (density, taxon richness, diversity, evenness, major taxonomic groups), and for ecologically relevant and statistically significant differences among sites. Quinsam River sites were sampled and analyzed using the Canadian Aquatic Biomonitoring Network (CABIN) method.

Phytoplankton and zooplankton samples collected once per sampling event on all four lakes as a routine requirement of PE-7008s. Samples were analyzed for count, identification and species abundance.

Long Lake Seep Passive Treatment System-

The Long Lake Seep Passive Treatment System (LLSPTS) consists of a series of treatment cells designed to receive mine-water pumped from the 2-South underground workings to reduce Parameters of Interest (POI) concentrations including dissolved sulphate and iron. This system was initiated as part of a remediation plan to limit localized mine-water seepage on the south-side of Long Lake as a result of subsidence caused by mining within close proximity and establishing an evident hydrologic connection.

The Long Lake Passive Treatment System (LLSPTS) continues to demonstrate reduction in sulphate concentrations throughout the system. Higher reduction is observed during warmer conditions, with reduction efficiencies of upwards of 300 mg/L or 50%. The addition of molasses (carbon source) has shown some capability to increase performance within the system but requires continuous maintenance and attention for the pump to continue running.

2.0 WATER MANAGEMENT SYSTEMS AND MONITORING LOCATIONS

Settling ponds, sumps and ditches have been constructed to manage and treat mine contact water to help mitigate any negative effects on the receiving environment. Water management at the Quinsam Mine is divided into three discrete areas: North, South, and 7-South. Appendix IX, Site Maps, displays underground mine locations, groundwater wells and surface monitoring sites. Table 1 below describes the within-mine releases monitoring sites and associated initial dilution zones.

Table 1: Description of Monitoring Sites: In-Mine Releases & Initial Dilution Zones

EMS ID #	Monitoring Sites	Station Code	*Type of Water (MW, FW,GW or IDZ)
North Coal Mining Operation			
E207409	**Settling Pond #4 Decant**	**WD**	**Discharge (MW)**
E207411	Culvert, at Middle Quinsam Lake Road	WC	MW & FW
E283433	2-North Portal Sump (Adit Sump)	2NPS	MW
E207412	2-North Pit Sump CCR Cover	WP	PAG-CCR Water Cover - MW
E292126	South Dyke Sump	SDS	MW
South Coal Mine			
E218582	**Settling Pond #1 Decant**	**SPD**	**Discharge (MW)**
E217014	Culvert, Downstream End at Access Road	SPC	MW & FW
E217015	South Pit Main Sump Water	3S	PAG-CCR Water Cover (MW & FW)
E292127	2-South Pit In Pit Water Cover (2-South Standpipe)	2S	PAG-CCR Water Cover (MW & FW)
E292128	1977 Bulk Sample Pit	3S77	MW & FW
E292129	Culvert Downstream of 4 South Access Road	4S-Lo	**MW & FW**
7-South Mining Operation			
E292069	**7-South Surface Decant**	**7SSD**	**Discharge (MW & FW)**
E292110	7-South Adit Sump	7SPS	MW
Seep Monitoring Sites			
E292131	Long Lake Seeps	LLS & LLSM	MW
	Small seep near the plant (PDS) & groundwater surface near road entering MQL (PDSR)	PDS & PDSR	GW & MW
Long Lake Seep Passive Treatment System			
N/A	Groundwater well (2-South Mine Pool) Influent to the treatment system	QU11-11 (INF-EFF)	MW
N/A	Bio Cell Reactor	BCR-EFF	MW
N/A	Sulphide Polishing Cell	SPC-EFF	MW
N/A	Aeration Lagoon	AL-EFF	MW
N/A	Settling Pond Effluent	SP-EFF	**Discharge MW**
Authorization to Bypass the Works			
N/A	Sampling location 35 m downstream of discharge from the treatment system (SP-EFF) and Settling Pond #1. Discharge is compared to SPD permit limits.	BDS	**Discharge MW**
Initial Dilution Zone (IDZ) Monitoring Sites			
E292130	Long Lake Entrance (South end water entering Long Lake)	LLE	IDZ
E292109	Road Crossing Bridge on Stream 1 above the Lower Wetland (Downstream of 7SSD). The site name is Stream 1, 7S.	7S	IDZ

*** MW= Mine Water, FW= Freshwater, GW =Groundwater IDZ = Intial Dilution Zone**

2.1 MINE RELATED DISCHARGE

2.1.1 *THE NORTH WATER MANAGEMENT SYSTEM*

The north water management system is designed to collect mine related runoff from the north disturbed surface areas and pumped water from the 2-North, 5-South and 7-South underground mine operations. This system includes catchment sumps and ditches, pipelines, a subaqueous storage facility for potentially acid generating (PAG) coarse coal reject (CCR) and Settling Pond # 4 (WD) EMS #E207409.

In December 2017, the combined 5-South and 7-South mine water and the South Dyke Sump (SDS) was redirected into two boreholes where water will discharge into 3-Mains, 2-North.There are 2 X 58 Hp pumps located in 3-Mains. Now all water from 5-South (includes 7-South water) and SDS will enter 2-North mine and be received at Settling Pond #4 or 2-North subaqueous PAG-CCR facility (WP).

The 2-North subaqueous PAG-CCR facility EMS #E207412 contains waste rock from 5-South Mine coal processing and is stored with at least 1.50 m of water cover to inhibit the onset of acid generation from the stowed material. This water cover is sourced from underground 1-Mains, 5-Mains, 3-Mains and the 2-North Portal Sump. This water is directed into the pond by opening gate values directing water into WP maintained by QCC personnel. Until the 2-North mine pool is flooded (303 masl) this is the system used to maintain a water cover.

Based on hydrogeology of the area and mine workings depth, the 2-North mine must be dewatered to allow operations underground. A series of underground pumps move water to surface as needed. The underground dewater wells 1 and 5 Mains are both equipped with 2 X 200 horsepower (HP) deep well pumps capable of pumping approximately 1500 gallons per minute collectively. Additional systems are installed to dewater portions of the mine that are hosting operations and are used intermittently as required.

Settling Pond # 4 collects gravity fed water from Brinco Brook, which includes disturbed surface runoff, tailings dam seepage, and underground water collected at 2-North Portal Sump (2NPS) EMS #E283433. When the gate values to Brinco Brook are open, all underground dewatering wells 1 and 5 Mains discharge are directed into and mix with the water from 2NPS and 3-Mains. Settling Pond # 4 acts as the final collection point before discharge into a meadow/biomass system where it flows into a culvert at Middle Quinsam Lake road sampling location (WC) EMS #E207411, prior to entering another extensive wetland that flows into the inlet of Middle Quinsam Lake.

Settling Pond #4 encompasses approximately 2.4 ha of marshland with an average depth of 1.5 m and a storage capacity of approximately 30,000 m^3. It has been designed to receive a 1 in 10-year flood event and has an emergency spillway to prevent structure failure during extreme flood events. Water from Settling Pond #4 is pumped to the wash plant for use in coal processing. When processing 2-North coal used wash plant water is pumped to the tailings dam at the pump site CPP collection ditch, where it filters through the north and south sides of the tailings dam to 2NPS and South Dyke Sump (SDS) EMS #E292126, respectively. When processing 7-South coal, wash plant water and fine tailings are pumped directly underground to 1-Mains 2-North. Water in the 2NPS is used for underground equipment, dust suppression, and emergency firefighting. Excess water in the 2NPS sump is pumped with a 65 HP pump and ties into a 12-inch pipeline from 3-Mains 2-North, along the 2-North high wall then discharged into Brinco Brook. SDS collects seepage water from the south side of the tailings dam and pumps it back into the 2-North mine pool at 3-Mains (the seepage does not report to the Quinsam River or Middle Quinsam Lake from this location).

Below the wash plant is a natural drainage where groundwater surfaces and flows towards Middle Quinsam Lake. This area has two nested (deep and shallow) groundwater wells. This water flows towards Middle Quinsam Lake near the inlet end. Deep and shallow nested groundwater wells MW00-1 (S and D) and MW00-6 (S and D) represent the groundwater below the collection ditch and processing plant. These wells were installed to monitor seepage from the plant site collection ditch. Historically, the plant site collection ditch was used to transport fine tailings from the processing of coal to WP, which was used as a fine tailing settling pond, with excess water pumped into Brinco Brook and gravity feed into Settling Pond # 4.

Figure 1 provides a flow chart describing the flow paths of water in the 2-North Water Management System.

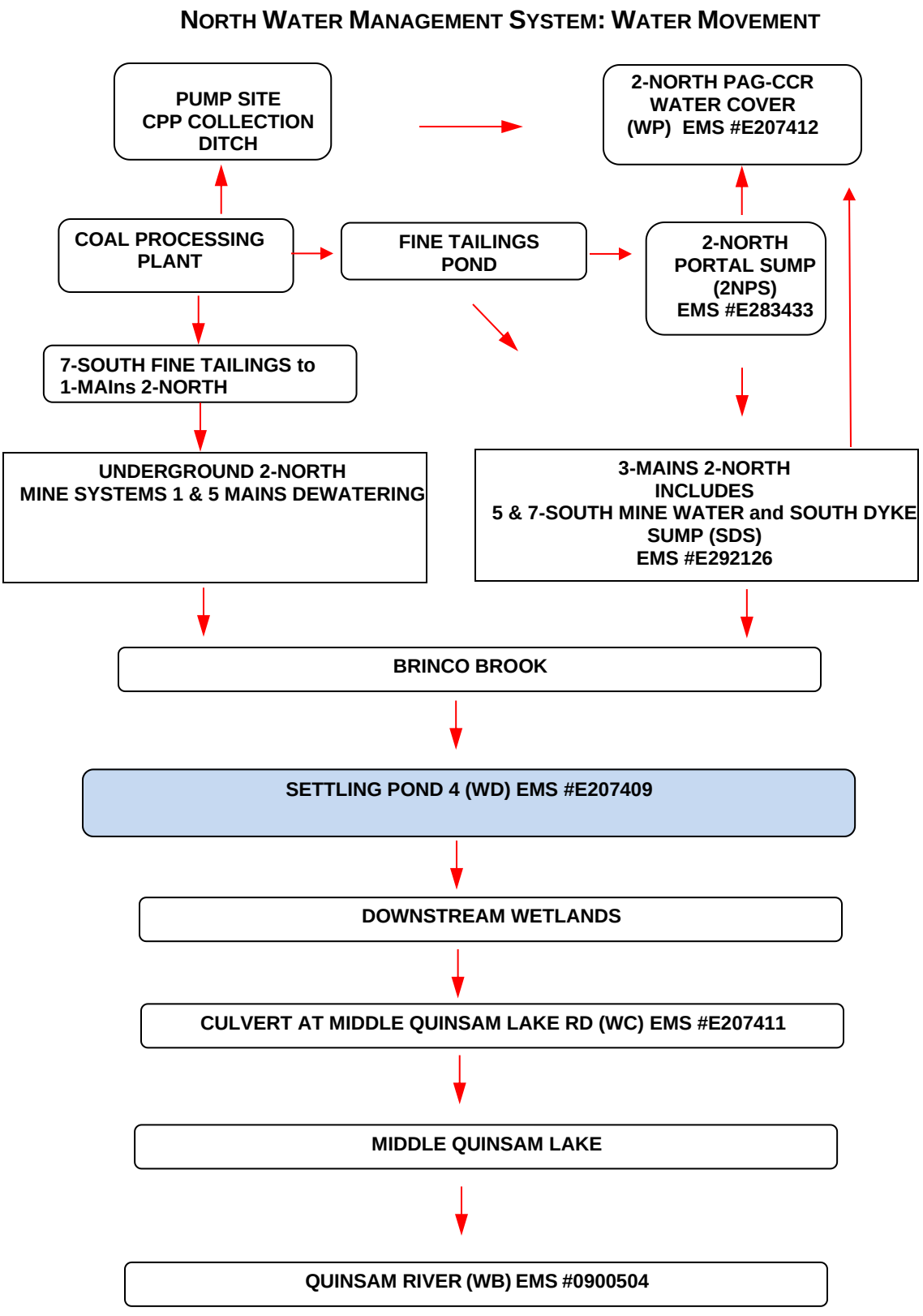


Figure 1: Water Movement and Flow Path in the North Management System

2.1.2 *The South Water Management System*

The South Water Management System is designed to collect mine related runoff from the south disturbed surface areas and manage water in the 2-South (2S) EMS #E292127 and 3-South (3S) EMS #E217015 PAG-CCR containment pits and Long Lake Seep Passive Treatment System (LLSPTS).

The two long-term PAG-CCR pits (2-South and 3-South) have been completed as part of the south water management system. Construction of the 2-South PAG-CCR pit was completed in 2014. It includes a clay-bentonite liner to retain water within the pit and a water cover fed by a series of ditches and pipes that collect local catchment water. Surface personnel control valves to direct fresh non-mine impacted water into the PAG-CCR facility or to No Name Lake. Source water is for the 2-South pit is from local catchment and the LLSPTS. Recently (2018) the LLSPTS discharge has been diverted into the 2S pit to maintain a water cover. This maintains a water cover and inflow rate of approximately 4 L/s. Flow rates are recorded at the well head for LLSPTS and at the inflow and outflow of the pit. The inflow of 2-South is equipped with a v-notch weir, pressure transducer and staff gauge where weekly measurements are recorded. A minimum of 1.0 m water cover is required in the 2-South pit and excess water from 2-South water cover overflows down a spillway (built in 2015) into a large channel that leads to the 3-South PAG-CCR storage pit. Seepage from under the liner is also directed down the channel to 3-South pit. The 2-South water cover and seepage maintains a 1.0 m water cover over the 3-South pit. Continuous flow is recorded at the H-Flume before water enters 3-South pit. Appendix I, Tables 166 and 167 and Appendix II, Graphs 67 and 68 display the recorded inflow and outflow of the 2-South pit and 3-South areas.

Excess water in 3-South is pumped via an 88 HP pump capable of pumping 500 gallons per minute directly into the roadside collection ditch that flows into Settling Pond #1 or during the summer a gate valve is opened on the highwall above the 2-South pit directing water back into the 2-South pit making it a closed loop system.

Settling Pond #1 (SPD) EMS #E218582 is the compliance point for permitted discharges before water enters Long Lake. Settling Pond #1 encompasses 1.8 ha of wetland with an average depth of 1.5 m. An emergency overflow ditch built into the impoundment dam is located on the north end of the pond. A siphon pipeline has been installed from Settling Pond #1 to the 3-South Pond to provide an emergency source of water to maintain the 1 m cover over the 3-South PAG-CCR pond.

The LLSPTS is designed to inhibit flow at the Long Lake seep by lowering the 2-South mine-pool through pumping from monitoring well QU11-11, where it is treated on surface. Previously four ponds were used Biochemical Reactor (BCR), Sulphide Polishing Cell (SPC), Aeration Lagoon (AL) & Settling Pond (SP) where water would go through processing. In 2018 only the ponds BCR and SPC have been operating, with the other two ponds decommissioned. Since May 2018, the treatment system discharge was directed into the 2-South pit. The sample location before it enters the pit, is referred to as 2-South Inflow (2SI). The reason for decommissioning the last two ponds was to keep the water within the authorized works and aid in maintaining a water cover over the 2S pit during the dry season. Previously the treatment system bypassed Settling Pond # 1 and the downstream location, capturing the combined discharges, Biocell Downstream (BDS) was used for compliance under an authorization to bypass the works letter obtained annually from the MoE. These three sites AL, SP and BDS are no longer monitored as a result of changing the discharge location of the treatment system. Settling Pond #1 channel leads into a series of meadow/biomass systems and combines with the surface and subsurface groundwater where it discharges at LLE near the outlet of Long lake.

The 3-South 1977 bulk sample pit (3S77) EMS #E292128 is located upstream of the 4-South Pad and collects groundwater filtering in from the wetland through which Settling Pond #1 flows. The bulk sample pit has a surface discharge that filters into the groundwater and through the connector ditch above the reclaimed 4-South pad area during fall and winter. The 4-South ditch monitoring location (4S-Lo) EMS #E292129 is a culvert downstream of 4-South Access Road and west of 4S coal pad; it collects runoff from the reclaimed 4S-pad, groundwater seepage from 3S77, and surface runoff from the haul road. The monitoring location SPC, EMS #E217014, located downstream of the 4-South pad and 4S-Lo, (does not interact with effluent from 4-South water); captures Settling Pond #1 water downstream of the wetland. The final collection point (EMS #E292130) is at the downstream end of the Long Lake Entrance (LLE) wetland and discharges approximately 50 m upstream of Long Lake. This site is considered the edge of the initial dilution zone (IDZ) for Long Lake.

The figures below provides a flow chart describing the flow paths of water in the South Water Management System.

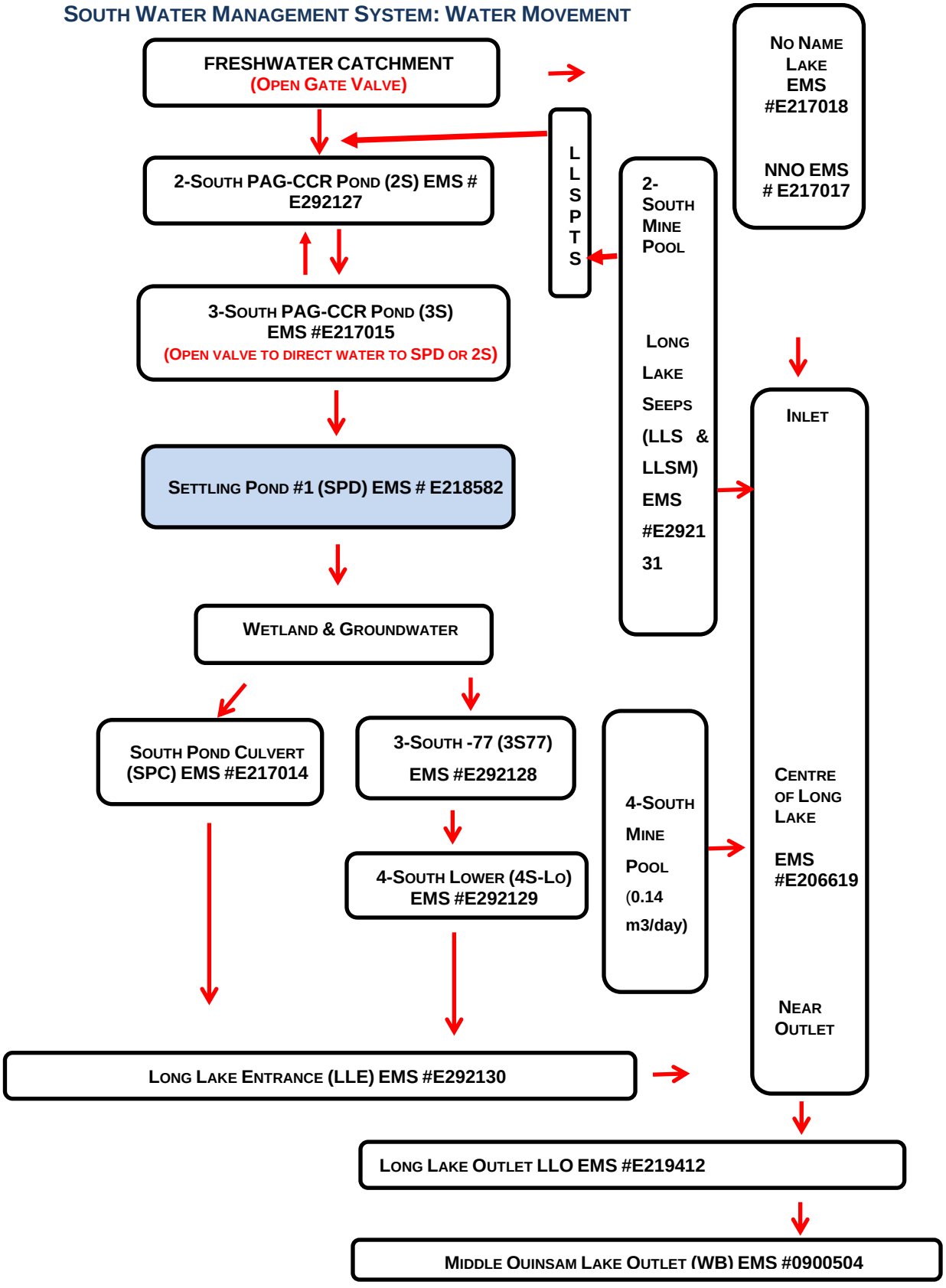


Figure 2: Water Movement & Flow Path in the South Water Management System

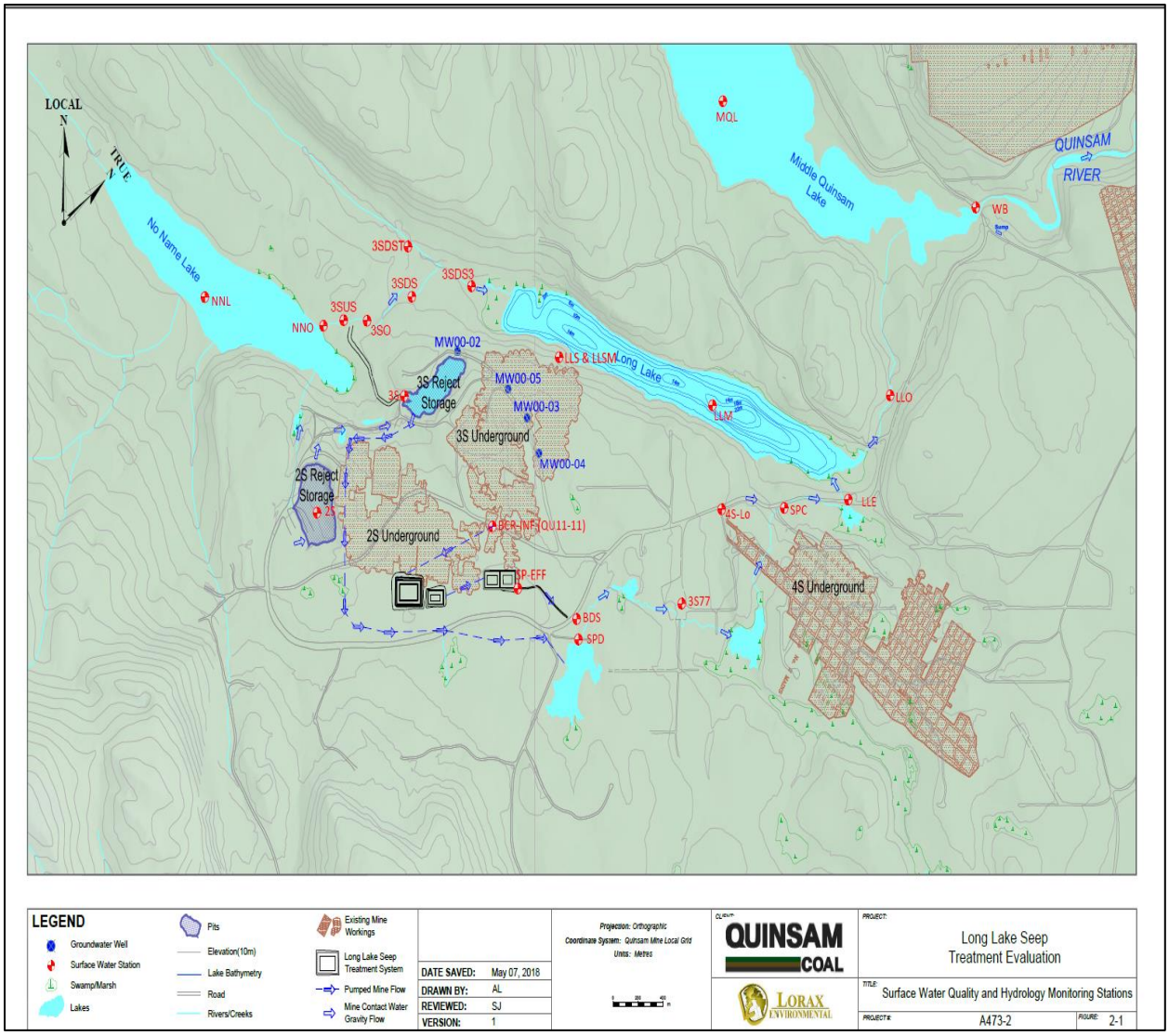


Figure 3: South Water Management System with Underground Workings

2.1.3 *7-South Water Management System*

The 7-South Water Management System includes permitted locations, 7-South Surface Decant Settling Pond (7SSD) EMS #E292069, 7-South-Adit Sump (7SPS) EMS #E292110, 7-South Containment Pond (7SCP), and receiving environment sites downstream at Stream 1 (7S) EMS #E292109, which flows into the lower wetland and monitoring location Lower Wetland Outlet (LWO) EMS #E292112 at the confluence of the Quinsam River. This system is designed to manage excess water from the 7-South catchment area and mitigate environmental impacts from

disturbed surface locations affected by mining and underground activity. Water is collected and stored in three main ponds in the 7-South Mine catchment area: 7SPS, 7SCP, and 7SSD.

7SPS contains water that is collected from dewatering processes during mining activity while most of surface water from the coal storage pad is directed into the adit sump (7SPS). Water is pumped from active mining areas, 7-South Area 5 (7SA5) and 1-Mains 7-South (1M7S) and either stored in 7SPS adjacent to the portal entrance to use for dust suppression on mining equipment or fire suppression or pipelined directly into 5-South flooded mine pool at borehole QU05-13. Water levels at 7SPS are set up on an automated float system, when water levels rise beyond a desired storage capacity, excess water is also pumped into the 5-South mine pool. From there water mixes with the 5-South water where it is pumped into the 2-North mine at 3-Mains. 3-Mains discharges into Brinco brook which is gravity fed to Settling Pond #4 and discharges into Middle Quinsam Lake.

7SCP collects surface runoff from the 7-South surface disturbance area, local groundwater, and infiltration water from the coal pad. This pond allows suspended solids in surface water to settle before the water enters 7SSD. When this pond reaches a certain capacity, it discharges through a culvert into 7SSD. In 2015, the 7SCP was enlarged to accommodate more water. Additional pumps were placed at 7SSD and 7SCP to decrease 7SSD discharge and assist with water management. The revised system pumps water from 7SSD and 7SCP to 7SPS which pumps into 5-South Mine Pool to 2-North Mine Pool into Brinco brook and flows into Settling Pond #4. The pump at 7SCP runs on an automated float system where water levels are kept below the overflow channel into 7SSD.

During high precipitation events, a secondary pump can be activated to assist in pumping water to 7SPS. This pump can also be relocated to 7SSD where accumulated water can be diverted into 7SCP. This system does not eliminate discharge from 7SSD but helps reduce the amount discharged as 7SSD still must discharge during times of heavy precipitation.

7SSD is the permitted discharge location and main water collection pond for the 7-South Mine area, with a cumulative catchment of 3.14 ha. 7SSD is a settling pond that receives water from groundwater infiltrated from the surrounding hillsides and the coal storage pad. This water is monitored for quality and quantity during discharge events. Water is discharged from the pond via a 2-inch discharge line equipped with a valve to allow environmental personal to set the discharge rate based on flow rates measured at the downstream site 7S in Stream 1. An 8:1 ratio (7S:7SSD) was calculated from previous water quality data and modelling conservatively to protect the Stream

1 receiving environment. Water quality downstream in Stream 1 meets applicable guidelines with dilution ratios greater than 8:1.

Discharge from 7SSD forms the headwaters of Stream 1, monitoring location 7S is located on Stream 1 below the confluence with Stream 2 and, for the purposes of the effluent permit, is compared to British Columbia water quality guidelines (WQGs) for protection of aquatic life to evaluate potential effects on aquatic receptors at this location.

Figure 4 provides a flow chart describing the flow paths of water in the 7-South Water Management System.

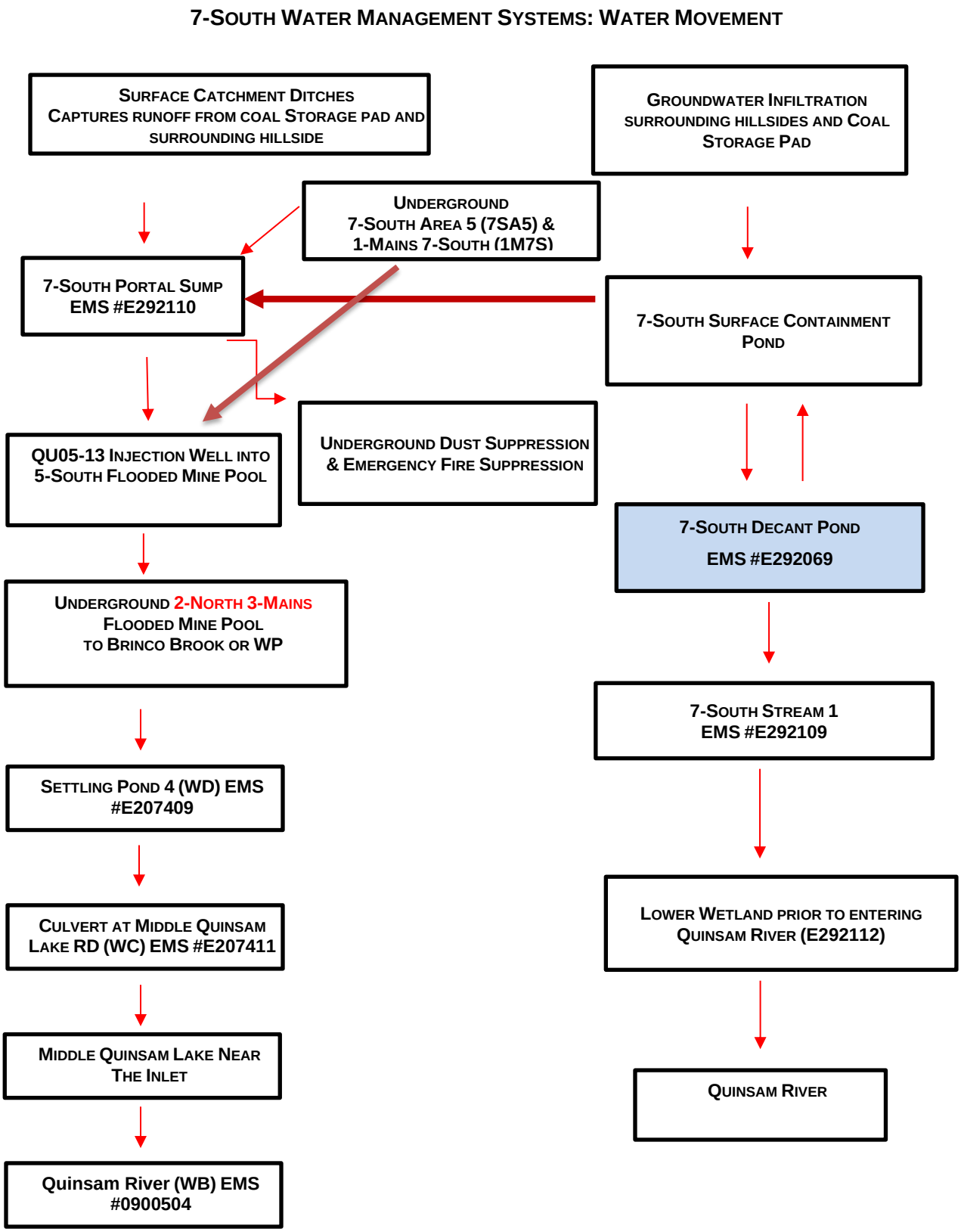


Figure 4: Water Movement and Flow Path at the 7-South Operation

2.2 RECEIVING ENVIRONMENT SITES

2.2.1 *RIVER, STREAM & LAKE MONITORING SITES*

Effluent Permit PE-7008 Section 4.2.3 identifies river, stream, and lake monitoring sites that represent the receiving environment for various mine related discharge(s). Most of these sites are monitored on a 5 in 30 sampling frequency (five events in 30 days) during the spring, summer and fall seasons. Table 2 lists the receiving water monitoring sites.

Table 2 : Receiving Water (Stream and Lake) Monitoring Sites

Streams	Lakes
North Mining Operation	
Quinsam River at Argonaut Road (WA) (EMS # 0126402) Outflow from Middle Quinsam Lake (WB) (EMS # 0900504)	Middle Quinsam Lake Centre (EMS # 206618)
South Mining Operation	
Long Lake Outlet (LLO) (EMS # E219412) No Name Lake Outlet (NNO) (EMS # E217017)	Long Lake at Centre (LLM) (EMS #E206619) No Name Lake (NNL) (EMS # E217018)
7-South Mining Operation (Areas 1 to 4)	
Quinsam River upstream of 7 South Mining Operation (QRDS1) (EMS # E286930) Quinsam River downstream of 7 South Mining Operation (7SQR) (EMS # E292113) Lower Wetland Outlet at the confluence of Quinsam River (LWO) (EMS # E292112)	Lower Quinsam Lake (LQL) (EMS #E292118)
7-South Area 5 Mining Operation	
Iron River upstream of mining operations (IR1) (EMS #E297230) Iron River upstream of 7SA5 (IR6) (EMS # E297231) Iron River downstream of 7SA5 and 242 inputs (IR8) (EMS # E297232) Quinsam River downstream of confluence with Iron River (IRQR) (EMS # E299256)	Lower Quinsam Lake (LQL) (EMS # E292118)

River and Stream Sites in the Quinsam River Sub-Basin

- Quinsam River at Argonaut Road (WA) EMS #0126402 – Located upstream of all mine related discharges; represents background (baseline) conditions for water quality comparisons.
- Outflow from Middle Quinsam Lake (WB) EMS #0900504 – Located at the outflow of Middle Quinsam lake; represents combined discharge from North and South water management systems.
- No Name Lake Outlet (NNO) EMS #E217017 – Located at the outflow of No Name Lake; not presently influenced by surface mine related discharge in the South. The groundwater influence from 2-South Pit to No Name Lake near the outlet site was estimated as 5 m^3/day or 10% of the seepage rate from 2-South Pit.
- Long Lake Outlet (LLO) EMS #E219412 – Located at the outflow to Long Lake; captures all South mine related inputs on surface and a percentage of groundwater (i.e. LLE and Long Lake Seep).
- Quinsam River Downstream Site 1 (QRDS1) EMS #E286930 – This site is located downstream of Middle Quinsam Lake Outflow (WB), the North Mining Operation and upstream of the 7-South Mining Operation; captures changes in water quality before the 7-South Mine and groundwater inputs related to mining.
- Lower Wetland Outlet at the confluence of the Quinsam River (LWO) EMS #E292112 – This site is located downstream of Stream 1 (7S); represents final surface discharge quality prior to combining with the Quinsam River.
- 7-South Quinsam River (7SQR) EMS #E292113 – Quinsam River downstream of QRDS1, LWO, and 7-South Mining Operation; captures incremental changes in water quality that may be attributed to 7-South PAG-CCR storage and flooded mine pool.

Iron River – Proposed 7-South Area 5 (7SA5) Mining Operation

- Iron River Upstream of Mining Operation (IR1) EMS #E297230 – Located upstream of any mine related activity; represents baseline conditions.
- Iron River Upstream of 7SA5 (IR6) EMS #E297231 – Located upstream of any mine related activity (currently); reflects baseline conditions in an area of different geologic formation(s) and baseline water quality influences than IR1 (mainly arsenic concentrations).
- Iron River downstream of 7SA5 and 242 inputs (IR8) EMS #E297232 – Downstream monitoring site on the Iron River; will be used to monitor potential influence of 7SA5.

- Quinsam River downstream of the confluence with the Iron River (IRQR) EMS #E299256 – Located downstream of all current and planned (7-South, Area 5) activities; represents the cumulative mine related discharge.

Lake Monitoring Sites

- No Name Lake (NNL) EMS #E217018– Located within the South mine development area.
- Long Lake (LLM) EMS #E206619 – Located within the South mine development area and receives water from No Name Lake, 2-South flooded mine pool as groundwater and surface water (Long Lake Seep). The outlet end receives seepage from 4-South flooded mine pool, estimated at 0.14 m^3/day and south water management discharge (LLE).
- Middle Quinsam Lake (MQL) EMS #E206618 – Located adjacent to the North mine development area and receives all discharge from the North water management system and upstream (non-mine related) inputs. Long Lake flows into Middle Quinsam Lake at the south end near the outlet (WB) via a small tributary stream (LLO).
- Lower Quinsam Lake (LQL) EMS #E292118 – Located well below mine related discharge(s); reflects the combined influences of Quinsam River and Iron River water quality.

2.2.2 *Groundwater Monitoring Sites*

Numerous groundwater observation wells in the vicinity of pits 2N, 1S, 2S, 3S, 4S, Block 242, and 7S are monitored. Table 3 (below) lists groundwater wells, location and geological details of these wells. For further information refer to Appendix I, Tables 171 to 267 for water chemistry and Appendix VI, *2018-2019 Annual Groundwater Monitoring Report*. As an alternative to the 2N, 1S, 2S, 3S, 4S and 7S wells, QCC established monitoring sites at underground sumps. During 2018-2019, QCC monitored 39 sites for groundwater.

Table 3: Groundwater Wells and Underground Sumps

Groundwater Wells - Description				
Area	**Groundwater ID**	**In-situ / Ex-situ**	**Screened Interval**	**Comment**
2-North	1 Mains 2-North (1M2N)	In-situ	No. 1 Seam	Flooded Underground Workings Dewatering well
	5 Mains#2 (5M#2)	In-situ	No. 1 Seam	Flooded Underground Workings Dewatering well
	QU08-21GD	Ex-situ	No. 1 Seam	Down gradient of u/g tailings disposal, measure water quality and hydraulic gradients downstream of forjan fault
	QU08-21GS	Ex-situ	No. 4 Coal Seam and	
	QU10-10D	Ex-situ	No. 1 Seam / mudstone	Down gradient of u/g tailings disposal, measure water quality and hydraulic head downstream of 2 North workings
	QU10-10S	Ex-situ	No. 4 Seam /	
	QU10-11S	Ex-situ	Fractured Sandstone	Measure water quality and hydraulic gradient in Forjan Fault
	QU10-11D	Ex-situ	No.1 Seam	Down gradient of u/g tailings disposal, measure water quality and hydraulic head downstream of 2 North workings
	QU10-13D	In-situ	Caved Zone	Measure hydraulic head above 2 North mine (1 mains), fine tailing disposal
5-South Mine Pool	5SMW	In-situ	Mine Pool (1 Seam)	5-S Mine Pool pumped into 2-North Mine Pool
River Barrier Pillar (RBP)	QU11-05S	Ex-situ	Sandstone	Monitoring water quality and vertical gradients downstream of the RBP and 2-North mine.
	QU11-05D	Ex-situ	Sandstone	Monitoring water quality and vertical gradients downstream of the RBP and 2-North mine.
	QU11-09S	Ex-situ	Sandstone	Monitor water quality & gradients downstream of the RBP and 2-North workings. Mine pool – CCR backfill in River Barrier Pillar
	QU11-09M	In-situ	RBP Mine Pool	Monitor water quality & gradients downstream of the RBP and 2-North workings. Mine pool – CCR backfill in River Barrier Pillar.
2-North Plant Site	MW-00-1S	Ex-situ	Till	Seepage to MQL
	MW-00-1D	Ex-situ	1-Seam	Seepage to MQL
	MW-00-6D	Ex-situ	Till	Seepage to MQL
	MW-00-6S	Ex-situ	Till	Seepage to MQL
4-South	QU10-08D	Ex-situ	No. 3 Seam	4 South (just outside mine pool) up gradient of existing workings
	QU11-01		Foot print area of 4 South GOB	Assess 4 South Mine Pool water quality
	QU10-09S	Ex-situ	Down gradient of existing workings	Access vertical gradients and water quality adjacent to Long Lake.
	QU10-09D	Ex-situ	Down gradient of existing workings	Access vertical gradients and water quality adjacent to Long Lake.
2-South & 3-South	MW002	Ex-situ	1 Seam	3S seepage to Long Lake
	MW004	In-Situ	Mine Pool (1 Seam)	2-South Mine Pool Gob depillared area
	MW1223	Ex-situ	Silt Stone	2-South seepage to No Name Lake
	MW1224	Ex-situ	Silt Stone	2-South seepage to No Name Lake
	QU11-11 (INF)	In-Situ	Mine Pool (1 Seam)	2-South mine pool dewatering well for Passive Treatment System
7-South	1M7S	In-Situ	No. 4 Coal Seam	Underground Sump
	QU08-10	Ex-situ	No. 4 Coal Seam	Downgradient of 7S -screened No. 3 Coal -Southern margin of workings
	QU08-13A	Ex-situ	No. 4 Coal Seam	Down Gradient of the CCR backfill towards QR
	QU08-13B	Ex-situ	Till & SST contact	Down Gradient of the CCR backfill towards QR
	QU14-10	In-Situ	Mine Void	PAG Storage Mine Void
7- South Area 5	7SA5	In-Situ	Mine Void	Groundwater draining into mine void
	QU1128	Ex-situ	N0. 4 Seam and 4L	Upgradiernt of 7SA5. Background 7 South Area 5
	QU1118S	Ex-situ	Till	Down Gradient of 7SA5 - Background info for 7S A5 Subcrop
	QU1118D	Ex-situ	Sandstone	Down Gradient of 7SA5 - Background info for 7S A5 Subcrop
	QU1206S	Ex-situ	Faulted sandstone near No. 4 Seam	Upgradient of 7SA5 along margine with proposed 4S expansion
	QU11-35	Ex-situ	Sandstone above No. 4 Seam	South end of 7SA5 footprint at 100280m N (mine grid)
242 AREA	QU11-36S	Ex-situ	Sandstone below No. 5 seam	Downgradient of 7SA5. Background (Between 242 and IR).
	QU11-36D	Ex-situ	Sandstone below No. 5 seam	Downgradient of 7SA5. Background (Between 242 and IR).
	242MW	In-situ	No. 4 Seam	Mine pool
	242PS	Ex-situ	Shallow groundwater/ rain water	Old Portal Sump

2.3 ADDITIONAL MONITORING PROGRAMS

QCC conducts a diverse environmental monitoring program governed largely by the effluent permit PE: 7008. There are also additional baseline water quality monitoring programs, and in 2016, a sediment and benthic invertebrate monitoring program was conducted with the next program scheduled for 2020.

2.3.1 *BASELINE MONITORING PROGRAMS*

Quinsam conducts additional monitoring to support permit amendment efforts and to provide additional insight into water quality trends and observations. Although this information is not specifically included in this report, the data may be used in future submissions to ENV. As part of the 7-South Area 5 permit application, monitoring in the Iron River continues to be performed. The Iron River sediment and benthic monitoring program will commence in August / September of 2019.

Baseline monitoring and characterizing of water quality for future permitting of the 3-South pit continues. An engineered outlet channel was constructed, which will act as a permanent overflow channel connecting the 3-South sub-aqueous PAG-CCR disposal pond to the drainage channel connecting No Name Lake to Long Lake. Monitoring locations include the 2-South Inflow (2SI), 2-South pit near the outflow (2S), 2-South Channel (2SC), and 3-South Pit (3S). Receiving environment monitoring sites are No Name Lake Outlet (NNO) and three locations on the No Name Lake connector channel. The three sites on the connector channel include:

- downstream of the 3S outlet channel (3SDS)
- a tributary to the connector channel (3SDST)
- 100 m downstream of the tributary and the connector channel (3SDS3)

The sites have been monitored on the 5 in 30 schedules during spring, summer, and fall, and more recently on a monthly basis. Water quality monitoring was completed in 2019. Baseline sediment and benthic sampling will be performed in 2019 on the No Name Lake connector stream to supplement permitting for discharge.

2.3.2 *SEDIMENT AND BENTHIC MONITORING PROGRAM ON THE QUINSAM WATERSHED FOR EFFLUENT PERMIT PE:7008*

QCC conducted sediment and benthic monitoring in August through October 2016 to meet condition 4.2.7 (iii) of the amended Permit PE-7008 (dated September 22, 2014). This monitoring program was designed to supplement existing water quality data by evaluating sediment chemistry

and benthic biota in waterbodies that receive mine impacted discharges and reference sites with similar characteristics. The *2016-2017 Annual Water Quality Monitoring Report* contains the findings of the program. The program included five lakes, one wetland, and one river system for a total of 23 sites. The table below lists the waterbody type, waterbody name and site outlined in the study.

Table 4: Sediment and Benthic Monitoring Sites

Waterbody Type	Waterbody Name	Site
Lakes	No Name Lake (NNL)	No Name Lake Inlet, NNLI (EMS # E224246) No Name Lake Deep, NNLD (EMS # E217018) No Name Lake Near Seep (EMS # E292114) No Name Lake Outlet (EMS # E217017)
	Middle Quinsam Lake (MQL)	Middle Quinsam Lake Inlet (EMS # E206901) Middle Quinsam Lake Deep (EMS # E292115) Middle Quinsam Lake Near Seep (EMS # E292116) Middle Quinsam Lake Outlet (EMS # 0900504)
	Lower Quinsam Lake (LQL)	Lower Quinsam Lake Inlet (EMS # E292117) Lower Quinsam Lake Deep 1 (EMS # E29118) Lower Quinsam Lake Deep 2 (EMS # E292119) Lower Quinsam Lake Outlet (EMS # E292120)
	Long Lake (LL)	Long Lake Inlet (EMS # E292121) Long Lake Deep (EMS # E292122) Long Lake Near Seep (EMS # E292123) Long Lake Outlet (EMS # E219412)
	Gooseneck Lake (GNL)	Middle Gooseneck Lake (EMS # 1132502)
Wetland	Lower Wetland	Lower Wetland Inlet (EMS # E292124) Lower Wetland Middle (EMS # E292125) Lower Wetland Outlet (EMS # E292112)
Quinsam River	At Argonaut Road (WA)	(EMS # 0126402)
	Upstream of 7 South Mining Operation (QRDS1)	(EMS # E286930)
	Downstream of 7 South Mining Operation (7SQR)	(EMS # E292113)

2.3.3 *Long Lake Seep Passive Treatment System (LLSPTS)*

Refer to the 2017-18 Annual Water Quality Monitoring Report, Appendix VI for the most recent report on the Long Lake Treatment System provided by Lorax Environmental entitled "*Long Lake Seepage Treatment System - Supplemental Evaluation May 22nd, 2018*" submitted to ENV and EMPR.

Since the 2-South Mine pool pump replacement in August 2018, the treatment system has been operating with all discharge directed to the 2-South Pit. The system has been operating normally except for a few interruptions in January and February 2019 when it was shut down due to freezing conditions that spit a flange at the well head. This was replaced and pumping was reinitiated at 4.5 L/s.

As discussed previously, the treatment system now has only two ponds, BCR and SPC treating mine water. The discharge is directed to the inlet of 2-South pit (2SI). This site is monitored for water quality and quantity. This system keeps the water within the authorized works where it meets permit limits at Settling Pond #1.

2.4 Maintenance & Reclamation Activities

To ensure proper functioning of site wide water management systems, haul roads, roadside ditches, catchment ditches, ponds, culverts, pumps and water lines are maintained on a routine basis. Regular maintenance activities include removal of debris from culverts, replacement of silt fences and straw bales, and removal of sediment build-up from catchment ditches and ponds. Pumps and water lines are inspected daily and maintained as part of the surface inspection.

Major maintenance of treatment works has not occurred this year. The main changes in the water management system include the new drill hole into the 5-South Mine that was directed into the 2-North Mine in 3-Mains. Composite samplers have been maintained according to the schedule detailed in the *Environmental Procedures Manual*.

The following reclamation and reclamation related work was completed through 2018 (see the *Annual Reclamation Report for 2018, Mines Act Permit Number C-172* for further details):

- Reforestation with a mixture of coast-Douglas fir (*P. menziesii* var. *menziesii)* and Red Alder (*Alnus rubra*) at 1200 to 1400 stems per hectare occurred in the South mine areas (1-South, 2-South, 3-South, 4-South) and 242 area for a total of 27.18 hectares re-forested.
- Douglas fir was planted at a rate of 1200 stems per hectare in the 2-North area for a total of 7 hectares re-forested.

- Logging (54.78 Ha) occurred above the 2-North mine within the surface rights owned by Quinsam Coal.
- 2-North Coarse Coal Refuse (CCR) (24,960 tonnes) was placed in the old tailings pit.
- Drilling for the purpose of mitigating the Long Lake Seep occurred within the vicinity of the 3-South Area.
- Drilling for the purpose of exploration occurred in 6-South and 7-South.

Previous reclamation work performed around the 2, 3, 4 and 7-South areas are expected to substantially improve water quality in the receiving environment by decreasing exposure of weathering waste rock dumps and highwalls.

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3.0 CHEMICAL REAGENTS AND WASTE STORAGE

Waste oil and solvents are stored in sealed containers or tidy tanks at secure locations and removed from site for recycling by Terrapure Nanaimo (RS15365). Scrap metal at the mine site is collected in designated containers and recycled.

4.0 INCIDENTS - PERMIT LIMIT EXCEEDANCES & PERMIT NON-COMPLIANCES

Please refer to Appendix 1, Table 2 for a summary of all permit limit exceedances (P) and permit non-compliances (PNC) specific to missed samples, parameter analysis, and missing flow data. Appendix VII provides the spill reports. All spill and excursion reports were submitted to the Environmental Compliance website at: environmentalcompliance@gov.bc.ca.

There was one event that resulted in a permit limit exceedance related to mine discharge during the 2018-2019 period:

- Total suspended solid sample result was 28 mg/L on February 1st, 2019 at Settling Pond #4 discharge, permit limit is 25 mg/L for this pond. Sample was frozen in the bottle may have caused build up on sides of the bottle to be removed. Elevated iron may have contributed to the TSS as well. This occurred for (1/353) samples collected. Spill report No. DGIR 184299.

5.0 MATERIALS AND METHODS: ENVIRONMENTAL MONITORING PROGRAM

All water samples were collected in accordance with methods described in "*The British Columbia Field Sampling Manual for Continuous Monitoring of Air- Emissions, Water, Soil, Sediment, and Biological Samples*" (MOE 2013)[1]. This includes following of specified field protocols: use of field duplicates, split samples, and method blanks and checking for transcription errors.

Maxxam Analytics (Burnaby B.C.), a Canadian Association for Laboratory Accreditation (CALA) designated laboratory, conducted the analysis of surface, groundwater, and sediment samples. Phytoplankton samples were analyzed by Stantec Consulting Ltd. (Burnaby B.C.). Zooplankton samples were analyzed by Fraser Environmental (Surrey, B.C.).

5.1 WATER QUALITY ANALYSIS

PE-7008 identifies the parameters to be analyzed in effluent. Each site has specific requirements for parameters to be analyzed. The following parameters are generally monitored at each station:

- Total suspended solids (TSS) (mg/L)
- Total dissolved solids (TDS) (mg/L)
- pH-Field (standard units)
- Conductivity-Field (uS/cm)
- Alkalinity (mg/L as $CaCO_3$)
- Hardness (mg/L as $CaCO_3$)
- Sulphate (mg/L)
- Ammonia as nitrogen (mg/L)
- Nitrate/nitrite combined as nitrogen (mg/L)
- Dissolved Organic Carbon (mg/L)
- Total phosphorus and dissolved phosphate (mg/L)
- Total and dissolved metals (mg/L)
- Oil and grease (for sites SPD and WD only) (mg/L)

[1] MOE. 2013. "The British Columbia Field Sampling Manual for Continuous Monitoring of Air- Emissions, Water, Soil, Sediment, and Biological Samples". Available at: http://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre/field_sample_man2013.pdf

- Rainbow trout bioassays (for sites SPD, WD and 7SSD only)
- 7 Day *Ceriodaphinia dubia* chronic toxicity test (at site 7S only)

The following parameters are specific to lake sampling:

- Dissolved oxygen (mg/L)
- Dissolved oxygen (Percent saturation)
- Temperature (Celsius)
- Oxidation reduction potential
- Biological
    - Phytoplankton (chlorophyll “a” and phaeopigment)
    - Phytoplankton (counts and identification to species)
    - Zooplankton (counts and identification to species)

All surface and groundwater samples were filtered through a 0.45 µm filter and most were preserved on site except for a few samples where preservation did not occur. Maxxam analyzed dissolved and total metals samples using the CCME/BC WQG analytical package to provide suitable detection limits for comparison with guidelines and as per ENV requirements. This included use of conventional and Inductively Coupled Plasma Mass Spectrometry (ICPMS) equipment.

5.2 ENVIRONMENTAL MONITORING EQUIPMENT

The following equipment was used to conduct the surface monitoring program at Quinsam Coal:

- ISCO 4210 flow meters equipped with a paper chart plotter and datalogger, which are connected to a sonic depth sensor to measure water height above decant (Settling Pond #1) and an ISCO signature flow meter with an ultrasonic sensor (Settling Pond #4). Both instruments use water height to determine discharge by using provided weir/orifice equations. Continuous monitoring is achieved using a datalogger and downloaded using a computer with Flowlink software.
- A Sitrans F M MAG 8000 CT electromagnetic flow meter to record discharge at 7SSD.
- ISCO 12-volt automatic samplers programmed to collect daily composite samples for analysis of TSS deployed at all permitted discharge locations.

- A YSI Exo 1 multiparameter sonde and YSI Pro-Plus, to obtain physical water quality parameters, and calibrated prior to each sampling event following manufacturer specifications for maintenance and handling.
- Two handheld sondes (Oakton PC Tester 35), for routine monitoring of pH and conductivity.
- Levelogger pressure transducers, used to obtain continuous water level measurements at Long Lake Outlet, Middle Quinsam Lake Outlet and the Iron River, with data used to create daily hydrographs.
- A 4 litre Beta sampler, to collect lake water samples; the sampler is constructed with materials to minimize interference cross contamination of metals and the 4 litre volume provides sufficient water for all required analyses in one deployment per depth.
- A Campbell Scientific weather site, to record temperature, precipitation, wind, humidity, solar intensity, and snow accumulation data (installed next to the 2-South pit in August 2015, became operational in October 2015).
- An Eckman grab sampler, for collection of sediment and benthic invertebrate samples.
- Hydro-lift used for collection of groundwater samples
- Portable Bladder pump used for collection of groundwater samples
- Peristaltic pump used for collection of groundwater samples

Although this list is not exhaustive, it provides an overview of the equipment used for environmental monitoring.

5.3 QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) sampling followed protocols described in MOE (2016). QA/QC practices were integrated into the water sampling program to maintain the integrity, consistency, and reproducibility of sampling techniques and results of environmental monitoring. Various samples, including field blanks, trip blanks, equipment blanks, and replicates, are used to evaluate methods and identify potential issues related to sampling techniques and equipment. Each sample type serves a specific purpose:

- Field Blanks – Samples of laboratory-grade, reverse osmosis, deionized water deposited into sample containers in the same location in which a field sample is collected. These samples are carried and treated in the same manner as a field sample to assess any potential cross-contamination that may occur due to sampler technique.
- Trip Blanks – Samples of laboratory-grade, reverse osmosis, deionized water deposited into sample containers in a laboratory setting are transported into field locations with

samplers to determine if any cross-contamination occurs due to the handling or storage of sample bottles.

- Equipment Blanks – Samples of laboratory-grade, reverse osmosis, deionized water placed into a piece of equipment at a sampling station to identify potential cross-contamination associated with equipment (e.g., Beta sampler), sampling procedures, or general cleanliness.
- Replicates – Samples collected at the same location and time by the same sampler using the same techniques and equipment. Replicates samples are used to assess precision for each analyte analyzed. Observed variance between replicates identifies uncertainty in sampling, environmental heterogeneity, and laboratory analysis.

Field replicate samples are collected during every sampling event, accounting for approximately 10% of analyses requested from the laboratory. One sampling event may span two or more days. The primary sampling events are:

- Weekly, monthly, and quarterly sampling for all permitted monitoring locations
- 5 in 30-day programs, three times per year for receiving environment sampling for lakes, rivers and streams

Monthly sampling at Long Lake Treatment System ponds, with a replicate collected Relative Percent Difference (RPD) values were calculated for the analytical results from the sample and its respective replicate. In accordance with the British Columbia Field-Sampling Manual, the calculation was applied as stated below:

$$RPD = Absolute \frac{(Sample\ Concentration - Replicate\ Concentration)}{\left(\frac{Sample\ Concentration + Replicate\ Concentration}{2}\right)}\ x\ 100\%$$

RPD calculations were only practical for results where concentrations were found at or greater than five times the reported detection limit (RDL) as there is considerable uncertainty at low levels. In addition, mathematical calculations for RPD appear exaggerated with low values where absolute differences may be relatively low. It is expected to see variation between a sample and its respective field replicate for a number of reasons. Some considerations include: inconsistent sample stream at sampling locations; heterogeneity of water at sampling location; the possibility of minor contaminations; laboratory sample preparation and accuracy of analytical instrument to name a few. Taking these possibilities into consideration, RPD values less than 20% are deemed

"acceptable" and indicate proper sampling methodology with representative results. It has been acknowledged that RPD values greater than 20% indicate a potential problem with sampling integrity whereas values greater than 50% indicate a definite problem.

RPD calculations with values greater than 20% and 50% are presented in Appendix I, Tables 40 and 41.

During the 2018/2019 monitoring year, there were 1733 sample sets submitted to the laboratory and a total of 66 replicate surface and groundwater water samples were collected. Of the 4850 analyzed parameters in these samples, 105 (2.16%) had an RPD greater than 20% while 57 of the 4850 (1.17% of total) had an RPD greater than 50%. Duplicate analyses for total aluminum accounted for the most frequent instances of RPD greater than 20% resulting in 10 out of 105 (10/105) occurrences, with 8 of those results having an RPD greater than 50%. Turbidity, sulphide and dissolved nitrogen occurred (8/105) and dissolved phosphorus (7/105), total iron (6/105) and total manganese (5/105) and dissolved selenium and acidity both resulted in (4/105). Overall the parameters that were found with an RPD greater than 50% seem to be displaying enough RPD magnitude to identify a serious problem needing immediate attention include total aluminum, copper and nutrients. QCC will continue to adhere to sampling practices identified in MOE (2016) and promote best practices at all locations.

The RPD for field blank sample concentrations should not be significantly greater nor occur more frequently than for laboratory method blanks (MOE 2016). Results greater than two times the laboratory MDL were identified and investigated to determine potential contamination.

Field blank, trip blank, and equipment blank results of laboratory grade deionized water were within the acceptable range for samples analyzed in 2018/2019. There were 4 blank samples analyzed for sulphate and metals; all results met the RPD, indicating acceptable field sample collection and handling.

Results of the 2018/2019 QA/QC review indicate confidence in the ability of QCC to collect and analyze samples that meet required accuracy and precision requirements. Internal performance audits will continue, and any identified deficiencies will be investigated to adjust sampling protocol. All employees will be kept up to date with sampling procedures and provided with any training and equipment necessary.

A variance analyses to identify outliers is performed prior to uploading analytical data into the database. Any results outside 95% confidence intervals (within 4 standard deviations) of previous results are investigated, and if needed Maxxam is contacted and the results are rerun, with a new report issued that include a review of Maxxam's internal investigation.

Maxxam Analytics laboratory performs internal QA/QC on all sample sets that are analyzed. This is included in the laboratory report provided from Maxxam and reviewed by QCC. The internal QA/QC performed by Maxxam Analytics meets laboratory standards. Maxxam Analytics internal QA/QC involves the following procedures with every sample set analyzed:

- Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
- Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
- Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

6.0 HYDROLOGY

6.1 NORTH WATER MANAGEMENT SYSTEM

6.1.1 *AUTHORIZED DISCHARGE RATES AT SETTLING POND #4 (WD) E207409*

Maximum authorized rates of discharge at WD are 0.32m^3/s (instantaneous) and 0.08m^3/s (annual average) or 2,522,880 m^3 over a period of 365 days. Maximum discharge rates were below 0.32m^3/s throughout the entire monitoring period and peaked in December through January during heavy precipitation events. Cumulative discharge was calculated as 3,793,971m^3, equivalent to an annual average discharge rate of 0.1203 m^3/s; higher than the authorized average (0.08 m^3/s or 2,522,880 m^3). Figure 4 displays cumulative annual average discharge rate and daily discharge rates compared to the average annual authorized rate of discharge.

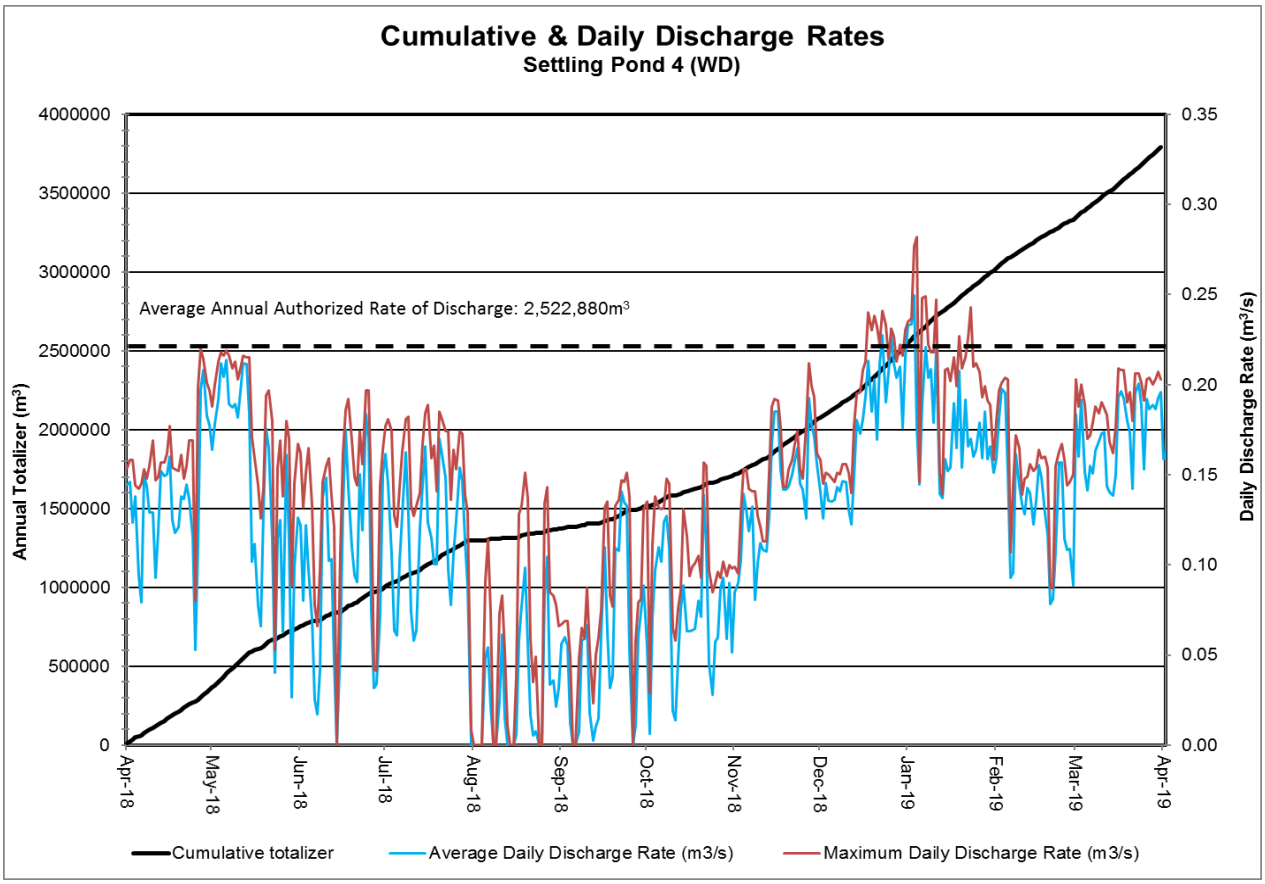


Figure 5: Settling Pond #4 Cumulative Annual Average Discharge Rate and Daily Discharge Rates

The annual average flow rate exceeded the permissible value due to elevated discharge rates at WD during spring, fall, and winter coinciding with increased (seasonal) precipitation events and continuous pumping to maintain water levels underground in 2-North mine in preparation for mining.

Coal processing water is pumped from Settling Pond #4, reducing the discharge rates significantly when this occurs. Discharge rates are related to coal processing, dewatering from underground 2-North mine and precipitation. In the absence of coal processing the discharge rates should increase as this water is not being removed from the pond.

The rate of discharge at Settling Pond #4 was under investigation with Quinsam Environmental Department. The outlet end of the discharge pipe is pointing upwards and is partially submerged causing a head pressure differential on the outlet end. These conditions cause slightly higher readings possibly by 20%. In order to correct this, construction work would have to occur on the dam to correct the position of the pipe. The decant riser and discharge pipe was cleaned out by Roto Rotter to remove any buildup. The quantity of water discharged next year is anticipated to remain consistent with this year's annual average authorized rate of discharge if pumping continuous at the same rate throughout the year.

A summary of discharges from Settling Pond # 4 is displayed in Appendix I, Tables (29-30).

6.2 SOUTH WATER MANAGEMENT SYSTEM

6.2.1 *AUTHORIZED DISCHARGE RATES AT SETTLING POND #1 (SPD) E218582*

Maximum authorized rates of discharge at SPD are 0.46m^3/s (instantaneous) and 0.10m^3/s (annual average) or 3,153,600m^3 over a period of 365 days. Both annual maximum flow (0.244m^3/s) and annual average flow (0.0265m^3/s) were well below the permitted rates. Figure 6 displays cumulative annual average discharge rate and daily discharge rates compared to permit limits.

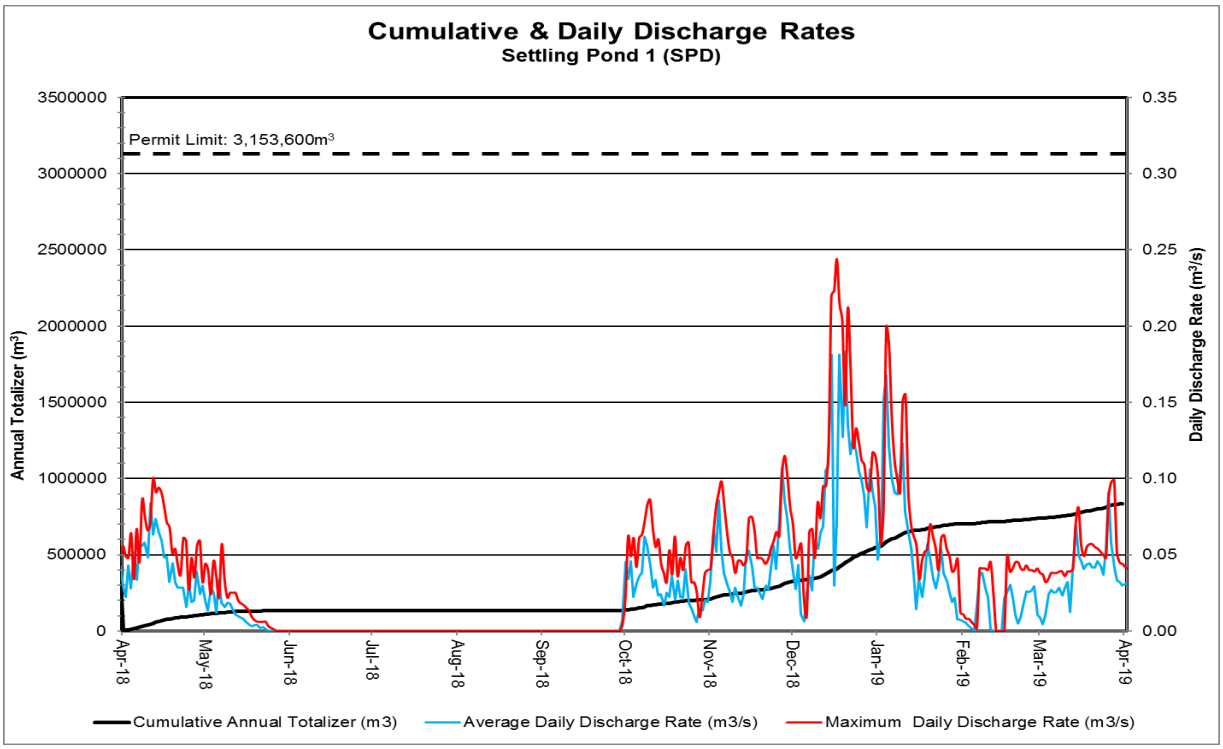


Figure 6: Settling Pond #1 Cumulative Annual Average Discharge Rate and Daily Discharge Rates

Zero discharge occurred from May 25th through September 28th, 2018. Daily discharge peaked at SPD throughout the winter December through January coinciding with heavy precipitation resulting in increased surface runoff and pumping from the 3-South pit.

A summary of SPD discharge is displayed in Appendix I, Tables (31-32).

6.2.2 *South Water Management System Entrance into Long Lake (LLE) E292130*

Flow monitoring is required weekly at LLE, which discharges near the outlet of Long Lake. Discharge at LLE represents the combined flow from the South water management systems along with groundwater from the 4-South coal pad area and non-mine related surface water from the upstream wetland and drainage features. As such, this site provides cumulative flow data representing all discharges from the South water management system prior to entering Long Lake near the outlet.

Flow at LLE is well correlated with precipitation events and, historically, experiences a seasonal dry period during summer.

Appendix II, Graph 59 displays discharge versus precipitation at LLE.

6.2.3 *Seep Monitoring Sites, Long Lake Seep (LLSM) – E292131*

Manual flow measurements are obtained weekly at the LLSM weir. The flow information is available in Appendix II, Graph 58. The flow recorded at Long Lake Seep indicates a dependency on mine pool (void) water levels. Mine pool water levels correlate with seasonal precipitation, with highest levels observed in January 2019. As mine pool levels decrease below a certain elevation in late spring, flow at the seep decreases substantially and temporarily ceases during late summer early fall. In 2018, discharge from the seep stopped for four months (August 10 through November 14th). It is determined that seep flow is most closely related to water level at the monitoring well MW004 and the threshold level for seep flow is approximately 303.5 - 304 mASL. This trend will continue to be monitored and verified in the future. In August 2018 an H-fume with a flow meter was installed at Long Lake Seep Middle to provide continuous monitoring of discharge at the seep.

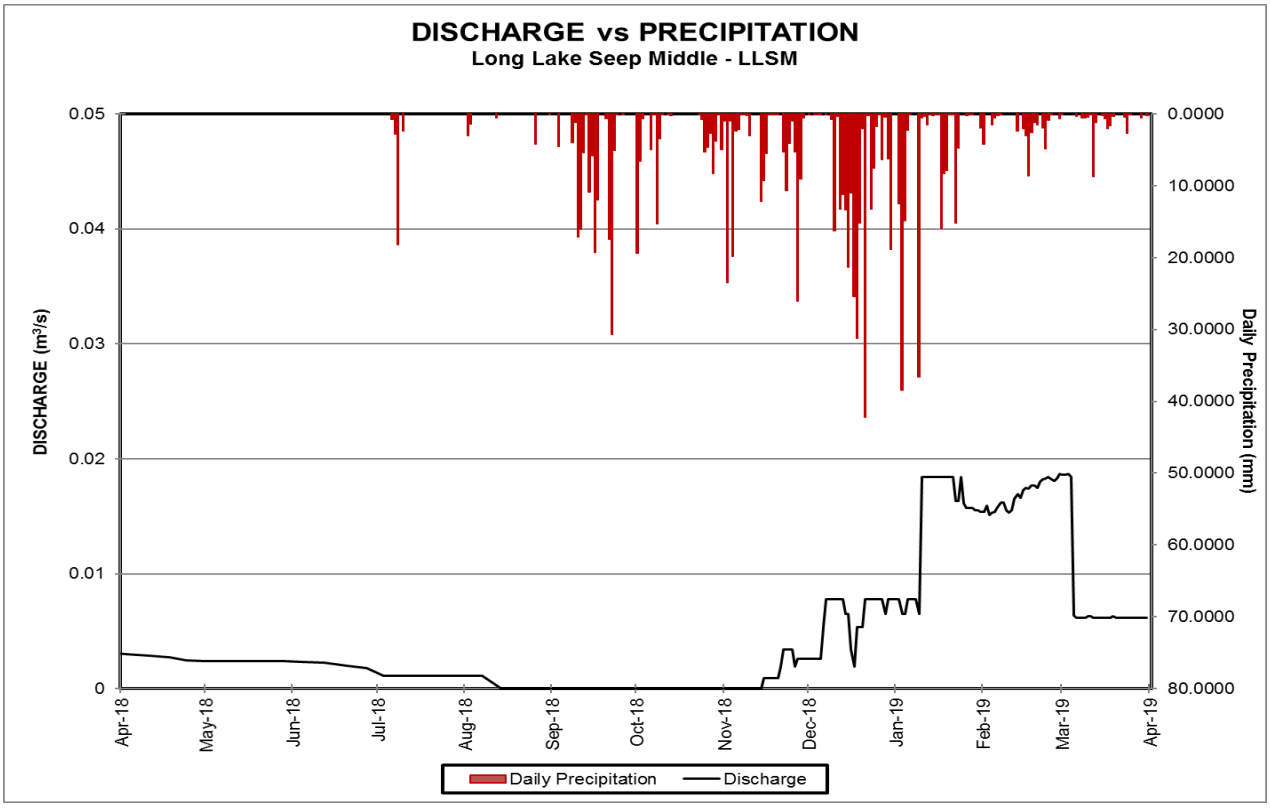


Figure 7: Discharge vs Precipitation Long Lake Seep Middle (LLSM)

6.3 7-South Mining Operation Decant (7SSD) - E292069

The maximum authorized discharge from settling pond 7SSD is 0.005m^3/s (5 L/s). However, discharge is dependent on assimilative capacity of Stream 1 (7S) and, therefore, dynamic in nature. To facilitate determination of the appropriate discharge level at 7SSD, a flow rating curve was developed for monitoring site 7S (Figure 8) to allow instantaneous flow levels at 7S to be measured by reading the installed staff gauge.

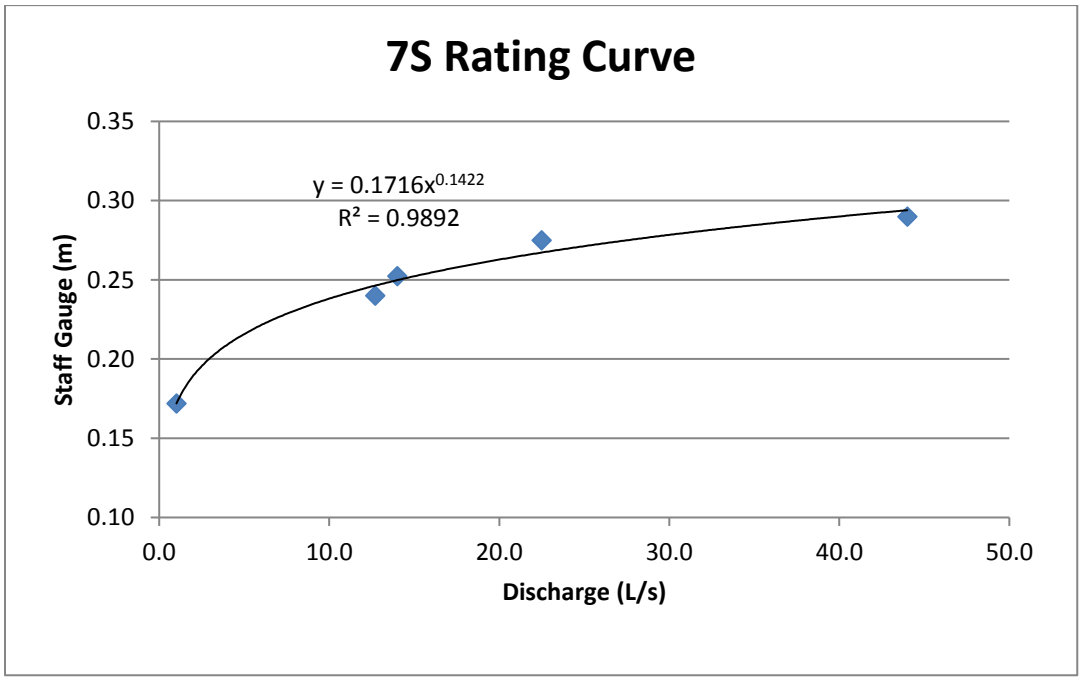


Figure 8: Monitoring Site 7S Stage Discharge Curve

Initially, an 8:1 dilution ratio was identified to maintain desirable water quality in the receiving environment, monitored at downstream site Stream 1 (7S). However, throughout the 7-South operational period, a lower dilution ratio has been shown to allow WQG's to be met in the receiving environment (site 7S). The dynamics of this system are still being monitored and measured; as a longer-term dataset is developed, the information will be evaluated to optimize discharge rates, while continuing to protect aquatic life.

In 2015, modifications were made to minimize discharge from 7SSD. The containment pond (7SCP) that delivers water into 7SSD was enlarged to accommodate more water. Additional pumps were placed at 7SSD and 7SCP to decrease 7SSD discharge and assist environmental personnel

in water management. The revised system pumps water from 7SSD and 7SCP to 7SPS. The pump at 7SCP runs on an automated float system where water levels are kept below the overflow channel into 7SSD. During high precipitation events, a secondary pump can be activated to assist in pumping water to 7SPS. This pump can also be relocated to 7SSD, where any accumulated water can be diverted into 7SCP. This system does not eliminate all discharge from 7SSD but substantially reduces discharge frequency and aids in management during times of heavy precipitation.

No discharge occurred during 2018-2019, Appendix I, Table 33.

7.0 RECEIVING ENVIRONMENT HYDROLOGY

Hydrometric stations in the receiving environment monitor hydrological conditions at key locations affected by QCC operations. Stage discharge curves for these stations have been developed using various methods (e.g. staff gauge, pressure transducer, manual measurements) and are periodically updated to ensure that the full range of flow is captured. The information is used to evaluate water quality and, in turn, determine assimilative capacity of the receiving environment with respect to mine related discharge. Moreover, flow is well correlated with lake flushing and turnover events, which directly influence concentrations of certain parameters (e.g. sulphate).

Flow data for WA is obtained from the Environment Canada monitoring station "Quinsam River at the Argonaut Bridge"; the data is currently subject to revision and has not been approved. The flow for WA is controlled upstream by the BC Hydro diversion dam to Gooseneck Lake; therefore, the volume of water diverted for hydro generating purposes influences flows at WA and WB. Accordingly, water levels at these two stations are not as closely correlated with precipitation as they are for other receiving environment stations.

Flow monitoring stations on the Iron River, Stream 1, and Long Lake system(s) are directly influenced by precipitation and the hydrographs typically show a pronounced peak following a precipitation event. This increase generally represents additional dilution and, therefore, assimilative capacity (for most parameters) in the receiving environment.

Appendix II, Graphs (56, 57, 60, 61 and 62) display flows compared to water level measurements and precipitation for the receiving environment hydrometric stations (WA, WB, LLO, 7S and IR8).

8.0 WATER QUALITY: IN-MINE MINE RELEASES & WATER MANAGEMENT SYSTEMS

This section presents results of the 2018/2019 water quality monitoring program for the North, South, and 7-South in-mine releases and water management systems for the major monitoring locations (e.g. settling ponds, discharges), permitted parameters and parameters of interest, to provide context for evaluating receiving environment water quality. The data for all in-mine release water quality monitoring stations are presented in throughout Appendix I of the tables section. Weekly field pH and conductivity results are presented in Appendix I, Tables (37 to 39).

Appendix I, Tables (43 - 72) provide a five year statistical summary (year over year, minimum, maximum, average, median, geometric mean, count, count < detection limit (DL), standard deviation, first quartile, third quartile and standard error) for 27 parameters measured in the Settling

Ponds, applicable receiving environment monitoring stations, and ex-situ groundwater wells. Monitoring years 2014-15 to 2018-19 are presented, where data is available. Table 5 below lists the monitoring stations, parameters, and statistics included in this evaluation.

For a summary of permit limit exceedances please refer to Appendix I, Table 2 and Appendix VIII to review the Annual Status Form prepared for PE-7008.

Table 5: List of Monitoring Stations, Parameters and Statistics

Monitoring Stations		
WA	LLS	
WD	LLSM	QU0813A
MW001D	MW002	QU0813B
MW001S	QU1009D	QU0821GD
MW006D	QU1009S	QU0821GS
MW006S	SPD	QU1010D
WC	LLE	QU1010S
MQL1	LLM1	QU1011D
MQLB	LLMB	QU1011S
NNL1	LLO	QU1105S
NNLB	WB	QU1109S
NNO	7SSD	7SQR
Parameters		
Arsenic (As-T)	Iron (Fe-T)	Lead (Pb-T)
Arsenic (As-D)	Iron (Fe-D)	Lead (Pb-D)
Aluminum (Al-T)	Manganese (Mn-T)	Sulphate (SO4-D)
Aluminum (Al-D)	Manganese (Mn-D)	Zinc (Zn-T)
Alkalinity (Alk-T)	Mercury (Hg-T)	Zinc (Zn-D)
Cadmium (Cd-T)	Mercury (Hg-D)	Phosphorous (P-T)
Cadmium (Cd-D)	Hardness (Hard-T)	Phosphorous (P-D)
Copper (Cu-T)	Nickel (Ni-T)	Nitrate & Nitrite combined (N-NO2,3)
Copper (Cu-D)	Nickel (Ni-D)	Ammonia Nitrate (N-NH3)
Statistics		
Count	Geometric Mean	1st Quartile
Minimum	Count <DL	Median
Maximum	Standard Deviation	3rd Quartile

8.1 NORTH WATER MONITORING SITES

The 2-North mine pool could be considered a large reservoir with different chambers hosting a variety of geochemical water quality. The 2-North mine system holds fresh water from perched water tables above the mine that interact with exposed mine walls at 5-Mains. 1-Mains 2-North holds 7-South tailings from processing of 7-South coal and 3-Mains holds a mixture of water from flooded 5-South mine pool (5SMW), dewatering of the 7-South mine and tailings dam seepage collected at SDS.

Mine water from 7-South Area 5 (7SA5) is directed into the underground sump 1-Mains 7-South (1M7S). From here water is pumped into the 7-South portal sump (7SPS) where it mixes with surface water in the sump or is pumped directly into the flooded 5-South mine pool at borehole (QU0513). From the 5-South mine, water is pumped via a 6-inch pipeline directly into 3-Mains 2-North mine and includes water from the SDS. Water collected in the 2NPS is a mixture of 1-Mains 2-North and tailings dam seepage. 2NPS discharge line ties into the 3-Mains pipeline and discharges into Brinco brook.

Brinco brook also collects discharge water from underground dewatering wells 1-Mains, 2-North (1M2N) where 7-South tailings are injected and 5-Mains #2 (5M#2) where flooded workings are dewatered. Both wells dewater the flooded mine pool of the 2-North mine.

All discharge water pumped into Brinco brook is sampled on a monthly or quarterly basis from the well heads and portal sumps. These sites include: 2NPS, SDS, 1M2N, 5M#2, 5SMW, 7SA5, 1M7S and 7SPS (Appendix I, Tables 6, 8, 179 to 267). Geochemical source terms were derived for specific areas and modeled with different scenarios where mine water interacts with tailings or flooded mine pools. This is discussed in more detail below.

Discharge water quality from Brinco brook forms the headwaters for Settling Pond # 4 where water quality is compared to permit limits and source terms derived for this site. The two primary permitted monitoring locations in the North water management system are located at Settling Pond #4, (SP4) sedimentation pond decant (WD) EMS #E207409 and the final discharge point above Middle Quinsam Lake, (WC) EMS #E207411. Results for WD and WC including additional monitoring locations in the North mine area are provided in Appendix I, Tables (4-9).

8.1.1 *Settling Pond #4 (WD) EMS #E207409*

Results for the 2018/2019 monitoring program demonstrated that most water quality for all permitted parameters were within the permit limits listed in Table 6, except for TSS. Appendix I, Tables (4, 27, 34 and 37) provide water quality results for Settling Pond #4.

Table 6: Permit Limits Applied to Settling Pond #4

Parameters	Limit	Unit
Total Suspended Solids (daily composite)	25	mg/L
Total Suspended Solids (hourly composite)	35	mg/L
pH	6.0-8.5	mg/L
Ammonia (as N)	1.0	mg/L
Phosphorus (as P)	0.03	mg/L
Oil and Grease (total)	10	mg/L
Aluminum, dissolved	0.5	mg/L
Copper, dissolved	0.02	mg/L
Iron, dissolved	0.3	mg/L
Lead, dissolved	0.05	mg/L
Zinc, dissolved	0.1	mg/L
Rainbow Trout Bioassay (*Oncorhynchus mykiss*)	No mortalities at 100% effluent concentration after 96 hour	96LC50

8.1.2 *General Parameters*

pH

In 2018/2019, field pH values displayed little variance, ranging from 7.02 to 8.40 and averaging 7.90. The water is alkaline to pH neutral. Starting in April 2013, field measurements (instead of lab) were used for improved accuracy and reliability. Consequently, a slight decline in reported pH was observed compared to historic results as depicted in Appendix II, Graph 3. Weekly field pH results are provided in Appendix I, Table 37.

Total Suspended Solids (TSS)

There was one exceedance that occurred on February 1st, 2019 resulting in 28 mg/L 3 mg/L above the permit limit of 25 mg/L. This occurred due to freezing conditions at the site where the composite sample froze in the bottle and possibly elevated iron in the water column. The mitigation plan for TSS exceedances is the use of a silt curtain that has been placed in Brinco brook to aid in reducing flow and increase retention time in the wetland, this was installed in March 2019. Observations with respect to precipitation, dewatering system operations, pond turbidity in Brinco brook and WD,

concentrations of TSS and metals will continue to refine best practices and minimize TSS concentrations in WD. TSS was below detection limits <4.0 mg/L for most of the monitoring period with peak concentrations reaching 28 mg/L.

Hardness and Dissolved Sulphate

Both hardness and sulphate concentrations at WD have displayed marked decreased since 1996; see Graphs 1 and 2 in Appendix II. During 2018/2019, dissolved hardness ranged from 307 mg/L to 444 mg/L (averaging 380 mg/L), while sulphate ranged from 491 mg/L to 764 mg/L (averaging 575 mg/L). Sulphate concentrations remained consistent throughout the year with average monthly sulphate concentrations peaking during February and March 2019; concentrations were not outside of a normal range for sulphate during this time.

Normally peak concentrations are observed in summer months, with lower concentrations during late winter and early spring and higher concentrations during summer and early fall. Peak concentrations may have been associated with runoff or dewatering. Sulphate continues to be the primary parameter of interest from mine related discharges, as it's a common and traceable parameter associated with coal mining.

8.1.2.1 *Metals and Geochemical Source Terms*

Since commencement of underground mining in 1992, dissolved aluminum, copper, iron, lead and zinc concentrations have remained below permit limits, with minor, irregular fluctuations noted. In 2018-19 all permitted dissolved metal parameters remained below permit limits.
Parameters of interest or those displaying trends such as total and dissolved iron, total arsenic and manganese are displayed graphically in appendix II, Graphs 5 through 8.

The *7-South Area 5 Water Quality Effects Assessment*[2] by Lorax Environmental Services Ltd (Lorax) 2013 was prepared in support of QCC's application to amend the mining permit C-172 to develop the 7-South mine into Area 5. Lorax was retained by QCC to developed and characterize the groundwater chemistry, predict seepage rates and geochemical mass loadings on receiving environment from 7-South Area 5 (7SA5). Monthly source terms were derived from modeling different scenarios of pumping rates from 7SA5 to SP4 discharge for Al-T, Al-D, As-T, B-T, Cd-T,

[2] Lorax. 2013. "7-South Area 5 Water Quality Effects Assessment".

Co-T, Cu-T, Fe-T, Fe-D, Pb-T, Mn-T, Ni-T, Se-T, Zn-T, Ca-T and Mg-T. This section and section 7.1.3 will present the water quality for the parameters of interest and those that were above the monthly predicted source terms in scenario 3d (Table 7 below). The predicted water quality in scenario 3d 2018 is where 30% of groundwater inflow to 7SA5 is directed to SP4. This equates to 12 L/s discharge to Settling Pond # 4 (SP4) from 7SA5, modeled in the report prepared by Lorax. The scenario 3d uses only the 7SA5 water that was originally meant to discharge into the tailings dam where seepage would be captured at the 2NPS and then discharged into Brinco brook.

The parameters graphed below include As-T, Fe-T, Fe-D, Cu-T, Co-T, Mn-T and SO_4. Monthly concentrations of As-T were graphed against scenario 3d for a direct comparison.

Table 7: Scenario 3d, 2018 -30% of 12L/s Discharge to SP4.

Scenario 3d, 2018 – 30% of 12 L/s Discharged to SP4.

	Concentration (mg/L - except pH)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
pH	8.04	8.05	8.06	8.13	8.06	8.02	8.07	8.03	8.11	8.13	8.10	8.03
SO_4	533	517	517	589	708	741	762	771	750	842	678	614
Al-T	0.182	0.117	0.147	0.226	0.209	0.305	0.202	0.187	0.201	0.189	0.119	0.159
Al-D	0.089	0.092	0.075	0.090	0.171	0.262	0.148	0.168	0.150	0.174	0.077	0.073
As-T	0.0023	0.0024	0.0023	0.0021	0.0026	0.0032	0.0025	0.0025	0.0023	0.0023	0.0040	0.0031
B-T	0.92	0.82	0.93	0.75	0.82	0.82	0.95	0.96	0.94	0.99	1.02	0.95
Cd-T	0.000034	0.000024	0.000019	0.000024	0.000036	0.000055	0.000021	0.000032	0.000019	0.000114	0.000032	0.000021
Co-T	0.0045	0.0030	0.0032	0.0040	0.0070	0.0093	0.0053	0.0058	0.0053	0.0059	0.0029	0.0032
Cu-T	0.0029	0.0013	0.0019	0.0020	0.0018	0.0023	0.0018	0.0016	0.0015	0.0014	0.0015	0.0023
Fe-T	0.60	0.41	0.54	0.58	0.63	0.95	0.55	0.57	0.53	0.57	0.58	0.59
Fe-D	0.198	0.271	0.175	0.201	0.549	0.661	0.377	0.432	0.394	0.442	0.200	0.165
Pb-T	0.000224	0.000223	0.000222	0.000225	0.000256	0.000284	0.000391	0.000286	0.00025	0.000255	0.000224	0.00022
Mn-T	0.160	0.118	0.147	0.136	0.223	0.308	0.184	0.189	0.178	0.184	0.117	0.135
Ni-T	0.0096	0.0062	0.0074	0.0094	0.0150	0.0197	0.0112	0.0119	0.0107	0.0124	0.0063	0.0074
Se-T	0.00029	0.00016	0.00025	0.00031	0.00033	0.00035	0.00032	0.00026	0.00024	0.00045	0.00026	0.00022
Zn-T	0.0075	0.0075	0.0073	0.0076	0.0110	0.0139	0.0101	0.0108	0.0103	0.0108	0.0076	0.0071

Pink shaded values indicate a permit limit exceedance

7-South Area 5 Water Quality Effects Assessment[3]

Presently the SP4 discharge is influenced by many sources of water therefore, this evaluation demonstrates that water quality is falling within the range of predicted values at 30% groundwater inflow from 7SA5 discharging to SP4, which represents the worst-case scenario.

[2]Lorax. 2013. "7-South Area 5 Water Quality Effects Assessment".

In February of 2019 mining commenced in 7SA5, dewatering had been occurring from this area since December. From February 2019 to April 2019 a total of 87,01.97 m3 has been pumped out of 7-South Area 5. This water becomes a combination of different sources (1-mains 7-South and 5-South mine water) as it is stage pumped into Brinco brook where it mixes with other sources of mine water and discharges at SP4.

Total arsenic concentrations have been graphed since 2011 and display a spike in concentrations attributed to the injection of 7-South tailings into the 2-North mine pool commencing in 2012. Peak concentrations occur in the winter and spring when pumping rates were greatest. Figure 8 below compares concentrations of total arsenic to the predicted values of scenario 3d. In 2018-2019 total arsenic has remained below the B.C. acute WQG of 0.005 mg/L from the discharge water but are approaching guidelines. This will be monitored closely in the future. The seasonal worst case was expected to be during the summer months when concentrations would peak but discharges would decrease to a minimal. At this time the spike displayed in arsenic is not suspected to be influenced by 7SA5 water quality but could be associated with other areas of dewatering in 7-South or 5-South mines. A new dewatering well pump (1-Mains 2-North well No. 1) was installed in the 2-North mine pool in December. This would have mobilized metals from underground and in Brinco brook.

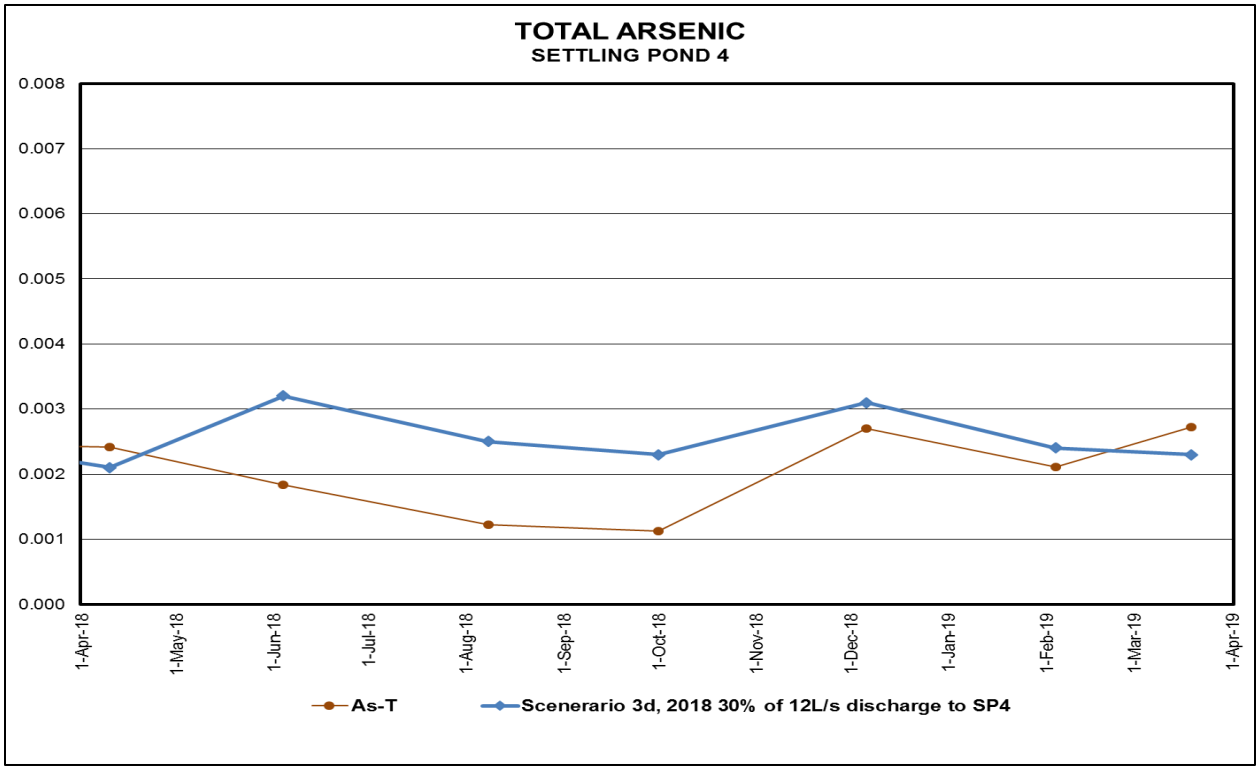


Figure 9: Total Arsenic at SP4 compared to predicted values

Iron speciation from ferrous iron to ferric iron occurs when waters are alkaline to pH neutral and exposed to oxygen. Ferric hydroxide ($Fe(OH)_3$) will result in the total form of iron and is the dominate species of iron in discharge water at SP4. Total iron concentrations (Fe-T) have shown an increasing trend since 2007, with concentration variations relating to fluctuating 2-North mine pool water elevations and pH of the discharge water. Concentrations ranged from 0.055 mg/L to 1.54 mg/L, averaging 0.636 mg/L. Peak concentrations were observed in February and March with elevated TSS and sulphate concentrations. The relationship between the mine pool water elevation and elevated total iron concentrations at SP4 is believed to be directly related to water flushing the oxidized mine walls releasing iron into the water column. Source waters such as tailings injection, 5-South and 7-South mine water also contribute to elevated iron in the water column. Scenario 3d predicted that iron would remain elevated in the total fraction due to precipitation of ferric hydroxides but remain below WQG levels of 1.00 mg/L. As displayed in the Figure 9 below elevated total iron concentrations have been observed since 2015 above WQG's of 1.00 mg/L.

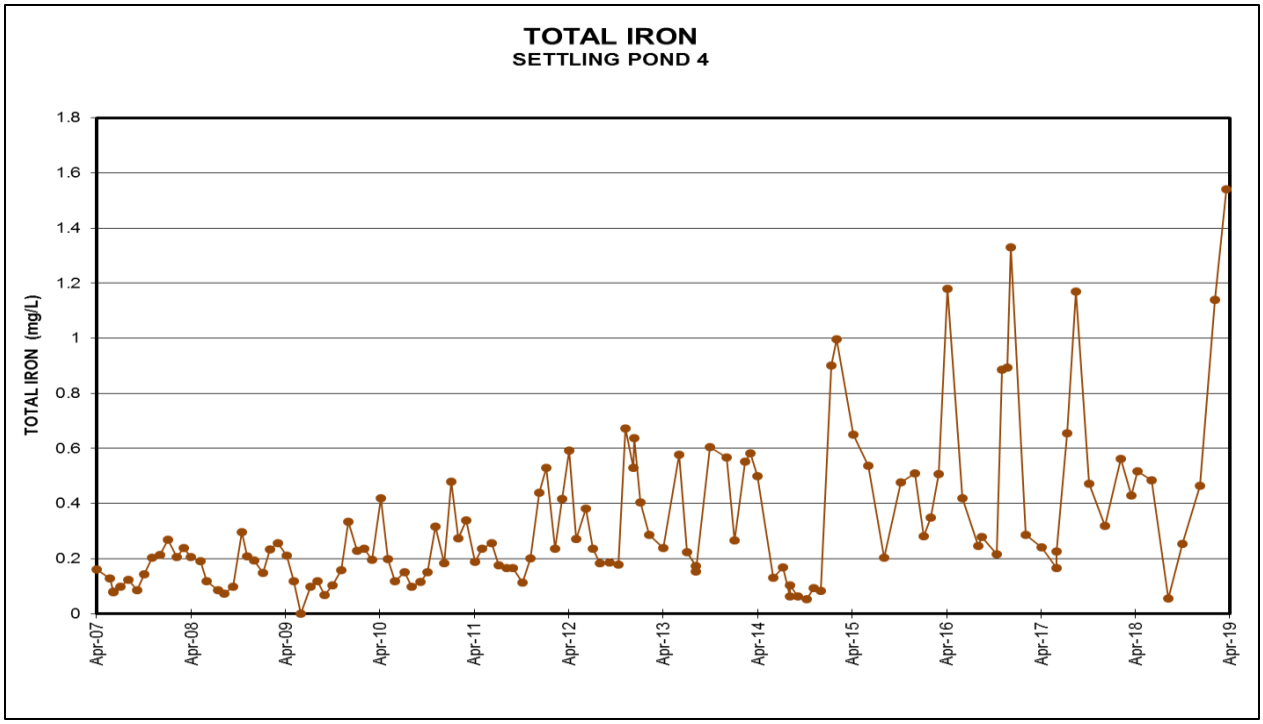


Figure 10: Total Iron at SP4

8.1.3 *Culvert into Middle Quinsam Lake (WC) EMS #E207411*

Monitoring station WC represents the cumulative surface water discharge from WD prior to entering Middle Quinsam Lake. Concentrations for parameters of interest are typically slightly lower at WC than at WD, likely attributed to the attenuation that occurs along the WD-WC flow path that includes an expansive wetland. The exception observed is sulphate concentration during summer when discharge and dilution are lowest, and evapo-concentration is thought to occur. During 2018/2019, sulphate ranged from 304 mg/L to 729 mg/L, averaging 518 mg/L at WC.

Metal concentrations are attenuated in the wetland, likely due to uptake by vegetation. This was particularly evident for total iron during times of elevated TSS and iron at WD. All concentrations of metals remained below permit limits and WQG's at this site. This site does not have permit limits but is graphed against WD discharge for comparison. Water quality at WC and WD are compared to scenario 3d from 2014 Lorax source terms predictions for those parameters displaying an increasing trend or approaching WQG.

The wetland below WD also provides additional settling and filtration for TSS, which was below the DL (4 mg/L), even when TSS was elevated at WD discharge historically (Appendix II, Graph 4).

The results demonstrate the wetland is functioning to reduce TSS before the discharge enters Middle Quinsam Lake. It is important to remember that after passing WC, the discharge water enters another large wetland before entering the inlet of Middle Quinsam Lake approximately 350 m downstream of WC.

The below figures compare concentrations of discharges from WD to WC from 2011 to present. As displayed water quality at WC is normally lower than concentrations from WD. Most parameters displayed below (As-T, Fe-T, Fe- D, Co-T, Cu-T and Mn-T) have remained below water quality guidelines historically to present and all parameters follow a similar trend as WD at a lower concentration except for dissolved iron. There have been a few occasions where concentrations have become elevated nearing guideline levels in Co-T, Cu-T and Mn-T. Sulphate and Fe-D are the only parameters that do not display a decrease in concentrations from WD to WC. In the scenario 3d cobalt was predicted to increase above background levels at WD. Concentrations of Co-T are observed to be elevated but are not above the acute-WQG of 0.11 mg/L at either station. Water quality in Middle Quinsam Lake has remained acceptable with POI remaining in low concentrations compared to WQG's.

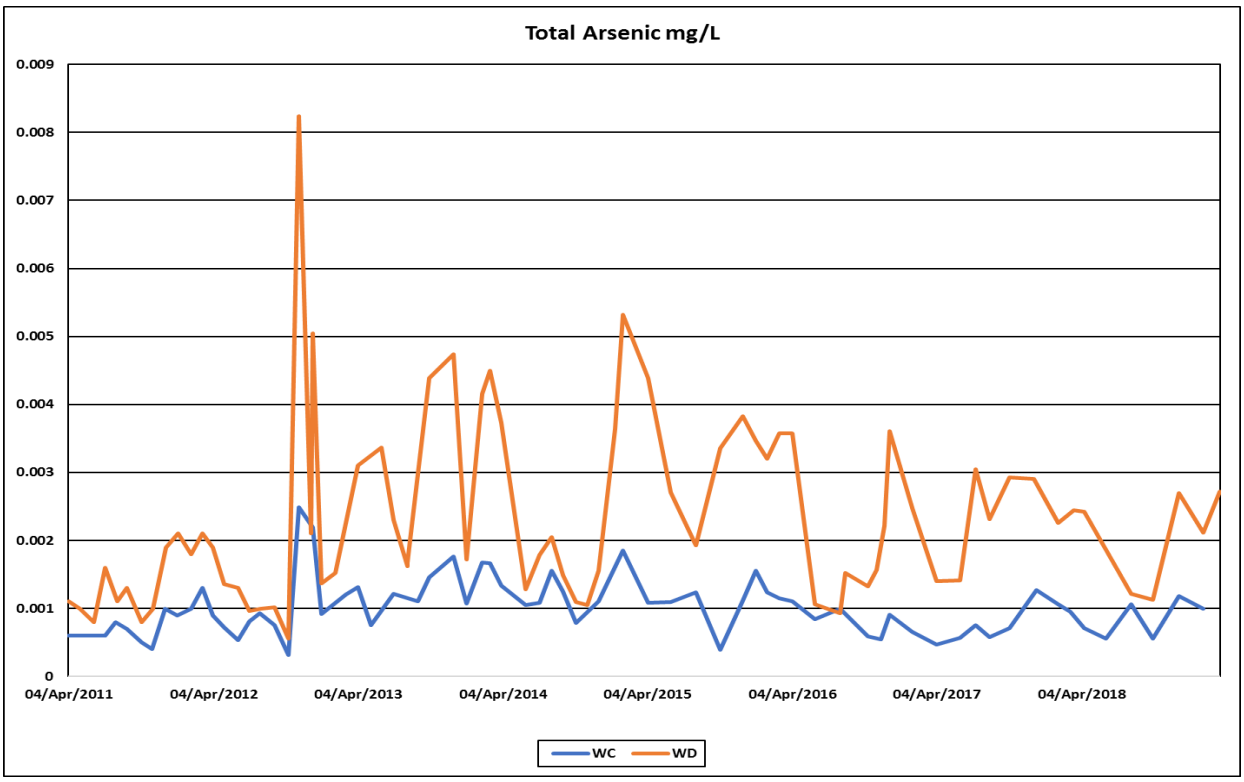


Figure 11: Total Arsenic Comparison at WC and WD

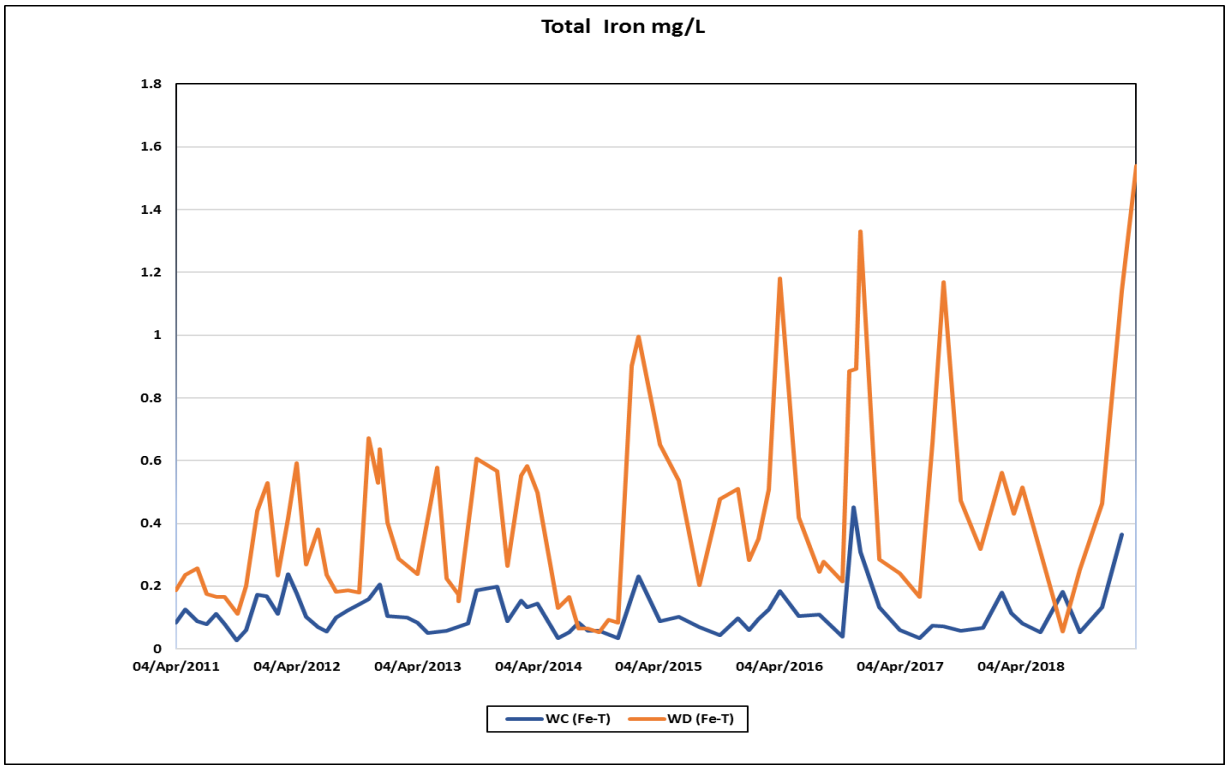


Figure 12: Total Iron Comparison at WC and WD

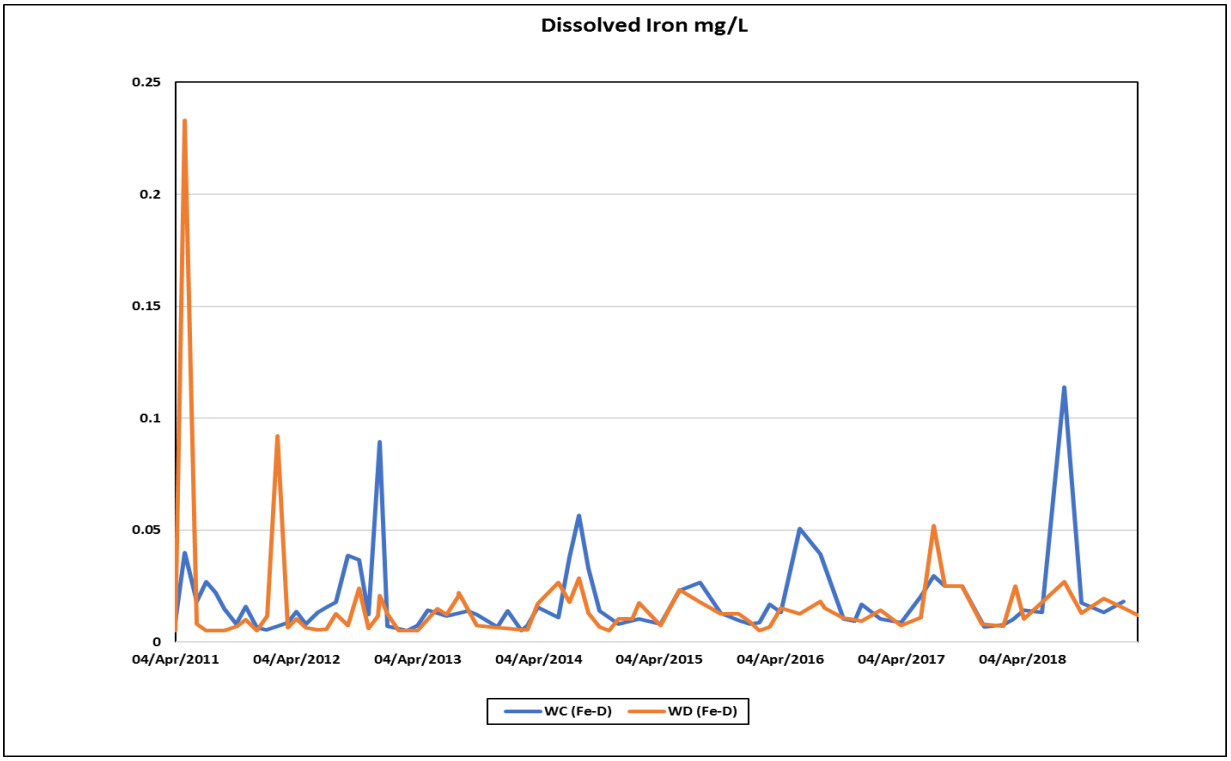


Figure 13: Dissolved Iron Comparison at WC and WD

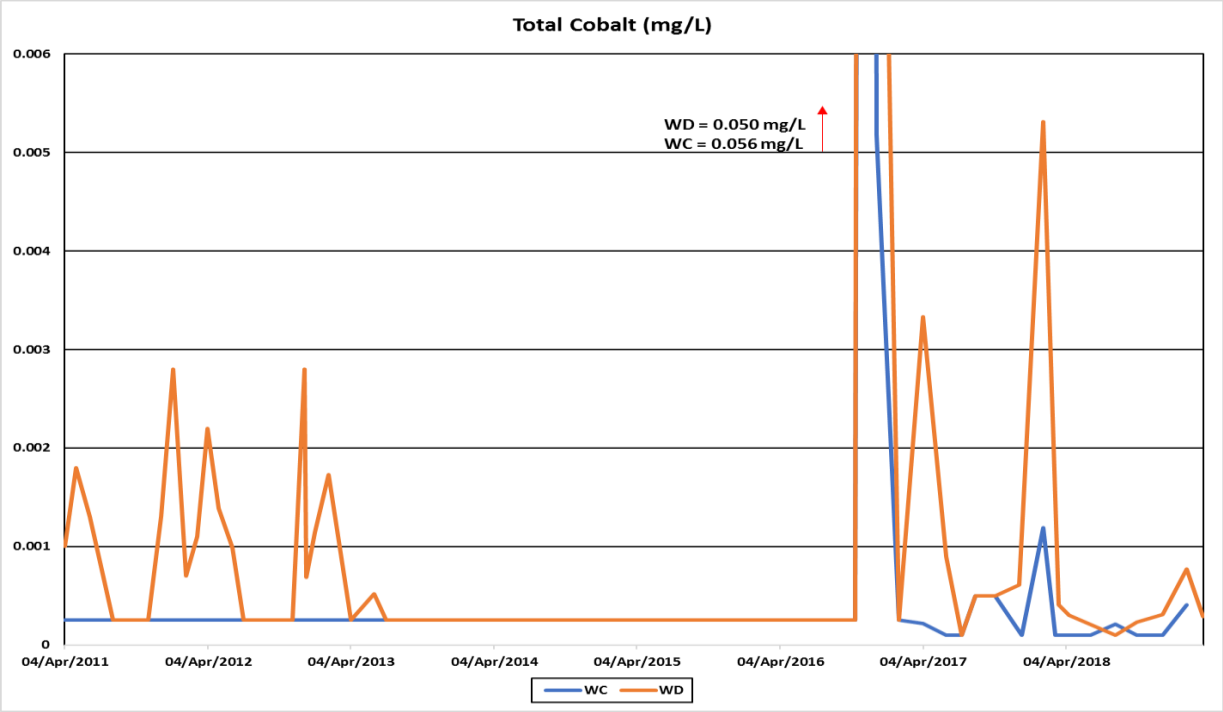


Figure 14: Total Cobalt Comparison at WC and WD

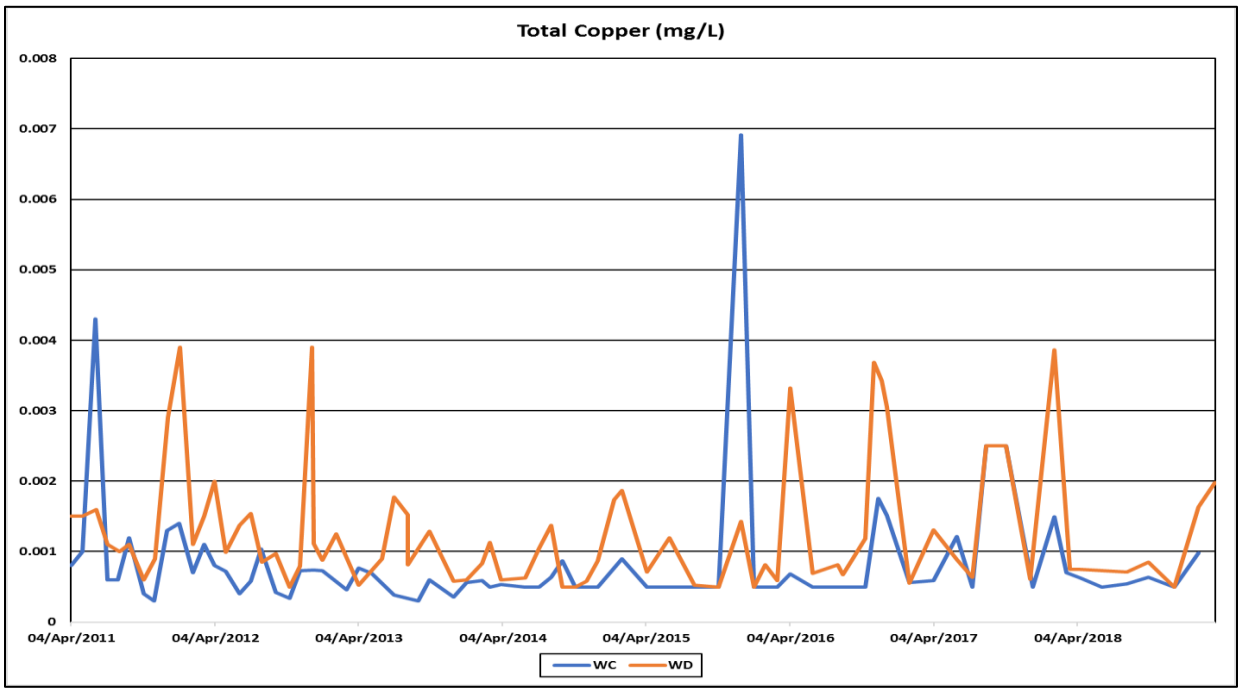


Figure 15: Total Copper Comparison at WC and WD

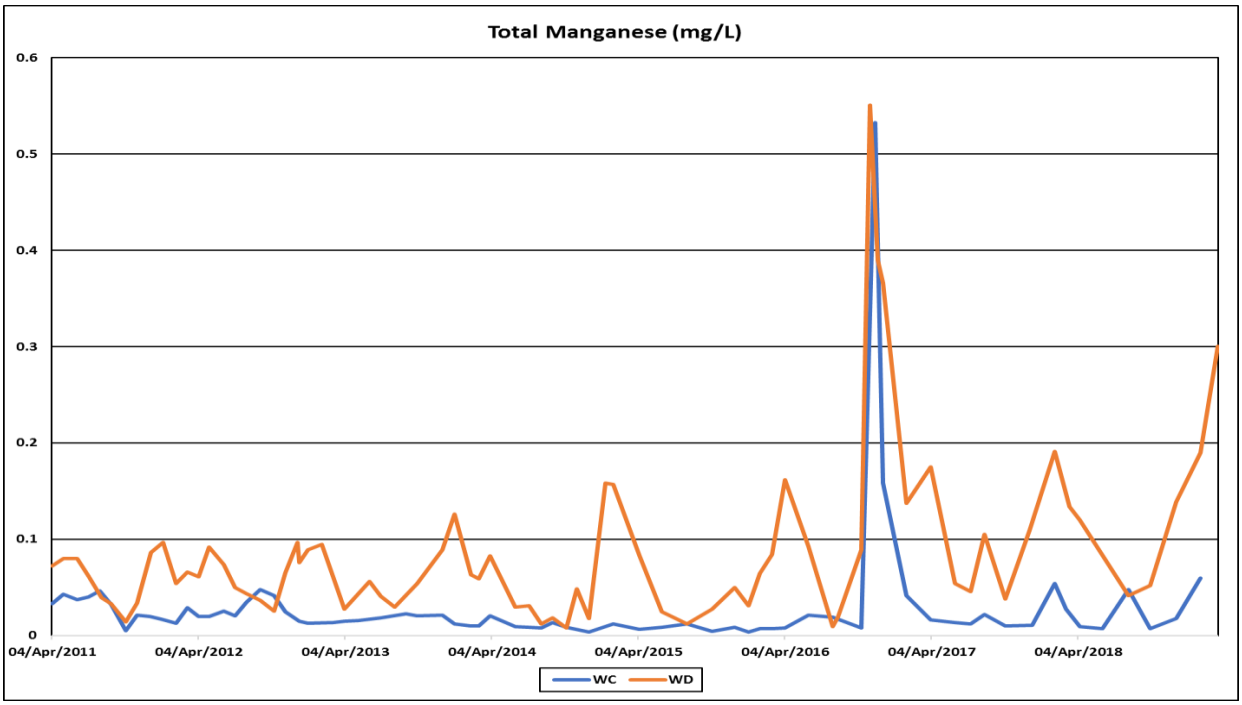


Figure 16: Total Manganese Comparison at WC and WD

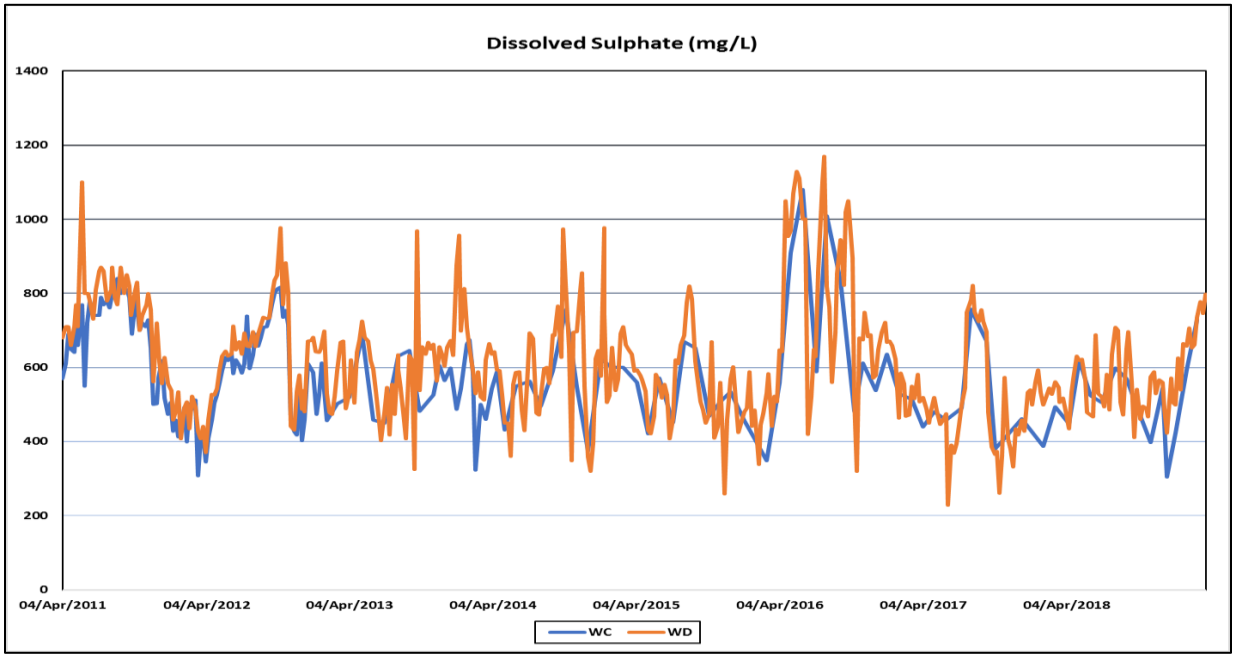


Figure 17: Dissolved Sulphate Comparison at WC and WD

8.2 SOUTH WATER MONITORING SITES

The primary monitoring locations in the South water management system are stations that directly influence water quality in Long Lake: Settling Pond #1 decant (SPD) EMS #E218582, Long Lake Entrance (LLE) EMS #E292130, and Long Lake Seeps (LLS & LLSM) EMS #E292131.

SPD captures the combined discharge of the Long Lake Seep Passive Treatment System (LLSPTS) from the biochemical reactor cell (BCREFF) and the sulphide polishing cell (SPCEFF). The treated discharge water from SPCEFF has been redirected to 2-South pit EMS #E292127, where (when overflowing from 2-South during winter), flows to 3-South pit and is pumped to SPD. In spring until late fall 3-South pit (EMS # E217015) water is directed back into 2-South pit for a closed loop circuit. The treatment system discharge aids in maintaining the required 1.5 m water cover over 2-South pit during times of low precipitation. All discharge is contained within the authorized works and meets permit limits when discharging from SPD.

Results for the monitoring locations in the South mine area are provided in Appendix I, Tables (10 through 24 and 34-36 and 38).

8.2.1 *SETTLING POND #1 (SPD) EMS #E218582*

Settling Pond #1 represent the cumulative mine related discharge from the South water management system. Permit limits applied to SPD are shown in the table below. All parameters remained within permit limits at SPD during 2018/2019.

Table 8: Permit Limits Applied to SPD

Parameters	Limit	Unit
Total Suspended Solids (daily composite)	25	mg/L
Total Suspended Solids (hourly composite)	35	mg/L
pH	6.0-8.5	mg/L
Ammonia (as N)	1.0	mg/L
Phosphorus (as P)	0.03	mg/L
Oil and Grease (total)	10	mg/L
Aluminum, dissolved	0.5	mg/L
Copper, dissolved	0.02	mg/L
Iron, dissolved	0.5	mg/L
Lead, dissolved	0.05	mg/L
Zinc, dissolved	0.2	mg/L
Rainbow Trout Bioassay (*Oncorhynchus mykiss*)	mortalities at 100% effluent concentration after 96 hour	96LC50

Appendix I, Tables (10, 28, 34 and 36) contain results for SPD water quality. Appendix II, Graphs (9 through 14) display the parameters of interest for SPD.

8.2.1.1 *General Parameters*

pH

All pH readings were within the permit limits in 2018/2019. Weekly field conductivity and pH are displayed in Appendix I, Table 38. pH values ranged from 6.45 to 8.50 and averaged 7.64. Appendix II, Graph 11 displays pH throughout the year peak values occur when there is no discharge from the settling pond and decline through fall and winter as discharge commences, corresponding to pumping from 3-South pit.

Nutrients

Ammonia and dissolved phosphorus remained below the permit criteria of 1 mg/L and 0.03 mg/L at SPD, respectively.

Total Suspended Solids (TSS)

Grab and composite samples for TSS analysis were collected, depending on discharge rates and sampling criteria. TSS ranged from 1.1 mg/L to 8.30 mg/L with no permit limit exceedances. Most results were less than the detection limit of 4.0 mg/L. Appendix II, Graph 12 displays the last six years of data for SPD compared to the downstream location SPC.

Hardness and Dissolved Sulphate

Prior to 2015, the 2 and 3-South pits were the main contributors of sulphate to Settling Pond #1 before dewatering of the 5-South commenced in 2015. As retreat mining was completed in 5-South mine, the workings were isolated from the 2-North mine workings via an engineered bulkhead that does not allow in-situ water to interact between mines. Dewatering occurs to maintain water level in the underground workings and alleviate the pressure on the concrete bulk heads that are installed separating 2-North from 5-South. The 5-South mine water was transported via pipeline to Settling Pond #1 via a pumping system triggered by increases in water elevation in the 5-South Mine. As water management is crucial in the 5-South mine pool, excess water was pumped into Settling Pond #1, resulting in increased sulphate concentrations there. In mid-December 2017 a

new drill hole was installed in between 14 crosscut and 15 crosscut on A1 road in the 5-South mine pool. With this new installation geographically the 2-North mine pool was closer would aid in further dilution of the 5-South mine water. The 5-South mine pool consists of the combination of 7-South portal water and 5-South water. This water is pumped into 2-North, 3 Mains and then eventually discharged into Brinco Brook.

Sulphate concentrations in Settling Pond #1 have varied, depending on pumping rates from 5-South underground and 3-South Pit during times of heavy precipitation. Since the 5-South Mine pool water was redirected to 2-North mine at the end of 2017, the main contributor to sulphate is 3-South pit. This year sulphate at SPD ranged from 25 mg/L to 368 mg//L and averaged 193 mg/L. Concentrations were highest from summer through fall (low dilution) and lowest during winter (higher flow and high dilution) as shown in Appendix II, Graph 10. Sulphate concentrations will continue to be closely monitored.

Typically, there is zero flow at SPD from late spring to early fall as there is no pumping from 3-South Pit. There was no discharge from SPD from May 26th through September 28th, 2018. Appendix I, Table 34, displays weekly sulphate results at SPD.

8.2.1.2 *Dissolved Metals*

All permitted dissolved metals (Al-D, Cu-D, Fe-D, Pb-D and Zn-D) concentrations at SPD remained below SPD permit limits. Appendix II, Graphs (13 and 14) display POI for SPD (Fe-D and Mn-T). Dissolved iron was elevated during summer (August) when no discharge occurred and in December. Discharge water quality remained below permit limits of 0.50 mg/L but was elevated nearing WQG of 0.35 mg/L during August and December resulting in 0.238 mg/L and 0.223 mg/L, respectively. Mn-T remained in low concentrations with one peak occurring in November (0.349 mg/L) related to increased discharge rates.

As-T and Fe-T remained in low concentrations with peak concentrations observed during zero discharge in summer months. Fe-T neared WQG of 1.00 mg/L during June (0.98 mg/L) and As-T peaked during August (0.004 mg/L).

Besides elevated sulphate, water quality at SPD has remained in good condition even after the addition of the treatment system water. It is expected that this trend will continue in the future.

8.2.2 *Long Lake Entrance (LLE) EMS #E2922130*

LLE is the most downstream monitoring station in the South Water Management System and represents cumulative mine water discharge into Long Lake (excluding the seeps). This station is located at the outflow of a culvert discharging from a wetland, where discharge water flows through an approximately 50 m long channel before entering Long Lake. LLE is not defined as a receiving environment station but rather constitutes the upstream segment of a mixing zone defined as the IDZ in the permit. For observation purposes, results for LLE are compared to WQGs to assess overall water management system performance and influence on Long Lake.

Sulphate and iron are two main parameters of interest at LLE; both frequently exceeding WQGs as displayed in Appendix II, Graphs 15 through 17. In 2018/2019, weekly rolling average sulphate ranged from 92 mg/L to 469 mg/L and annual average sulphate concentration resulting from weekly samples was 204 mg/L. Peak concentrations were observed in spring and summer during low flow periods. Sulphate concentrations exceeded the WQG of 128 mg/L for 12 out of 36 weeks when applying a five-week rolling average. The sulphate WQG varies with hardness (see Table 9) and QCC follows a conservative approach defined in the WQG assuming a background hardness of 30 mg/L (very soft water, measured at WA) to derive a sulphate WQG of 128 mg/L. Annual average hardness concentration at LLE was 216 mg/L. If the sulphate guideline for very hard water (hardness between 181 mg/L and 250 mg/L) at LLE was applied, the sulphate WQG would be 429 mg/L resulting in exceedances for only 5 out of 36 weeks. If the average hardness in Long Lake 1 m from surface during all seasons (79 mg/L) was applied, the WQG would be 309 mg/L resulting in exceedances for 6 out of the 36 weeks.

These comparisons demonstrate the conservative approach incorporated into the WQG for protection of aquatic life. It should also be noted that during the summer low flow period LLE discharge may not be flowing into the lake before it is evaporated. This year there has also been beaver activity at LLE which blocked the culvert and stirred up the bottom sediment. The culvert was cleaned out many times during the summer and fall. Discharge at LLE is extremely low during summer and early fall. This is displayed in Appendix II, Graph 59.

Table 9: Approved 30-day Average Water Quality Guideline for Sulphate to Protect Aquatic Life

Water hardness* (mg/L)	Sulphate water quality guideline (mg/L)
Very Soft (0-30)	128
Soft to moderately soft (31-75)	218
Moderately soft/hard to hard (76-180)	309
Very hard (181-250)	429
>250	Need to determine based on site water

Both total (1.00 mg/L) and dissolved (0.35 mg/L) iron exceeded the WQG in monthly sampling events. Total iron had 1 exceedance in September resulting in 1.93 mg/L. Dissolved iron had 3 out of 10 months (September, October and March) where results were elevated above WQG resulting in 0.800 mg/L, 0.383 mg/L and 0.869 mg/L, respectively. Exceedances occurred in late September and early October after the removal of a beaver dam that had been blocking the culvert all summer and during the spring freshet when the ice was melting.

Elevated iron is observed during low flow when anoxic conditions are occurring in the wetland and high flow conditions causing the mixing of iron-rich bottom waters of the wetland into surface water discharged at LLE. The high flows may have inhibited the typical redox reactions and iron precipitation processes that reduce dissolved iron to particulate iron.

The Vancouver Island Objective (VIO) for streams defines a maximum suitable concentration for total phosphorous of 0.01 mg/L and an average concentration of 0.005 mg/L applied from May through September. Exceedances occurred for two of the four monthly samples collected in May and August resulting in 0.0114 mg/L and 0.0172 mg/L. The 5-month average was not calculated due to only 3 months being sampled. As previously stated, LLE is not considered a stream and the VIO is used for general comparison. Nutrients are monitored at LLE to assess loading from the treatment system for potential adverse effects on Long Lake and the downstream receiving environment. The elevated concentrations are most likely attributed to natural biotic processes including assimilation by vegetation, plankton, periphyton, and microorganisms. In wetlands, macrophytes play a significant role in uptake, assimilation and storage of phosphorous. Macrophytes absorb phosphorous directly from the water column and release it shortly after upon

vegetation decomposition (R. Reddy, R. H. Kadlec, E. Flaig & P. M. Gale.1999)[4]. Elevated total phosphorus concentrations have been measured since before the treatment system was installed as displayed in the figure below. The measured concentrations are unlikely to result in eutrophication downstream given the low discharge rates from LLE during summer and the absence of a measurable increase in phosphorus in Long Lake where LLE enters the lake.

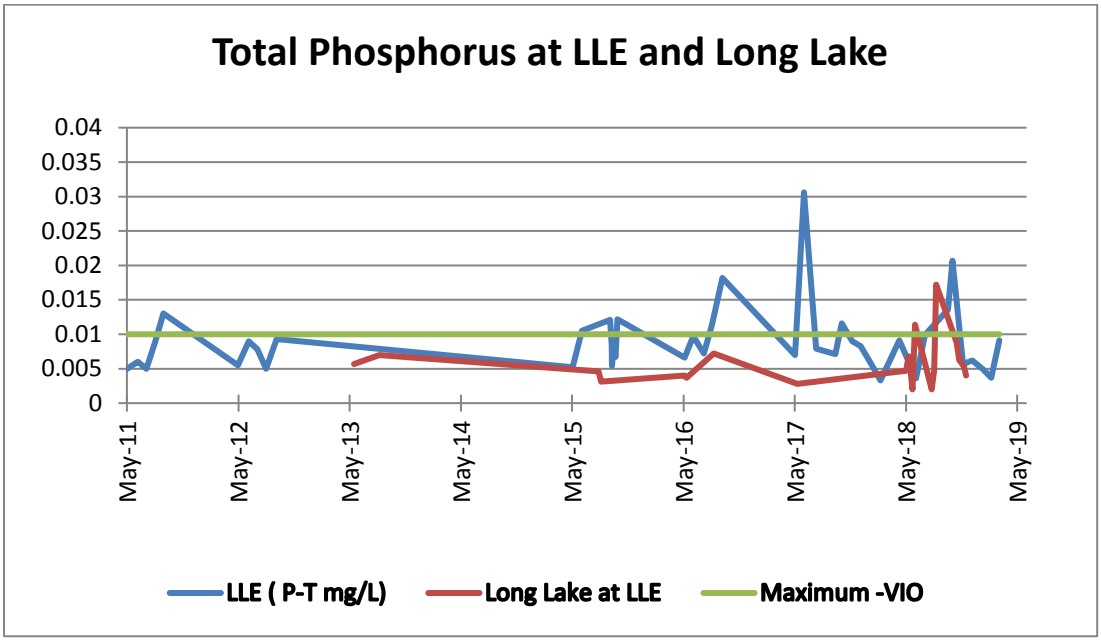


Figure 18: Total Phosphorus at LLE and Long Lake May through September 2011- 2019

Sulphate, iron, and TSS concentrations are influenced by precipitation events and source loading from the multiple disturbance areas within the South mining area. As sulphate and iron are continually found in high concentrations throughout routine monitoring. As a result, Lorax was contracted to perform a loading assessment for LLE to investigate the potential influence from the 4-South portal pad area. This was followed up with further water quality monitoring at LLE during times of low flow and additional studies. Lorax submitted a study in February 2017 entitled "*LLE Wetland Survey and Iron Discharge Study."* Quinsam submitted a report in April 2017 entitled "4-South Loading - LLE Water Quality Summary Report (Including Historical Reports)". These studies provide a greater understanding of elevated iron and sulphate concentrations within the LLE wetland.

[4]R. Reddy, R. H. Kadlec, E. Flaig & P. M. Gale .1999. Phosphorus Retention in Streams and Wetlands: A Review, Critical Reviews in Environmental Science and Technology, 29:1, 83-146K

Lorax (2017) concluded:

> "*The study results indicated that iron introduced into the LLE wetland via 4S-Lo is particulate Fe3+, which is stored within the wetland. Under typical conditions, the particulate Fe3+ settles in the wetland pond and cycles between the wetland substrate and the base of the oxic surface water layer. Water discharging from the wetland and sampled at LLE on August 29th, 2016 had a low concentration of Fe-T, and iron was less than detection limit in all the filtered samples. These data indicate that iron being discharged to Long Lake is present as particulate iron, which has a relatively low bioavailability. Therefore, potential effects from mine-related inputs of iron to Long Lake should be assessed for the Fe-T fraction."*

Water quality has improved following the reclamation work performed on the 4-South Pad as well as the new culvert (at a slightly higher elevation) installation at LLE. Total and dissolved iron has continued to exceed guidelines as the wetland experiences anoxic conditions during summer and fall flush causes turbidity during high flows stirring up the bottom waters.

Appendix I, Tables (22, 36 and 38) provide the full set of data collected at LLE. A statistical summary of the past five years is available in Appendix I, Tables 43 through 72.

8.2.3 *Long Lake Seep*

The seep into Long Lake is a bedrock groundwater seep delivering water from the 2-3 South mine pool. This seep is monitored for water quality and quantity to assess overall loading into Long Lake. Long Lake seep water chemistry is influenced by groundwater levels in the 2 and 3-South mining area(s) and is subject to seasonal 'flushing' events due to local precipitation and infiltration.

Two seep sites are monitored on a continuous basis – LLS is the smaller seep and LLSM is the middle seep. LLSM is considered the primary seep, as flows at this site are typically much higher (and variable) than LLS; as such, the hydrology monitoring station is located on this seep.

Overall, water chemistry at both seeps remained consistent with that observed during previous reporting periods. A similar pattern of high flow during winter and no flow through summer and early fall was observed in 2018-19; the dry period (late August through early November) was the same as 2017. During spring and summer of 2018 (May and August) a serious of drill holes (24) were drilled into the cliff area above the seep. A poly urethan expanding foam was injected into some of the drill holes; those experienced a change in turbidity at the seep water while drilling. The change in turbidity indicated contact with the seep water area. It was anticipated that after injecting the foam the seep would have been mitigated. As experienced in previous years the middle seep flow ceases in August and commenced in November, when the mine pool is recharged with

groundwater. Unfortunately, the injection of foam did not mitigate the seep areas as intended. The middle seep ceases to flow when the mine pool water level falls below the elevation of approximately 303.5 - 304 meters above sea level (MASL) (measured at MW00-4).

During the dry season for the middle seep a concrete pad was poured above the weir structure and below the weir. An H-Flume was installed below the weir on the concrete, equipped with an ultra-sonic depth sensor and a flow meter. With the expectation of a few interruptions the seep flow has been capture since November when discharge commenced. The flow rates were similar to what was recorded previously with peak flows at around 18 L/s occurring from mid-January to mid-March and subsiding in spring. Appendix II, Graph 58.

Sulphate concentrations at the middle seep (LLSM) are normally elevated with and consistent through throughout the year. This year higher concentrations were observed in summer and spring with lower concentrations observed in winter. Results remained fairly consistent throughout the monitoring year with a lowest concentration in April of 325 mg/L and peak concentrations occurring in June and March resulting in 545 mg/L.

Concentrations at the smaller seep (LLS) are elevated during summer and spring and decrease slightly during winter and early fall. Although results are available for LLS, the cumulative flow at this site was negligible. The increase in sulphate concentrations observed during winter and spring is thought to be attributed to oxidation (and leaching) of the mine void walls as displayed in Appendix II, Graph 19. The mine void is recharged with infiltration of groundwater after it is depleted during summer.

Other parameters of interest include arsenic, iron, and total manganese. This year concentrations of arsenic were low at the middle seep with a peak concentration for total and dissolved arsenic resulting in 0.00130 mg/L and 0.00083 mg/L, respectively. At the smaller seep (LLS) there was one exceedance of WQG (0.005 mg/L) resulting in 0.00649 mg/L during November. Appendix II, Graph 20 displays dissolved arsenic concentrations at the seeps. Concentrations are displaying a declining trend compared to previous years.

Several exceedances for both total and dissolved iron at both seeps were observed. Since the initiation of field filtering and preserving dissolved metal samples, dissolved iron has displayed an increase in concentrations. Mine water high in iron concentrations has the highest observed effect from the transition of laboratory filtering compared to field filtering. This is explained in detail in Section 5.3 of this report.

Iron occurs naturally in water in soluble form as the ferrous iron (bivalent iron in dissolved form Fe2+ or Fe (OH)+) or complexed form like the ferric iron (trivalent iron: Fe3+ or precipitated as Fe (OH)3). The occurrence of iron in the Seep water ‘s is mine related. These sites have elevated concentrations of iron, which is evident by the iron rich sediment deposited as the iron changes state from ferrous iron to its oxidized state ferric iron, when it interacts with oxygen. This makes sample collection extremely difficult at these locations and insurances are made so the flow path is not disturbed prior to sampling (as is routine everywhere). If any of the sediment is disturbed due to higher flow conditions or extremely low flow conditions the results will display elevated levels of iron. As a result, iron has a higher percentage of exceedances occurring here due to the flow path the water is taking over the iron rich sediment and sample collection.

Metals display the same seasonal trend as sulphate, with peak concentrations in the summer and spring at the middle seep. Appendix II, Graphs 21 and 22 displays the concentrations of total manganese and dissolved iron since 2011. Total manganese has remained below the WQG of 0.8 mg/L since 2011. Dissolved iron exceeded the WQG of 0.35 mg/L at LLS on 7 out of 13 monthly samples collected and 2 out of 10 monthly samples collected at LLSM. Peak concentrations at LLS were observed during winter with a maximum of 1.44 mg/L. At LLSM peak concentrations were observed in August and March with a maximum of 0.483 mg/L. Total iron exceeded the WQG of 1.00 mg/L at LLS on 4 out of 13 monthly samples collected during fall and winter. Peak concentrations resulted in 2.77 mg/L in November. At LLSM total iron concentrations resulted in 1 out of 10 exceedances. This occurred during December resulting in 1.03 mg/L.

All monthly water quality samples collected from the seeps are included in Appendix I, Tables 23-24 and 38.

8.3 7-South Water Monitoring Sites

The 7-South water management system is comprised of several structures (Section 2.3) to manage local water in and around the disturbed area, with the most substantial structure being the 7-South settling pond (7SSD). This structure represents the point of discharge for 7-South operations and is regulated under PE-7008. Table 10 outlines the applicable permit limits at 7SSD for each controlled parameter.

Table 10: Permit Limits Applied to 7SSD EMS #E292069

Parameters	Limit	Unit
Total Suspended Solids (daily composite)	25	mg/L
Total Suspended Solids (hourly composite)	35	mg/L
pH	6.0-8.0	mg/L
Sulphate	500	mg/L
Aluminum dissolved	0.1	mg/L
Cadmium dissolved	0.000045	mg/L
Copper dissolved	0.014	mg/L
Iron dissolved	0.35	mg/L
Selenium dissolved	0.016	mg/L
Rainbow Trout Bioassay (*Oncorhynchus mykiss*)	No mortalities at 100% effluent concentration after 96 hour	-

8.3.1 *7-South Settling Pond (7SSD) EMS #E292069 and Steam 1, (7S) EMS #E292109*

No discharge occurred at 7SSD this year.

A discussion of settling pond performance and validation of actual effluent water quality compared to the water quality prediction model developed for the 7-South water management plan by Lorax was not performed at 7SSD as there was no discharge from this location. Refer to section 7.1.2.1 for a comparison of geochemical source terms associated with 7-South Area 5 and SP4 discharge water quality predictions.

Complete water chemistry datasets can be found in Appendix I, Tables (25, 33 and 34).

Water quality compared to the water quality predictions model are presented in Table 11 for 7S. All annual average water quality concentrations measured for the parameters modeled at 7S were below the expected case predictions modeled by Lorax. This indicates that water quality has improved from previous years, resultant of adopted water management practices that are effective at reducing impacts downstream at 7S. These methods include pumping all mine related discharged from the 7-South area into 5-South mine pool and then into 2-North mine pool where it

is discharged at SP4. Appendix I, Table 26 provides discharge water quality at 7S and Appendix II, Graph 61 provides flow vs precipitation at Stream 1, 7S.

Table 11: Water Quality Prediction Model-Bes and Worst-Case Scenarios Compared to Measured Concentrations at 7S

7S WQ (2018-19 Averages)				
Parameter	**Expected Case (mg/L)**	**Worst Case (mg/L)**	**Average (mg/L)**	**Result**
Fluoride	N/A	N/A	N/A	
Sulphate	6.49-7.80	15.4-17.8	4.0	**Below Expected**
Aluminum	0.043	0.055-0.056	0.02619	**Below Expected**
Arsenic	0.0002	0.0003	0.00008	**Below Expected**
Boron	0.052-0.063	0.061-0.063	0.00159	**Below Expected**
Cadmium	0.000010	0.000013	0.0000035	**Below Expected**
Cobalt	0.00046-0.00047	0.00062-0.00065	0.0001	**Below Expected**
Copper	0.001	0.001	0.00044	**Below Expected**
Iron	0.020-0.021	0.030-0.031	0.0055	**Below Expected**
Manganese	0.0026-0.003	0.007	0.0005	**Below Expected**
Nickel	0.001	0.001	0.0005	**Below Expected**
Selenium	0.00028-0.00030	0.00070-0.00075	0.00005	**Below Expected**
Zinc	0.005	0.005	0.0025	**Below Expected**

***When calculating averages, 0.5 of the method detection limit values were used.**

8.4 BIOASSAYS

An LC50 (median lethal concentration) is the concentration of material (in this case, effluent) in water that is estimated to be lethal to 50% of the test organisms. The LC_{50} and its 95% confidence limits are usually derived by statistical analysis of percent mortalities in several test concentrations, after a fixed period of exposure. The duration of exposure must be specified (e.g., 96-h LC50).

PE-7008 indicates that rainbow trout (*Oncorhynchus mykiss*) LC_{50} bioassays are required once per year (fall flush) at Settling Pond #1, EMS# E218582 and at Settling Pond #4, EMS# E207409. The bioassays are performed using 100% (non-diluted) discharge water to assess the potential survival of rainbow trout over a period of 96-hours. A successful test sees no mortalities throughout the 96-hour period. Discharge was collected from Settling Pond #1 and Settling Pond #4 on October 4th, 2018.

The permit requires a 96-hour LC_{50} test on rainbow trout to be completed using 7SSD EMS# E292069 effluent water and, concurrently, a 7-day *Ceriodaphnia dubia* test from water obtained

from 7S, EMS# E292109. This is required twice per year; once during the spring freshet and once during the fall flush, when discharging is occurring from 7SSD. The discharge from 7SSD pond did not occur this resulted in omitting the spring freshet and fall flush samples.

All rainbow trout bioassays and the *Cedriodaphnia dubia / Daphnia Magna* bioassays had 100% survival (Appendix III). This indicated that mine related discharges at Settling Pond #1 and Settling Pond 4, are compliant, with no acute toxicity in the effluent discharged.

9.0 WATER QUALITY IN THE RECEIVING ENVIRONMENT

Preamble – Water Hardness

For this report, hardness dependent WQGs were derived using background levels of hardness (i.e., WA and IR1 monitoring location, ~30 mg/L) to provide a conservative assessment of receiving environment water quality. Guidelines and objectives do not have legal status but are designed to provide resource managers with direction and comparison for protection of receiving environments with aquatic life.

Guidelines and Objectives: Receiving environment water quality is compared to the British Columbia Ambient WQG for Protection of Aquatic Life for most parameters. The exceptions are hypolimnetic DO (using a WQO based on a site-specific conditions), total cobalt and total lead (using more recently established site-specific Water Quality Objectives (WQO)[5]), and total phosphorus in streams (using the Vancouver Island objective[6]). Table 12 lists the WQG, WQO and VIO used to screen receiving water quality.

[5] Campbell River Area Middle Quinsam Lake Sub-Basin Water Quality Assessment and Objectives. Ministry of Environment. 1989

[6] Guidance Document for Phosphorous Management in Vancouver Island Streams. Ministry of Environment. 2012

Table 12: Water Quality Guidelines and Objectives Applied to Receiving Environment Stations

Parameter	Lakes (mg/L)		Streams (mg/L)	
	Maximum	5 in 30-day Avg	Maximum	5 in 30-day Avg
Phosphorus - total	0.007 summer avg - Long Lake		0.01	0.005**
	0.006 summer avg - Middle Quinsam L		(May-September)	
Turbidity	n/a	n/a	5.0 NTU	1.0 NTU
Non-filterable residue or TSS	25	5	n/a	n/a
Hypolimnetic DO	3 mg/L minimum during June-August		n/a	n/a
pH	6.5 – 9	n/a	6.5 – 9	n/a
Aluminum (dissolved)	0.1	0.05	0.1	0.05
Arsenic (total)	0.005	n/a	0.005	n/a
*Cadmium (dissolved)	0.00017	0.000088	0.00017	0.000088
Cobalt (total)	0.05	0.004	0.05	0.004
Copper (total)	0.007	0.002	0.007	0.002
Iron (total)	1.0	n/a	1.0	n/a
Iron (dissolved)	0.35	n/a	0.35	n/a
Lead (total)	0.005	0.003	0.005	0.003
Manganese (total)	0.8	0.7	0.8	0.7
Mercury (total)	0.0001	n/a	0.0001	n/a
Nickel (total)	0.025	n/a	0.025	n/a
Silver (total)	0.0001	n/a	0.0001	n/a
Zinc (total)	0.03	n/a	0.03	n/a
*Sulphate dissolved	n/a	128	n/a	128

* Values represent Middle Quinsam sub-basin water quality using WA hardness.

** Average based on monthly samples from May to Sept

Water quality at locations outside of the Middle Quinsam Lake Sub-basin, such as the Iron River and 7-South (7S and LWO), are compared exclusively to the WQG.

9.1 LAKES

The monitoring program for the Middle Quinsam Lake Sub-basin employed a 5 in 30 sampling approach at No Name Lake (NNL), Long Lake (LLM), Middle Quinsam Lake (MQL), and Lower Quinsam Lake (LQL). There are four depths monitored at each lake:

- 1 metre below surface (1m)
- 4 metres below surface (4m)
- 9 metres below surface (9m)
- 1 metre above bottom (1mb)

Monitoring occurred during three separate periods:

- Spring – May 2018
- Summer –July / August 2018
- Fall – October / November 2018

Table 13 below summarizes those parameters above WQG and WQO observed in the lakes for 2018/2019. A summary table is also provided in Appendix I, Table 3 and Tables (43 through 72) provide a statistical summary for parameters of interest with Tables (73 through 127), displaying the depth profiles and water chemistry results compared to WQG and WQO. Appendix II, Graphs (23 through 45) illustrate parameter trends at each lake.

Table 13: Summary of Water Quality Guideline Observations at Lake Monitoring Sites

SUMMARY OF WATER QUALITY GUIDELINE OBSERVATIONS IN THE RECEIVING ENVIRONMENT							
EMS ID & Site Name	Site Code & Depth	Parameter (mg/L or pH Units)	Guideline Limit	Result	Date	Guideline	Sampling Events Exceeding Guideline
E217018 - No Name Lake (NNL)	NNL 9-12 metres	pH	6.5	6.39 - 6.49	May 3 - 23	Min	3 events during spring
	NNL 6-11.7 metres	pH	6.5	5.84 - 6.48	July 25 - August 23	Min	5 events during summer
	NNL all depths	pH	6.5	5.22 - 6.49	Fall 5 in 30	Min	5 events during fall
	NNL9	Cu-T	0.002	0.00754	Fall 5 in 30	A	Average fall 5 in 30
			0.007	0.0342	November 15th	M	(1/5) weekly samples during fall
E206619 - Long Lake Middle (LLM)	LLMB (17-18 metres)	pH	6.5	6.46-6.47	November 15th	Min	1 event during fall
	LLM 9M	SO4-D	128	135.2	Spring 5 in 30	A	Average spring 5 in 30
	LLM 1MB			140.4			
	LLM 9M	SO4-D	128	142.2	Summer 5 in 30	A	Average summer 5 in 30
	LLM 1MB			143.0			
	LLM 1MB	SO4-D	128	133.8	Fall 5 in 30	A	Average fall 5 in 30
E292118 - Lower Quinsam Lake (LQL)	LQLB (15 - 16.6 metres)	pH	6.5	6.43 - 6.45	August 23rd	Min	1 event during summer
	LQLB (15 - 16.6 metres)				November 15th		1 event during fall
	LQL 1MB	Fe-D	0.35	0.442, 0.442,0.632 and 0.746	August 2nd though August 22nd	M	(4/5) weekly samples during summer
		Fe-T	1	1.17 and 1.35	August 17 and 22		(2/5) weekly samples during summer
	LQL 1MB	Fe-D	0.35	0.355	October 22nd	M	(1/5) weekly samples during fall
Min = Minimum Water Quality Guideline (WQG) M= Maximum WQG, A= Average WQG							
For all Middle Quinsam Lake Sub-basin and Iron River results background hardness of 30 mg/L was used to calculate those parameters that are hardness dependent.							

9.1.1 *Seasonal Trends*

Spring and fall sampling events are timed to cover lake turnover, when water circulates freely in the water column and nutrients become more available for phytoplankton growth (Wetzel 2001)[7]. Water is most dense at 4ºC, and during winter, the surface water (epilimnion) is typically colder than 4ºC and the deeper water (hypolimnion) is at about 4ºC (displaying inverse stratification). Spring turnover occurs when the surface water warms to 4ºC and begins to mix with the deeper water. The lake circulates freely throughout the water column for several days (Wetzel 2001). Through the spring and summer, surface temperatures increase, establishing a thermocline (region of rapid temperature change), with warmer water above and cooler water below. Temperatures

[7]Wetzel, R.G. 2001. Limnology, Third Edition. Academic Press, San Diego CA.

cool in late summer, and eventually the thermal stratification breaks down, leading to fall overturn and to mixing of the water column. As surface waters continue to cool, a colder layer overlies the dense bottom water (4ºC) and inverse stratification persists from late fall to spring. During periods with distinct stratification, it has been observed that water chemistry often displays variable concentrations throughout the water column. During overturn, nutrients associated with decomposition of organic matter that has sunk to the bottom are brought into surface waters, where they are available for phytoplankton growth. The timing and duration of spring and fall turnover depend on the size and depth of the lake.

9.1.1.1 *Spring*

The spring sampling program is scheduled to capture the lake turnover that typically occurs in conjunction with warmer temperatures, snowmelt, and increased precipitation. Spring sampling was performed during May. The sampling regime commenced during the spring turnover event with warming ambient temperatures of greater than 4 ºC. From April 1st through to May 31st 83.0 mm of precipitation was received with only 8.10 mm received in May.

Stratification gradually developed during the five weeks of sampling as temperatures warmed from 14 ºC to 20ºC in the upper water column, (1m below surface) for NNL, MQL and LLM. Temperatures in LQL ranged from 6.72 ºC to 11.75 ºC throughout May.

Noteworthy observations resulting from the spring lake monitoring program include the following:

- The only parameters of interest that were outside of the WQGs during spring sampling were sulphate (LLM 9 m and 1 mb) and pH (deep water at NNL).
- Sulphate was below the WQG (128 mg/L) in NNL, MQL and LQL at all depths.
- Sulphate was above the WQG (128 mg/L) in LLM at 9m and 1mb resulting in 135.2 mg/L and 140.4 mg/L, respectively.
- No Name Lake continued to experience low pH values at depth.

9.1.1.2 *Summer*

The summer sampling program is scheduled to capture the period of low flow and lake stratification. The summer program ran from July 25th through August 23rd. The summer program represents the lake's seasonal thermal stratification and a time when deeper lakes naturally develop anoxia in deeper waters. Results from this sampling period represent low dilution conditions when the lakes

display minimum assimilative capacity and mine related surface discharges and groundwater infiltration have the greatest influence.

During the summer sampling program, there were high ambient temperatures and low precipitation (97.30 mm of accumulated precipitation for June through August), with 61.70 mm in June, 26.40 mm in July, 9.20 mm in August. Summer 2018 was a drier season compared to summer 2017 (45.8 mm for June through August).

Noteworthy observations resulting from the summer monitoring program include the following:

- Sulphate was below the WQG (128 mg/L) in NNL, MQL, LQL at all depths,
- Sulphate was above the WQG (128 mg/L) in LLM at 9m (135.3 mg/L) and 1mb (143 mg/L),
- LLM 1mb maximum and average Mn-T concentrations remained below WQGs
- NNL and LQL had lower pH (below 6.5 WQG) at depth than in surface waters
- Hypolimnetic DO was below the site-specific WQO (3 mg/L) in LQL in the hypolimnion zone ranging from 0.86 mg/L to 2.93 mg/L
- Iron concentrations were elevated above the WQG on several occasions at 1mb in LQL related to low dissolved oxygen levels in the hypolimnion

9.1.1.3 *Fall*

The fall sampling program is scheduled to capture the period of elevated precipitation following the summer dry season, representing fall overturn and a 'fall flushing' event that is correlated with elevated surface water metal concentrations resulting from localized weathering and mobilization. The lakes turn over in the fall as the water temperatures decrease and high inflows return. In 2018, the fall monitoring program was initiated on October 15th and ran through November 15h during a time of light precipitation (156.50 mm from October 1st through November 15th). This was slightly lower than fall 2017, when 205.90 mm of accumulated precipitation was received from October 1st through November 17th.

Noteworthy observations resulting from the fall monitoring program include the following:

- Water quality parameters at most lakes remained below WQGs; exceedances occurred for coper, iron, pH and sulphate
- Lower pH valves <6.5 WQG, were observed in NNL (all depths throughout fall), LLMB (17-18 m, once in fall) and LQLB (15-16 m, once in fall)

- NNL had one elevated Cu-T result (0.0342 mg/L) above maximum (0.007 mg/L) WQG resulting in an average (0.002 mg/L) WQG exceedance of 0.00754 mg/L.
- In LLM, total manganese concentrations at 1mb were not elevated throughout fall.
- Total manganese was moderately elevated, not above (WQG) in MQL 1mb due to low DO in fall.
- Sulphate concentrations were below the WQG (128 mg/L) in NNL, MQL, LQL at all depths. and at LLM 1m, 4m and 9m depths; LLM 1mb was just above the WQG with an average of 133.8 mg/L.
- In LLM average sulphate was below 50 mg/L at surface (1m and 4m) and at 9m the average was 104.3 mg/L.
- In LQL 1mb, dissolved iron (0.355 mg/L) was slightly elevated above WQG on one event.

9.1.1.4 *General Parameters*

pH

Lakes that are deeper and thermally stratified normally have pH that ranges from alkaline on the surface (epilimnion) to slightly acidic at bottom depths (hypolimnion). This trend is typically more pronounced during summer, when the lake is stratified, and surface temperatures are elevated.

During 2018, NNL had several occurrences where pH fell below the WQG minimum of 6.5. For depths profiled during spring, summer and fall, pH values ranged from 5.22 to 6.49. Most exceedances were experienced during fall at all depths.

Factors that may contribute to acidic conditions observed through the water column of NNL include:

- Natural conditions – the western end of the sub-basin is surrounded by a vast wetland; organic wetland soils tend to be acidic
- Limited turnover – temperature gradients are relatively small during spring and NNL is shallow (~12-13 m) compared to Long Lake (20 m) and Lower Quinsam Lake (16-18 m)
- Anthropogenic sources – i.e., mining and logging in the area

NNL has a shallow basin (12-13 m) and a large drainage area. Since monitoring began in 2012, slightly acidic conditions have been recorded throughout the water column during spring, summer and fall sampling events, with most of the readings below the WQG of 6.5. Baseline water quality

sampling performed by MoE 1983 and 1984 also indicated pH less than 6.5 at depth. Monitoring will continue at NNL and No Name Lake Outlet, with trends for pH evaluated.

The sampling location on No Name Lake is considered to be outside of mine related discharge, and low pH values are not believed to be associated with mining activities. No direct surface mine discharge locations to No Name Lake have been identified and the low pH is understood to be naturally occurring.

For all other lakes, pH remained mostly circumneutral and within WQG's 6.5 to 9.0. On one event during summer and fall LQL had lower pH values ranging from 6.43 to 6.45 at depth. In fall at depth LLM had one occurrences of lower pH ranging from 6.46 to 6.47.

Middle Quinsam Lake is generally neutral to slightly basic throughout the spring, summer, and fall and this trend continued for 2018 (all samples above the WQG minimum). Both WA and WC, which enter Middle Quinsam Lake, exhibit neutral pH.

HARDNESS

The WQG for sulphate and several metals varies with hardness. Water is defined as very soft if hardness ranges from 0 - 30 mg/L and soft to moderately soft at 31- 75 mg/L. No Name Lake is considered to have very soft water (average concentration of 15 mg/L at all depths). Lower Quinsam Lake is characterized as very soft to moderately soft (average concentration of 32 mg/L at all depths). Since summer of 2014, Middle Quinsam Lake has had soft to moderately soft water throughout the water column. In 2018 the average concentration was 39 mg/L at all depths. Long Lake generally has moderate to hard water (higher hardness in deep water), but the range varies with season and depth. Spring and fall averages of were 115 mg/L and 100 mg/L. With highest concentrations in summer (average 128 mg/L). The spring and summer surface depths have the most variability compared to the deeper waters. The influence of freshwater inflow and lake turnover is most evident at surface. Due to its depth (19-20 m), Long Lake has very little turnover or flushing in the hypolimnion zone.

SULPHATE

As noted previously, the sulphate WQG is hardness dependent, but for QCC, it is set at 128 mg/L (applying a background hardness of 30 mg/L from monitoring station WA, upstream of mine influences).

Sulphate concentrations were lower than the WQG of 128 mg/L in No Name, Middle Quinsam, and Lower Quinsam lakes at all depths, during all seasons and in Long Lake at 1 m, 4 m and 9 m depths during fall. The surface 1 m and 4 m depths remained below 128 during all three seasons in Long Lake.

During spring and summer, the deeper waters of Long Lake (9m and 1mb) had similar concentrations resulting in 135.2 mg/L (9m) and 140.4 mg/L (1mb) during spring and 142.2 mg/L (9m) and 143.0 mg/L (1mb) during summer. Results for fall sampling displayed a decrease at depth resulting in 104.3 mg/L for 9 m and 133.8 mg/L for 1mb. This vertical pattern through the seasons suggests that the deeper water (15 to 20 m depth) does not fully flush.

If the sulphate WQG used average hardness measured in Long Lake at 1m depth during spring (69 mg/L), summer (107 mg/L) and fall (63 mg/L), the average sulphate guideline would range from 218 mg/L to 309 mg/L during these seasons. Recognizing that hardness and sulphate concentrations in Long Lake reflect the influence of mining discharges, and not baseline conditions, a higher hardness defined WQG would still be protective of aquatic life, given the protective mechanism provided by hardness (MOE 2013)[8].

Sulphate concentrations increased with depth in LLM, MQL, and NNL and appeared to be correlated with thermal stratification. In LQL, concentrations decreased with depth.

In 2018, sulphate concentrations in Long Lake were greatest during summer at depth 1mb. Higher concentrations during summer were associated with contributions from the seeps that flowed until mid-August, at a time of limited to no surface discharge from Settling Pond #1; and no inflow or outflow from the inlet or outlet.

In Middle Quinsam Lake, the fall 2014 monitoring indicated a decrease in sulphate concentrations at 1 mb from above 128 mg/L to below 20 mg/L after a flushing event. Sulphate concentrations had remained below 52 mg/L from fall 2014 until spring 2017, when an increase was observed at depth. In 2018, the average sulphate concentrations were greatest during spring at 1 m, 4 m, 9 m and

[8] Ministry of Environment. 2013. Ambient water quality guidelines for sulphate. Technical Appendix Update. Available at:http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/bc_moe_wqg_sulphate.pd

1mb depths averaging 41 mg/L, 39 mg/L, 34 mg/L and 48 mg/L, respectively. The greatest decrease was observed in summer at the surface 1 m (22 mg/L) and 4 m (23 mg/L) depths and 1mb displayed a slight decrease (45 mg/L), with 9 m remaining the same (34 mg/L). The decease at surface would be attributed to deceased discharge rates from Settling pond # 4 during summer low flow. During fall results remained similar at surface compared to summer and decreases were observed at depth 9 m and 1 mb resulting in 26 mg/L and 32 mg/L, respectively.

No Name Lake and Lower Quinsam lakes continued to have sulphate concentrations well below the WQG in 2018. In Lower Quinsam Lake, peak concentrations were reported during summer at 4 m (average of 24 mg/L) and suggested some influence of mining related discharges. The range of average concentrations in Lower Quinsam Lake remained similar during spring and fall throughout the water column, with a greater range observed between surface and 1mb in summer, indicating stratification. Once again, the sulphate concentrations were lowest at depth in Lower Quinsam Lake. In No Name Lake, the average sulphate concentration was at or below 5 mg/L for all three monitoring periods.

HYPOLIMNETIC DISSOLVED OXYGEN

The hypolimnetic dissolved oxygen (DO) Water Quality Objective of 3 mg/L minimum in June through August was developed for the Water Quality Objectives for Middle Quinsam Lake Sub-basin (MQL and LL); however, Quinsam also applies this objective to NNL and LQL. The hypolimnion is the dense, cold bottom layer below the thermocline in a thermally stratified lake. Typically, the hypolimnion is the coldest layer in summer and the warmest layer during winter. Anoxic conditions may develop naturally in deep waters over the summer due to the lack of circulation with upper, oxic water during stratification and the consumption of DO by microorganisms that decompose organic matter and by chemical reactions. The reducing environment can cause lake sediments to release iron, manganese, sulfide, and arsenic, all of which could have potential toxicological effects on aquatic receptors.

In 2018, hypolimnetic DO in Long Lake was not below 3 mg/L during the summer sampling period. Low DO was observed during the fall sampling into mid-November. Long Lake has a deep basin (20 m) and experiences anoxic conditions during summer and fall normally associated with elevated manganese.

Lower Quinsam Lake exhibited anoxic conditions in the hypolimnion during the summer and fall, sampling events. In Lower Quinsam Lake, water at 14 to 16 m had DO below 3 mg/L for the last

three weeks of sampling during summer and fall. This lake has a deep basin (17 m) and typically experiences low DO at depth when stratification is pronounced.

9.1.1.5 *Total and Dissolved Metals*

Concentrations of most metals at the four lake monitoring stations were low and below WQGs throughout the spring, summer, and fall sampling periods. Concentrations of total copper and total and dissolved iron were higher than WQGs in some lakes, as discussed below.

Iron and Dissolved Oxygen

Total and dissolved iron (Fe-T and Fe-D) concentrations in the four lakes have displayed similar trends since 2013: low concentrations near surface throughout the year; low concentrations at all depths during spring; and increased concentrations at depth during anoxic conditions during summer and fall. Iron concentrations were well below WQGs for No Name, Long, and Middle Quinsam Lakes (all depths) and at Lower Quinsam Lake (all depths except 1mb).

Lower Quinsam Lake (at 1mb) had elevated Fe-T on two occasions during summer resulting in 1.17 mg/L and 1.35 mg/L. Elevated Fe-D was observed on four occasions during summer and one occasion during the fall. Fe-D ranged from 0.442 mg/L to 0.746 mg/L during summer. The fall result was just above the WQG resulting in 0.355 mg/L. This is one of the deepest lakes sampled (17 m depth), and the elevated iron concentrations are directly related to anoxic conditions and associated increase in iron solubility at the sediment/water interface. Appendix II, Graphs (44 and 45) display the inverse relationship between low DO and elevated iron concentrations: when DO decreases below 3 mg/L, iron concentrations increase.

Manganese and Dissolved Oxygen

An inverse relationship between manganese (Mn-T) and DO is observed in Long Lake. Mn-T concentrations are highest when DO falls below 3 mg/L. In 2018, Mn-T concentrations remained low during spring, summer and fall at 1mb, below average and maximum WQGs (0.7 mg/L and 0.8 mg/L, respectively). Total Mn concentrations in Long Lake have been greatest at 1mb depth since 2006. Appendix II, Graph 27 displays the relationship between hypolimnetic dissolved oxygen and Mn-T at 1mb with Graphs 30 and 31 display the maximum and 5 in 30 average concentrations of total manganese at Long Lake, respectively.

A similar trend of elevated Mn-T with low DO has been identified for Lower Quinsam Lake at 1mb during the summer monitoring period previously; this trend was not observed this year and concentrations did not exceed the WQG maximum or average during 2018.

The Ambient Water Quality Guidelines for Manganese[9] state:

> "*Mn is only slightly to moderately toxic to aquatic organisms in excessive amounts. It is present in almost all organisms and often ameliorates the hazard posed by other metals. Hence jurisdictions in the international arena have not disseminated Mn guidelines to protect freshwater and marine life. Mn availability and, hence its toxicity in the aquatic environment, can be influenced by many factors including water hardness."*

In deeper lakes, stratification may result in anoxic conditions in the hypolimnion and the dissolution of the iron and manganese from sediment. Casey (2009)[10] noted:

> "*Iron and manganese are commonly found in groundwater and some surface water such as lakes that have a significant groundwater input. The existence of Fe and or Mn in groundwater generally infers prior anaerobic conditions with the result that the water is likely to be devoid of oxygen and may also have a high carbon dioxide (CO_2) concentration. As well as being associated with groundwater input the existence of Fe and Mn in some deep lakes and reservoirs may be due to stratification, resulting in the development of anaerobic conditions in the bottom water zone and the dissolution of the iron and manganese from floor deposits*."

Long Lake has historically been characterized as having very low DO at depth, with levels in September to October below 4 mg/L at depths greater than 15 m (Kangasniemi,1989)[11]. Nordin (2006)[12] reported that Long Lake stratifies into hyperlimnion and hypolimnion sections in April and May and remains stratified until October through November. Appendix II Graph 27 displays the inverse relationship between historical DO vs Mn-T reported at 1 mb since 2005 that occurs during late summer and fall when DO levels decline to below 3 mg/L.

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9 Ministry of Environment.2013. Ambient Water Quality Guidelines for Manganese

10 Casey,T.J. 2009. Iron and Manganese in Water Occurrence, Drinking Water Standards and Treatment Options through the Aquavarra Research LMT Water Engineering Papers. Paper 3..

11 Kangasniemi, B.J.1989.Campbell River Area Middle Quinsam Lake Sub-Basin Water Quality Assessment and Objectives. Ministry of Environment, Lands and Parks. Summary.

12 Nordin, R.N.2006.An Evaluation of the sediment quality and invertebrate benthic communities of Long and Middle Quinsam Lakes with regards to local coal mining activity.

SLR (2015)[13] suggested these findings have potential implications for the means by which sediments and Contaminants of Potential Concern (COPC) are distributed in Long Lake. They suggested that the deepest portion of the lake has the greatest potential to accumulate and retain COPCs whose mobility in aquatic systems is affected by oxygen availability in overlying waters and sediments.

It is conceivable that manganese has a greater loading rate from the parent rock and substrate materials, with mobility accelerated by anoxic conditions at depth (SLR, 2015); The regional geology of Long Lake is divided in half with the Nanaimo group in the southern half and the Island Plutonic Suite (IPS) in the northern half (SLR, 2015); this could have implications for different loading of arsenic and possibly manganese and other metals from parent material (SLR, 2015).

The Mn-T concentrations in deep waters of the lakes do not appear to be mine related, as concentrations at most discharge locations remains low; however, the WQG exceedances are of concerns for assessing potential effects in the receiving environment and trends will continue to be monitored in subsequent years.

Arsenic

Arsenic has become a parameter of interest in the Quinsam watershed, particularly for Long Lake; however, this parameter is not observed to be elevated in the receiving waters. In the 2018 monitoring programs, arsenic concentrations were well below the WQG (0.005 mg/L), in the four lakes monitored. Arsenic concentrations in sediment were elevated above guidelines in Long Lake, No Name Lake, and Lower Quinsam Lake as presented in the *2017-18 Annual Water Quality Monitoring Report* and in ex-situ groundwater throughout the site due to the host rock geology (See Appendix IX). The water quality data confirm that arsenic found in the sediment is not transported into the water column, even during times of anoxic conditions.

Copper and Zinc

Total copper was elevated above average and maximum WQGs (0.002 mg/L and 0.007 mg/L, respectively) in NNL at 9m during fall. There was one results that could be considered an outlier however the sample was rerun and returned similar results of 0.0342 mg/L. This one results

[13]SLR.2015. Sediment Quality, Toxicity, and Bioavailability Review with Background Assessment Based on Current Knowledge of Sediment Dynamics and interpretation or Pre and Post Mining Sediment Concentrations and Distribution.

increased the average above the guideline. This is thought to be attributed to increased runoff during spring and fall.

9.2 RIVER AND STREAM SITES

The table below summarizes those river and stream sites that were observed to have parameters in excess of the WQGs. This table is also available in Appendix I, Table 3.

Table 14: Summary of Water Quality Guideline Exceedances in the Streams and Rivers

SUMMARY OF WATER QUALITY GUIDELINE OBSERVATIONS IN THE RECEIVING ENVIRONMENT							
EMS ID & Site Name	Site Code & Depth	Parameter (mg/L or pH Units)	Guideline Limit	Result	Date	Guideline	Sampling Events Exceeding Guideline
E292112 - Lower Wetland Outlet (LWO)	LWO	TSS	<5	8.00	Spring 5 in 30	A	Spring 5 in 30
		Cu-T	0.002	0.00223			
		Al-D	0.05	0.152			
			0.1	0.117, 0.166, 0.184 and 0.22	April 19th through May 9th	M	(4/5) Weekly samples collected in spring
		Fe-D	0.35	0.777, 1.09 and 1.99	April 25th through May 9th	M	(3/5) Weekly samples collected in spring
		Fe-T	1	1.58 and 2.59	May 1st and 9th	M	(2/5) Weekly samples collected in spring
		Al-D	0.100	0.209	October 11th	M	1 sample collected during fall
E219412 - Long Lake Outlet (LLO)	LLO	Cu-T	0.007	0.0204	Summer 5 in 30	A	Average Summer 5 in 30
			0.002	0.00449	August 7th	M	(1/5) Weekly samples collected in summer *(possible outlier)*
E297230 - Quinsam River Upstream of Mining Operations (IR1)	IR1	Al-D	0.05	0.061	Spring 5 in 30	A	Spring 5 in 30
E297231 - Iron River Upstream of 7SA5 (IR6)	IR6	Al-D	0.05	0.0745	Spring 5 in 30	A	Spring 5 in 30
	IR6	As-T	0.005	0.0052, 0.00565 and 0.00746	August 1st, 7th and 14th	M	(3/5) weekly samples during summer
E297232 - Iron River Downstream of 7SA5 (IR8)	IR8	Al-D	0.05	0.0723	Spring 5 in 30	A	Spring 5 in 30
	IR8	As-T	0.005	0.00612, 0.00894, 0.00961 and 0.0114	July 24th, August 1st, 7th, and 14th	M	(4/5) weekly samples during summer

Min = Minimum Water Quality Guideline (WQG) M= Maximum WQG, A= Average WQG

For all Middle Quinsam Lake Sub-basin and Iron River results background hardness of 30 mg/L was used to calculate those parameters that are hardness dependent.

9.2.1 *Middle Quinsam Lake Inflow (WA) EMS #0126402 and Outflow (WB) EMS #0900504*

Comparing Middle Quinsam Lake's inlet (WA) EMS # 0126402 and outlet (WB) EMS #0900504 offers an opportunity to assess potential mine-related effects on Middle Quinsam Lake water quality. Furthermore, water quality results from WA are considered "baseline" for the Middle Quinsam sub-basin receiving environment stations as the site is situated upstream of any mine related discharge. Data obtained from WB (outlet of Middle Quinsam Lake) provides information on lake water quality after the addition of discharges from the South water management system, shallow and deep groundwater, Long Lake Outlet (LLO), mine related discharge from Settling Pond #4, and other anthropogenic sources (e.g., logging). Summary statistics for the last five years are provided in Appendix I, Tables (43 through 72) with Tables (128 through 133) presenting water quality data for WA and WB with comparison to WQOs and WQGs. Appendix II, Graph (56) displays Middle Quinsam Lake daily inflow obtained at the WA hydrometric station and Graph (57) compares discharge at WB with precipitation. Appendix II, Graphs (48 through 52) display the parameters of interest or those found elevated above WQGs (dissolved sulphate, aluminum, total arsenic and zinc) in the Quinsam Sub-basin.

TSS results at WA and WB remained at or just above detection limits (4.0 mg/L) throughout all sampling events, as reported in previous years, and are expected to continue at low concentrations. Samples for WB are collected below the Coal Main road crossing on the Quinsam River and the low TSS results reflect the efforts made in reducing sediment and erosion at this location.

The pH values were similar at WA and WB, pH at WA and WB was weakly alkaline and within the WQG range of 6.5-9.0; pH values averaged 7.72 at WA and 7.85 at WB.

Conductivity at WB reflected the mine influences (elevated conductivity and sulphate are considered signatures of mine influence). For example, average conductivity values were 51 µs/cm at WA and 149 µs/cm at WB. Average sulphate concentrations were 1.27 mg/L at WA and 29.1 mg/L at WB, below the WQG at both stations (Appendix II, Graph 48). Like sulphate, annual average hardness concentrations display a moderate increase from WA to WB with average concentrations of 19.5 mg/L and 36.5 mg/L, respectively.

Dissolved metals displaying a slight increase in annual average concentrations between WA and WB include both iron (0.018 mg/L at WA to 0.059 mg/L at WB) and manganese (0.00133 mg/L at WA to 0.0077 mg/L at WB), likely attributed to mine related discharge. All total and dissolved metals remained below WQGs, and concentrations were similar to previous years.

	Statistic	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Stn.Code		Hard-T	SO4-D	Al-D	As-D	As-T	Cu-T	Fe-D	Fe-T	Mn-T	Ni-T	Pb-T	TSS	Zn-D
WA	Average	19.5	1.27	0.0208	0.00012	0.00012	0.00089	0.0139	0.018	0.00133	0.00100	0.000200	4.08	0.00473
WB	Average	36.5	29.1	0.0161	0.00019	0.00020	0.00083	0.0262	0.059	0.0077	0.00100	0.000200	4.03	0.00500

9.2.2 *No Name Outlet (NNO) EMS # E217017 and Long Lake Outlet (LLO) EMS # E219412*

Flow from No Name Lake (NNO) enters the west end of Long Lake and exits Long Lake at the site known as LLO. LLO discharges to Middle Quinsam Lake upstream of Middle Quinsam Lake outlet (WB). Water quality monitoring at NNO and LLO provides information on changes in water chemistry in both Long Lake and the channel connecting the two lakes. The sampling location on No Name Lake is considered to be outside of direct mine discharge but could be influenced by groundwater. Therefore, changes in water chemistry between NNO and LLO represent the incremental mine loading into Long Lake from various inputs, including shallow and deep groundwater (e.g. emanating from 2S/3S), Long Lake Seep discharge, mine related discharge from the South water management system, and other anthropogenic sources (e.g., logging).

As shown in Appendix I, Tables (134 through 139), average TSS concentrations for LLO and NNO remained at or just above 4 mg/L during the three monitoring periods. Both NNO and LLO exhibited similar pH, averaging 7.47 at NNO and 7.62 at LLO, with no WQG exceedances.

Conductivity, sulphate and hardness levels increase between NNO and LLO, reflecting mine related influence on Long Lake. Annual average conductivity was 41 µs/cm at NNO and 215 µs/cm at LLO. Annual average sulphate was 1.97 mg/L at NNO and 54.9 mg/L at LLO. Sulphate concentrations at LLO are cyclic, highest during summer and decreasing during fall and winter along with higher flow rates and increased dilution, Appendix II, Graph (47). Sulphate is monitored weekly at LLO to assess water quality exiting Long Lake. Appendix I, Table (35) displays rolling average values for sulphate, which provide the most appropriate concentration to compare to the WQG. Like sulphate, water hardness increases from NNO (average of 14.7 mg/L) to LLO (average of 73.7 mg/L).

Average concentrations of metals observed in NNO and LLO remained low, with many below laboratory DLs. A possible outlier for total copper collected from LLO on August 7th during extremely low flow resulted in a maximum 0.00449 mg/L. The result was above the maximum WQG (0.007 mg/L) for total copper and resulted in an average WQG of 0.0204 mg/L above the average WQG

of 0.002 mg/L. This sample was re-run and the result was confirmed. This is outside of the normal range and remains suspicious. All other total and dissolved metals were below their WQGs.

Water quality data for sites LLO and NNO are presented in Appendix I, Tables (134 to 139) with comparison to WQOs and WQGs. Appendix II, Graph (60) compares discharge with precipitation at LLO.

	Statistic	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Stn.Code		Hard-T	SO4-D	Al-D	As-D	As-T	Cu-T	Fe-D	Fe-T	Mn-T	Ni-T	Pb-T	TSS	Zn-D
NNO	Average	14.7	1.97	0.0288	0.00031	0.00032	0.000759	0.0522	0.075	0.0117	0.00100	0.000200	4.13	0.00500
LLO	Average	73.7	54.9	0.0179	0.00048	0.00051	0.001934	0.0307	0.055	0.0126	0.00100	0.000200	4.05	0.00549

9.2.3 *Stream 1 – (7S) EMS # E292109 and Lower Wetland Outlet (LWO) EMS #E292112*

The headwaters of Stream 1 are formed by the discharge of 7SSD, which combines with Stream 2 above sampling location 7S. Downstream of site 7S, Stream 1 enters the Lower Wetland then flows into the Quinsam River. Given the aquatic values (fish habitat) in the Quinsam River, the 7S station has been defined as the initial dilution zone for 7-South discharge water. This receiving environment site is used to evaluate the influence of 7-South operations on aquatic receptors. The Lower Wetland Outlet (LWO) station was established to monitor the cumulative water quality in Stream 1, and to understand overall contributions to the Quinsam River. The Lower Wetland Outlet station has not been representative of water quality from 7SSD nor from 7S.

There was zero discharge from 7SSD during 2018/2019 and only 24 hours in 2017/2018 and 12 days in 2016/2017, indicating the limited amount of surface loading from the 7SSD discharge to the Lower Wetland.

The average sulphate level of 4.0 mg/L at 7S was well below the WQG (128 mg/L), which was a direct result of diligent control of releases from the 7SSD sedimentation pond (to maintain an 8:1 dilution ratio) and water management measures employed at 7-South operations. There was one TSS result that was outside of normal range for this stream resulting in 22 mg/L on May 15th. No other parameters were observed to be elevated as a result. In 2018/2019, all total and dissolved metals were below WQGs at 7S.

Downstream site LWO had neutral to slightly acidic pH during spring weekly sampling. The site was dry during summer and during fall authorization was received from ENV to temporarily suspend monitoring from this site for the fall 2018 period due to zero discharge occurring from 7SSD. There was one week of samples collected during fall.

Spring sampling resulted in elevated concentrations of TSS, Al-D, Cu-T and Zn-T. These results are consistent with baseline measurements collected by Golder Associates[14] in June 2011, which showed WQG exceedances for iron (3.79 mg/L Fe-T and 2.52 mg/L for Fe-D) and aluminum (0.101 mg/L Al-D). Elevated metals concentrations such as iron, aluminum and copper at this station are attributed to natural causes associated with anoxic conditions in wetlands during spring, summer and fall. LWO is normally dry during the summer, low flow period. Elevated metals concentrations were localized to the wetland (beaver dam area) and downstream of 7S; concentrations were low at 7S throughout the monitoring periods. All other parameters were below WQGs; results for 7S are displayed in Appendix I, Table 26 and Appendix II, Graph 61 displays discharge at 7S. Results for LWO are displayed in Appendix I, Tables (143 to 145).

9.2.4 *Quinsam River Downstream Site 1 (QRDS1) EMS # E286930 & 7-South Quinsam River (7SQR) EMS # E292113*

QRDS1 is located approximately 2 km downstream from the Middle Quinsam Lake outlet (sampling site WB) and upstream of any inputs associated with 7-South operations. QRDS1 was established to monitor groundwater inputs from the underground disposal of 7-South tailings into the 2-North mine and the underground sub-aqueously stored PAG-CCR material from processing of 5-South coal stored in the river barrier pillar. 7SQR is the 7-South Quinsam River monitoring station on the Quinsam River approximately 4 km downstream of QRDS1. 7SQR water quality is used to evaluate the influence of 7-South mine related discharge to the Quinsam River downstream of the LWO, and groundwater inputs to the Quinsam River from sub-aqueously stored PAG-CCR in the 7-South mine.

The incremental loading associated with discharge from 7-South operation was observed to be negligible in 2018/2019. General parameter concentrations were similar for both sites with total and dissolved iron displaying a slight increase from upstream to downstream.

Sulphate concentrations were similar for the two sites and were well below the WQG (128 mg/L). The annual average sulphate concentration was 29.2 mg/L at QRDS1 and 27.6 mg/L at 7SQR. Both stations were sampled during the three 5 in 30 sampling periods and 7SQR was also sampled monthly.

[14] Golder Associates. Quinsam 7-South Effluent Technical Assessment Report. 2011

Appendix I, Tables (140 to 142 and 146 to 148) and Appendix II, Graphs (48 - 52) display relevant parameters of interest for these sites.

	Statistic	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Stn.Code		Hard-T	SO4-D	Al-D	As-D	As-T	Cu-T	Fe-D	Fe-T	Mn-T	Ni-T	Pb-T	TSS	Zn-D
QRDS1	Average	37.2	29.2	0.0150	0.00030	0.00033	0.00071	0.0271	0.056	0.0068	0.00100	0.000200	4.13	0.00500
7SQR	Average	36.1	27.6	0.0183	0.00036	0.00039	0.00073	0.0570	0.090	0.0063	0.00100	0.000204	4.13	0.00500

9.2.5 *IRON RIVER*

The Iron River Baseline Summary Report was submitted to the MOE on March 31, 2016. The report reviewed the monitoring data at all sites in the Iron River, summarizing trends and parameters found to be naturally elevated due to the watershed geology and contact with the Benson/Dunsmuir members of the Comox Formation.

As part of the 7-South Area 5 permit application, baseline water quality data were collected at ten stations on the Iron River to gain an understanding of existing water quality and local influences. Additionally, six tributaries were monitored to identify incremental loading.

One year of monthly baseline samples was obtained at all sites to maximize interpretation of seasonal variations and trending on the Iron River. Post-baseline monitoring in 2017/2018 continues to consist of 5 in 30 and monthly sampling at three stations on the Iron River (IR1, IR6 and IR8) and one station on the Quinsam River, downstream of the confluence of the Iron River (IRQR). Monitoring on the Iron River was supposed to be decreased after the baseline monitoring report was submitted.

Most general parameters (e.g., TSS and sulphate) had low concentrations at the four stations and remained well below WQGs. Hardness showed seasonal variability, with lower levels in spring and fall (higher flow) than in summer (low flow). Due to the varying hardness levels at IR1 (upstream of mining operations) a conservative approach was taken when calculating hardness-dependent WQGs (using a hardness of 30 mg/L).

Dissolved aluminum and total arsenic are the two primary parameters displaying a trend related to flows in the Iron River. Al-D concentrations were higher than the WQG during multiple sampling events at all three stations (IR1, IR6 and IR8) during spring. As-T concentrations were higher than WQGs during summer low flow at IR6 and IR8 and increasing from IR6 to IR8 (downstream) as displayed in Appendix II, Graph 55.

An inverse relationship between As-T and Al-D has been identified: Al-D is elevated during periods of higher flow while As-T is elevated at times of low flow (Appendix II, Graphs 53 to 55). In 2018-2019, for example, As-T exceeded the WQG at IR6 and IR8 in most of the samples collected during the summer while Al-D was above the WQG during spring.

All other parameters of interest were below WQGs at IR1, IR6, and IR8 and there were no parameters above WQGs observed at 7SQR or IRQR. Therefore, mixing of the Quinsam and Iron rivers continues to provide sufficient dilution to maintain water quality.

Appendix I, Tables (150 - 165) and Appendix II, Graphs (53 to 55) display relevant data for all Iron River sites graphed against flow.

10.0 BIOTA MONITORING IN THE RECEIVING ENVIRONMENT

Phytoplankton and zooplankton are monitored every year at one station in each of No Name, Long, Middle Quinsam, and Lower Quinsam lakes. The sampling sites are shown in Appendix X, Figure 1. This section of the report describes sampling objectives, methods, QA/QC, and results for phytoplankton and zooplankton. Refer to Appendix IV for all historical and present phytoplankton data.

10.1 PHYTOPLANKTON

Phytoplankton are photosynthetic microorganisms that live in lakes at depths to where adequate sunlight can penetrate. They are the main primary producers in lakes, converting sunlight, CO_2, and water into organic matter, and are the foundation for the aquatic food web (Wetzel 2001). Phytoplankton includes algae and cyanobacteria, both of which contain at least one form of chlorophyll (chlorophyll *a*), the major photosynthetic pigment. They are sensitive to changes in water quality (Wetzel 2001). Many lakes have a spring and fall phytoplankton bloom (peak growth period) following the seasonal “overturns” or mixing of the water column, which redistribute nutrients through the water column.

Phytoplankton are monitored annually at one station each in No Name, Long, Middle Quinsam, and Lower Quinsam lakes, in the deepest area of the lakes, where routine water quality monitoring is conducted. Since 2013, phytoplankton samples have been collected at the four lakes once each during the spring, summer and fall 5 in 30-day water sampling periods defined in amended Permit PE 7008. From the 1990s to 2012, Permit PE 7008 required sampling at 1, 4, and 9 m depth in

April through September at Long Lake and Middle Quinsam Lake, with No Name Lake added in 2012 and Lower Quinsam Lake added in 2013.

10.1.1 *Methods*

10.1.1.1 *Field Methods*

In 2018, samples were collected from 1 m depth using a 4 L Beta sampler. Chlorophyll *a* samples were collected as 1 L raw water samples, shipped to Maxxam Analytics (Burnaby B.C.) and laboratory filtered for analysis. A 250 mL sample was preserved with Lugol's in the field and analyzed for community composition, i.e., counts and identification to lowest practical level (Stantec Consulting Ltd., Burnaby B.C.). Field replicates were collected for QA/QC in May and September 2018.

10.1.1.2 *Laboratory Methods*

Organisms were identified to lowest practical level (species where possible) using an inverted microscope. A 27 mL volume of lake water was settled in a chamber. Counts were made at 100X, 400X, and 1000X magnifications, to record the size range of phytoplankton.

10.1.2 *Results*

10.1.2.1 *Chlorophyll a*

Chlorophyll *a* concentrations provide an indication of overall phytoplankton biomass at any given time and provide a basis for comparing primary production among lakes. Table 15 provides data for samples collected from 1 m depth in 2018. Concentrations ranged from 0.48 µg/L (spring sample from Middle Quinsam Lake) to 1.55 µg/L (Lower Quinsam Lake, fall sample).

Table 15: Chlorophyll a Concentrations, 1 m Depth, Quinsam Lakes System, 2018

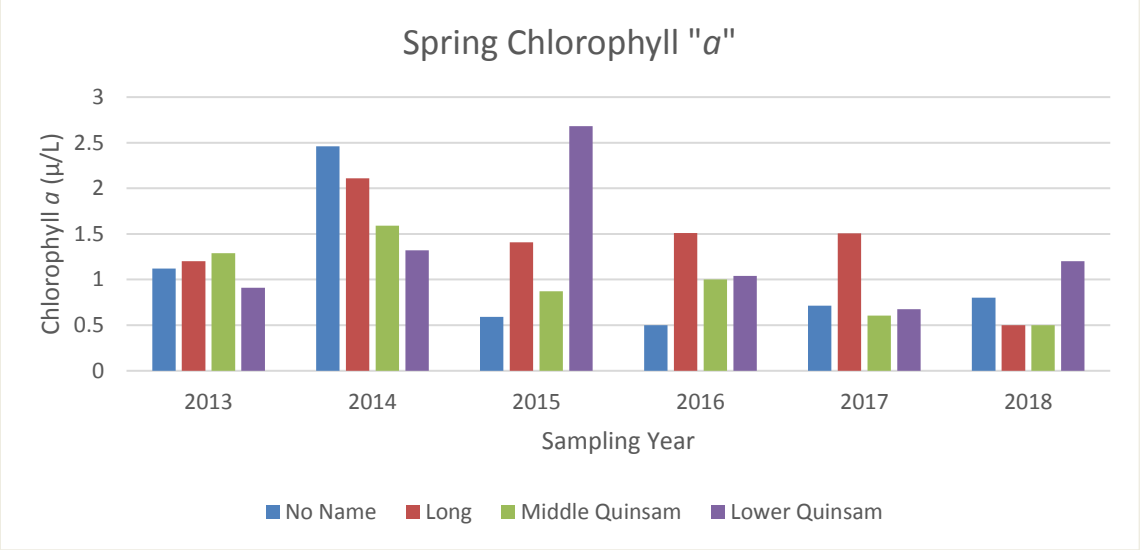
Lake	Chlorophyll *a* (µg/L)		
	Spring	Summer	Fall
No Name Lake (NNL)	0.80	<0.50	1.39
Long Lake (LL)	<0.50	0.50	1.22
Middle Quinsam (MQL)	<0.50	<0.50	1.81
Lower Quinsam (LQL)	1.20	0.94	1.53

Chlorophyll *a* concentration were low among the three lakes NNL, LL and MQL during spring and summer with LQL displaying the highest results. All three lakes displayed peak concentrations in fall. Seasonal trends were as follows in 2018:

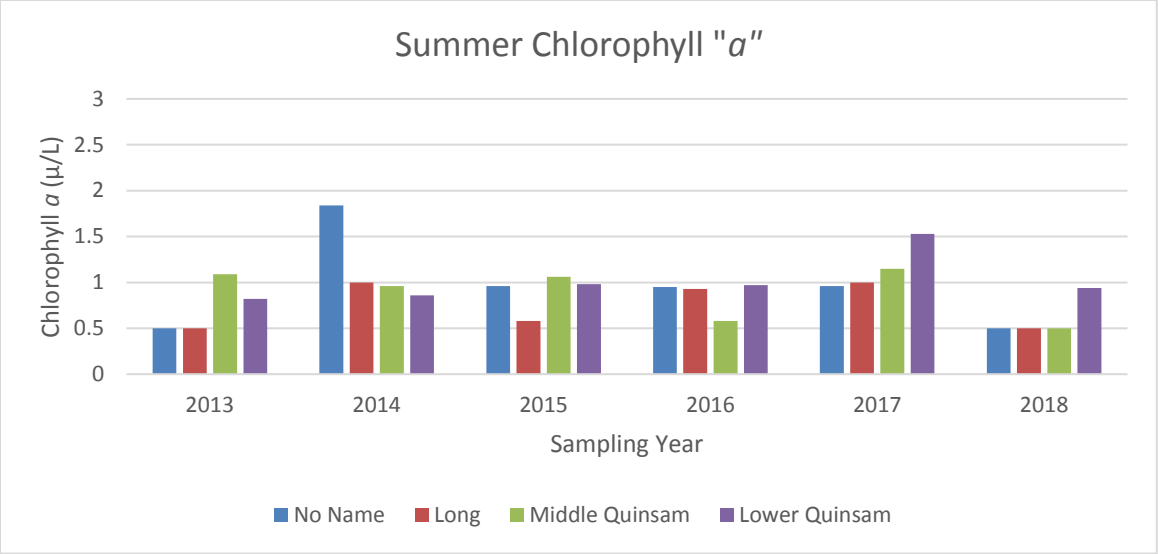
- In spring, concentrations were lowest in MQL and LL intermediate in NNL, and highest in LQL.
- In summer, concentrations were similar in NNL, LL and MQL and highest in LQL.
- In fall, concentrations were lowest in LL (1.22 µg/L) and highest in MQL (1.81 µg/L).

The chlorophyll *a* concentrations reported for these lakes reflect oligotrophic conditions (mean of 1.7 µg/L, maximum of 4.5 µg/L), and low total phosphorous concentrations (mean of 8 µg/L, maximum of 18 µg/L), according to the trophic classification system for lakes developed by Vollenweider and Kerekes (1982; cited in Environment Canada 2004)[15]. Permit PE 7008 does not require nutrient analysis for the lakes, and nitrate, and ammonia data were not available to confirm this trophic classification.

Appendix IV and Figure 10 provide data for 2013 through 2018. Chlorophyll *a* result for 2018 were within the range reported from 2013 to 2017 (0.48 to 2.68 µg/L).



[15] Vollenweider, R. and J. Kerekes. 1982. Eutrophication of Waters. Monitoring Assessment and Control. Organization for Economic Co-operation and Development (OECD) Paris. 156 pp. cited in Environment Canada 2004. Canadian Guidance Framework for the Management of Phosphorus in Freshwater Systems. Report No. 1-8. http://publications.gc.ca/collections/Collection/En1-34-8-2004E.pdf



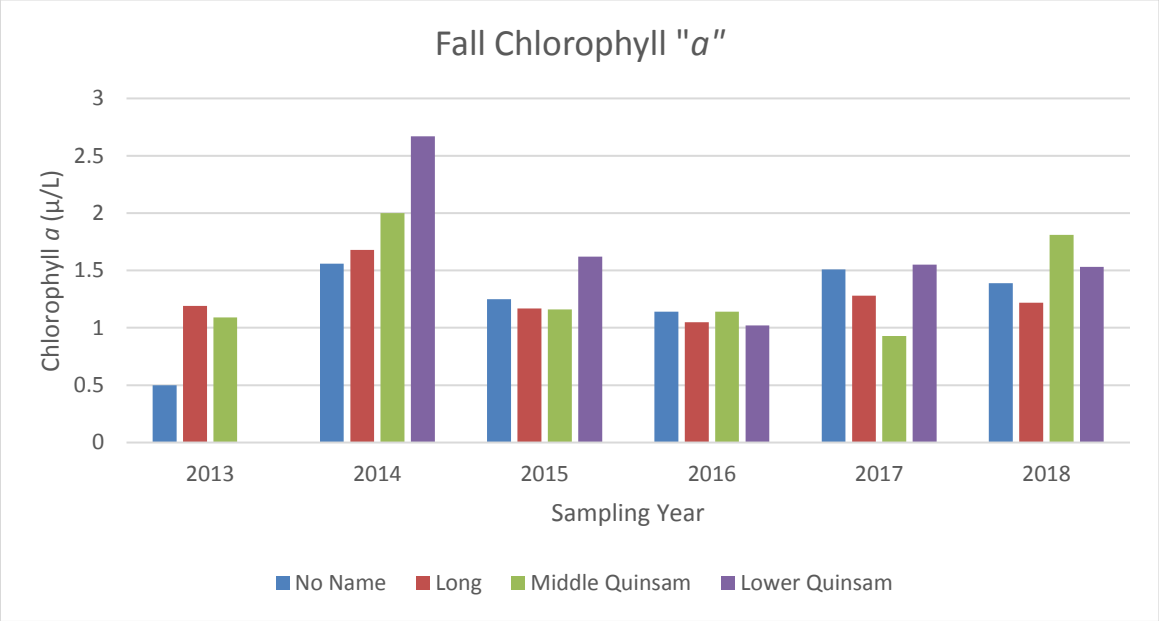


Figure 19: Chlorophyll a (µg/L) at 1 m Depth, Quinsam Lakes System, 2013 – 2018

10.1.2.2 *Phytoplankton Communities*

Phytoplankton taxonomy reports are included in Appendix IV and results are summarized here. Duplicate samples collected for Long Lake in May and Lower Quinsam Lake October showed good agreement for the paired samples (within 20% of duplicate samples).

Abundance is summarized in Table 16 as total and by size fraction (identified at 1000X, 400X, and 100X magnifications). Total abundance ranged from 1000 to 9200 cells/mL in 2018. The smallest size fraction (less than 5 µm in size) comprised of 60% of the total abundance.

Table 16: Phytoplankton Abundance, Quinsam Lake System, 2018

Lake	Month	Abundance (cells/mL) at 1 m depth			
		Total	< 5 µm (1,000 X)	5 to 25 µm (400 X)	> 25 µm (100 X)
Long	May	1500	1300	150	3.4
Long Lake - Rep		1300	1100	140	4.8
Middle Quinsam		1000	920	110	0.4
No Name		1800	1500	250	0.1
Lower Quinsam		2700	2400	320	0.5
Long	Aug	1200	1100	110	1.7
Middle Quinsam		1600	1500	180	0.2
No Name		1400	1200	270	2.0
Lower Quinsam		2300	680	1600	13.0
Lower Quinsam - Rep		3400	1100	2300	6.6
Long	Oct.	9200	`2500	210	6500
Middle Quinsam		2100	1700	360	0.04
No Name		1600	1300	300	0.7
Lower Quinsam		1800	1500	230	96

In 2018, abundance was greatest in spring at Lower Quinsam and No Name lakes, summer in Middle and Lower Quinsam lakes and during fall in Long and Middle Quinsam Lakes. Total abundance was lowest in spring at Middle Quinsam lake, in summer at Long Lake and in fall at No Name Lake. The highest abundance was recorded in fall at Long Lake (9200 cells/mL). Peak abundance and chlorophyll *a* concentration's did not always coincide, likely related to changes in size of abundant taxa over the sampling periods.

Variation in total abundance among lakes and through the three seasonal sampling periods for 2013 through 2018 is shown in Figure 20. As noted for chlorophyll *a*, high variability among seasons, years, and lakes between 2013 and 2018 was likely related to variation in timing of spring and fall overturn and nutrient concentrations. Phytoplankton abundance data for 2018 were consistent with those of previous years.

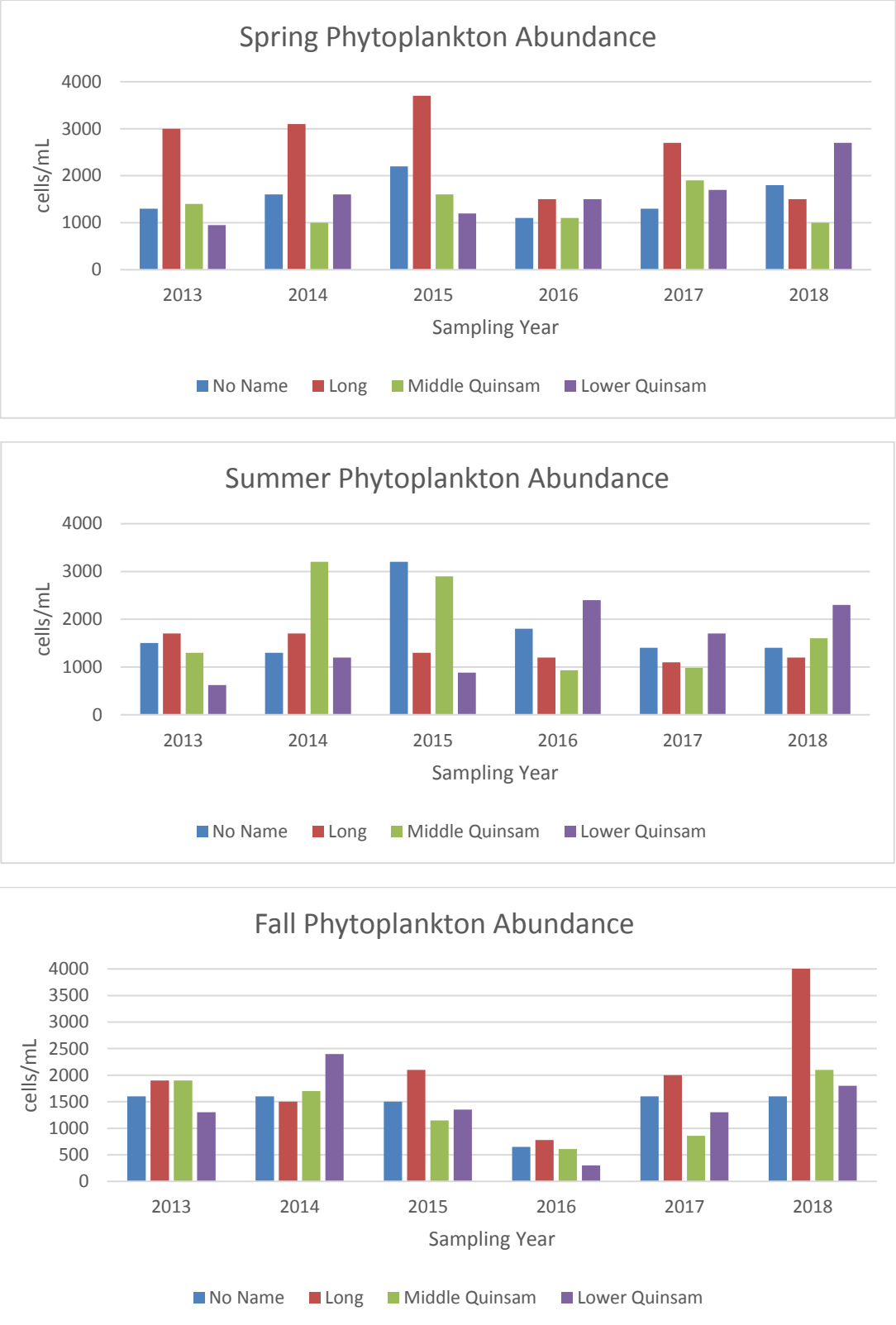


Figure 20: Total Phytoplankton Abundance, 1 m Depth, Quinsam Lakes System, 2013 – 2018

Very small (<5 µm) chrysoflagellates (*Ochromonas* spp. and *Chromulina* spp.) were the most abundant phytoplankton in samples from all lakes and all dates in 2018, as has been noted since monitoring began in the 1990's (Appendix IV-2). Although these ultra-nanoplankton were very abundant numerically, they contributed little to algal biomass. Small chrysoflagellates are numerically dominant in many lakes. In Lower Quinsam Lake, the colonial green alga *Gloeocystis* sp. was predominant and notably high in abundance compared to the other lakes and to previous data in summer of 2018. The bloom of *Gloecystis* sp. in Lower Quinsam Lake has not been reported previously. Records from 2013 to 2018 were reviewed. Prior to 2018, the species was present during July or August, but not abundant. The bloom in 2018 may be related to human activities in the Lower Quinsam Lake watershed (e.g., logging, mine expansion), variation in the timing of sampling collection from year to year, or to weather conditions that could affect limnological characteristics. In the other three lakes, phytoplankton community characteristics were similar to previous years.

10.2 ZOOPLANKTON

Zooplankton form the second trophic level in the water column of lakes (secondary producers), grazing on phytoplankton, consuming organic matter, and providing a food source for juvenile fish (Wetzel 2001). Abundance and composition of the zooplankton community vary among lakes due to variation in water chemistry, lake characteristics, and grazing pressures from fish (Wetzel 2001[16]).

According to permit 7008, zooplankton are monitored in the Quinsam mine receiving environment three times per year at one station in each of No Name, Long, Middle Quinsam, and Lower Quinsam lakes. Since 2014, zooplankton samples have been collected once in the spring, summer, and fall during the 5 in 30 water quality sampling periods.

10.2.1 *METHODS*

10.2.1.1 *Field Methods*

Zooplankton were collected from No Name, Long, Middle Quinsam, and Lower Quinsam lakes three times in 2018 (once during each 5 in 30-day period). Samples were collected using a

[16] Wetzel R. 2001. Limnology: Lake and River Ecosystems 150 pp

Wisconsin Plankton Sampler (63 µm net) in a 10 m vertical tow, with one sample collected per lake. Samples were preserved with ethanol and sent to Fraser Environmental Services (Surrey B.C.) for taxonomic analyses.

10.2.1.2 *Laboratory Methods*

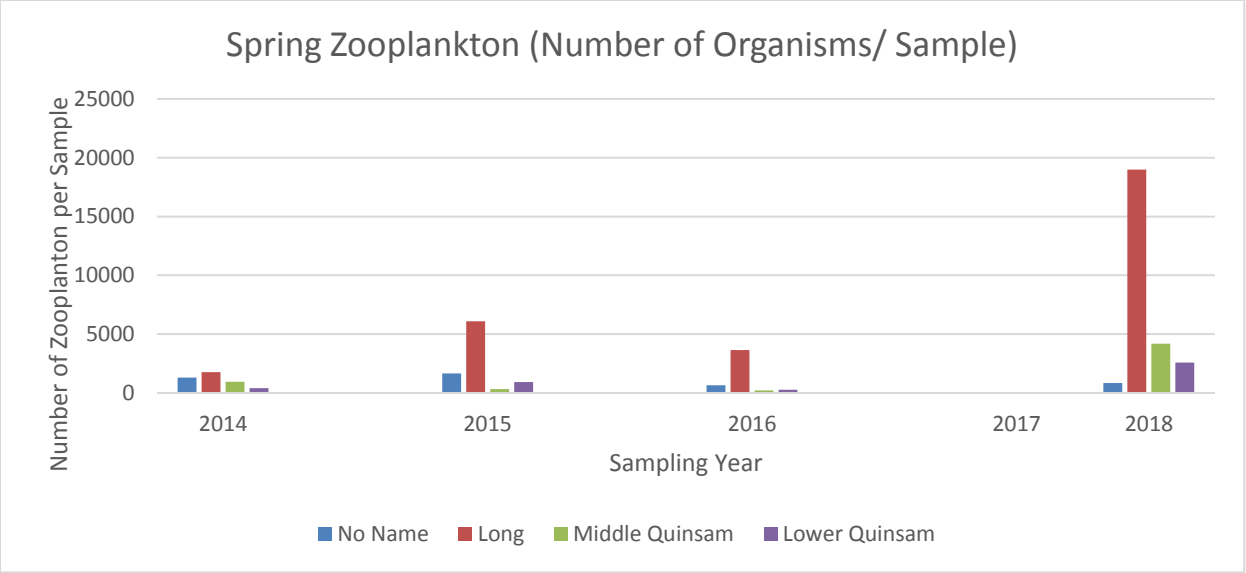
Organisms were counted and identified to lowest practical level.

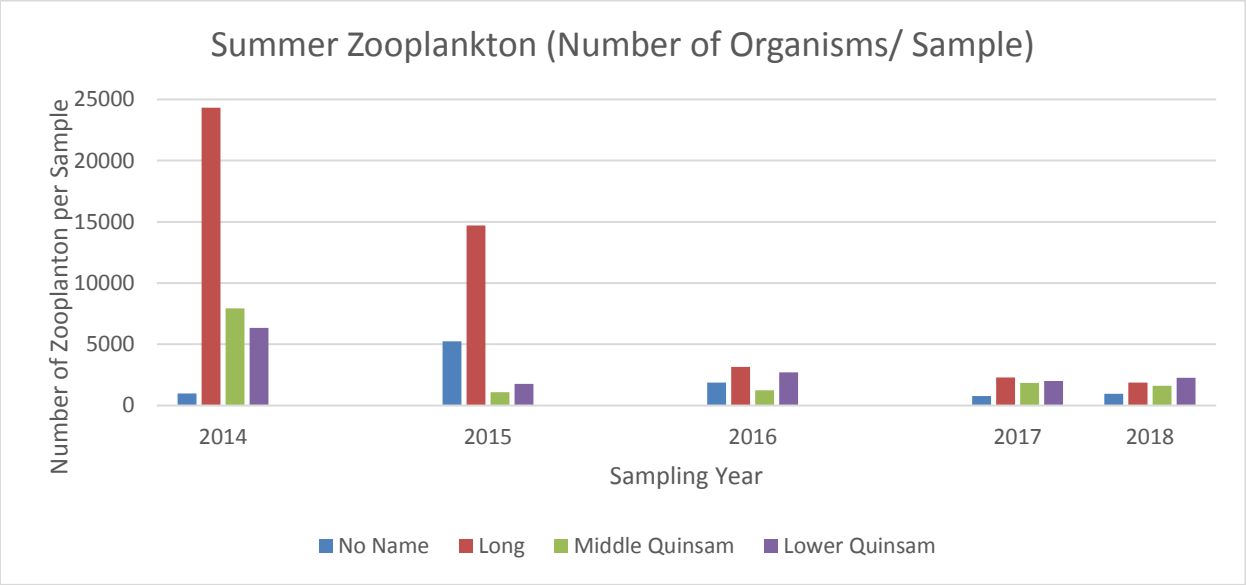
10.2.2 *Results*

Detailed zooplankton taxonomic composition results are provided in Appendix I, Tables 168 to 170 and Appendix IV are summarized below.

Zooplankton abundance in samples collected in 2018 is listed in Appendix IV. Abundance ranged from 18,984 organisms/sample (Long Lake, May) to 1672 organisms/sample Lower Quinsam Lake, October. No Name Lake had the lowest abundance among the four lakes, in both September and October. In Middle Quinsam and Lower Quinsam lakes, maximum abundance was reported in the summer and in Long Lake, the maximum occurred in October. Abundance was higher in Long Lake and lower in No Name Lake compared to the other lakes.

Seasonal and spatial trends are shown in Figure 21 for samples collected from 2014 through 2018. There has been high variability among lakes, seasons, and years. In general, abundance is highest for the summer samples, following peaks in levels of phytoplankton and organic matter; however, there are exceptions, including low abundance in No Name Lake in summer 2014 and peak abundance in Lower Quinsam Lake in fall 2015. Variations in total abundance when comparing lake phytoplankton abundance may be related to the month sampled and phytoplankton blooms.


Spring Zooplankton (Number of Organisms/ Sample)
Number of Zooplanton per Sample
25000
20000
15000
10000
5000
0
2014
2015
2016
2017
2018
Sampling Year
No Name
Long
Middle Quinsam
Lower Quinsam


Summer Zooplankton (Number of Organisms/ Sample)
Number of Zooplanton per Sample
25000
20000
15000
10000
5000
0
2014
2015
2016
2017
2018
Sampling Year
No Name
Long
Middle Quinsam
Lower Quinsam

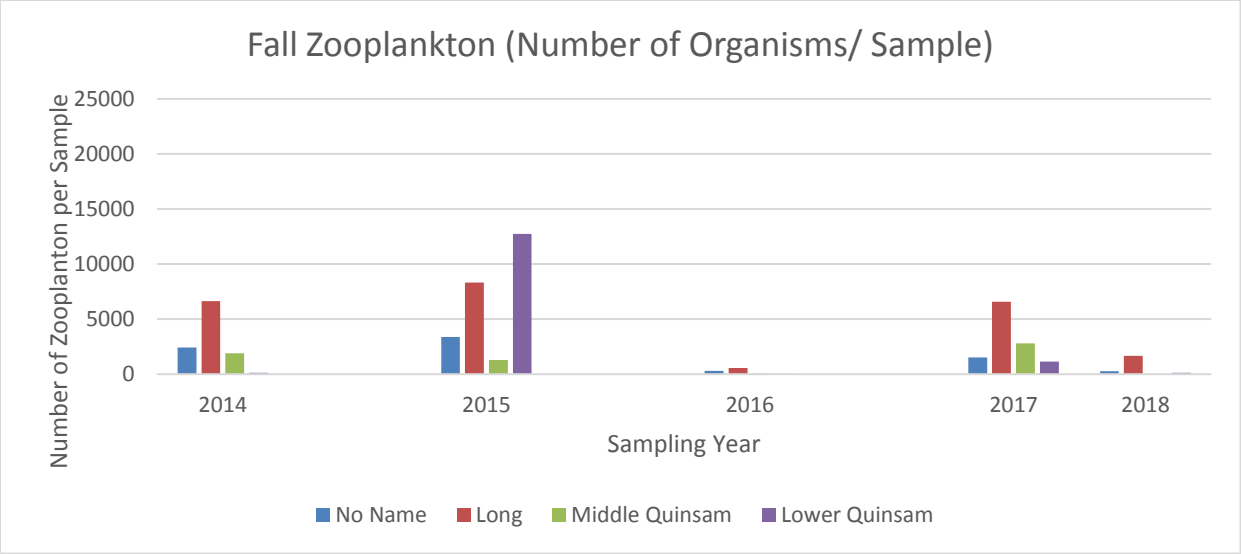


Figure 21: Total Zooplankton Abundance (0 to 10 m Vertical Tows), Quinsam Lakes System, 2014 - 2018
(no samples analyzed in Spring 2017)

Differences in taxonomic composition are related to seasonal conditions, including food supply (phytoplankton and organic matter) and grazing pressures from fish. The larger copepods and cladocerans provide preferred food sources for fish. All four lakes are known to be fish bearing (e.g., salmon and trout species), but there is not enough information about fish populations to estimate grazing pressures on zooplankton.

CONCLUSION

Water in lakes of the Quinsam River watershed near Quinsam Mine and in the Quinsam River itself is of good quality, meeting WQGs and WQOs on all sampling dates in 2018 in the Quinsam river and most WQGs and WQOs in the lakes. Sulphate remains slightly higher than the WQG in deep water (9 m and 1 mb) of Long Lake. Sulphate concentrations in Middle Quinsam Lake remained in low concentrations < 50 mg/L at 1mb throughout the water column during all sampling periods.

Low DO levels in deep waters are common during summer and early fall in in Long and Lower Quinsam lakes, which can result in mobilization of iron and manganese. Concentrations of these metals in deep water were lower than in earlier years. No Name, Long, Middle Quinsam, and Lower Quinsam lakes support phytoplankton communities typical of oligotrophic conditions and distinct zooplankton communities in each lake that provide typical prey for fish. There were no indications of adverse effects of mine discharges on the plankton communities of lakes (density, taxonomic richness, composition). There was a bloom of *Gloecystis* sp. in Lower Quinsam Lake has not been reported in abundance previously. Gloeocystis is a genus of green algae in the family

Radiococcaceae. Future monitoring will determine if this alga is naturally abundant during summer in Lower Quinsam Lake. This bloom is most likely related to seasonal limnological conditions.

While levels of iron are low in discharges from the mine, they can be elevated along with arsenic in groundwater and seeps entering Long Lake (Golder 2011, Cullen 2011, SLR 2015). However, seep monitoring conducted since 2011 has shown a notable decline in concentrations of these metals (except for iron) and groundwater monitoring indicates naturally elevated concentrations in wells established in the Dunsmuir rock formation. The presence of anoxic or suboxic conditions in deep lake waters during the summer and early fall (which develop naturally in Long and Lower Quinsam lakes) leads to conditions where metals that are sensitive to changes in the redox environment can be mobilized and enter the deep waters. The amount of mobilization varies from year to year: In 2018, there were no WQG exceedances for total manganese in Long Lake; both total and dissolved iron was elevated at 1mb in Lower Quinsam Lake. However, in earlier years, the concentrations of iron and manganese were higher in both Long and Lower Quinsam Lakes. Results from the 2016 Sediment and Benthic study and earlier studies, summarized in SLR (2015) cannot conclusively identify a mine-related source for these metals in Long Lake, aside from possible localized sources from seeps, and there are naturally elevated levels observed in other lakes in the watershed.

11.0 CLOSING

Water quality in the Middle Quinsam Sub-Basin remained consistent with previous years and is considered to be in good condition with little appreciable impacts associated with coal mining. The majority of parameters of concern were below Provincial guideline and objective levels indicating minimal health risk to sensitive aquatic receptors. For example, sulphate concentrations were recorded below its respective guideline during all sampling events in three out of four lakes sampled; this trend signifies water management features and controls at the mine site are effective.

This year, Quinsam experienced one permit limit exceedance for total suspended solids at Settling Pond #4 mostly attributed to a combination of freezing conditions during winter. Quinsam was diligent in monitoring the downstream receiving environment and the results demonstrated that the risk to aquatic receptors was minimal.

Parameters of interest and those displaying slightly elevated concentrations in the lakes include total and dissolved iron (LQL 1mb) and concentrations of manganese at (LLM 1mb) both are associated with anoxic concentrations at depth. Normally concentrations of manganese are elevated at LLM 1mb during summer and fall but this did not occur this year. In Middle Quinsam Lake at 1mb manganese was elevated (not above guidelines) during fall on two occasions which

was directly related to low DO. The relationship between low DO and elevated iron and manganese in Long Lake 1mb and Lower Quinsam Lake 1mb has been demonstrated in Appendix II, Graphs (27, 44 and 45). This pattern of elevated manganese and iron at depth in these lakes has become more evident since the initiation of the 5 in 30 monitoring in 2013. Previously, there were occasional exceedances occurring during monthly sampling over summer and fall and all events were associated with low DO.

Dissolved sulphate was elevated above WQG in Long lake at 9m and 1mb.This may be attributed to the Long Lake Seep treatment system not operating over the period of 8 months while the pump was waiting to be replaced. Or it may be related to low perception causing limited lake turnover throughout the year. Appendix II Graph 28 displays historic sulphate in Long lake and shows the cyclic pattern of sulphate with the 9m and 1mb following a similar trend.

Total copper was elevated above guidelines on one occasion at NNL 9 m during fall and one occasion at LLO during summer low flow. These two results were anomalies and considered outliers.

Quinsam anticipates that the efforts invested into the reclamation projects will continue to contribute to improved water quality in Long Lake. This will be determined over the next few years as vegetation starts to become established within the area and concentrations of parameter loading start to decline.

Once again depth profiling has resulted in low pH conditions exceeding lower water quality guidelines of 6.5 observed in No Name Lake during all seasons, Lower Quinsam Lake summer and fall and Long Lake during fall. However, there is little concern as the slightly acidic conditions are likely naturally occurring.

The Iron River was added to the receiving environment monitoring program during the 2014/2015 monitoring period as a result of the 7-South Area 5 mine approval. This development commenced in mid- July of 2018 with the initiation of blasting through the Long Lake fault zone. The project was complete in mid- January 2019. This system experiences naturally elevated concentrations (above water quality guidelines) of aluminum and arsenic; aluminum is present throughout the system (i.e. from IR1 through IR8) whereas arsenic is primarily detected below the sandstone unit of the Dunsmuir member contact represented by monitoring location IR6. These parameters have continued to be observed throughout 2018-19 monitoring in this system with less frequent exceedances of aluminum in fall and arsenic during low flow sampling. The main intention is to develop water quality objectives reflective of baseline conditions.

Quinsam Coal will continue to focus on site wide water management with a target of mitigating parameter of interest concentrations in the receiving environment. To date, Quinsam has demonstrated that the existing mine related controls and features implemented have been effective at reducing concentrations of certain parameters (e.g. sulphate). This trend is expected to persist and will be highlighted by future monitoring programs.

In closing, Quinsam trusts the information herein addresses the environmental responsibilities and provisions applicable to effluent permit PE: 7008.

Should you have any questions or concerns please contact the undersigned at Quinsam Coal Environmental Department 250-286-3224 Ext 225.

Kathleen Russell, B.Sc. Environmental Coordinator - Quinsam Coal Corporation

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Table 1
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Description of Effluent, In-Mine Releases & Receiving Environment Monitoring Sites			
EMS ID #	**Monitoring Sites**	**Abbreviation (Station Code)**	***Type of Water (MW, FW or GW)**
	North Coal Mining Operation		
E207409	Settling Pond #4 Decant	WD	**Discharge (MW)**
E207411	Culvert, at Middle Quinsam Lake Road	WC	MW & FW
E283433	2-North Portal Sump (Adit Sump)	2NPS	MW
E207412	2-North Pit Sump CCR Cover	WP	PAG-CCR Water Cover - MW
E292126	South Dyke Sump	SDS	MW
	South Coal Mine		
E218582	Settling Pond #1 Decant	SPD	**Discharge (MW)**
E217014	Culvert, Downstream End at Access Road	SPC	MW & FW
E217015	South Pit Main Sump Water	3S	PAG-CCR Water Cover (MW & FW)
E292127	2-South Pit In Pit Water Cover (2-South Standpipe)	2S	PAG-CCR Water Cover (MW & FW)
E292128	1977 Bulk Sample Pit	3S77	MW & FW
E292129	Culvert Downstream of 4 South Access Road	4S-Lo	MW & FW
	7-South Mining Operation		
E292069	7-South Surface Decant	7SSD	**Discharge (MW & FW)**
E292110	7-South Adit Sump	7SPS	MW
	Seep Monitoring Sites		
E292131	Long Lake Seeps	LLS & LLSM	GW / MW
	Culvert that collects groundwater and Coal Main logging road water entering MQL (PDSR)	PDSR	GW / SW
	Receiving Environment Monitoring Sites - Near Initial Zone of Dilution (NIDZ)		
Near Initial Dilution Zone (NIDZ) Monitoring Sites			
E292130	Long Lake Entrance (South end water entering Long Lake)	LLE	NIDZ
E292109	Road Crossing Bridge on Stream 1 above the Lower Wetland (Downstream of 7SSD).The site name is Stream 1, 7S.	7S	NIDZ
	Receiving Water (Rivers & Lakes Monitoring Sites) 5 in 30 Monitoring Locations		
North Coal Mining Operation			
E0126402	Quinsam River at Argonaut Road	WA	FW
E206618	Middle Quinsam Lake Centre	MQL (1, 4, 9 & 1m from Bottom)	FW
E0900504	Outflow from Middle Quinsam Lake	WB	FW
South Coal Mine			
E217018	No Name Lake	NNL (1, 4, 9 & 1m from Bottom)	FW
E217017	No Name Lake Outlet	NNO	FW
E206619	Long Lake at Centre	LLM (1, 4, 9 & 1m from Bottom)	FW
E219412	Long Lake Outlet	LLO	FW
7-South Mining Operation (Areas 1 to 4)			
E286930	Quinsam River Upstream of 7-South Mining Operation	QRDS1	FW
E292113	Quinsam River Downstream of 7-South Mining Operation	7SQR	FW
E292112	Lower Wetland Outlet at the confluence of the Quinsam River	LWO	FW
E292118	Lower Quinsam Lake Centre	LQL (1, 4, 9 & 1m from Bottom)	FW
7-South (Proposed) Area 5 Mining Operation			
E297230	Iron River upstream of mining operations	IR1	FW
E297231	Iron River upstream of 7SA5	IR6	FW
E297232	Iron River downstream of 7SA5 and 242 inputs	IR8	FW
E299256	Quinsam River downstream of confluence with Iron River	IRQR	FW
E292118	Lower Quinsam Lake Centre	LQL (1, 4, 9 & 1m from Bottom)	FW
Block 242 Mining Operation (Reclaimed / Not Monitored)			
E225798	Iron River upstream of the 242 influence	Not Monitored	FW
E225808	Iron River downstream of the 242 influence	Not Monitored	FW
N/A	Old portal sump used for collection of water from underground	Reclaimed	FW / GW
Long Lake Seep Passive Treatment System			
N/A	Groundwater well (2-South Mine Pool) influent to the treatment system	QU11-11 (INF-EFF)	MW
N/A	Bio Cell Reactor	BCR-EFF	MW
N/A	Sulphide Polishing Cell	SPC-EFF	MW
N/A	2-South Inflow	2SI	MW
N/A	Aeration Lagoon	AL-EFF	Not in use
N/A	Settling Pond Effluent	SP-EFF	Not in use

*** MW= Mine Water, FW= Freshwater, GW =Groundwater NIDZ = Near Intial Dilution Zone**

Table 2
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SUMMARY OF PERMIT LIMIT EXCEEDANCES & PERMIT NON-COMPLIANCES (April 1st, 2018 through March 31st, 2019)

EMS ID & Site Name	Permit Limit Exceedance (P) or Non-Compliance (PNC)	Parameter Exceeded / Other	Result (mg/L)	Requirement	Date	Non-Compliance Reason	Number of events or period for PNC, P or spill event.
E218582-Settling Pond #1 (SPD)	**PNC**	TSS	Missing weekly composite TSS	Weekly composite	May 23rd	Beaver had clogged the decant riser, no flow could be released. Flow meter calculated mud as water level. Flow ceased May 14th, 2018.	Missing (1/233) daily composite TSS samples collected.
	PNC	Alkalinity and Acidity	No Results	Monthly	September 4th	Sample was collected but the chain of custody did not request this test to be analyzed.	(1/6) monthly required events.
	PNC	Weekly Sulphate	No Results	Weekly	October 8th and 16th	Sample was not collected due to scheduling misinterpretation.	(2/52) weekly required events.
E207409-Settling Pond #4 (WD)	**PNC**	TSS	No Results	TSS daily composite if decant flow is greater than 0.054 m^3/s.	July 30th, August 5th, 6th , 14th, 15th, 30th and 31st	Water level in the pond was extremely low during the day and only discharged during the evening. The suction line for the composite sampler was not low enough in the water for required sample volume to be collected.	Missing (7/353) daily composite samples collected.
	P	TSS	28	25 mg/L	February 1st	Sample was frozen in the bottle may have caused build up on sides of bottle to be removed.	(1/ 353) samples collected. Spill report No. DGIR 184299
	Used to calculate fees	Annual average authorized rate of discharge	Annual average authorized rate of discharge was 0.1203 m^3	Authorized annual average rate of discharge is 0.08m^3/s	April 1st, 2018 through March 31st, 2019	The annual rate of discharge is greater than authorized. The rate of discharge is used for permit fee calculation purposes.	Exceeded by 50.4%
E292130- South end water entering Long Lake (LLE)	**PNC**	Metals (total and dissolved), Nutrients, TSS, Sulphate, alkalinity and acidity.	No Results	Required monthly	May 8th	Work was being preformed on culvert to remove the beaver dam and sample was not collected.	(1/12) monthly samples.
E207411- Culvert, at Middle Quinsam Lake Road (WC)	**PNC**	TSS	No Results	Every two weeks	May 1st, 14th and June 25th	Samples were collected but not on a bi-weekly sequence	(3/26) samples were not collected on a biweekly schedule.
E292127- 2 South Pit in Pit Water Cover (CCR Water Cover) (2S)	**PNC**	Continuous (Outflow)	Missing two days of outflow data.	Daily	December 28th, 2018 and January 2nd, 2019	Battery failure occurred.	(2/365) days. Battery has been replaced.
Section 4.5 Reporting	**PNC**	Late submission of report	N/A	Annual Report due June 30	Submitted late	QCC claimed bankrupcy and deadlines could not be met as a result of layoffs.	

Table 3
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SUMMARY OF WATER QUALITY GUIDELINE OBSERVATIONS IN THE RECEIVING ENVIRONMENT

EMS ID & Site Name	Site Code & Depth	Parameter (mg/L or pH Units)	Guideline Limit	Result	Date	Guideline	Sampling Events Exceeding Guideline
E217018 - No Name Lake (NNL)	NNL 9-12 metres	pH	6.5	6.39 - 6.49	May 3 - 23	Min	3 events during spring
	NNL 6-11.7 metres	pH	6.5	5.84 - 6.48	July 25 - August 23	Min	5 events during summer
	NNL all depths	pH	6.5	5.22 - 6.49	Fall 5 in 30	Min	5 events during fall
	NNL9	Cu-T	0.002	0.00754	Fall 5 in 30	A	Average fall 5 in 30
			0.007	0.0342	November 15th	M	(1/5) weekly samples during fall
E206619 - Long Lake Middle (LLM)	LLMB (17-18 metres)	pH	6.5	6.46-6.47	November 15th	Min	1 event during fall
	LLM 9M	SO4-D	128	135.2	Spring 5 in 30	A	Average spring 5 in 30
	LLM 1MB			140.4			
	LLM 9M	SO4-D	128	142.2	Summer 5 in 30	A	Average summer 5 in 30
	LLM 1MB			143.0			
	LLM 1MB	SO4-D	128	133.8	Fall 5 in 30	A	Average fall 5 in 30
E292118 - Lower Quinsam Lake (LQL)	LQLB (15 - 16.6 metres)	pH	6.5	6.43 - 6.45	August 23rd	Min	1 event during summer
	LQLB (15 - 16.6 metres)				November 15th		1 event during fall
	LQL 1MB	Fe-D	0.35	0.442, 0.442,0.632 and 0.746	August 2nd though August 22nd	M	(4/5) weekly samples during summer
		Fe-T	1	1.17 and 1.35	August 17 and 22		(2/5) weekly samples during summer
	LQL 1MB	Fe-D	0.35	0.355	October 22nd	M	(1/5) weekly samples during fall
E292130 - Long Lake Entry (LLE) -Last wetland South Water Management flows into prior to entering Long Lake.	LLE	SO4-D	128	129-469	5 in 30 rolling averages	A	(12/44) 5 in 30 weekly rolling averages
		Fe-D	0.35	0.80, 0.383 and 0.869	September, October and March	M	(3/10) Monthly samples collected during low flow, once the culvert started flowing again and during spring freshet when the ice melted.
		Fe-T	1	1.93	October		(1/10) Monthly samples collected during low flow, once the culvert started flowing again.
E292131- Long Lake Seeps	LLSM	Fe-D	0.35	0.483 and 0.427	August and March	M	(2/10) Monthly samples
	LLSM	Fe-T	1.00	1.03	December		(1/10) Monthly samples
	LLS	Fe-T	1.00	1.13, 1.33, 1.40 and 2.77	November and January through March		(4/12) Monthly samples
		Fe-D	0.35	0.373, 0.455, 0.517, 0.526, 1.09, 1.20 and 1.44	July through September and December through March		(7/12) Monthly samples
		As-T	0.005	0.00649	November		(1/12) Monthly samples
E292112 - Lower Wetland Outlet (LWO)	LWO	TSS	<5	8.00	Spring 5 in 30	A	Spring 5 in 30
		Cu-T	0.002	0.00223			
		Al-D	0.05	0.152			
			0.1	0.117, 0.166, 0.184 and 0.22	April 19th through May 9th	M	(4/5) Weekly samples collected in spring
		Fe-D	0.35	0.777, 1.09 and 1.99	April 25th through May 9th	M	(3/5) Weekly samples collected in spring
		Fe-T	1	1.58 and 2.59	May 1st and 9th	M	(2/5) Weekly samples collected in spring
		Al-D	0.100	0.209	October 11th	M	1 sample collected during fall
E219412 - Long Lake Outlet (LLO)	LLO	Cu-T	0.007	0.0204	Summer 5 in 30	A	Average Summer 5 in 30
			0.002	0.00449	August 7th	M	(1/5) Weekly samples collected in summer *(possible outlier)*
E297230 - Quinsam River Upstream of Mining Operations (IR1)	IR1	Al-D	0.05	0.061	Spring 5 in 30	A	Spring 5 in 30
E297231 - Iron River Upstream of 7SA5 (IR6)	IR6	Al-D	0.05	0.0745	Spring 5 in 30	A	Spring 5 in 30
	IR6	As-T	0.005	0.0052, 0.00565 and 0.00746	August 1st, 7th and 14th	M	(3/5) weekly samples during summer
E297232 - Iron River Downstream of 7SA5 (IR8)	IR8	Al-D	0.05	0.0723	Spring 5 in 30	A	Spring 5 in 30
	IR8	As-T	0.005	0.00612, 0.00894, 0.00961 and 0.0114	July 24th, August 1st, 7th, and 14th	M	(4/5) weekly samples during summer

Min = Minimum Water Quality Guideline (WQG) M= Maximum WQG, A= Average WQG

For all Middle Quinsam Lake Sub-basin and Iron River results background hardness of 30 mg/L was used to calculate those parameters that are hardness dependent.
***SO4 at LLE was calculated using a rolling average.**

Table 4
2018-2019 Annual Report

EMS ID		E207409													
Site Description		Settling Pond #4		Permitted Decant for the North Mining Operation											
Site Name		WD													
Date		10-Apr-18	8-May-18	4-Jun-18	3-Jul-18	8-Aug-18	4-Sep-18	1-Oct-18	5-Nov-18	6-Dec-18	8-Jan-19	4-Feb-19	4-Mar-19	19-Mar-19	Permit Limit
Parameter	Unit														North
SO4-D	mg/L	435	619	532	520	708	651	541	575	560	499	657	736	745	-
Alk-T	mg/L	374	404	415	397	252	368	278	338	408	365	405	437	391	-
Acidity 8.3	mg/L	4.0	2.0	8.3	3.3	2.2	7.4	3.6	2.9	7.2	13.5	<1.0	<1.0	5.3	-
Al-T	mg/L	0.0184		0.0053		0.0035		0.0679		0.0130		0.013		0.0101	-
As-T	mg/L	0.00242		0.00184		0.00122		0.00113		0.00270		0.00211		0.00272	-
Ba-T	mg/L	0.0224		0.0213		0.0201		0.02		0.0232		0.0254		0.0243	-
B-T	mg/L	0.82		0.872		0.93		0.773		0.86		0.958		1.03	-
Cd-T	mg/L	<0.000010		<0.000010		<0.000010		<0.000010		<0.000010		0.000011		<0.000010	-
Ca-T	mg/L	107		119		130		132		121		152		143	-
Cr-T	mg/L	<0.0010		<0.0010		<0.0010		<0.0010		<0.0010		<0.0010		<0.0010	-
Co-T	mg/L	0.0003		<0.00020		<0.00020		0.00023		0.00031		0.00077		0.00029	-
Cu-T	mg/L	0.00075		0.00059		0.00071		0.00085		<0.00050		0.00163		0.00198	-
Hard-T	mg/L	313		351		391		388		360		436		422	-
Fe-T	mg/L	0.516		0.485		0.055		0.253		0.464		1.14		1.540	-
Pb-T	mg/L	<0.00020		<0.00020		<0.00020		<0.00020		<0.00020		<0.00020		<0.00020	-
Mg-T	mg/L	11.1		12.8		16.4		14.20		13.7		13.8		15.5	-
Mn-T	mg/L	0.12		0.069		0.0412		0.0518		0.139		0.19		0.3	-
Hg-T	mg/L	<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020	-
Mo-T	mg/L	<0.0010		<0.0010		<0.0010		<0.0010		<0.0010		<0.0010		<0.0010	-
Ni-T	mg/L	0.0014		<0.0010		0.001		0.001		0.0012		0.0041		0.0013	-
K-T	mg/L	3.31		3.77		4.25		3.59		3.84		4.38		5.09	-
S-T	mg/L	163		191		237		202		199		246		276	-
Se-T	mg/L	<0.00010		<0.00010		<0.00010		<0.00010		<0.00010		<0.00010		<0.00010	-
Si-T	mg/L	2.66		2.33		2.30		2.77		3.21		3.41		3.15	-
Ag-T	mg/L	<0.000020		<0.000020		<0.000020		<0.000020		<0.000020		<0.000020		<0.000020	-
Na-T	mg/L	267		287		288		229		296		305		365	-
Sr-T	mg/L	0.922		1.00		1.35		1.26		1.19		1.38		1.43	-
Zn-T	mg/L	<0.0050		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050		0.0063	-
Al-D	mg/L	0.0049		<0.0030		<0.015		0.0063		0.0054		0.0037		<0.0030	0.5
As-D	mg/L	0.00153		0.00127		0.00116		0.00079		0.00207		0.00104		0.00130	-
Ba-D	mg/L	0.0216		0.0223		0.0204		0.0198		0.0222		0.0235		0.0239	-
B-D	mg/L	0.789		0.928		1.04		0.727		0.864		0.84		0.914	-
Be-D	mg/L	<0.00010		<0.00010		<0.00050		<0.00010		<0.00010		<0.00010		<0.00010	-
Cd-D	mg/L	<0.0000050		<0.0000050		<0.000025		<0.0000050		<0.0000050		<0.0000050		<0.0000050	-
Ca-D	mg/L	103		134		147		127		121		140		152	-
Cr-D	mg/L	<0.0010		<0.0010		<0.0050		<0.0010		<0.0010		<0.0010		<0.0010	-
Co-D	mg/L	0.00028		<0.00020		<0.0010		<0.00020		0.00031		0.00081		0.00027	-
Cu-D	mg/L	0.00044		0.00032		<0.0010		0.00046		<0.00020		0.00043		0.00025	0.02
Hard-D	mg/L	307		390		444		374		357		407		442	-
Fe-D	mg/L	0.0103		0.0098		0.027		0.013		0.0195		0.0151		0.012	0.3
Pb-D	mg/L	<0.00020		<0.00020		<0.0010		<0.00020		<0.00020		<0.00020		<0.00020	0.05
Mg-D	mg/L	11.8		13.5		18.5		14		13.2		14.2		15.3	-
Mn-D	mg/L	0.117		0.0764		0.0435		0.0539		0.1400		0.176		0.278	-
Hg-D	mg/L	<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020	-
Mo-D	mg/L	<0.0010		<0.0010		<0.0050		<0.0010		<0.0010		<0.0010		<0.0010	-
Ni-D	mg/L	0.0013		<0.0010		<0.0050		<0.0010		0.0012		0.0044		0.001	-
K-D	mg/L	3.46		4.22		4.44		3.47		3.81		4.28		4.8	-
S-D	mg/L	178		209		246		194		196		239		279	-
Se-D	mg/L	<0.00010		<0.00010		<0.00050		<0.00010		<0.00010		<0.00010		<0.00010	-
Si-D	mg/L	2.58		2.59		2.37		2.43		3.12		3.07		3.55	-
Na-D	mg/L	263		299		316		234		282		298		352	-
Sr-D	mg/L	0.948		1.07		1.42		1.160		1.190		1.45		1.67	-
Zn-D	mg/L	<0.0050		<0.0050		<0.025		<0.0050		<0.0050		<0.0050		<0.0050	0.1
O&G	mg/L	<5.0		<5.0		<5.0		<5.0		<5.0		<5.0		<5.0	10

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EMS ID		E207412											
Site Description		2-North Pit Sump CCR Water Cover											
Site Name		WP											
Date		10-Apr-18	8-May-18	4-Jun-18	3-Jul-18	8-Aug-18	4-Sep-18	1-Oct-18	5-Nov-18	17-Dec-18	8-Jan-19	4-Feb-19	19-Mar-19
Parameter	Unit												
SO4-D	mg/L	559	589	636	560	588	705	608	675	553	458	465	288
TSS	mg/L	<4.0	<4.0	<4.0	18.8	<4.0	48.8	11.3	<4.0	6.8	<4.0	<4.0	<4.0
Alk-T	mg/L	262	286	291	268	237	290	197	281	211	187	234	140
Acidity 8.3	mg/L	1.2	<1.0	<1.0	1.1	<1.0	3.3	2.2	<1.0	3.9	3	<1.0	<1.0
Al-T	mg/L	0.042	0.021	0.0437	0.0618	0.015	0.349	0.6060	0.0508	1.29	0.115	0.0307	0.032
As-T	mg/L	0.00093	0.00124	0.0009	0.00107	0.00077	0.00192	0.00119	0.00059	0.00419	0.00065	0.00053	0.00029
Ba-T	mg/L	0.0187	0.0216	0.0193	0.0187	0.0188	0.0259	0.0206	0.0178	0.0214	0.0171	0.0181	0.0082
B-T	mg/L	0.685	0.81	0.891	0.804	0.961	1.04	0.603	0.694	0.56	0.402	0.587	0.344
Cd-T	mg/L	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	0.00001	<0.000010	<0.000010
Ca-T	mg/L	118	138	112	92.9	79.1	133	138	138	161	131	157	55.5
Cr-T	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010
Co-T	mg/L	0.00072	<0.0010	<0.00020	<0.00020	<0.00020	0.00087	0.00137	0.00069	0.0037	0.00128	0.00193	0.00066
Cu-T	mg/L	0.00094	0.0117	0.00065	0.00081	0.00081	0.003	0.00242	0.00089	0.0138	0.00094	0.00072	0.00065
Hard-T	mg/L	365	418	351	296	263	400	417	424	505	401	474	169
Fe-T	mg/L	0.107	0.207	0.058	0.207	0.029	1.05	0.4	0.145	2.930	0.236	0.136	0.112
Pb-T	mg/L	<0.00020	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.0010	<0.00020	<0.00020	<0.00020
Mg-T	mg/L	17.1	17.5	17.7	15.5	16.0	16.6	17.70	19.3	24.9	18.1	19.9	7.44
Mn-T	mg/L	0.0474	0.0812	0.0073	0.021	0.0039	0.0632	0.0935	0.0600	0.135	0.087	0.107	0.044
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000022	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Mo-T	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	0.003	<0.0050	0.0018	0.0011	<0.0010	0.0015	0.0032	0.0022	0.0066	0.0031	0.0047	0.0019
K-T	mg/L	3	3.77	3.97	3.56	3.83	4.75	4.44	3.22	2.65	2.13	2.68	1.37
S-T	mg/L	188	214	233	198	214	277	214	244	2120	174	222	92.3
Se-T	mg/L	0.00014	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	0.00029	0.00013	<0.00050	0.00016	0.00012	<0.00010
Si-T	mg/L	2.47	2.9	2.39	2.12	2.28	3.13	2.26	2.59	4.13	2.20	2.6	1.12
Ag-T	mg/L	<0.000020	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00010	<0.000020	<0.000020	<0.000020
Na-T	mg/L	229	261	286	271	293	307	190	242	181	124	166	95.4
Sr-T	mg/L	0.994	1.02	1.08	1.09	1.13	1.310	1.12	1.43	1.24	0.975	1.17	0.46
Zn-T	mg/L	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050
Al-D	mg/L	0.0065	<0.015	0.0051	0.0032	<0.015	<0.015	0.0119	0.0114	0.0091	0.0121	0.0066	<0.0030
As-D	mg/L	0.00076	0.00079	0.00078	0.00067	0.00064	0.00075	0.00058	0.00042	0.00029	0.00054	0.00035	0.00024
Ba-D	mg/L	0.0191	0.02	0.0203	0.0179	0.0184	0.0226	0.0185	0.0166	0.0164	0.0167	0.0191	0.009
B-D	mg/L	0.677	0.75	0.931	0.826	1.04	1.09	0.59	0.738	0.496	0.476	0.502	0.311
Be-D	mg/L	<0.00010	<0.00050	<0.00010	<0.00010	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cd-D	mg/L	<0.0000050	<0.000025	<0.0000050	<0.0000050	<0.000025	<0.000025	0.0000059	0.000006	0.0000086	0.0000083	0.000005	<0.0000050
Ca-D	mg/L	124	114	125	94.2	79.4	134.0	136	155	146	135	145	64.5
Cr-D	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	0.00067	<0.0010	<0.00020	<0.00020	<0.0010	<0.0010	0.00086	0.00063	0.00084	0.00129	0.00162	0.00066
Cu-D	mg/L	0.00044	<0.0010	0.00051	0.00049	<0.0010	<0.0010	0.00065	0.00063	0.00076	0.00054	0.00047	0.00021
Hard-D	mg/L	376	351	387	301	267	404	406	468	456	418	449	193
Fe-D	mg/L	0.0055	<0.025	0.0081	0.0059	<0.025	0.034	0.0093	0.0106	0.0058	0.006	<0.0050	<0.0050
Pb-D	mg/L	<0.00020	<0.0010	<0.00020	<0.00020	<0.0010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	mg/L	16.2	16	17.9	15.9	16.6	16.8	16	19.9	22	19.5	21	7.86
Mn-D	mg/L	0.0456	0.0211	0.0021	0.0026	<0.0050	0.0236	0.0815	0.0557	0.0658	0.0913	0.0874	0.047
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000024	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Mo-D	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ni-D	mg/L	0.0029	<0.0050	0.0016	<0.0010	<0.0050	<0.0050	0.0022	0.0021	0.0027	0.0034	0.0044	0.0018
K-D	mg/L	2.97	3.19	4.26	3.76	3.95	4.48	4.33	3.57	2.53	2.15	2.55	1.47
S-D	mg/L	195	184	242	199	208	238	203	260	208	186	217	102
Se-D	mg/L	0.00014	<0.00050	<0.00010	<0.00010	<0.00050	<0.00050	0.00029	0.00011	0.00016	0.00014	0.00019	<0.00010
Si-D	mg/L	2.58	2.2	2.52	2.35	2.25	2.21	1.69	2.53	2.1	2.13	2.41	1.17
Na-D	mg/L	213	244	285	278	307	312	186	274	165	134	165	97.3
Sr-D	mg/L	1.01	1.02	1.12	1.06	1.05	1.32	1.04	1.28	1.22	1.03	1.16	0.527
Zn-D	mg/L	<0.0050	<0.025	<0.0050	<0.0050	<0.025	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Table 6
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EMS ID		E283433											
Site Description		2-North Portal Sump Effluent											
Site Name		2NPS											
Date		10-Apr-18	8-May-18	4-Jun-18	3-Jul-18	8-Aug-18	5-Sep-18	1-Oct-18	5-Nov-18	6-Dec-18	10-Jan-19	5-Feb-19	4-Mar-19
Parameter	Unit												
SO4-D	mg/L	928	1090	1060	949	890	869	816	821	1040	777	958	970
Alk-T	mg/L	266	252	308	305.00	295.00	277	277	254	312	220	288	289
Acidity83	mg/L	11.0000	8.4000	13.3000	12.9	13.8	17	16.3000	8.4000	24.2000	9.5	2.2	5.2
Al-T	mg/L	0.203	0.14	0.017	0.044	0.03	0.076	1.07	0.631	0.0387	0.208	0.0739	0.294
As-T	mg/L	0.00088	0.00063	0.00056	0.00063	0.00075	0.00098	0.00186	0.0012	0.00054	0.00044	0.00095	0.00202
Ba-T	mg/L	0.0162	0.0142	0.012	0.0122	0.0138	0.01	0.0184	0.02	0.015	0.0188	0.0129	0.014
B-T	mg/L	0.674	0.75	0.86	0.830000	1.000000	1	0.806	0.659	0.877	0.584	0.795	0.755
Cd-T	mg/L	0.000032	<0.000050	<0.000050	<0.000050	<0.000050	<0.000020	0.00001	0.000037	0.000013	0.000017	<0.000010	0.000015
Ca-T	mg/L	261	302	288	242	258	245	237	224	301	233	264	288
Cr-T	mg/L	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	0.0016	0.0011	<0.0010	<0.0010	<0.0010	<0.0010
Co-T	mg/L	0.00635	0.0017	<0.0010	<0.0010	<0.0010	0.00094	0.002	0.00472	0.00219	0.00188	0.00151	0.00171
Cu-T	mg/L	0.00224	<0.0025	<0.0025	<0.0025	<0.0025	<0.0010	0.00344	0.00548	0.00097	0.0012	0.00064	0.00263
Hard-T	mg/L	767	894	844	713	756	713	692	649	880	672	768	839
Fe-T	mg/L	0.628	0.341	0.165	0.198	0.27	0.296	0.982	0.781	0.104	0.153	0.344	1.43
Pb-T	mg/L	<0.00020	<0.0010	<0.0010	<0.0010	<0.0010	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00024
Mg-T	mg/L	27.7	34.1	30.6	26.2	27.4	24.5	24.1000	22.0000	31.4000	22.1	26.3	29
Mn-T	mg/L	0.302	0.257	0.189	0.168	0.167	0.279	0.373	0.319	0.32	0.135	0.274	0.283
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Mo-T	mg/L	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	0.0126	<0.0050	<0.0050	<0.0050	<0.0050	0.0024	0.0039	0.0105	0.0044	0.0043	0.0033	0.0035
K-T	mg/L	3.7	4.24	4.02	3.53	3.94	4.02	3.66	3.4	4.33	3.52	3.82	3.92
S-T	mg/L	321	381	351	280	310	314	285	281	374	275	346	356
Se-T	mg/L	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00010	0.00016	<0.00010	0.00027	<0.00010	<0.00010
Si-T	mg/L	3.18	2.97	3.08	2.72	3.06	3.54	4.32	3.91	3.67	3.03	3.12	3.49
Ag-T	mg/L	<0.000020	<0.00010	<0.00010	<0.00010	<0.00010	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Na-T	mg/L	200	223.00	223	212	246	238	208	169	244	175	212	228
Sr-T	mg/L	1.84	1.91	1.8300	1.77	1.91	1.8	1.81	1.72	2.28	1.66	2	1.81
Zn-T	mg/L	0.0103	<0.025	<0.025	<0.025	<0.025	<0.010	0.0052	0.012	<0.0050	<0.0050	<0.0050	0.0114
Al-D	mg/L	0.0079	<0.015	<0.015	<0.0030	<0.015	0.0097	0.0083	0.02900	<0.015	0.034	0.0164	0.0098
As-D	mg/L	0.00053	<0.00050	0.00054	0.00053	<0.00050	0.00068	0.0007	0.00058	0.00065	<0.00050	0.00066	0.00056
Ba-D	mg/L	0.0139	0.0133	0.013	0.0124	0.0132	0.0139	0.0167	0.0193	0.02	0.02	0.0119	0.0116
B-D	mg/L	0.651	0.71	0.86	0.777	1.02	0.96	0.83	0.758	0.83	0.77	0.71	0.68
Be-D	mg/L	<0.00010	<0.00050	<0.00050	<0.00010	<0.00050	<0.00020	<0.00020	<0.00010	<0.00050	<0.00050	<0.00020	<0.00020
Cd-D	mg/L	0.000032	<0.000025	<0.000025	<0.0000050	<0.000025	<0.000010	0.00001	0.000032	<0.000025	<0.000025	<0.000010	<0.000010
Ca-D	mg/L	254	277	317	261	247	237	235	252	348	254	253	242
Cr-D	mg/L	<0.0010	<0.0050	<0.0050	<0.0010	<0.0050	<0.0020	<0.0020	<0.0010	<0.0050	<0.0050	<0.0020	0.0032
Co-D	mg/L	0.00671	0.0015	<0.0010	0.00065	<0.0010	0.00089	0.00142	0.00433	0.00217	0.0021	0.00152	0.00133
Cu-D	mg/L	0.00062	<0.0010	<0.0010	0.00022	<0.0010	0.00063	0.00044	0.0015	<0.0010	<0.0010	<0.00040	<0.00040
Hard-D	mg/L	748	817	926	767	731	694	683	725	1030	749	744	713
Fe-D	mg/L	0.0071	0.038	<0.025	0.0183	<0.025	0.021	0.015	0.0141	0.163	<0.025	0.081	0.057
Pb-D	mg/L	<0.00020	<0.0010	<0.0010	<0.00020	<0.0010	<0.00040	<0.00040	<0.00020	<0.0010	<0.0010	<0.00040	<0.00040
Mg-D	mg/L	27.5	30.3	32.7	28.2	27.8	25	23.7000	23.5000	38.1000	27.9	27.5	26.5
Mn-D	mg/L	0.301	0.267	0.213	0.179	0.161	0.275	0.359	0.319	0.387	0.163	0.284	0.237
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000023	<0.0000020	<0.0000020	<0.0000020
Mo-D	mg/L	<0.0010	<0.0050	<0.0050	<0.0010	<0.0050	<0.0020	<0.0020	<0.0010	<0.0050	<0.0050	<0.0020	<0.0020
Ni-D	mg/L	0.0132	<0.0050	<0.0050	0.002	<0.0050	0.00	0.0029	0.01	0.0059	0.0051	0.0035	0.0044
K-D	mg/L	3.72	3.44	4.87	3.86	4.01	4	3.64	3.9	5.08	4.15	3.65	3.42
S-D	mg/L	320	316	385	309	306	310	285	306	427	323	324	307
Se-D	mg/L	<0.00010	<0.00050	<0.00050	<0.00010	<0.00050	<0.00020	<0.00020	0.00013	<0.00050	<0.00050	<0.00020	<0.00020
Si-D	mg/L	2.87	2.47	3.39	2.94	3.03	3.25	2.84	3.15	4.06	2.85	2.55	2.63
Na-D	mg/L	197.00	212	250	223	247	236.00	214.00	196	295	211	215	202
Sr-D	mg/L	1.81	2.09	1.97	1.94	1.82	1.81	1.68	1.61	2.7	1.88	1.81	1.83
Zn-D	mg/L	0.0094	<0.025	<0.025	<0.0050	<0.025	<0.010	<0.010	0.0086	<0.025		<0.010	<0.010

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EMS ID		E207411											
Site Description		Culvert, at Middle Quinsam Lake Road											
Site Name		WC											
Date		10-Apr-18	8-May-18	4-Jun-18	3-Jul-18	8-Aug-18	12-Sep-17	1-Oct-18	5-Nov-18	6-Dec-18	8-Jan-19	4-Feb-19	4-Mar-19
Parameter	Unit												
SO4-D	mg/L	448	618	524	505	598	570	494	397	544	422	593	729
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Al-T	mg/L	0.0149		0.0043		0.0073		0.0068		0.0077		0.009	
As-T	mg/L	0.00071		0.00056		0.00106		0.00056		0.00118		0.001	
Ba-T	mg/L	0.0178		0.0162		0.0228		0.0182		0.02		0.0215	
B-T	mg/L	0.733		0.851		1.07		0.75		0.84		0.882	
Cd-T	mg/L	<0.000010		<0.000010		<0.000010		<0.000010		<0.000010		<0.000010	
Ca-T	mg/L	92.1		92.8		95.5		104		117		136	
Cr-T	mg/L	<0.0010		<0.0010		<0.0010		<0.0010		<0.0010		<0.0010	
Co-T	mg/L	<0.00020		<0.00020		0.00021		<0.00020		<0.00020		0.00041	
Cu-T	mg/L	0.00063		<0.00050		0.00054		0.00064		<0.00050		0.00098	
Hard-T	mg/L	274		282		300		312		349		393	
Fe-T	mg/L	0.082		0.054		0.182		0.054		0.133		0.366	
Pb-T	mg/L	<0.00020		<0.00020		<0.00020		<0.00020		<0.00020		<0.00020	
Mg-T	mg/L	10.7		12.3		15		12.4		13.9		13.2	
Mn-T	mg/L	0.0095		0.0069		0.0479		0.0068		0.0177		0.0594	
Hg-T	mg/L	<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020	
Mo-T	mg/L	<0.0010		<0.0010		<0.0010		<0.0010		<0.0010		<0.0010	
Ni-T	mg/L	<0.0010		<0.0010		0.001		<0.0010		<0.0010		0.0056	
K-T	mg/L	3.04		3.51		4.25		3.22		3.72		4.08	
S-T	mg/L	147		183		224		175		200		235.00	
Se-T	mg/L	<0.00010		<0.00010		<0.00010		<0.00010		<0.00010		<0.00010	
Si-T	mg/L	2.51		2.2		4.89		2.84		3.31		3.21	
Ag-T	mg/L	<0.000020		<0.000020		<0.000020		<0.000020		<0.000020		<0.000020	
Na-T	mg/L	240		269		323		215		288		281	
Sr-T	mg/L	0.854		0.935		1.2		1.09		1.15		1.23	
Zn-T	mg/L	<0.0050		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
Al-D	mg/L	0.0098		0.0048		<0.015		0.0053		0.0072		0.0064	
As-D	mg/L	0.00067		0.00048		0.00092		0.00053		0.00094		0.00064	
Ba-D	mg/L	0.0173		0.0181		0.0218		0.0182		0.0191		0.0218	
B-D	mg/L	0.783		0.954		1.08		0.712		0.821		0.831	
Be-D	mg/L	<0.00010		<0.00010		<0.00050		<0.00010		<0.00010		<0.00010	
Cd-D	mg/L	<0.0000050		<0.0000050		<0.000025		<0.0000050		<0.0000050		<0.0000050	
Ca-D	mg/L	91.6		113		90.5		103		112		131	
Cr-D	mg/L	<0.0010		<0.0010		<0.0050		<0.0010		<0.0010		<0.0010	
Co-D	mg/L	<0.00020		<0.00020		<0.0010		<0.00020		<0.00020		0.00042	
Cu-D	mg/L	0.0006		0.00058		<0.0010		0.00039		0.00024		0.00034	
Hard-D	mg/L	273		339		288		307		332		384	
Fe-D	mg/L	0.0142		0.0133		0.114		0.0174		0.0133		0.0181	
Pb-D	mg/L	<0.00020		<0.00020		<0.0010		<0.00020		<0.00020		<0.00020	
Mg-D	mg/L	10.8		13.8		15		12.3		13		14	
Mn-D	mg/L	0.0089		0.0098		0.0521		0.0072		0.0187		0.0598	
Hg-D	mg/L	<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020		<0.0000020	
Mo-D	mg/L	<0.0010		<0.0010		<0.0050		<0.0010		<0.0010		<0.0010	
Ni-D	mg/L	<0.0010		<0.0010		<0.0050		<0.0010		<0.0010		0.0053	
K-D	mg/L	3.27		4.05		4.16		3.2		3.67		4.1	
S-D	mg/L	169		198		209		169		193		229	
Se-D	mg/L	<0.00010		<0.00010		<0.00050		<0.00010		<0.00010		<0.00010	
Si-D	mg/L	2.54		2.5		4.61		2.62		3.11		3.03	
Na-D	mg/L	242		299		317		221		268		290	
Sr-D	mg/L	0.86		1.01		1.07		1		1.12		1.36	
Zn-D	mg/L	<0.0050		<0.0050		<0.025		<0.0050		<0.0050		<0.0050	

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EMS ID		E292126			
Site Description		South Dyke Sump - Collects seepage from tailings dam that is pump underground 2N mine			
Site Name		SDS			
Date		10-Apr-18	10-Jul-18	1-Oct-18	27-Mar-19
Parameter	Unit				
SO4-D	mg/L	966	1450	441	771
Alk-T	mg/L	179	183	87.2	130
Acidity 8.3	mg/L	3	2.2	2.5	2.8
Al-T	mg/L	0.312	0.031	2.050	0.0547
As-T	mg/L	0.00045	<0.00050	0.00152	0.00015
Ba-T	mg/L	0.0227	0.019	0.0239	0.009
B-T	mg/L	0.46	0.73	0.262	0.221
Cd-T	mg/L	0.00002	<0.000050	0.000034	<0.000010
Ca-T	mg/L	280	372	154	180
Cr-T	mg/L	<0.0010	<0.0050	0.0039	<0.0010
Co-T	mg/L	0.00185	<0.0010	0.00266	0.00074
Cu-T	mg/L	0.00301	<0.0025	0.011	0.00057
Hard-T	mg/L	837	1140	455	542
Fe-T	mg/L	0.672	<0.050	2.61	0.09
Pb-T	mg/L	<0.00020	<0.0010	0.00029	<0.00020
Mg-T	mg/L	33.4	51.8	17.3	22.5
Mn-T	mg/L	0.259	0.0105	0.18	0.284
Hg-T	mg/L	<0.0000020	<0.0000020	0.0000028	<0.0000020
Mo-T	mg/L	<0.0010	<0.0050	<0.0010	<0.0010
Ni-T	mg/L	0.0061	<0.0050	0.0063	0.0048
K-T	mg/L	3.83	5	2.91	1.69
S-T	mg/L	317	463	155	190
Se-T	mg/L	0.00037	<0.00050	0.00061	<0.00010
Si-T	mg/L	2.88	0.57	4.41	1.84
Ag-T	mg/L	<0.000020	<0.00010	<0.000020	<0.000020
Na-T	mg/L	117	190	45.8	43.1
Sr-T	mg/L	1.68	2.49	0.842	1.11
Zn-T	mg/L	<0.0050	<0.025	0.0083	<0.0050
Al-D	mg/L	0.0173	0.0153	0.0090	0.0051
As-D	mg/L	0.00022	0.00057	0.0002	0.00022
Ba-D	mg/L	0.0213	0.0195	0.0192	0.0114
B-D	mg/L	0.463	0.772	0.234	0.311
Be-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010
Cd-D	mg/L	0.0000170	<0.0000050	0.0000148	0.000015
Ca-D	mg/L	285	384	151	248
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	0.00143	<0.00020	0.00076	0.00085
Cu-D	mg/L	0.00108	0.00083	0.00148	0.00033
Hard-D	mg/L	858	1190	445	749
Fe-D	mg/L	0.0058	0.0082	0.0082	0.0058
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	mg/L	35.6	55.3	16.4	31.4
Mn-D	mg/L	0.246	0.0143	0.1360	0.355
Hg-D	mg/L	<0.0000020	<0.0000020	0.0000023	<0.0000020
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Ni-D	mg/L	0.0056	0.0015	0.0024	0.0069
K-D	mg/L	3.88	5.02	2.9	2.37
S-D	mg/L	335	481	151	275
Se-D	mg/L	0.00036	0.00019	0.00057	<0.00010
Si-D	mg/L	2.48	0.48	1.55	2.26
Na-D	mg/L	120	198	45.3	61.3
Sr-D	mg/L	1.69	2.47	0.806	1.4
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050

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Site Description		Groundwater / Surface Water from 2N Area at Road									
Site Name		PDSR									
Date		10-Apr-18	8-May-18	4-Jun-18	3-Jul-18	1-Oct-18	5-Nov-18	6-Dec-18	8-Jan-19	4-Feb-19	4-Mar-19
Parameter	Unit										
SO4-D	mg/L	495	784	1060	992	629	369	569	267	408	665
Alk-T	mg/L	144	203	246	246	159	114	166	116	152	184
Acidity 8.3	mg/L	2.1	<1.0	2.80	5	5.4	1.2	4.3	1.5	<1.0	<1.0
Al-T	mg/L	0.0173	0.016	0.0550	0.035	0.0404	0.0163	0.0082	0.0126	0.0082	0.033
As-T	mg/L	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Ba-T	mg/L	0.02	0.0342	0.041	0.0447	0.0264	0.0174	0.0206	0.0123	0.0179	0.0207
B-T	mg/L	0.236	0.38	0.45	0.48	0.295	0.165	0.195	0.145	0.192	0.205
Cd-T	mg/L	<0.000010	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Ca-T	mg/L	182	297	307	304	204	126	205	108	179	227
Cr-T	mg/L	<0.0010	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-T	mg/L	<0.00020	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Cu-T	mg/L	<0.00050	<0.0025	<0.0025	<0.0025	0.00076	0.00062	<0.00050	<0.00050	<0.00050	<0.00050
Hard-T	mg/L	569	933	988	981	651	402	651	347	562	718
Fe-T	mg/L	0.018	<0.050	0.061	0.065	0.04	0.012	<0.010	<0.010	0.019	0.028
Pb-T	mg/L	<0.00020	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-T	mg/L	27.9	46.6	53.7	54	34.3	21.4	34.1	19	27.9	37
Mn-T	mg/L	0.0043	<0.0050	0.0074	<0.0050	0.0042	0.0013	<0.0010	<0.0010	<0.0010	0.0014
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Mo-T	mg/L	<0.0010	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	<0.0010	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
K-T	mg/L	1.64	2.85	2.73	2.44	1.96	1.33	1.51	1.08	1.35	1.39
S-T	mg/L	177	317	336	346	216	133	204	107	182	237
Se-T	mg/L	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Si-T	mg/L	3.58	4.17	3.84	4.25	3.54	3.88	3.39	3.11	3.19	3.16
Ag-T	mg/L	<0.000020	<0.00010	<0.00010	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Na-T	mg/L	49.3	79.5	85.4	85.7	66.7	40.3	59.8	31.8	42.9	56.2
Sr-T	mg/L	1.11	1.68	2.07	2.32	1.43	0.888	1.26	0.68	1.1	1.31
Zn-T	mg/L	<0.0050	<0.025	<0.025	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Al-D	mg/L	0.012	<0.015	<0.015	0.017	0.0114	0.0116	0.0067	0.0094	0.0072	0.0058
As-D	mg/L	<0.00010	<0.00050	<0.00050	<0.00050	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Ba-D	mg/L	0.0202	0.0313	0.0428	0.0417	0.029	0.0174	0.0201	0.0115	0.0182	0.0215
B-D	mg/L	0.235	0.34	0.45	0.45	0.279	0.191	0.194	0.151	0.17	0.177
Be-D	mg/L	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cd-D	mg/L	<0.0000050	<0.000025	<0.000025	<0.000025	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Ca-D	mg/L	177	240	355	329	205	145	200	111	176	219
Cr-D	mg/L	<0.0010	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	<0.00020	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Cu-D	mg/L	0.00055	<0.0010	<0.0010	<0.0010	0.00055	0.00059	0.00034	0.00048	0.00042	0.00024
Hard-D	mg/L	561	754	1100	1040	656	457	630	356	562	697
Fe-D	mg/L	0.0064	<0.025	<0.025	<0.025	0.0063	0.0069	<0.0050	<0.0050	<0.0050	<0.0050
Pb-D	mg/L	<0.00020	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	mg/L	29	37.6	51.3	53.8	35	22.8	32.1	19	29.5	36.4
Mn-D	mg/L	0.0029	<0.0050	<0.0050	<0.0050	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000028	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Mo-D	mg/L	<0.0010	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ni-D	mg/L	<0.0010	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
K-D	mg/L	1.69	2.17	2.55	2.4	1.89	1.47	1.49	1.03	1.3	1.38
S-D	mg/L	179	228	349	320	220	147	201	106	175	221
Se-D	mg/L	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Si-D	mg/L	3.52	3.25	4.62	3.83	3.58	3.97	3.22	2.96	2.81	2.76
Na-D	mg/L	48	65.1	76.8	87.6	69.3	45.6	56.1	32	45.3	53
Sr-D	mg/L	1.09	1.66	2.15	2.08	1.49	0.817	1.3	0.679	1.1	1.43
Zn-D	mg/L	<0.0050	<0.025	<0.025	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

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EMS ID		E218582												
Site Description		Settling Pond # 1 - Permitted Decant for South Mining Operation												Permit
Site Name		SPD				(SPD was not discharging from May 14th through to September 29th)								Limit-South
Date		10-Apr-18	8-May-18	4-Jun-18	3-Jul-18	8-Aug-18	4-Sep-18	1-Oct-18	5-Nov-18	5-Dec-18	8-Jan-19	4-Feb-19	4-Mar-19	
Parameter	Unit													
SO4-D	mg/L	276	307	339	252	255	262	297	174	190	128	129	55.3	-
TSS	mg/L	<4.0	<4.0	8.3	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	**25**
Alk-T	mg/L	87	99.5	84.2	79	92	**PNC**	74.4	52.6	54.4	38.3	44.6	39.2	-
Acidity83	mg/L	1	<1.0	5.20	<1.0	2.4	**PNC**	3.4	1.3	7.2	4.9	<1.0	1.3	-
Al-T	mg/L	0.0401	0.008	0.138		0.0085		0.0747		0.0703		0.055		-
As-T	mg/L	0.0004	0.0006	0.0019		0.0036		0.0013		0.0008		0.0004		-
Ba-T	mg/L	0.0119	0.0143	0.0172		0.0207		0.0196		0.0126		0.0051		-
B-T	mg/L	0.17200	0.21	0.217		0.319		0.24600		0.11600		0.05900		-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010		<0.000010		0.0000		<0.000010		<0.000010		-
Ca-T	mg/L	118	133.000	127		106		113		74.6		51.1		-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010		<0.0010		<0.0010		<0.0010		<0.0010		-
Co-T	mg/L	<0.00020	<0.00020	0.00094		0.00048		0.00301		0.00069		0.00038		-
Cu-T	mg/L	0.0006	<0.00050	0.0026		0.0007		0.0013		0.0020		0.0006		-
Hard-T	mg/L	359.0	401.0	394.0		340.0		345.0		227.0		152.0		-
Fe-T	mg/L	0.14	0.12	0.96		0.35		0.56		0.41		0.25		-
Pb-T	mg/L	<0.00020	<0.00020	<0.00020		<0.00020		<0.00020		0.0002		<0.00020		-
Mg-T	mg/L	15.4	16.9	18.6		18		15.10		9.88		5.87		-
Mn-T	mg/L	0.0183	0.0273	0.0918		0.0757		0.35		0.05		0.04		-
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020		<0.0000020		0.00000		<0.0000020		<0.0000020		-
Mo-T	mg/L	<0.0010	<0.0010	<0.0010		<0.0010		<0.0010		<0.0010		<0.0010		-
Ni-T	mg/L	<0.0010	<0.0010	0.0013		0.0021		0.007		<0.0010		<0.0010		-
K-T	mg/L	1.22	1.50	1.47		2.27		1.66		0.76		0.51		-
S-T	mg/L	106.0	116.0	114.0		108.0		102.0		63.1		41.9		-
Se-T	mg/L	<0.00010	<0.00010	<0.00010		<0.00010		<0.00010		<0.00010		<0.00010		-
Si-T	mg/L	1.9	0.9	0.5		6.4		3.8		4.0		3.3		-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020		<0.000020		<0.000020		<0.000020		<0.000020		-
Na-T	mg/L	14.0	15.3	18.2		25.9		17.9		12.9		5.8		-
Sr-T	mg/L	0.73	0.82	0.86		0.82		0.77		0.42		0.27		-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050		<0.0050		0.007400		<0.0050		<0.0050		-
Al-D	mg/L	0.0128	0.0046	<0.0030		0.0071		0.0223		0.0556		0.0346		**0.5**
As-D	mg/L	0.0004	0.0006	0.0005		0.0033		0.0010		0.0006		0.0003		-
Ba-D	mg/L	0.0113	0.0128	0.0153		0.0207		0.0183		0.011		0.0052		-
B-D	mg/L	0.166	0.196	0.195		0.319		0.227		0.092		0.064		-
Be-D	mg/L	<0.00010	<0.00010	<0.00010		<0.00010		<0.00010		<0.00010		<0.00010		-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050		<0.0000050		0.0000202		0.0000099		<0.0000050		-
Ca-D	mg/L	119	155	121		102		114		58.3		48.4		-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010		<0.0010		<0.0010		<0.0010		<0.0010		-
Co-D	mg/L	<0.00020	<0.00020	<0.00020		0.0005800		0.00249		0.00065		0.00038		-
Cu-D	mg/L	0.00054	0.00045	0.00067		0.00065		0.00105		0.00081		0.0005		**0.02**
Hard-D	mg/L	362	462	379		333		346		179		146		-
Fe-D	mg/L	0.022	0.060	0.008		0.238		0.127		0.223		0.128		**0.5**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020		<0.00020		<0.00020		<0.00020		<0.00020		**0.05**
Mg-D	mg/L	15.70	18.40	18.30		18.70		15.20		8.01		6.09		-
Mn-D	mg/L	0.0123	0.0182	<0.0010		0.0831		0.31		0.0489		0.035		-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020		<0.0000020		0.00000		0.00000		<0.0000020		-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010		<0.0010		<0.0010		<0.0010		0.0026		-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010		0.0024		0.0067		<0.0010		<0.0010		-
K-D	mg/L	1.28	1.48	1.41		2.16		1.71		0.65		0.49		-
S-D	mg/L	110	117	101		98		106		52		39		-
Se-D	mg/L	<0.00010	<0.00010	<0.00010		<0.00010		<0.00010		<0.00010		<0.00010		-
Si-D	mg/L	1.84	0.94	0.26		5.38		3.63		3.99		2.75		-
Na-D	mg/L	14.4	17.4	18.1		26.4		18.2		10.6		6.1		-
Sr-D	mg/L	0.69	0.78	0.80		0.79		0.75		0.34		0.27		-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050		<0.0050		0.0067		<0.0050		<0.0050		-
O&G	mg/L	<5.0		<5.0		<5.0		<5.0		<5.0		<5.0		-

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Site Description		Long Lake Seep Passive Treatment System (LLSPTS) Influent for Treament System (2-South Mine Pool)							
Site Name		INF							
Date		5-Sep-18	2-Oct-18	5-Nov-18	5-Dec-18	10-Dec-18	30-Jan-19	4-Feb-19	11-Feb-19
Parameter	Unit								
SO4-D	mg/L	479	499	489	600	596	506	407	507
TSS	mg/L	6.8	7.3	11.8	8.5			8.4	
Alk-T	mg/L	255	257	232	253			239	
Acidity83	mg/L	17.6	17	9.6	13.6			15.2	
N-NH3	mg/L	0.062	0.12	0.034	0.092			0.069	
N-NO23	mg/L	<0.020	<0.020	1200	<0.020			<0.020	
Al-T	mg/L	0.0053	0.0035	0.403	0.0108			0.0056	
As-T	mg/L	0.00414	0.00434	0.00468	0.00387			0.00257	
Ba-T	mg/L	0.0225	0.0243	0.0254	0.0256			0.0228	
B-T	mg/L	0.844	0.797	0.637	0.798			0.723	
Cd-T	mg/L	<0.000010	<0.000010	0.000027	<0.000010			<0.000010	
Ca-T	mg/L	182	182	178	221			191	
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010			<0.0010	
Co-T	mg/L	0.00027	0.00025	0.00656	0.00141			0.0008	
Cu-T	mg/L	0.00087	0.00054	0.023	0.00064			0.00314	
Hard-T	mg/L	502	502	493	608			523	
Fe-T	mg/L	2.83	2.89	3.68	3.51			2.94	
P-T	mg/L		0.0033	0.005	<0.0020			<0.030	
Pb-T	mg/L	<0.00020	<0.00020	0.00608	<0.00020			0.00074	
Mg-T	mg/L	11.8	11.8	11.8	13.9			11.5	
Mn-T	mg/L	0.273	0.298	0.401	0.394			0.292	
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020			<0.0000020	
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010			<0.0010	
Ni-T	mg/L	<0.0010	<0.0010	0.0114	0.0023			0.0012	
K-T	mg/L	1.76	1.78	1.67	1.87			1.71	
S-T	mg/L	185	175	183	218			190	
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010			<0.00010	
Si-T	mg/L	3.21	3.23	3.86	3.58			3.39	
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020			<0.000020	
Na-T	mg/L	123	122	102	127			100	
Sr-T	mg/L	1.8	1.94	2	2.23			1.74	
Zn-T	mg/L	<0.0050	<0.0050	0.0211	<0.0050			0.0051	
Al-D	mg/L	<0.0060	0.0051	0.0703	0.0062			0.0031	
As-D	mg/L	0.0039	0.0044	0.00433	0.00453			0.00244	
Ba-D	mg/L	0.0224	0.0246	0.0244	0.0261			0.0222	
B-D	mg/L	0.87	0.762	0.725	0.767			0.71	
Cd-D	mg/L	<0.000010	<0.0000050	0.000023	0.0000064			<0.0000050	
Ca-D	mg/L	182	181	192	215			189	
Cr-D	mg/L	<0.0020	<0.0010	<0.0010	<0.0010			<0.0010	
Co-D	mg/L	<0.00040	0.00023	0.00649	0.00143			0.00079	
Cu-D	mg/L	<0.00040	<0.00020	0.00034	<0.00020			<0.00020	
Hard-D	mg/L	504	500	530	591			517	
Fe-D	mg/L	2.98	3.11	3.65	4.22			2.83	
Pb-D	mg/L	<0.00040	<0.00020	<0.00020	<0.00020			<0.00020	
Mg-D	mg/L	12.2	11.7	12.1	13.1			11.2	
Mn-D	mg/L	0.274	0.287	0.387	0.386			0.293	
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020			<0.0000020	
P-D	mg/L							<0.0030	
Mo-D	mg/L	<0.0020	<0.0010	0.0016	<0.0010			<0.0010	
Ni-D	mg/L	<0.0020	<0.0010	0.0113	0.0023			0.0014	
K-D	mg/L	1.73	1.77	1.78	1.88			1.71	
S-D	mg/L	179	175	185	212			182	
Se-D	mg/L	<0.00020	0.0001	<0.00010	<0.00010			<0.00010	
Si-D	mg/L	3.16	3.11	3.79	3.4			3.16	
Na-D	mg/L	123	123	115	119			98.5	
Sr-D	mg/L	1.78	1.83	1.86	2.24			1.83	
Zn-D	mg/L	<0.010	<0.0050	0.0153	<0.0050			<0.0050	
S2-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0019			0.0057	

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Site Description		LLSPTS - Biochemical Reactor (BCREFF)							
Site Name		BCREFF							
Date		April to	2-Oct-18	5-Nov-18	5-Dec-18	10-Dec-18	30-Jan-19	10-Feb-19	11-Feb-19
Parameter	Unit	September							
SO4-D	mg/L		381	409	465	506	433	428	375
TSS	mg/L		5.5	<4.0	<4.0			4.8	
Alk-T	mg/L		316	294	266			277	
Acidity83	mg/L		28.8	9.6	22.5			18.9	
N-NH3	mg/L		0.099	0.04	0.035			0.037	
N-NO23	mg/L		<0.020	<0.020	<0.020			<0.020	
Al-T	mg/L		0.0152	0.0072	0.0076			0.0077	
As-T	mg/L		0.00033	0.00016	0.00027			0.00019	
Ba-T	mg/L		0.028	0.0278	0.0278			0.0238	
B-T	mg/L		0.775	0.637	0.706			0.735	
Cd-T	mg/L		0.000108	<0.000010	<0.000010			<0.000010	
Ca-T	mg/L		173	181	198			171	
Cr-T	mg/L		<0.0010	<0.0010	<0.0010			<0.0010	
Co-T	mg/L		<0.00020	<0.00020	<0.00020			<0.00020	
Cu-T	mg/L		<0.00050	<0.00050	<0.00050			<0.00050	
Hard-T	mg/L		477	501	547			471	
Fe-T	mg/L		0.044	0.01	0.015			<0.010	
P-T	mg/L		0.0418	0.0209	0.0194			<0.030	
Pb-T	mg/L		<0.00020	<0.00020	<0.00020			<0.00020	
Mg-T	mg/L		11.2	11.9	13			10.5	
Mn-T	mg/L		0.256	0.266	0.3			0.252	
Hg-T	mg/L		<0.0000020	<0.0000020	<0.000020			<0.0000020	
Mo-T	mg/L		<0.0010	<0.0010	<0.0010			<0.0010	
Ni-T	mg/L		<0.0010	<0.0010	<0.0010			<0.0010	
K-T	mg/L		1.89	1.69	1.76			1.79	
S-T	mg/L		135	167	187			150	
Se-T	mg/L		<0.00010	<0.00010	<0.00010			<0.00010	
Si-T	mg/L	Treatment system deactived during this time period	4.45	4	3.93			3.59	
Ag-T	mg/L		<0.000020	<0.000020	<0.000020			<0.000020	
Na-T	mg/L		110	108	120			91.5	
Sr-T	mg/L		1.78	1.97	1.94			1.6	
Zn-T	mg/L		<0.0050	<0.0050	<0.0050			<0.0050	
Al-D	mg/L		0.0093	0.0079	0.0065			0.0069	
As-D	mg/L		0.00031	0.00015	0.0002			0.00017	
Ba-D	mg/L		0.0271	0.0264	0.0261			0.0249	
B-D	mg/L		0.735	0.68	0.638			0.729	
Cd-D	mg/L		0.0000105	<0.0000050	<0.0000050			<0.0000050	
Ca-D	mg/L		171	197	186			178	
Cr-D	mg/L		<0.0010	<0.0010	<0.0010			<0.0010	
Co-D	mg/L		<0.00020	<0.00020	<0.00020			<0.00020	
Cu-D	mg/L		<0.00020	<0.00020	<0.00020			<0.00020	
Hard-D	mg/L		474	543	514			490	
Fe-D	mg/L		0.0095	0.0091	0.0126			0.008	
Pb-D	mg/L		<0.00020	<0.00020	<0.00020			<0.00020	
Mg-D	mg/L		11.20000	12.10000	12			10.90000	
Mn-D	mg/L		0.242	0.3	0.289			0.261	
Hg-D	mg/L		<0.0000020	<0.0000020	<0.000020			<0.0000020	
P-D	mg/L							<0.0030	
Mo-D	mg/L		<0.0010	<0.0010	<0.0010			<0.0010	
Ni-D	mg/L		<0.0010	<0.0010	<0.0010			<0.0010	
K-D	mg/L		1.80	1.84	1.76			1.76	
S-D	mg/L		155	228	195			176	
Se-D	mg/L		0.00375	<0.00010	0.00069			0.00084	
Si-D	mg/L		4.23	3.94	3.64			3.68	
Na-D	mg/L		113	120	108			97.8	
Sr-D	mg/L		1.66	1.76	1.87			1.77	
Zn-D	mg/L		<0.0050	<0.0050	<0.0050			<0.0050	
S2-T	mg/L			14.4				3.19	

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Site Description		LLSPTS - Sulphide Polishing Cell							
Site Name		Sulphide Polishing Cell (SPCEFF)			(All discharge water from the treatment system was directed into 2-South pit from May 14th to present)				
Date		5-Sep-18	2-Oct-18	5-Nov-18	5-Dec-18	10-Dec-18	30-Jan-19	10-Feb-19	11-Feb-19
Parameter	Unit								
SO4-D	mg/L	473	445	447	464	512	464	507	419
TSS	mg/L	9.5	38.5	9.3	8			75.2	
Alk-T	mg/L	259	310	291	285			252	
Acidity83	mg/L	17.40	36	12	13.6			26.30	
N-NH3	mg/L	0.091	0.1600	0.064	0.058			0.21	
N-NO23	mg/L	<2.0	<0.020	<0.020	<0.020			<0.020	
Al-T	mg/L	0.0605	0.012	0.0196	0.0147			0.0091	
As-T	mg/L	0.00463	0.00059	0.00027	0.00035			0.00778	
Ba-T	mg/L	0.0224	0.0273	0.0276	0.0265			0.0373	
B-T	mg/L	0.676	0.804	0.626	0.665			0.606	
Cd-T	mg/L	<0.000010	0.000063	<0.000010	<0.000010			0.000013	
Ca-T	mg/L	188	192	184	197			189	
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010			<0.0010	
Co-T	mg/L	0.00040	0.02430	0.00199	0.00106			0.01230	
Cu-T	mg/L	0.00366	0.0236	0.00149	0.00081			0.0117	
Hard-T	mg/L	519	529	508	546			515	
Fe-T	mg/L	3.68	9.7	1.41	0.905			35.8	
P-T	mg/L		0.0323	0.0194	0.016			<0.30	
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020			<0.00020	
Mg-T	mg/L	12.1	12.3	11.9	12.9			10.4	
Mn-T	mg/L	0.264	0.8910	0.359	0.372			2.24	
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.000020			<0.0000020	
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010			0.0030	
Ni-T	mg/L	<0.0010	0.0088	<0.0010	<0.0010			0.0036	
K-T	mg/L	1.77	1.98	1.74	1.77			1.95	
S-T	mg/L	174	157	171	181			186	
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010			0.00011	
Si-T	mg/L	2.59	4.71	4.08	3.91			5.53	
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020			0.000028	
Na-T	mg/L	123	109	104	117			94.2	
Sr-T	mg/L	1.87	1.84	1.98	1.91			1.47	
Zn-T	mg/L	0.0195	0.0093	<0.0050	<0.0050			<0.0050	
Al-D	mg/L	<0.0060	0.0102	0.0172	0.0069			0.0034	
As-D	mg/L	0.0038	0.00022	0.00023	0.00032			0.00657	
Ba-D	mg/L	0.0222	0.0266	0.0266	0.0265			0.0353	
B-D	mg/L	0.9	0.746	0.712	0.648			0.702	
Cd-D	mg/L	0.0000160	0.0000072	0.000007	<0.0000050			0.0000100	
Ca-D	mg/L	180	190	193	192			205	
Cr-D	mg/L	<0.0020	<0.0010	<0.0010	<0.0010			<0.0010	
Co-D	mg/L	<0.00040	0.00176	0.00115	0.001			0.01290	
Cu-D	mg/L	<0.00040	<0.00020	<0.00020	<0.00020			0.00058	
Hard-D	mg/L	500	524	532	529			558	
Fe-D	mg/L	3.0200	0.339	0.592	0.753			36.4	
Pb-D	mg/L	<0.00040	<0.00020	<0.00020	<0.00020			<0.00020	
Mg-D	mg/L	12.30000	12.10000	12.2	12.3			10.80000	
Mn-D	mg/L	0.3	0.9	0.328	0.371			2.35	
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.000020			<0.0000020	
P-D	mg/L							<0.0030	
Mo-D	mg/L	<0.0020	<0.0010	<0.0010	<0.0010			0.0032	
Ni-D	mg/L	<0.0020	<0.0010	<0.0010	<0.0010			0.0037	
K-D	mg/L	1.76	2.03	1.82	1.81			1.97	
S-D	mg/L	178	162	214	176			192	
Se-D	mg/L	<0.00020	0.00225	<0.00010	<0.00010			<0.00010	
Si-D	mg/L	3.1	4.71	3.91	3.75			5.78	
Na-D	mg/L	125	111	116	109			101	
Sr-D	mg/L	1.76	1.71	1.76	1.95			1.6	
Zn-D	mg/L	<0.010	<0.0050	<0.0050	<0.0050			<0.0050	
S2-T	mg/L	0.01	21.4	12.7				0.0186	

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Site Description		LLSPTS Settling Pond Effluent							PL-S (P)
Site Name		SPEFF	This station was not discharging after May 14, 2018						
Date		3-Apr-18	10-Apr-18	17-Apr-18	23-Apr-18	30-Apr-18	8-May-18	14-May-18	
Parameter	Unit								
SO4-D	mg/L	365	326	321	304	316	328	349	
TSS	mg/L	<4.0	<4.0	4.8	<4.0	<4.0	<4.0	9.0	**25**
Alk-T	mg/L		108				68.6		
Acidity83	mg/L		<1.0				<1.0		
N-NH3	mg/L		<0.020				<0.020		1.0
N-NO23	mg/L		<0.020				0.022		
Al-T	mg/L		0.0052				0.0070		
As-T	mg/L		0.00052				0.00097		
Ba-T	mg/L		0.0152				0.0145		
B-T	mg/L		0.401				0.424		
Cd-T	mg/L		<0.000010				<0.000010		
Ca-T	mg/L		104				88.9		
Cr-T	mg/L		<0.0010				<0.0010		
Co-T	mg/L		<0.00020				0.00026		
Cu-T	mg/L		0.00052				0.00067		
Hard-T	mg/L		300				265		
Fe-T	mg/L		0.072				0.141		
P-T	mg/L		0.0128				0.0075		
Pb-T	mg/L		<0.00020				<0.00020		
Mg-T	mg/L		9.87				10.4		
Mn-T	mg/L		0.0127				0.0342		
Hg-T	mg/L		<0.0000020				<0.0000020		
Mo-T	mg/L		<0.0010				<0.0010		
Ni-T	mg/L		<0.0010				<0.0010		
K-T	mg/L		1.40				1.35		
S-T	mg/L		113				122		
Se-T	mg/L		<0.00010				<0.00010		
Si-T	mg/L		2.70				3.57		
Ag-T	mg/L		<0.000020				<0.000020		
Na-T	mg/L		72.1				75.4		
Sr-T	mg/L		1.19				1.18		
Zn-T	mg/L		<0.0050				<0.0050		
Al-D	mg/L		<0.0030				<0.0030		0.5
As-D	mg/L		0.00047				0.00083		
Ba-D	mg/L		0.0148				0.0128		
B-D	mg/L		0.396				0.405		
Cd-D	mg/L		<0.0000050				<0.0000050		
Ca-D	mg/L		105				91.1		
Cr-D	mg/L		<0.0010				<0.0010		
Co-D	mg/L		<0.00020				<0.00020		
Cu-D	mg/L		0.00037				0.00057		0.02
Hard-D	mg/L		303				271		
Fe-D	mg/L		0.0194				0.0273		0.5
Pb-D	mg/L		<0.00020				<0.00020		0.05
Mg-D	mg/L		10.1				10.6		
Mn-D	mg/L		0.0049				0.0034		
Hg-D	mg/L		<0.0000020				<0.0000020		
P-D	mg/L						<0.0020		0.03
Mo-D	mg/L		<0.0010				<0.0010		
Ni-D	mg/L		<0.0010				<0.0010		
K-D	mg/L		1.48				1.33		
S-D	mg/L		124				123		
Se-D	mg/L		<0.00010				<0.00010		
Si-D	mg/L		2.66				3.44		
Na-D	mg/L		75.1				82.9		
Sr-D	mg/L		1.19				1.12		
Zn-D	mg/L		<0.0050				<0.0050		0.2
S2-T	mg/L		0.0050						

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Site Description		Combined discharge from the LLSPTS and Settling Pond #1							PL-S (P)
Site Name		BDS	This station was not discharging after May 14, 2018						
Date		3-Apr-18	10-Apr-18	17-Apr-18	23-Apr-18	30-Apr-18	8-May-18	14-May-18	
Parameter	Unit								
SO4-D	mg/L	356	243	217	202	280	304	313	
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	6.5	<4.0	<4.0	**25**
Alk-T	mg/L		81.1				95.3		
Acidity83	mg/L		<1.0				2.5		
N-NH3	mg/L		<0.020				<0.020		1.0
N-NO23	mg/L		<0.020				<0.020		
Al-T	mg/L		0.0455				0.0054		
As-T	mg/L		0.00049				0.00145		
Ba-T	mg/L		0.0111				0.0214		
B-T	mg/L		0.158				0.21		
Cd-T	mg/L		<0.000010				<0.000010		
Ca-T	mg/L		118				136		
Cr-T	mg/L		<0.0010				<0.0010		
Co-T	mg/L		0.00023				0.00043		
Cu-T	mg/L		0.0006				0.00069		
Hard-T	mg/L		354				411		
Fe-T	mg/L		0.155				0.246		
P-T	mg/L		0.0064				0.005		
Pb-T	mg/L		<0.00020				<0.00020		
Mg-T	mg/L		14.3				17.5		
Mn-T	mg/L		0.0273				0.124		
Hg-T	mg/L		<0.0000020				<0.0000020		
Mo-T	mg/L		<0.0010				<0.0010		
Ni-T	mg/L		<0.0010				0.0013		
K-T	mg/L		1.19				1.45		
S-T	mg/L		96.9				118		
Se-T	mg/L		<0.00010				<0.00010		
Si-T	mg/L		1.99				1.83		
Ag-T	mg/L		<0.000020				<0.000020		
Na-T	mg/L		13.2				16.5		
Sr-T	mg/L		0.66				0.823		
Zn-T	mg/L		<0.0050				<0.0050		
Al-D	mg/L		0.015				0.0057		0.5
As-D	mg/L		0.00038				0.00109		
Ba-D	mg/L		0.011				0.0187		
B-D	mg/L		0.157				0.202		
Cd-D	mg/L		<0.0000050				<0.0000050		
Ca-D	mg/L		112				143		
Cr-D	mg/L		<0.0010				<0.0010		
Co-D	mg/L		<0.00020				0.0005		
Cu-D	mg/L		0.00046				0.0007		0.02
Hard-D	mg/L		337				429		
Fe-D	mg/L		0.043				0.114		0.5
Pb-D	mg/L		<0.00020				<0.00020		0.05
Mg-D	mg/L		14.3				17.7		
Mn-D	mg/L		0.0217				0.133		
Hg-D	mg/L		<0.0000020				<0.0000020		
P-D	mg/L						0.0033		0.03
Mo-D	mg/L		<0.0010				<0.0010		
Ni-D	mg/L		<0.0010				0.0013		
K-D	mg/L		1.2				1.43		
S-D	mg/L		96.7				113		
Se-D	mg/L		<0.00010				<0.00010		
Si-D	mg/L		1.94				1.66		
Na-D	mg/L		12.7				17.7		
Sr-D	mg/L		0.642				0.763		
Zn-D	mg/L		<0.0050				<0.0050		0.2

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Site Description		2 South Inflow for Pit Water Cover - from LLSPTS												
Site Name		2SI												
Date		10-Apr-18	5-Sep-18	1-Oct-18	3-Oct-18	5-Nov-18	5-Dec-18	10-Dec-18	17-Dec-18	10-Jan-19	30-Jan-19	4-Feb-19	11-Feb-19	4-Mar-19
Parameter	Unit													
SO4-D	mg/L	140	582	251	326	269	379	379	195	149	221	273	294	189
TSS	mg/L		<4.0	4			<4.0			<4.0		16.4		
Alk-T	mg/L	44.7	207	147		145	203			41.3		153		97.2
Acidity83	mg/L	1.9	8.5	8.5		2	3.0			<1.0		3.2		<1.0
N-NH3	mg/L		<0.020	0.047			0.023			0.017		0.084		
N-NO23	mg/L		<0.020	<0.020			<0.020			0.055		0.030		
Al-T	mg/L	0.0501	0.0042	0.0326		0.0124	0.0101			0.0571		0.0098		0.0137
As-T	mg/L	0.00016	0.00018	0.00031		0.00019	0.00022			<0.00010		0.00089		0.00013
Ba-T	mg/L	0.0109	0.0344	0.0217		0.019	0.0216			0.0097		0.0184		0.0108
B-T	mg/L	<0.050	0.783	0.358		0.305	0.521			0.056		0.403		0.181
Cd-T	mg/L	<0.000010	0.000024	0.000015		<0.000010	<0.000010			0.000010		<0.000010		<0.000010
Ca-T	mg/L	54.2	188	110		110	154			51.2		140		75.0
Cr-T	mg/L	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010			<0.0010		<0.0010		<0.0010
Co-T	mg/L	0.00048	0.00457	0.00314		0.0008	0.00089			0.00097		0.00563		0.00138
Cu-T	mg/L	0.00087	0.00118	0.00152		0.00083	<0.00050			0.00077		0.00210		0.00059
Hard-T	mg/L	168	529	314		315	434			153		390		218
Fe-T	mg/L	0.295	0.076	0.711		0.272	0.276			0.304		6.41		0.392
P-T	mg/L						0.0046					<0.0030		
Pb-T	mg/L	<0.00020	<0.00020	<0.00020		<0.00020	<0.00020			<0.00020		<0.00020		<0.00020
Mg-T	mg/L	7.84	14.6	9.52		9.8	12.1			6.14		9.84		7.50
Mn-T	mg/L	0.135	1.19	0.45		0.154	0.254			0.120		1.19		0.311
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020		<0.0000020	<0.0000020			<0.0000020		<0.0000020		<0.0000020
Mo-T	mg/L	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010			<0.0010		<0.0010		<0.0010
Ni-T	mg/L	0.0010	0.0017	0.0031		<0.0010	<0.0010			0.0023		0.0020		<0.0010
K-T	mg/L	0.370	1.67	1.13		1.03	1.42			0.374		1.26		0.542
S-T	mg/L	41.4	211	91.2		102	148			43.8		128		63.1
Se-T	mg/L	<0.00010	<0.00010	<0.00010		<0.00010	<0.00010			<0.00010		<0.00010		<0.00010
Si-T	mg/L	3.76	3.26	4.83		4.52	4.10			3.57		4.72		3.70
Ag-T	mg/L	<0.000020	<0.000020	<0.000020		<0.000020	<0.000020			<0.000020		<0.000020		<0.000020
Na-T	mg/L	4.28	113	48.3		50.6	86.6			6.74		58.1		26.1
Sr-T	mg/L	0.249	1.65	0.862		1	1.36			0.271		0.941		0.442
Zn-T	mg/L	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050			<0.0050		<0.0050		<0.0050
Al-D	mg/L	0.0157	0.0081	0.0178		0.011	0.0060			0.0321		0.0049		0.0056
As-D	mg/L	0.00015	0.00025	0.00033		0.0002	0.00020			0.00015		0.00061		0.00010
Ba-D	mg/L	0.0109	0.0366	0.0226		0.0185	0.0205			0.0089		0.0188		0.0113
B-D	mg/L	<0.050	0.85	0.34		0.347	0.456			0.070		0.335		0.155
Cd-D	mg/L	0.0000050	<0.0000050	<0.0000050		<0.0000050	<0.0000050			0.0000068		0.0000061		<0.0000050
Ca-D	mg/L	57.3	196	117		124	151			53.6		132		70.6
Cr-D	mg/L	<0.0010	<0.0020	<0.0010		<0.0010	<0.0010			<0.0010		<0.0010		<0.0010
Co-D	mg/L	0.00039	0.00478	0.00407		0.00073	0.00069			0.00079		0.00600		0.00142
Cu-D	mg/L	0.00084	0.00110	0.00036		0.00044	0.00024			0.00066		0.00034		0.00038
Hard-D	mg/L	177	553	334		352	424			162		369		207
Fe-D	mg/L	0.158	0.057	0.55		0.17	0.0602			0.332		5.75		0.242
Pb-D	mg/L	<0.00020	<0.00040	<0.00020		<0.00020	<0.00020			<0.00020		<0.00020		<0.00020
Mg-D	mg/L	8.26	15.5	10.2		10.3	11.5			6.75		9.67		7.43
Mn-D	mg/L	0.130	1.26	0.563		0.15	0.197			0.139		1.29		0.330
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020		<0.0000020	0.0000034			<0.0000020		<0.0000020		<0.0000020
P-D	mg/L											<0.0030		
Mo-D	mg/L	<0.0010	<0.0020	<0.0010		<0.0010	<0.0010			<0.0010		0.0011		<0.0010
Ni-D	mg/L	<0.0010	<0.0020	0.0043		<0.0010	<0.0010			0.0017		0.0020		<0.0010
K-D	mg/L	0.423	1.69	1.21		1.12	1.31			0.364		1.21		0.579
S-D	mg/L	48.1	215	97.8		105	140			47.8		121		60.8
Se-D	mg/L	<0.00010	<0.00020	<0.00010		<0.00010	<0.00010			<0.00010		<0.00010		<0.00010
Si-D	mg/L	3.99	3.31	4.79		4.36	3.88			3.23		3.93		3.47
Na-D	mg/L	4.52	117	51.3		57.6	81.2			8.78		59.6		26.5
Sr-D	mg/L	0.255	1.71	0.89		0.919	1.38			0.303		0.982		0.484
Zn-D	mg/L	<0.0050	<0.010	<0.0050		<0.0050	<0.0050			<0.0050		<0.0050		<0.0050

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EMS ID		E292127											
Site Description		2 South Pit in Pit Water Cover (CCR Water Cover)											
Site Name		2S											
Date		10-Apr-18	8-May-18	4-Jun-18	3-Jul-18	8-Aug-18	4-Sep-18	1-Oct-18	5-Nov-18	5-Dec-18	8-Jan-19	5-Feb-19	21-Mar-19
Parameter	Unit												
SO4-D	mg/L	161	133	448	416	457	481	387	302	354	220	156	87.5
Alk-T	mg/L	71.9	56.2	108	97.8	97	140.0	194	151	147	116	52.1	71.7
Acidity83	mg/L	<1.0	<1.0	4	<1.0	1.7	<1.0	<1.0	<1.0	2.8	<1.0	<1.0	<1.0
Al-T	mg/L	0.0352	0.109	0.107	0.0317	0.0666	0.0175	0.0367	0.1	0.0264	0.0225	0.305	0.0091
As-T	mg/L	0.00056	0.00051	0.00050	0.0006	0.00084	0.00054	0.00048	0.00028	0.00205	0.00201	0.00072	0.00045
Ba-T	mg/L	0.0127	0.0097	0.0168	0.0191	0.025	0.0247	0.023	0.0195	0.0212	0.0132	0.0117	0.0041
B-T	mg/L	0.09	<0.050	0.272	0.261	0.363	0.571	0.495	0.346	0.329	0.185	0.106	0.051
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	<0.000010	<0.000010	<0.000010
Ca-T	mg/L	73.4	59.9	157	150	176	186	157	123	146	93.4	60	26
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00117	0.00098	0.00028	0.00022	0.00035	<0.00020
Cu-T	mg/L	0.00088	0.00211	0.00202	0.00143	0.00228	0.00226	0.00129	0.00144	0.00227	<0.00050	0.0013	<0.00050
Hard-T	mg/L	219	182	484	466	552	562	461	352	438	277	173	76.7
Fe-T	mg/L	0.039	0.14	0.118	0.037	0.061	0.03	0.09	0.19	0.054	0.051	0.324	0.016
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-T	mg/L	8.58	7.95	22.5	22.3	27.1	23.3	16.8	11.1	17.7	10.6	5.55	2.87
Mn-T	mg/L	0.0058	0.009	0.0143	0.0065	0.0091	0.0044	0.144	0.1150	0.107	0.0845	0.0119	0.0122
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000007
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0016	0.0014	<0.0010	<0.0010	<0.0010	<0.0010
K-T	mg/L	0.865	0.555	2.03	2.07	2.67	2.42	2.06	1.4	1.86	1.28	0.601	0.363
S-T	mg/L	49.6	49	152	144	172	194	140	119	148	81	49.8	20.3
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Si-T	mg/L	1	2.36	0.61	0.39	0.73	1.79	2.9	3.98	2.03	1.68	2.58	0.46
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Na-T	mg/L	6.17	4.57	21.3	22.6	29.1	59.8	63.0	55.4	55.3	28.4	12.3	6.57
Sr-T	mg/L	0.357	0.275	0.992	1.08	1.28	1.38	1.32	1.1	0.827	0.533	0.371	0.154
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Al-D	mg/L	0.0069	0.0288	0.0192	0.0146	0.0196	0.0089	0.0251	0.02	0.0071	0.0038	0.0062	<0.0030
As-D	mg/L	0.00053	0.0004	0.00045	0.0005	0.0007	0.00047	0.0005	0.00024	0.00188	0.00172	0.00017	0.00051
Ba-D	mg/L	0.0130	0.0086	0.0177	0.0183	0.024	0.0228	0.0229	0.019	0.0204	0.0131	0.0115	0.0052
B-D	mg/L	0.101	<0.050	0.281	0.251	0.337	0.538	0.477	0.412	0.293	0.224	0.102	0.064
Cd-D	mg/L	<0.0000050	<0.0000050	0.000006	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000008	0.0000121	<0.0000050	<0.0000050	<0.0000050
Ca-D	mg/L	72.8	63.4	181	159	168	174	159	137	142	90.5	57.3	32.8
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00109	0.00086	0.00026	0.00021	<0.00020	<0.00020
Cu-D	mg/L	0.00082	0.00174	0.00125	0.00213	0.00194	0.00202	0.00091	0.0008	0.00045	0.00041	0.00062	0.00022
Hard-D	mg/L	215	189	554	490	530	527	465	390	422	273	168	96.7
Fe-D	mg/L	<0.0050	0.0105	0.0369	0.0154	0.0136	0.0115	0.0281	0.0286	0.0122	0.0052	0.0332	<0.0050
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	mg/L	8.17	7.40	24.8	22.8	26.8	22.4	16.6	11.5	16.2	11.3	6.07	3.61
Mn-D	mg/L	0.0034	0.0018	0.0103	0.003	0.0025	0.0021	0.138	0.1070	0.106	0.0854	0.0019	0.0123
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000061	<0.0000020	<0.0000020	<0.0000020
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	0.0014	<0.0010	<0.0010	<0.0010	<0.0010
K-D	mg/L	0.9	0.476	2.3	2.02	2.56	2.32	1.93	1.5	1.670	1.29	0.58	0.474
S-D	mg/L	51.3	43.2	168	140	163	174	135	122	132.0	83.3	49.4	26.1
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Si-D	mg/L	0.98	2.1	0.6	0.31	0.62	1.43	2.9	3.74	1.82	1.53	2.03	0.5
Na-D	mg/L	6.080	4.57	23.00	23.30	29.1	58.1	64.1	63.9	48.2	30.4	13.1	8.89
Sr-D	mg/L	0.366	0.251	1.07	0.992	1.17	1.37	1.28	0.98	0.866	0.568	0.377	0.195
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Table 18
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EMS ID		E217015											
Site Description		3 South Pit Main Water Sump (CCR Water Cover)											
Site Name		3S											
Date		10-Apr-18	8-May-18	4-Jun-18	3-Jul-18	8-Aug-18	4-Sep-18	1-Oct-18	5-Nov-18	5-Dec-18	8-Jan-19	5-Feb-19	4-Mar-19
Parameter	Unit												
SO4-D	mg/L	465	542	414	428	470	486	240	393	566	470	584	614
Alk-T	mg/L	156	151	128	140	137	131	71.2	124	175	142	180	196
Acidity83	mg/L	2.60	<1.0	1.50	<1.0	1.4	<1.0	<1.0	1.1	4.7	2.8	<1.0	<1.0
Al-T	mg/L	0.0416	0.068	0.0182	0.02	0.0108		1.18		0.0185	0.0283	0.0099	
As-T	mg/L	0.00025	<0.00050	0.00048	0.00055	0.00063		0.00063		0.00034	0.00042	0.00029	
Ba-T	mg/L	0.0143	0.0163	0.0154	0.0152	0.02		0.0180		0.0181	0.014	0.0141	
B-T	mg/L	0.28	0.31	0.3	0.316	0.372		0.173		0.35	0.207	0.325	
Cd-T	mg/L	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010		<0.000010		<0.000010	<0.000010	<0.000010	
Ca-T	mg/L	207	239	176	172	208		97.7		252	202	241	
Cr-T	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010		0.0019		<0.0010	<0.0010	<0.0010	
Co-T	mg/L	<0.00020	<0.0010	<0.00020	<0.00020	<0.00020		0.00100		<0.00020	<0.00020	<0.00020	
Cu-T	mg/L	0.00061	<0.0025	0.00157	0.00067	<0.00050		0.00513		<0.00050	0.00059	<0.00050	
Hard-T	mg/L	623	728	541	528	630		297		759	604	713	
Fe-T	mg/L	0.067	0.116	0.08	0.057	0.044		1.580		0.036	0.04	0.027	
Pb-T	mg/L	<0.00020	<0.0010	<0.00020	<0.00020	<0.00020		<0.00020		<0.00020	<0.00020	<0.00020	
Mg-T	mg/L	25.6	31.7	24.8	24	26.6		12.8		31.7	24	26.9	
Mn-T	mg/L	0.0177	0.0231	0.01	0.0302	0.022		0.0313		0.0237	0.0258	0.011	
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020		<0.0000020		0.0000062	<0.0000020	<0.0000020	
Mo-T	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010		<0.0010		<0.0010	<0.0010	<0.0010	
Ni-T	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010		0.0018		<0.0010	0.0011	<0.0010	
K-T	mg/L	2.21	2.49	2.17	2.43	2.88		1.6		2.55	1.77	2.14	
S-T	mg/L	176	209	157	154	185		84.5		236	184	220	
Se-T	mg/L	0.00017	<0.00050	<0.00010	<0.00010	<0.00010		<0.00010		0.00021	0.00018	0.00018	
Si-T	mg/L	1.78	0.87	0.51	0.76	0.95		2.37		2.34	2.18	2.32	
Ag-T	mg/L	<0.000020	<0.00010	<0.000020	<0.000020	<0.000020		<0.000020		<0.000020	<0.000020	<0.000020	
Na-T	mg/L	23.2	25.6	24	26.5	31.1		12.6		35.4	22.6	24	
Sr-T	mg/L	1.23	1.39	1.22	1.23	1.38		0.63		1.5	1.15	1.46	
Zn-T	mg/L	<0.0050	<0.025	<0.0050	<0.0050	<0.0050		<0.0050		<0.0050	<0.0050	<0.0050	
Al-D	mg/L	0.005	<0.015	0.0059	0.0190	0.005		0.0118		0.0073	0.0095	0.0044	
As-D	mg/L	0.00026	<0.00050	0.0004	0.00046	0.00059		0.00016		0.00031	0.0004	0.00028	
Ba-D	mg/L	0.0137	0.0148	0.0154	0.0141	0.0204		0.0122		0.0175	0.0143	0.0145	
B-D	mg/L	0.292	0.31	0.282	0.307	0.399		0.147		0.301	0.249	0.256	
Cd-D	mg/L	<0.0000050	<0.000025	<0.0000050	<0.0000050	<0.0000050		<0.0000050		0.0000076	0.000009	<0.0000050	
Ca-D	mg/L	202	265	177	168	185		94.8		250	199	236	
Cr-D	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010		<0.0010		<0.0010	<0.0010	<0.0010	
Co-D	mg/L	<0.00020	<0.0010	<0.00020	<0.00020	<0.00020		<0.00020		<0.00020	<0.00020	<0.00020	
Cu-D	mg/L	0.00044	<0.0010	0.0010	0.00084	0.00035		0.00088		0.00032	0.00044	0.00058	
Hard-D	mg/L	610	791	547	518	575		283		738	601	703	
Fe-D	mg/L	0.0063	<0.025	0.0092	0.0265	0.0183		<0.0050		0.0095	<0.0050	0.0065	
Pb-D	mg/L	<0.00020	<0.0010	<0.00020	<0.00020	<0.00020		<0.00020		<0.00020	<0.00020	<0.00020	
Mg-D	mg/L	25.6	31.5	25.4	23.9	27.4		11.2		27.8	25.2	27.7	
Mn-D	mg/L	0.0149	0.0076	<0.0010	0.0265	0.0051		0.0066		0.0248	0.0258	0.0101	
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020		<0.0000020		<0.0000020	<0.0000020	<0.0000020	
Mo-D	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010		<0.0010		<0.0010	<0.0010	<0.0010	
Ni-D	mg/L	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010		<0.0010		<0.0010	0.001	<0.0010	
K-D	mg/L	2.14	2.67	2.13	2.35	2.79		1.48		2.28	1.79	2.03	
S-D	mg/L	176	204	147	140	167		78.6		211	187	202	
Se-D	mg/L	0.00014	<0.00050	<0.00010	<0.00010	<0.00010		<0.00010		0.00017	0.00017	0.00018	
Si-D	mg/L	1.78	0.86	0.47	0.7	0.74		0.60		2.19	2.01	1.87	
Na-D	mg/L	22.6	28.6	25.1	25.9	31.9		11.5		28.6	24.5	24.6	
Sr-D	mg/L	1.21	1.32	1.19	1.09	1.29		0.551		1.53	1.21	1.41	
Zn-D	mg/L	<0.0050	<0.025	<0.0050	<0.0050	<0.0050		<0.0050		<0.0050	<0.0050	<0.0050	

Table 19
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EMS ID		E292128			
Site Description		3 South 77 Adit Pit- Exploration pit from 1977			
Site Name		3S77			
Date		10-Apr-18	10-Jul-18	1-Oct-18	8-Jan-19
Parameter	Unit				
SO4-D	mg/L	276	250	232	189
Alk-T	mg/L	87.3	114	102	67.8
Acidity83	mg/L	1.7	<1.0	4.00	<1.0
Al-T	mg/L	0.0062	0.0087	0.0074	0.022
As-T	mg/L	0.00045	0.00163	0.00218	0.0004
Ba-T	mg/L	0.0217	0.0247	0.0171	0.0132
B-T	mg/L	0.213	0.225	0.244	0.147
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010
Ca-T	mg/L	120	108	94.6	74
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
Cu-T	mg/L	0.00058	<0.00050	0.00053	0.00056
Hard-T	mg/L	360	324	285	223
Fe-T	mg/L	0.014	0.057	0.082	0.08
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
Mg-T	mg/L	14.6	13.3	11.9	9.27
Mn-T	mg/L	0.0014	0.0352	0.0971	0.0021
Hg-T	mg/L	<0.0000020	<0.0000020	0.0000021	<0.0000020
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
K-T	mg/L	1.34	1.62	1.85	0.93
S-T	mg/L	104	89.3	80	63.1
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010
Si-T	mg/L	2.63	2.51	3.34	2.51
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020
Na-T	mg/L	17.7	24.9	26.1	12.6
Sr-T	mg/L	0.745	0.734	0.663	0.466
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050
Al-D	mg/L	0.0043	0.0033	0.0041	0.0047
As-D	mg/L	0.00044	0.00162	0.00233	0.00046
Ba-D	mg/L	0.0213	0.025	0.0178	0.0128
B-D	mg/L	0.202	0.251	0.238	0.165
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Ca-D	mg/L	118	109	105	72.9
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
Cu-D	mg/L	0.00055	0.00029	0.00033	0.00055
Hard-D	mg/L	357	331	316	222
Fe-D	mg/L	0.0062	0.0341	0.0388	0.0128
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	mg/L	15.1	14.1	12.9	9.73
Mn-D	mg/L	0.0012000	0.0336000	0.115	0.0018
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
K-D	mg/L	1.4	1.54	1.88	0.909
S-D	mg/L	102.00000	89.70000	87.00000	64.3
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010
Si-D	mg/L	2.59	2.42	3.3	2.35
Na-D	mg/L	17.8	26.2	28.3	13.2
Sr-D	mg/L	0.7310	0.7000	0.7120	0.471
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050

Table 20
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EMS ID		E292129									
Site Description		4 South Lower- Culvert Dowstream of Access Road									
Site Name		4S-LO									
Date		10-Apr-18	8-May-18	4-Jun-18	Jul through Sep 2018	1-Oct-18	5-Nov-18	5-Dec-18	8-Jan-19	4-Feb-19	4-Mar-19
Parameter	Unit										
SO4-D	mg/L	194	221	209		229	206	156	113	128	161
Alk-T	mg/L	39.8	57.4	54.6		40.7	44.2	50.8	37.7	44.7	47.4
Acidity83	mg/L	1.7	<1.0	3		3.3	1.4	1.6	1.6	<1.0	<1.0
Al-T	mg/L	0.4560	0.0317	0.0086		0.2200	0.476	0.0083	0.396	0.008	0.334
As-T	mg/L	0.00041	0.0002	0.00032		0.00021	0.00013	0.00014	0.00018	0.00012	0.00023
Ba-T	mg/L	0.0165	0.0209	0.0325		0.0165	0.0149	0.0095	0.0089	0.0077	0.0099
B-T	mg/L	0.096	0.181	0.13		0.167	0.126	0.122	0.076	0.091	0.091
Cd-T	mg/L	0.000014	<0.000010	0.00002		0.000015	0.00004	<0.000010	0.000018	<0.000010	0.000012
Ca-T	mg/L	64.3	78.8	95.1		67.8	69.6	58.5	41.3	47.8	54.7
Cr-T	mg/L	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-T	mg/L	0.00164	0.0014	0.00726		0.00164	0.00328	<0.00020	0.00296	<0.00020	0.00167
Cu-T	mg/L	0.00218	<0.00050	<0.00050		0.00186	0.00274	<0.00050	0.00072	<0.00050	0.00076
Hard-T	mg/L	193	236	282		204	209	179	123	144	166
Fe-T	mg/L	1.4	1.18	7.01		0.173	0.158	0.017	1.07	0.04	1.18
Pb-T	mg/L	<0.00020	<0.00020	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-T	mg/L	7.78	9.51	10.8		8.45	8.51	7.98	4.88	6.04	7.11
Mn-T	mg/L	0.367	0.694	4.2		0.345	0.205	0.0196	0.588	0.0326	0.367
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020		0.0000031	<0.0000020	0.0000025	<0.0000020	<0.0000020	<0.0000020
Mo-T	mg/L	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	0.0023	0.0015	0.0063		0.0024	0.0062	<0.0010	0.0042	<0.0010	0.0018
K-T	mg/L	0.748	0.775	1.11		0.597	0.594	0.435	0.402	0.391	0.4
S-T	mg/L	60.0	76.3	94.1		68.5	67.2	52.8	36.4	42.2	51.3
Se-T	mg/L	<0.00010	<0.00010	<0.00010		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Si-T	mg/L	3.33	3.81	4.83		3.9	4.09	2.99	3.4	2.93	3.03
Ag-T	mg/L	<0.000020	<0.000020	<0.000020		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Na-T	mg/L	14.7	19.6	16	No Flow - Sample station was dry until October, 2018	18.9	13.9	15.5	7.15	10.7	12.4
Sr-T	mg/L	0.302	0.434	0.322		0.375	0.384	0.312	0.178	0.252	0.257
Zn-T	mg/L	0.0051	<0.0050	0.0066		0.0181	0.0099	<0.0050	0.0066	<0.0050	<0.0050
Al-D	mg/L	0.0262	0.0241	0.0056		0.0898	0.1810	0.0073	0.188	0.0062	0.0694
As-D	mg/L	0.00015	0.0002	0.00032		0.0002	0.00013	0.00016	0.00014	0.00012	0.00011
Ba-D	mg/L	0.0146	0.0178	0.0369		0.0161	0.0143	0.0096	0.0086	0.0078	0.0095
B-D	mg/L	0.105	0.165	0.126		0.157	0.152	0.118	0.087	0.087	0.088
Cd-D	mg/L	0.000011	0.000006	0.000018		0.0000158	0.0000380	0.0000062	0.0000180	<0.0000050	0.0000086
Ca-D	mg/L	64.8	81.2	112		71.40	75.30	57.1	43.3	45.1	49.8
Cr-D	mg/L	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	0.00124	0.00141	0.00779		0.00165	0.00332	<0.00020	0.00295	<0.00020	0.00108
Cu-D	mg/L	0.00056	0.00038	0.00024		0.00142	0.00189	0.00038	0.00045	0.00029	0.00021
Hard-D	mg/L	193	243	328		214	225	174	129	137	153
Fe-D	mg/L	0.605	1.16	8.27		0.1040	0.1010	0.0178	0.976	0.0235	0.644
Pb-D	mg/L	<0.00020	<0.00020	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	mg/L	7.58	9.83	11.8		8.77	8.87	7.54	5.01	5.93	6.87
Mn-D	mg/L	0.325	0.645	4.59		0.3450	0.1980	0.0221	0.593	0.0311	0.347
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020		<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Mo-D	mg/L	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ni-D	mg/L	0.0017	0.0015	0.0066		0.0025	0.0059	<0.0010	0.0043	<0.0010	0.0013
K-D	mg/L	0.733	0.782	1.28		0.648	0.645	0.429	0.375	0.361	0.403
S-D	mg/L	62.0	75.2	101		74.7	70.2	52.3	37.9	39.5	47.9
Se-D	mg/L	<0.00010	<0.00010	<0.00010		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Si-D	mg/L	2.9	3.67	5.48		3.88	4.01	2.86	3.33	2.49	2.53
Na-D	mg/L	14.6	21.7	17.2		20.2	15.7	14.7	7.47	10.5	11.7
Sr-D	mg/L	0.3	0.382	0.364		0.383	0.352	0.325	0.182	0.244	0.269
Zn-D	mg/L	<0.0050	<0.0050	0.0067		0.0177	0.0087	<0.0050	0.0063	<0.0050	<0.0050

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EMS ID		E217014								
Site Description		South Pit Culvert- Culvert, downstream of Settling Pond #1 discharge								
Site Name		SPC								
Date		10-Apr-18	8-May-18	Jun through Sep 2018	1-Oct-18	5-Nov-18	5-Dec-18	8-Jan-19	5-Feb-19	4-Mar-19
Parameter	Unit									
SO4-D	mg/L	69.6	147		52.5	124	130	143	72.3	38.9
Alk-T	mg/L	24.5	53		25.2	39.8	39.6	39.2	34	23.1
Acidity 8.3	mg/L	<1.0	<1.0		<1.0	1	<1.0	<1.0	<1.0	<1.0
Al-T	mg/L	0.0932			0.1380		0.071		0.0659	
As-T	mg/L	0.0003			0.00065		0.00029		0.00025	
Ba-T	mg/L	0.0073			0.0072		0.0086		0.0062	
B-T	mg/L	0.051			0.076		0.068		<0.050	
Cd-T	mg/L	<0.000010			<0.000010		<0.000010		<0.000010	
Ca-T	mg/L	27.1			21.7		47.2		32.8	
Cr-T	mg/L	<0.0010			<0.0010		<0.0010		<0.0010	
Co-T	mg/L	<0.00020			<0.00020		<0.00020		<0.00020	
Cu-T	mg/L	0.00057			0.0014		0.00054		0.00056	
Hard-T	mg/L	82.3			67.3		145		98.9	
Fe-T	mg/L	0.112			0.249		0.093		0.094	
Pb-T	mg/L	<0.00020			<0.00020		<0.00020		<0.00020	
Mg-T	mg/L	3.57			3.16		6.49		4.11	
Mn-T	mg/L	0.0103			0.0017		0.0016		0.0016	
Hg-T	mg/L	0.0000025			0.0000062		<0.0000020		<0.0000020	
Mo-T	mg/L	<0.0010			<0.0010		<0.0010		<0.0010	
Ni-T	mg/L	<0.0010			<0.0010		<0.0010		<0.0010	
K-T	mg/L	0.346			0.303		0.514		0.353	
S-T	mg/L	21.2			17.0		40		25.1	
Se-T	mg/L	<0.00010			<0.00010		<0.00010		<0.00010	
Si-T	mg/L	2.79			4.61		3.75		3.61	
Ag-T	mg/L	<0.000020			<0.000020		<0.000020		<0.000020	
Na-T	mg/L	4.9		No Flow - Sample station was dry until Oct 2018	5.61		8.55		5.14	
Sr-T	mg/L	0.162			0.139		0.287		0.181	
Zn-T	mg/L	<0.0050			<0.0050		<0.0050		<0.0050	
Al-D	mg/L	0.0785			0.135		0.0652		0.059	
As-D	mg/L	0.00026			0.00062		0.00029		0.00023	
Ba-D	mg/L	0.0071			0.0075		0.0084		0.0063	
B-D	mg/L	<0.050			0.066		0.064		<0.050	
Cd-D	mg/L	<0.0000050			<0.0000050		0.0000052		<0.0000050	
Ca-D	mg/L	26.5			23.0		46.2		30.4	
Cr-D	mg/L	<0.0010			<0.0010		<0.0010		<0.0010	
Co-D	mg/L	<0.00020			<0.00020		<0.00020		<0.00020	
Cu-D	mg/L	0.00058			0.00191		0.00057		0.00051	
Hard-D	mg/L	81.3			70.4		141		92.2	
Fe-D	mg/L	0.0801			0.2150		0.093		0.0919	
Pb-D	mg/L	<0.00020			<0.00020		<0.00020		<0.00020	
Mg-D	mg/L	3.69			3.18		6.14		3.98	
Mn-D	mg/L	0.0025			<0.0010		0.0013		0.0011	
Hg-D	mg/L	0.0000028			0.0000054		0.0000045		<0.0000020	
Mo-D	mg/L	<0.0010			<0.0010		<0.0010		<0.0010	
Ni-D	mg/L	<0.0010			<0.0010		<0.0010		<0.0010	
K-D	mg/L	0.397			0.33		0.514		0.33	
S-D	mg/L	22.4			18.3		39.7		23.3	
Se-D	mg/L	<0.00010			<0.00010		<0.00010		<0.00010	
Si-D	mg/L	2.85			4.59		3.66		3	
Na-D	mg/L	5.16			5.9		8.08		5.04	
Sr-D	mg/L	0.159			0.145		0.287		0.17	
Zn-D	mg/L	<0.0050			<0.0050		<0.0050		<0.0050	

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EMS ID		E292130												
Site Description		Long Lake Entrance- Last wetland prior to entering Long Lake, near the outlet												
Site Name		LLE												WQG-Max
Date		10-Apr-18	1-May-18	4-Jun-18	3-Jul-18	1-Aug-18	17-Sep-18	1-Oct-18	5-Nov-18	5-Dec-18	10-Jan-19	5-Feb-19	4-Mar-19	
Parameter	Unit													
SO4-D	mg/L	78.9		600	452		310	102	132	128	83.5	76.9	123	
TSS	mg/L	<4.0		<4.0	<4.0		5.3	9.0	<4.0	<4.0	<4.0	<4.0	<4.0	25
Alk-T	mg/L	25.2		100	110		90.8	<1.0	41	38.2	27.3	34.5	42.2	
Acidity83	mg/L	<1.0		4.00	2.9		1.70	2.30	<1.0	1.8	<1.0	<1.0	<1.0	
N-NH3	mg/L	<0.020		0.042	<0.020		0.024	0.0310	0.022	<0.020	<0.015	<0.015	0.055	12.9
N-NO23	mg/L	<0.020		<0.020	0.022		0.129	0.093	<0.020	0.031	<0.020	0.069	0.1	
Al-T	mg/L	0.113		0.0465	<0.015		0.1220	0.3360	0.108	0.101	0.1050	0.1000	0.0593	
As-T	mg/L	0.00063		0.00073	0.00063		0.00112	0.00148	0.00065	0.00134	0.00051	0.00145	0.00172	0.005
Ba-T	mg/L	0.0092		0.0353	0.0313		0.0362	0.0186	0.0136	0.0137	0.007	0.0112	0.0196	5.0
B-T	mg/L	0.055		0.391	0.26		0.209	0.095	0.079	0.077	<0.050	<0.050	0.073	
Cd-T	mg/L	<0.000010		<0.000010	<0.000050		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Ca-T	mg/L	29.4		191	136		102	37.5	45.7	47.2	28.8	30.8	39.2	
Cr-T	mg/L	<0.0010		<0.0010	<0.0050		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Co-T	mg/L	<0.00020		<0.00020	<0.0010		0.00055	0.00041	<0.00020	<0.00020	<0.00020	<0.00020	0.00055	0.11
Cu-T	mg/L	0.00082		<0.00050	<0.0025		0.00096	0.00209	0.00089	0.00069	0.00058	0.00057	<0.00050	0.007
Hard-T	mg/L	90.4		601	432		324	118	139	145	87.8	94.1	125	
Fe-T	mg/L	0.218		0.426	0.187		1.93	1.00	0.289	0.235	0.159	0.336	0.978	1.0
P-T	mg/L	0.0091		0.0036	0.0099		0.0136	0.0207	0.0057	0.0062	0.0049	0.0037	0.0091	0.005
Pb-T	mg/L	<0.00020		<0.00020	<0.0010		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.01763
Mg-T	mg/L	4.1		30.3	22.2		16.8	5.82	6.13	6.67	3.85	4.17	6.64	
Mn-T	mg/L	0.0435		0.0737	0.0531		0.328	0.133	0.0194	0.0341	0.0075	0.0767	0.501	0.8
Hg-T	mg/L	0.0000024		<0.0000020	<0.0000020		<0.0000020	0.0000029	<0.0000020	0.0000049	<0.0000020	<0.0000020	<0.0000020	0.00001
Mo-T	mg/L	<0.0010		<0.0010	<0.0050		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	2.0
Ni-T	mg/L	<0.0010		<0.0010	<0.0050		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.025
K-T	mg/L	0.43		1.41	0.92		2.04	0.962	0.664	0.565	0.355	0.395	0.484	
S-T	mg/L	25.6		217	1690		110	31.5	39.4	41.9	25.6	26.8	39.6	
Se-T	mg/L	<0.00010	No Flow - blocked by beaver dam	<0.00010	<0.00050	No Flow- sample station was dry until mid-September, 2018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Si-T	mg/L	2.91		3.63	2.74		3.12	4.3	3.65	3.86	2.68	3.4	3.59	
Ag-T	mg/L	<0.000020		<0.000020	<0.00010		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0001
Na-T	mg/L	6.51		53.4	40.9		32	10.1	7.58	9.2	4.16	5.9	11.4	
Sr-T	mg/L	0.178		1.15	0.848		0.712	0.252	0.315	0.276	0.174	0.183	0.238	
Zn-T	mg/L	<0.0050		<0.0050	<0.025		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.033
Al-D	mg/L	0.0681		0.004	<0.0030		0.0045	0.0417	0.0682	0.0468	0.0537	0.0434	0.0331	0.1
As-D	mg/L	0.00054		0.00074	0.00065		0.00077	0.00128	0.00063	0.00118	0.00046	0.00097	0.00130	
Ba-D	mg/L	0.0088		0.0364	0.0327		0.0357	0.0186	0.0131	0.0136	0.0066	0.0107	0.02	
B-D	mg/L	0.058		0.368	0.27		0.259	0.094	0.094	0.068	<0.050	0.052	0.07	
Cd-D	mg/L	<0.0000050		0.0000060	<0.0000050		0.0000050	<0.0000050	<0.0000050	0.0000084	<0.0000050	<0.0000050	0.0000056	0.0001702
Ca-D	mg/L	30.1		204	148		112	39.4	53	46.9	30.9	30.7	40.3	
Cr-D	mg/L	<0.0010		<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Co-D	mg/L	<0.00020		<0.00020	<0.00020		0.00052	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	0.00057	
Cu-D	mg/L	0.00063		0.00037	0.00035		0.00041	0.00117	0.00073	0.00049	0.00039	0.0005	0.00035	
Hard-D	mg/L	92.4		640	474		354	123	158	143	94.2	94.3	127	
Fe-D	mg/L	0.124		0.321	0.0665		0.800	0.383	0.258	0.165	0.122	0.282	0.869	0.35
Pb-D	mg/L	<0.00020		0.00026	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Mg-D	mg/L	4.21		31.6	25.5		18.4	5.92	6.31	6.35	4.11	4.32	6.48	
Mn-D	mg/L	0.0402		0.0776	0.0622		0.364	0.141	0.0185	0.0358	0.0073	0.0793	0.488	
Hg-D	mg/L	0.0000022		<0.0000020	<0.0000020		<0.0000020	0.0000042	<0.0000020	0.0000044	0.0000021	<0.0000020	<0.0000020	
Mo-D	mg/L	<0.0010		<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Ni-D	mg/L	<0.0010		<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
K-D	mg/L	0.44		1.59	1.11		1.96	1.07	0.717	0.534	0.377	0.375	0.511	
S-D	mg/L	25.8		231	160		115	33.6	42.6	40.4	25.2	25	37.2	
Se-D	mg/L	<0.00010		<0.00010	<0.00010		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Si-D	mg/L	2.91		3.76	2.97		2.79	4.11	3.77	3.57	2.69	3.02	3.39	
Na-D	mg/L	6.57		56.1	45.9		33.8	10.1	8.34	8.63	4.46	6.06	11.2	
Sr-D	mg/L	0.179		1.2	0.974		0.697	0.239	0.293	0.292	0.177	0.177	0.253	
Zn-D	mg/L	<0.0050		<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	

Table 23
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EMS ID.		E292131													
Site Description		Seep into Long Lake													
Site Name		LLS													WQO-Max
Date		10-Apr-18	22-May-18	28-May-18	05-Jun-18	04-Jul-18	08-Aug-18	06-Sep-18	01-Oct-18	05-Nov-18	05-Dec-18	10-Jan-19	05-Feb-19	05-Mar-19	
Parameter	Unit														
SO4-D	mg/L	474	543	579	570	600	491	453	528	546	376	553	599	640	
TSS	mg/L	<4.0	<5.0	4.5	<4.0	<4.0	<4.0	<4.0	<4.0	13.5	<4.0	<4.0	<4.0	<4.0	26.5
Alk-T	mg/L	190	233	245	255	255	245	243	214	142	188	203	238	251	
Acidity83	mg/L	9.5	13.6	12.2	14.9	12.1	3.2	11.4	14.9	2.7	5.5	7.7	2.5	<1.0	
Al-T	mg/L	0.0080	0.0352	0.016	0.0045	0.0064	0.0132	<0.0030	0.0243	0.267	0.0052	0.0336	0.0044	<0.0030	
As-T	mg/L	0.00126	0.00249	0.00169	0.00144	0.00170	0.00129	0.00087	0.00104	0.00649	0.00115	0.00294	0.00386	0.00281	0.005
Ba-T	mg/L	0.0196	0.0215	0.0232	0.0220	0.0225	0.0214	0.0200	0.0204	0.0264	0.0197	0.0191	0.0203	0.0211	5.0
B-T	mg/L	0.466	0.653	0.65	0.700	0.69	0.732	0.641	0.553	0.464	0.577	0.512	0.670	0.662	
Cd-T	mg/L	<0.000010	<0.000010	<0.000050	<0.000010	0.000134	<0.000010	0.000045	<0.000010	0.000018	<0.000010	<0.000010	<0.000010	<0.000010	
Ca-T	mg/L	180	207	220	216	204	201	178	197	184	193	202	230	226	
Cr-T	mg/L	<0.0010	<0.0010	<0.0050	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Co-T	mg/L	0.00062	0.00128	0.0015	0.00143	0.00174	0.00183	0.00154	0.00311	0.00479	0.00119	0.00219	0.00152	0.00210	0.11
Cu-T	mg/L	<0.00050	0.00063	<0.0025	0.00052	<0.0010	<0.00050	<0.00050	0.00101	0.00401	<0.00050	0.00051	<0.00050	<0.00050	0.007
Hard-T	mg/L	515	583	625	609	579	570	505	570	528	550	577	649	646	
Fe-T	mg/L	0.465	0.890	0.463	0.371	0.521	0.498	0.207	0.287	2.77	0.167	1.13	1.40	1.33	1.0
Pb-T	mg/L	<0.00020	<0.00020	<0.0010	<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.01763
Mg-T	mg/L	15.7	16.0	18.2	17.0	16.9	16.6	15.0	18.7	16.7	16.7	17.4	18.1	19.8	
Mn-T	mg/L	0.155	0.359	0.426	0.417	0.419	0.416	0.339	0.378	0.454	0.282	0.315	0.373	0.546	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00001
Mo-T	mg/L	<0.0010	<0.0010	<0.0050	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	2.0
Ni-T	mg/L	0.0015	0.0021	<0.0050	0.0019	0.0023	0.0022	0.0020	0.0066	0.0095	0.0022	0.0050	0.0033	0.0038	0.025
K-T	mg/L	2.03	2.36	2.46	2.44	2.33	2.41	2.16	2.56	2.59	2.64	2.32	2.44	2.43	
S-T	mg/L	165	198	207	204	192	186	161	199	201	195	201	230	230	
Se-T	mg/L	<0.00010	<0.00010	<0.00050	<0.00010	<0.00020	<0.00010	<0.00010	0.00017	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	
Si-T	mg/L	2.77	3.00	3.21	3.18	3.07	2.96	2.72	2.87	4.63	3.10	3.05	3.15	2.95	
Ag-T	mg/L	<0.000020	<0.000020	<0.00010	<0.000020	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0001
Na-T	mg/L	78.8	97.3	107	107	106	111	97.4	94.2	77.3	89.4	83.5	92.5	106	
Sr-T	mg/L	1.55	1.81	2.10	1.84	1.96	1.97	1.88	1.93	1.99	1.79	1.87	2.13	2.14	
Zn-T	mg/L	<0.0050	<0.0050	<0.025	<0.0050	<0.010	<0.0050	0.0163	<0.0050	0.0073	<0.0050	<0.0050	<0.0050	<0.0050	0.033
Al-D	mg/L	0.0033	0.0035	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0043	0.0142	0.0034	0.0116	0.0035	<0.0030	0.1
As-D	mg/L	0.00062	0.00122	0.00139	0.00143	0.00153	0.00124	0.00088	0.00067	0.00087	0.00177	0.00288	0.00385	0.00264	
Ba-D	mg/L	0.0196	0.0216	0.0219	0.0218	0.0208	0.0209	0.0191	0.0222	0.0228	0.0193	0.0192	0.0206	0.0206	
B-D	mg/L	0.499	0.557	0.641	0.699	0.616	0.662	0.556	0.602	0.542	0.514	0.576	0.587	0.594	
Cd-D	mg/L	<0.0000050	<0.0000050	0.0000058	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000006	0.00001	<0.0000050	0.0000060	<0.0000050	<0.0000050	0.0001702
Ca-D	mg/L	171	206	216	217	203	194	174	186	210	185	227	226	221	
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Co-D	mg/L	0.00061	0.00122	0.00134	0.00142	0.00170	0.00176	0.00158	0.00254	0.00343	0.00123	0.00232	0.00168	0.00205	
Cu-D	mg/L	0.00034	0.00031	0.00021	0.00020	<0.00020	<0.00020	<0.00020	0.00036	0.00065	0.00029	0.00037	<0.00020	<0.00020	
Hard-D	mg/L	493	581	611	614	579	552	496	532	595	527	643	641	631	
Fe-D	mg/L	0.0898	0.160	0.224	0.292	0.517	0.526	0.373	0.046	0.0373	0.455	1.09	1.44	1.20	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Mg-D	mg/L	16.0	16.3	17.5	17.9	17.3	16.5	15.2	16.5	17.2	15.9	18.8	18.8	18.9	
Mn-D	mg/L	0.151	0.365	0.429	0.448	0.440	0.396	0.333	0.298	0.243	0.298	0.332	0.396	0.508	
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000022	<0.0000020	<0.0000020	<0.0000020	
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0012	<0.0010	<0.0010	<0.0010	
Ni-D	mg/L	0.0015	0.0020	0.0019	0.0020	0.0019	0.0021	0.0020	0.006	0.008	0.0023	0.0053	0.0035	0.0035	
K-D	mg/L	2.17	2.30	2.46	2.32	2.40	2.32	2.21	2.52	2.74	2.47	2.45	2.46	2.36	
S-D	mg/L	172	177	198	196	184	175	164	190	205	182	223	222	216	
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	
Si-D	mg/L	2.73	2.61	3.13	3.15	2.87	2.80	2.62	2.89	4.26	2.84	3.21	2.89	2.77	
Na-D	mg/L	80.6	98.8	107	111	109	109	95.5	87.2	84.1	80.3	91.0	98.4	98.7	
Sr-D	mg/L	1.56	1.90	2.09	2.08	1.90	1.85	1.73	1.79	1.79	1.84	1.94	2.18	2.19	
Zn-D	mg/L	0.0069	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	

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Table 24
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EMS ID.		E292131											
Site Description		Middle Seep into Long Lake											
Site Name		LLSM											WQO-Max
Date		10-Apr-18	22-May-18	5-Jun-18	4-Jul-18	8-Aug-18	Sep - Oct	6-Nov-18	5-Dec-18	10-Jan-19	5-Feb-19	5-Mar-19	
Parameter													
SO4-D	mg/L	325	500	545	524	448	No Flow	434	400	413	455	545	
TSS	mg/L	4.3	<4.0	<4.0	<4.0	<4.0		<4.0	<4.0	<4.0	<4.0	<4.0	26.5
Alk-T	mg/L	120	225	244	241	236		137	155	171	215	234	
Acidity83	mg/L	3.0	14.6	10.2	5.4	3.9		2	4.1	4.3	3.1	1.0	
Al-T	mg/L	0.0575	0.0244	<0.0030	0.0039	0.0034		0.186	0.178	0.0809	0.0059	<0.0030	
As-T	mg/L	0.00081	0.00088	0.00063	0.00038	0.00068		0.00054	0.00130	0.00058	0.00084	0.00086	0.005
Ba-T	mg/L	0.0169	0.0204	0.0198	0.0204	0.0193		0.0182	0.0175	0.0189	0.0180	0.0179	5.0
B-T	mg/L	0.320	0.611	0.637	0.600	0.602		0.419	0.424	0.415	0.558	0.590	
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Ca-T	mg/L	124	190	192	203	188		165	155	164	198	192	
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Co-T	mg/L	0.00052	0.00154	0.00129	0.00084	0.00118		0.00271	0.00110	0.00167	0.00097	0.00179	0.11
Cu-T	mg/L	0.00097	0.00063	<0.00050	<0.00050	<0.00050		0.00242	0.00191	0.00119	<0.00050	<0.00050	0.007
Hard-T	mg/L	362	538	546	573	533		478	451	470	558	548	
Fe-T	mg/L	0.457	0.356	0.186	0.132	0.500		0.273	1.03	0.447	0.421	0.515	1.0
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.01763
Mg-T	mg/L	12.5	15.5	16.2	15.9	15.4		16.1	15.2	14.5	15.4	16.6	
Mn-T	mg/L	0.0742	0.238	0.272	0.177	0.311		0.132	0.161	0.0988	0.141	0.348	0.80
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020		<0.0000020	0.0000044	<0.0000020	<0.0000020	<0.0000020	0.00001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	2.0
Ni-T	mg/L	0.0012	0.0031	0.0022	0.0014	0.0016		0.0061	0.0028	0.0043	0.0033	0.0035	0.025
K-T	mg/L	1.64	2.81	2.37	2.37	2.40		2.73	2.38	1.99	2.19	2.11	
S-T	mg/L	111	188	188	183	176		170	161	161	186	190	
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		0.00016	<0.00010	<0.00010	<0.00010	<0.00010	
Si-T	mg/L	2.58	2.88	2.95	2.87	3.09		3.33	2.76	2.90	2.82	2.79	
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0001
Na-T	mg/L	50.5	95.6	101	101	100		67.2	65.8	68.5	82.3	93.0	
Sr-T	mg/L	1.01	1.71	1.69	1.90	1.75		1.41	1.40	1.47	1.75	1.77	
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.033
Al-D	mg/L	0.0116	0.0032	<0.0030	<0.0030	<0.0030		0.0171	0.0071	0.0170	<0.0030	<0.0030	0.1
As-D	mg/L	0.00026	0.00051	0.00063	0.00037	0.00061		0.00049	0.00060	0.00053	0.00083	0.00080	
Ba-D	mg/L	0.0176	0.0205	0.0208	0.0190	0.0204		0.0189	0.0171	0.0185	0.0191	0.0185	
B-D	mg/L	0.324	0.527	0.680	0.568	0.644		0.449	0.395	0.491	0.531	0.523	
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050		0.000009	<0.0000050	0.0000070	0.0000068	0.0000055	0.0001702
Ca-D	mg/L	130	196	211	189	185		165	153	162	195	188	
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Co-D	mg/L	0.00037	0.00138	0.00134	0.00099	0.00124		0.00272	0.00092	0.00169	0.00106	0.00172	
Cu-D	mg/L	0.00075	0.00025	0.00022	<0.00020	<0.00020		0.00159	0.00057	0.00094	0.00034	<0.00020	
Hard-D	mg/L	375	551	597	545	526		475	439	467	554	536	
Fe-D	mg/L	0.0265	0.0441	0.0665	0.128	0.483		0.132	0.303	0.223	0.314	0.427	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Mg-D	mg/L	12.6	15.2	17.1	17.9	15.8		15.5	13.9	15.2	16.3	15.9	
Mn-D	mg/L	0.0471	0.232	0.294	0.202	0.314		0.139	0.145	0.102	0.150	0.339	
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020		<0.0000020	0.0000025	<0.0000020	<0.0000020	<0.0000020	
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		0.0023	<0.0010	<0.0010	<0.0010	<0.0010	
Ni-D	mg/L	0.0012	0.0028	0.0024	0.0016	0.0017		0.0062	0.0026	0.0045	0.0035	0.0033	
K-D	mg/L	1.78	2.63	2.29	2.54	2.28		2.86	2.15	2.05	2.19	2.09	
S-D	mg/L	122	166	193	188	167		176	145	165	185	179	
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		0.00016	<0.00010	<0.00010	<0.00010	<0.00010	
Si-D	mg/L	2.67	2.52	3.06	2.64	2.80		3.52	2.59	2.72	2.67	2.54	
Na-D	mg/L	48.7	94.2	108	113	103		68.1	59.1	71.9	84.1	86.8	
Sr-D	mg/L	1.05	1.79	2.03	1.92	1.74		1.44	1.44	1.51	1.87	1.89	
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	

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Table 25
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EMS ID			E292069											
Site Description			Settling Pond at 7S - Permitted discharge location for the 7-South Mining Operation											Permit Limits
Site Name			7SSD - No discharge occurred this monitoring year											
Date		10-Apr-18	15-May-18	5-Jun-18	3-Jul-18	8-Aug-18	4-Sep-18	1-Oct-18	13-Nov-18	6-Dec-18	10-Jan-19	Feb	21-Mar-19	7SSD
Parameter	Unit													
SO4-D	mg/L	67.8	33.5	34.9	31.8	27.7	27.6	13.8	13.2	10.9	14.1	Frozen Solid	115	500
TSS	mg/L	<4.0	5.0	10.5	<4.0	8.0	13.8	4.3	<4.0	<4.0	<4.0		<4.0	25
Alk-T	mg/L	108	124	111	97.6	88.5	88.4	99.6	148	147	51.7		151	-
Acidity83	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.20		<1.0	-
Al-T	mg/L	0.116	0.040	0.024	0.014	0.013	0.011	0.015	0.016	0.017	0.954		0.015	-
As-T	mg/L	0.0010	0.0033	0.0037	0.0050	0.0130	0.0091	0.0031	0.0020	0.0013	0.0012		0.0010	-
Ba-T	mg/L	0.0088	0.0075	0.0058	0.0046	0.0036	0.0021	0.0044	0.0068	0.0064	0.0079		0.013	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		<0.050	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		<0.000010	-
Ca-T	mg/L	49	38.5	32	26.6	17.8	14.4	28.9	42.6	42.6	17.7		66.7	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012		<0.0010	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00052		<0.00020	-
Cu-T	mg/L	0.00132	0.00259	0.00228	0.00167	0.00228	0.00238	0.00129	0.00084	0.00097	0.00274		0.00071	-
Hard-T	mg/L	168	145	132	112	96.3	87.7	110	156	153	56.8		228	-
Fe-T	mg/L	0.237	0.075	0.035	0.044	0.076	0.088	0.027	0.03	0.024	0.886		0.118	-
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020		<0.00020	-
Mg-T	mg/L	11	11.9	12.7	11.1	12.6	12.6	9.24	12	11.3	3.08		14.9	-
Mn-T	mg/L	0.0312	0.0828	0.0288	0.0307	0.104	0.0655	0.0416	0.0473	0.019	0.0356		0.0594	-
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020		<0.0000020	-
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	-
K-T	mg/L	0.642	1.02	1.07	0.939	1.33	1.59	0.738	0.684	0.576	0.356		0.689	-
S-T	mg/L	21.2	11.6	12.8	9.1	9.9	9.8	4.5	5.5	4	4.4		34.0	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		<0.00010	-
Si-T	mg/L	4.07	4.87	2.75	2.43	3.1	1.01	2.37	4.1	4.88	4.69		4.67	-
Ag-T	mg/L	<0.000020	0.000045	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020		<0.000020	-
Na-T	mg/L	6.75	6.89	7.6	6.91	10.2	12.6	5.35	5.66	5.4	1.76		8.71	-
Sr-T	mg/L	0.178	0.164	0.162	0.134	0.132	0.11	0.126	0.166	0.156	0.061		0.255	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		<0.0050	-
Al-D	mg/L	0.0053	0.0067	0.0084	0.0111	0.0086	0.0152	0.0041	0.0047	0.0041	0.0300		<0.0030	0.1
As-D	mg/L	0.00086	0.00323	0.00379	0.0050	0.0124	0.00872	0.00315	0.0019	0.00134	<0.00050		0.00084	-
Ba-D	mg/L	0.0083	0.0068	0.0053	0.0047	0.0031	0.0019	0.0042	0.0064	0.0061	<0.0050		0.0125	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25		<0.050	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000025		<0.0000050	0.000045
Ca-D	mg/L	45.5	38	31.4	25.8	17.3	13.9	29.3	41.1	41.5	18		66.2	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050		<0.0010	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.0010		<0.00020	-
Cu-D	mg/L	0.00085	0.00177	0.00179	0.00183	0.00207	0.00235	0.00119	0.00089	0.00073	0.0011		0.00048	0.014
DOC	mg/L	1.69	3.30	3.92	5.37	7.26	11.00	3.1	1.90	2.20	1.30		2.20	-
Hard-D	mg/L	155	140	132	114	97.1	87.6	110	152	147	56.7		229	-
Fe-D	mg/L	0.016	0.0183	0.0151	0.0353	0.0388	0.0462	0.0062	0.0066	0.0069	0.0430		0.0101	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.0010		<0.00020	-
Mg-D	mg/L	10.2	11.1	13	12.1	13.1	12.80	8.86	12.1	10.6	2.9		15.4	-
Mn-D	mg/L	0.0074	0.0104	0.0051	0.0119	0.0439	0.0152	0.0017	0.0284	0.0097	0.0245		0.0533	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000029	<0.0000020		<0.0000020	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050		<0.0010	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050		<0.0010	-
K-D	mg/L	0.644	0.803	0.911	1.02	1.37	1.52	0.78	0.68	0.518	0.287		0.709	-
S-D	mg/L	21.8	10.6	12.1	9.5	10.0	9.1	4.9	4.8	3.1	4.2		34.1	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050		<0.00010	0.016
Si-D	mg/L	3.85	3.57	2.66	2.04	3.06	0.81	2.56	4.31	4.53	3.41		4.47	-
Na-D	mg/L	5.79	6.3	7.84	7.5	10.8	13.3	5.04	5.68	4.91	1.69		8.92	-
Sr-D	mg/L	0.176	0.177	0.169	0.139	0.127	0.108	0.122	0.171	0.158	0.0658		0.25	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.025		<0.0050	-

Table 26
2018-2019 Annual Report

EMS ID		E292109									
Site Description		Stream 1 - Downstream of the 7SSD discharge, prior to entering the Lower Wetland Outlet									
Site Name		7S									
Date		10-Apr-18	15-May-18	1-Jun-18	1-Oct-18	6-Nov-18	10-Dec-18	14-Jan-19	5-Feb-19	4-Mar-19	WQG-Max
Parameter	Unit										
SO4-D	mg/L	4.3	3.7		3.4	3.0	3.9	4.1	4.8	4.4	
TSS	mg/L	<4.0	22.3		<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	26.5
Alk-T	mg/L	10.5	24.8		22.4	13.9	11.4	10.4	93.1	14.5	
Acidity83	mg/L	<1.0	2.6		1.10	<1.0	<1.0	<1.0	<1.0	<1.0	
Al-T	mg/L	0.0298	0.514		0.0266	0.0352	0.0287	0.0346	0.0255	0.0195	
As-T	mg/L	0.00011	0.00040		0.00011	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.005
Ba-T	mg/L	0.0014	0.0048		0.002	0.0016	0.0013	0.0013	0.0012	0.0013	
B-T	mg/L	<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Cd-T	mg/L	<0.000010	<0.000010		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Ca-T	mg/L	4.07	6.84		6.27	4.99	4.32	3.78	4.04	4.25	
Cr-T	mg/L	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Co-T	mg/L	<0.00020	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.11
Cu-T	mg/L	<0.00050	0.00137		0.00053	0.00074	<0.00050	<0.00050	<0.00050	<0.00050	0.00482
Hard-T	mg/L	14	23.5		21.3	16.8	14.8	13.2	13.9	14.8	
Fe-T	mg/L	<0.010	0.411		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	1
Pb-T	mg/L	<0.00020	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.01763
Mg-T	mg/L	0.924	1.56		1.37	1.05	0.974	0.905	0.929	1.02	
Mn-T	mg/L	<0.0010	0.0160		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.8706
Hg-T	mg/L	<0.0000020	<0.0000020		<0.0000020	<0.0000020	<0.0000020	0.0000021	<0.0000020	<0.0000020	
Mo-T	mg/L	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	2
Ni-T	mg/L	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
K-T	mg/L	0.091	0.267		0.124	0.113	0.084	0.106	0.089	0.083	
S-T	mg/L	<3.0	<3.0		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	
Se-T	mg/L	<0.00010	<0.00010		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Si-T	mg/L	3.88	5.14		4.76	5.01	4.21	3.68	3.92	3.83	
Ag-T	mg/L	<0.000020	<0.000020	7S - No Flow Until October, 2018	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0001
Na-T	mg/L	1.42	1.94		1.96	1.63	1.60	1.29	1.33	1.48	
Sr-T	mg/L	0.0164	0.0274		0.0249	0.0201	0.017	0.0158	0.0163	0.0173	
Zn-T	mg/L	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.033
Al-D	mg/L	0.0302	0.0169		0.0286	0.0314	0.0281	0.033	0.0254	0.0159	0.1
As-D	mg/L	<0.00010	<0.00010		0.00013	0.00011	0.00011	<0.00010	<0.00010	<0.00010	
Ba-D	mg/L	0.0014	0.0021		0.0024	0.0016	0.0012	0.0016	0.0012	0.0012	
B-D	mg/L	<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Cd-D	mg/L	<0.0000050	<0.0000050		0.0000110	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0001702
Ca-D	mg/L	4.14	6.75		6.45	4.67	4.27	3.64	3.92	4.18	
Cr-D	mg/L	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Co-D	mg/L	<0.00020	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Cu-D	mg/L	0.00033	0.00057		0.00059	0.00056	0.00039	0.00043	0.00054	<0.00020	
DOC	mg/L	1.35	0.80		2.30	2.72	1.90	1.80	0.72	1.20	
Hard-D	mg/L	14.1	23		21.9	15.9	14.8	12.3	13.7	14.6	
Fe-D	mg/L	0.0050	<0.0050		0.0069	0.0084	0.0052	0.0061	0.0073	<0.0050	0.35
Pb-D	mg/L	<0.00020	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Mg-D	mg/L	0.902	1.5		1.4	1.03	1.01	0.785	0.95	1.02	
Mn-D	mg/L	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Hg-D	mg/L	<0.0000020	<0.0000020		0.0000027	<0.0000020	0.0000046	<0.0000020	0.0000034	<0.0000020	
Mo-D	mg/L	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Ni-D	mg/L	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
K-D	mg/L	0.109	0.15		0.154	0.102	0.103	0.093	0.096	0.084	
S-D	mg/L	<3.0	<3.0		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	
Se-D	mg/L	<0.00010	<0.00010		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Si-D	mg/L	4.16	4.89		5.02	4.4	4.4	3.53	3.65	3.4	
Na-D	mg/L	1.36	1.96		2.04	1.67	1.67	1.16	1.32	1.46	
Sr-D	mg/L	0.0176	0.0282		0.027	0.0190	0.0158	0.0153	0.0157	0.0171	
Zn-D	mg/L	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	

Table 27
2018-2019 Annual Report

Settling Pond # 4 - Daily Total Suspended Solid Results (WD)

EMS ID **E207409**

Site Description **Settling Pond #4 (WD)**

TSS Permit Limit: 25.0 mg/L

Date	April	May	June	July	August	September	October	November	December	January	February	March
1	<4.0	4.3	8.5	<4.0	-	<4.0	<4.0	<4.0	<4.0	<4.0	**28.4**	<4.0
2	4.0	<4.0	5.8	<4.0	-	<4.0	<4.0	<4.0	5.0	8.3	5.2	<4.0
3	<4.0	<4.0	<4.0	<4.0	-	<4.0	<4.0	<4.0	<4.0	<4.0	22.8	<4.0
4	4.3	<4.0	5.5	<4.0	-	<4.0	<4.0	<4.0	<4.0	6.5	13.6	4.0
5	<4.0	<4.0	<4.0	<4.0	**PNC**	<4.0	<4.0	<4.0	<4.0	7.5	5.6	<4.0
6	<4.0	<4.0	<4.0	<4.0	**PNC**	<4.0	<4.0	<4.0	5.0	<4.0	<4.0	<1.0
7	<4.0	<4.0	4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	6.5	<4.0	2.3
8	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.3	<4.0	<4.0	<4.0
9	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	8.3	4.8	<4.0	8.0
10	<4.0	4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	8.4	<4.0	5.2
11	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	14.8	<4.0	8.0
12	4.5	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.3	8.4	<4.0	<4.0
13	4.0	4.0	5.3	<4.0	4.5	<6.2	<4.0	<4.0	<4.0	4.0	<4.0	<4.0
14	4.3	<4.0	<4.0	<4.0	**PNC**	<4.0	<4.0	<4.0	5.3	4.8	4.0	<4.0
15	4.5	<4.0	<4.0	<4.0	**PNC**	<4.0	<4.0	8.2	4.8	<4.0	<4.0	4.8
16	<4.0	<4.0	5.3	<4.0	4.8	<4.0	<4.0	<4.0	9.3	5.6	4.8	4.0
17	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	6.0	6.4	4.4
18	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.5	12.4	5.6	<4.0
19	<4.0	<4.0	4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	13.2	4.8	<4.0
20	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	7.2	<4.0	<4.0
21	4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.8	<4.0	<4.0
22	5.3	4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.8
23	<4.0	4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.5	8.4	<4.0	4.8
24	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	8.0	4.0	<4.0	6.4
25	4.3	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.3	<4.0	<4.0	2.5
26	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	4.8	<4.0	1.8
27	<4.0	<4.0	<4.0	4.30	<4.0	<4.0	<4.0	<4.0	<4.0	10.0	5.6	2.7
28	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.8	<4.0	8.0	<4.0	5.2
29	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	5.6		4.0
30	<4.0	<4.0	<4.0	**PNC**	**PNC**	21.0	<4.0	<4.0	<4.0	7.6		5.2
31		<4.0	-	-	**PNC**	-	<4.0	-	15.5	13.2		7.6

Notes: TSS composite sample is required: monthly - no decant flow, weekly when max daily flow < 0.054m^3/s & daily when max daily flow > 0.054m^3/s

Values highlighted in **bold red** indicate a permit limit exceedance

PNC (Permit Non-Compliance) indicates a required TSS sample was not collected

A dash (-) indicates that a sample was not required

Table 28
2018-2019 Annual Report

Settling Pond # 1 - Total Suspended Solid Results (SPD)

EMS ID

Site Description **Settling Pond #1 (SPD)**

TSS Permit Limit: 25.0 mg/L

Date	TSS mg/L	Date	TSS mg/L	Date	TSS mg/L	Date	TSS mg/L	Date	TSS mg/L	Date	TSS mg/L	Date	TSS mg/L	Date	TSS mg/L
1-Apr-18	<4.0	1-May-18	<4.0	12-Oct-18	<4.0	11-Nov-18	<4.0	11-Dec-18	<4.0	1-Jan-19	<4.0	1-Feb-19	7.2	1-Mar-19	<4.0
2-Apr-18	<4.0	2-May-18	<4.0	13-Oct-18	<4.0	12-Nov-18	<4.0	12-Dec-18	<4.0	2-Jan-19	<4.0	2-Feb-19	5.6	2-Mar-19	4.0
3-Apr-18	<4.0	3-May-18	<4.0	14-Oct-18	<4.0	13-Nov-18	<4.0	13-Dec-18	<4.0	3-Jan-19	<4.0	3-Feb-19	5.6	3-Mar-19	<4.0
4-Apr-18	<4.0	4-May-18	<4.0	15-Oct-18	<4.0	14-Nov-18	<4.0	14-Dec-18	<4.0	4-Jan-19	<4.0	4-Feb-19	<4.0	4-Mar-19	<4.0
5-Apr-18	<4.0	5-May-18	<4.0	16-Oct-18	<4.0	15-Nov-18	<4.0	15-Dec-18	4.5	5-Jan-19	<4.0	4-Feb-19	<4.0	4-Mar-19	<4.0
6-Apr-18	<4.0	6-May-18	<4.0	17-Oct-18	<4.0	16-Nov-18	<4.0	16-Dec-18	4.8	6-Jan-19	<4.0	5-Feb-19	<4.0	5-Mar-19	<4.0
7-Apr-18	<4.0	7-May-18	<4.0	18-Oct-18	<4.0	17-Nov-18	<4.0	17-Dec-18	<4.0	7-Jan-19	<4.0	6-Feb-19	<4.0	6-Mar-19	1.1
8-Apr-18	<4.0	8-May-18	<4.0	19-Oct-18	<4.0	18-Nov-18	<4.0	18-Dec-18	5.0	8-Jan-19	<4.0	7-Feb-19	<4.0	7-Mar-19	1.3
9-Apr-18	<4.0	9-May-18	<4.0	20-Oct-18	<4.0	19-Nov-18	<4.0	19-Dec-18	<4.0	8-Jan-19	<4.0	8-Feb-19	<4.0	8-Mar-19	<4.0
10-Apr-18	<4.0	16-May-18	<4.0	21-Oct-18	<4.0	20-Nov-18	<4.0	20-Dec-18	6.8	9-Jan-19	<4.0	9-Feb-19	<4.0	9-Mar-19	<4.0
11-Apr-18	<4.0	23-May-18	PNC	22-Oct-18	<4.0	21-Nov-18	<4.0	21-Dec-18	<4.0	10-Jan-19	<4.0	10-Feb-19	<4.0	10-Mar-19	<4.0
12-Apr-18	<4.0	4-Jun-18	8.3	23-Oct-18	<4.0	22-Nov-18	<4.0	22-Dec-18	<4.0	11-Jan-19	<4.0	11-Feb-19	<4.0	11-Mar-19	<4.0
13-Apr-18	<4.0	19-Jul-18	<4.0	24-Oct-18	<4.0	23-Nov-18	<4.0	23-Dec-18	<4.0	12-Jan-19	<4.0	12-Feb-19	<4.0	12-Mar-19	<4.0
14-Apr-18	<4.0	8-Aug-18	<4.0	25-Oct-18	<4.0	24-Nov-18	<4.0	24-Dec-18	<4.0	13-Jan-19	<4.0	13-Feb-19	<4.0	13-Mar-19	<4.0
15-Apr-18	<4.0	4-Sep-18	<4.0	26-Oct-18	<4.0	25-Nov-18	<4.0	25-Dec-18	4.0	14-Jan-19	<4.0	14-Feb-19	<4.0	14-Mar-19	<4.0
16-Apr-18	<4.0	27-Sep-18	6.0	27-Oct-18	<4.0	26-Nov-18	<4.0	26-Dec-18	<4.0	15-Jan-19	4.0	15-Feb-19	<4.0	15-Mar-19	<4.0
17-Apr-18	<4.0	28-Sep-18	<4.0	28-Oct-18	<4.0	27-Nov-18	<4.0	27-Dec-18	<4.0	16-Jan-19	<4.0	16-Feb-19	<4.0	16-Mar-19	<4.0
18-Apr-18	<4.0	29-Sep-18	<4.0	29-Oct-18	<4.0	28-Nov-18	4.0	28-Dec-18	<4.0	17-Jan-19	<4.0	17-Feb-19	<4.0	17-Mar-19	<4.0
19-Apr-18	<4.0	30-Sep-18	4.00	30-Oct-18	<4.0	29-Nov-18	<4.0	29-Dec-18	<4.0	18-Jan-19	<4.0	18-Feb-19	<4.0	18-Mar-19	<4.0
20-Apr-18	<4.0	1-Oct-18	<4.0	31-Oct-18	<4.0	30-Nov-18	<4.0	30-Dec-18	<4.0	19-Jan-19	<4.0	19-Feb-19	<4.0	19-Mar-19	<4.0
21-Apr-18	<4.0	2-Oct-18	<4.0	1-Nov-18	<4.0	1-Dec-18	<4.0	31-Dec-18	<4.0	20-Jan-19	<4.0	20-Feb-19	<4.0	20-Mar-19	<4.0
22-Apr-18	5.0	3-Oct-18	<4.0	2-Nov-18	<4.0	2-Dec-18	<4.0			21-Jan-19	<4.0	21-Feb-19	<4.0	21-Mar-19	<4.0
23-Apr-18	<4.0	4-Oct-18	4.0	3-Nov-18	<4.0	3-Dec-18	<4.0			22-Jan-19	<4.0	22-Feb-19	<4.0	22-Mar-19	<4.0
24-Apr-18	<4.0	5-Oct-18	<4.0	4-Nov-18	<4.0	4-Dec-18	<4.0			23-Jan-19	<4.0	23-Feb-19	<4.0	23-Mar-19	<4.0
25-Apr-18	<4.0	6-Oct-18	<4.0	5-Nov-18	<4.0	5-Dec-18	<4.0			24-Jan-19	<4.0	24-Feb-19	<4.0	24-Mar-19	<4.0
26-Apr-18	<4.0	7-Oct-18	<4.0	6-Nov-18	<4.0	6-Dec-18	<4.0			25-Jan-19	<4.0	25-Feb-19	<4.0	25-Mar-19	1.7
27-Apr-18	<4.0	8-Oct-18	<4.0	7-Nov-18	<4.0	7-Dec-18	<4.0			26-Jan-19	<4.0	26-Feb-19	<4.0	26-Mar-19	2.3
28-Apr-18	<4.0	9-Oct-18	<4.0	8-Nov-18	<4.0	8-Dec-18	<4.0			27-Jan-19	<4.0	27-Feb-19	<4.0	27-Mar-19	1.4
29-Apr-18	<4.0	10-Oct-18	<4.0	9-Nov-18	<4.0	9-Dec-18	<4.0			28-Jan-19	4.4	28-Feb-19	<4.0	28-Mar-19	<4.0
30-Apr-18	<4.0	11-Oct-18	<4.0	10-Nov-18	<4.0	10-Dec-18	<4.0			29-Jan-19	<4.0			29-Mar-19	<4.0
										30-Jan-19	<4.0			30-Mar-19	<4.0
										31-Jan-19	<4.0			31-Mar-19	4.0

Notes: TSS composite sample is required: monthly - no decant flow, weekly when max daily flow < 0.046m^3/s & daily when max daily flow > 0.046m^3/s

Values highlighted in **bold red** indicate a permit limit exceedance

PNC (Permit Non-Compliance) indicates a required TSS sample was not collected.

Table 29
2018-2019 Annual Report

EMS ID **E207409**

DISCHARGE FROM SETTLING POND # 4 (WD)

Date	April Max. (m3/s)	April Daily (m3/s)	May Max. (m3/s)	May Daily (m3/s)	June Max. (m3/s)	June Daily (m3/s)	July Max. (m3/s)	July Daily (m3/s)	August Max. (m3/s)	August Daily (m3/s)	September Max. (m3/s)	September Daily (m3/s)
1	**0.1540**	0.1446	**0.1880**	0.1640	**0.1620**	0.1219	**0.177**	0.161740	0.0000	0.0000	**0.0670**	0.0563
2	**0.1580**	0.1459	**0.2000**	0.1785	**0.1320**	0.0800	**0.181**	0.144677	0.0000	0.0000	**0.0690**	0.0601
3	**0.1580**	0.1234	**0.2130**	0.1916	**0.1510**	0.1220	**0.174**	0.106188	0.0000	0.0000	**0.0690**	0.0554
4	**0.1440**	0.1378	**0.2180**	0.2119	**0.1650**	0.0971	**0.127**	0.063885	0.0000	0.0000	0.0490	0.0124
5	**0.1420**	0.0936	**0.2160**	0.2043	**0.1330**	0.0697	**0.121**	0.060604	**0.0910**	0.0488	0.0000	0.0000
6	**0.1450**	0.0791	**0.2190**	0.2139	**0.0780**	0.0249	**0.143**	0.101635	**0.1140**	0.0542	0.0000	0.0000
7	**0.1530**	0.1495	**0.2160**	0.1895	**0.0660**	0.0172	**0.163**	0.128260	**0.0740**	0.0220	0.0480	0.0077
8	**0.1480**	0.1434	**0.2090**	0.1875	**0.0970**	0.0419	**0.181**	0.162250	0.0000	0.0000	**0.0650**	0.0580
9	**0.1550**	0.1289	**0.2130**	0.1894	**0.1460**	0.1375	**0.182**	0.127646	0.0000	0.0000	**0.0590**	0.0590
10	**0.1690**	0.1293	**0.2030**	0.1818	**0.1550**	0.1482	**0.133**	0.074146	**0.0730**	0.0242	**0.0870**	0.0665
11	**0.1470**	0.0926	**0.2090**	0.1965	**0.1590**	0.1020	**0.127**	0.057802	**0.0830**	0.0614	0.0530	0.0179
12	**0.1490**	0.1189	**0.2160**	0.2121	**0.1380**	0.1031	**0.133**	0.063583	0.0520	0.0147	0.0230	0.0023
13	**0.1570**	0.1520	**0.2150**	0.2113	**0.1210**	0.0469	**0.14**	0.120604	0.0110	0.0006	0.0500	0.0105
14	**0.1570**	0.1495	**0.2150**	0.1839	0.0000	0.0000	**0.167**	0.144323	0.0000	0.0000	**0.0600**	0.0148
15	**0.1620**	0.1504	**0.1710**	0.1016	**0.1070**	0.0548	**0.184**	0.165688	0.0000	0.0000	**0.0750**	0.0614
16	**0.1770**	0.1600	**0.1590**	0.1116	**0.1620**	0.1328	**0.189**	0.123635	0.0380	0.0056	**0.1320**	0.1097
17	**0.1540**	0.1247	**0.1440**	0.0773	**0.1860**	0.1752	**0.159**	0.115073	**0.1280**	0.0586	**0.1350**	0.0633
18	**0.1530**	0.1176	**0.1260**	0.0662	**0.1920**	0.1431	**0.166**	0.100167	**0.1330**	0.0771	**0.0830**	0.0318
19	**0.1520**	0.1211	**0.1420**	0.1290	**0.1690**	0.1095	**0.141**	0.100427	**0.1510**	0.0985	**0.0770**	0.0382
20	**0.1610**	0.1381	**0.1940**	0.1756	**0.1490**	0.0942	**0.185**	0.169948	**0.1370**	0.0566	**0.1330**	0.1091
21	**0.1480**	0.1364	**0.1970**	0.1647	**0.1440**	0.0903	**0.181**	0.161229	**0.0590**	0.0165	**0.1360**	0.1078
22	**0.1550**	0.1445	**0.1800**	0.1149	**0.1740**	0.1503	**0.174**	0.148448	0.0350	0.0051	**0.1470**	0.1407
23	**0.1690**	0.1364	0.0530	0.0401	**0.1560**	0.1193	**0.174**	0.097521	0.0490	0.0078	**0.1460**	0.1348
24	**0.1690**	0.1159	**0.1540**	0.1149	**0.1970**	0.1836	**0.136**	0.077646	0.0000	0.0000	**0.1510**	0.1328
25	**0.0800**	0.0529	**0.1690**	0.1249	**0.1970**	0.1701	**0.164**	0.106167	0.0000	0.0000	**0.1380**	0.0526
26	**0.1980**	0.1108	**0.1380**	0.0628	**0.1380**	0.0740	**0.153**	0.124802	**0.1340**	0.0833	0.0000	0.0000
27	**0.2200**	0.1973	**0.1800**	0.1609	0.0420	0.0315	**0.174**	0.153948	**0.1430**	0.1048	**0.0580**	0.0108
28	**0.2140**	0.2079	**0.1700**	0.1133	0.0410	0.0341	**0.173**	0.146240	**0.0850**	0.0336	**0.0790**	0.0605
29	**0.2010**	0.1825	**0.0880**	0.0266	**0.1440**	0.0728	**0.139**	0.114198	**0.0830**	0.0361	**0.0810**	0.0739
30	**0.1970**	0.1776	**0.1450**	0.0985	**0.1640**	0.1498	**0.129**	0.087542	**0.0780**	0.0212	**0.1310**	0.0886
31			**0.1670**	0.1264			0.008	0.000385	**0.0660**	0.0316		
Monthly Max	0.2200		0.2190		0.1970		0.1890		0.1510		0.0800	
Monthly Avg		0.1354		0.1460		0.0966		0.1132		0.0278		0.0546

P = Permit Limit Exceedance

Bold = TSS composite sample is required: **monthly** - no decant flow, **weekly** when max daily flow < 0.054m^3/s & **daily** when max daily flow > 0.054m^3/s

PNC = Permit Non-compliance

Table 30
2018-2019 Annual Report

EMS ID **E207409**

DISCHARGE FROM SETTLING POND # 4 (WD)

Date	October Max. (m3/s)	October Daily (m3/s)	November Max. (m3/s)	November Daily (m3/s)	December Max. (m3/s)	December Daily (m3/s)	January Max. (m3/s)	January Daily (m3/s)	February Max. (m3/s)	February Daily (m3/s)	March Max. (m3/s)	March Daily (m3/s)
1	**0.135**	0.054	**0.099**	0.085	**0.158**	0.141	**0.2350**	0.2329	**0.1800**	0.1594	**0.2030**	0.1834
2	0.029	0.006	**0.095**	0.090	**0.145**	0.126	**0.2370**	0.2336	**0.1970**	0.1812	**0.1880**	0.1602
3	**0.111**	0.071	**0.129**	0.103	**0.151**	0.146	**0.2770**	0.2494	**0.2010**	0.1976	**0.2000**	0.1915
4	**0.138**	0.097	**0.153**	0.139	**0.15**	0.136	**0.2820**	0.1769	**0.2040**	0.1956	**0.1890**	0.1519
5	**0.132**	0.110	**0.153**	0.131	**0.148**	0.135	**0.1460**	0.1445	**0.2030**	0.1513	**0.1700**	0.1411
6	**0.131**	0.102	**0.142**	0.119	**0.146**	0.136	**0.2480**	0.1888	**0.1070**	0.0926	**0.1720**	0.1547
7	**0.132**	0.124	**0.141**	0.132	**0.151**	0.143	**0.2490**	0.2208	**0.1440**	0.0956	**0.1790**	0.1509
8	**0.148**	0.127	**0.141**	0.081	**0.15**	0.141	**0.2220**	0.2040	**0.1720**	0.1614	**0.1880**	0.1635
9	**0.145**	0.109	**0.127**	0.101	**0.156**	0.146	**0.2180**	0.2086	**0.1650**	0.1435	**0.1840**	0.1685
10	**0.065**	0.019	**0.121**	0.112	**0.156**	0.146	**0.2180**	0.1788	**0.1390**	0.1336	**0.1900**	0.1729
11	**0.058**	0.014	**0.113**	0.108	**0.151**	0.130	**0.2470**	0.2201	**0.1480**	0.1282	**0.1870**	0.1736
12	**0.076**	0.047	**0.113**	0.107	**0.14**	0.122	**0.1510**	0.1395	**0.1490**	0.1427	**0.1830**	0.1436
13	**0.086**	0.075	**0.151**	0.127	**0.177**	0.149	**0.1390**	0.1371	**0.1560**	0.1400	**0.1680**	0.1404
14	**0.131**	0.089	**0.188**	0.167	**0.195**	0.180	**0.2080**	0.1586	**0.1520**	0.1225	**0.1620**	0.1385
15	**0.116**	0.063	**0.192**	0.185	**0.196**	0.173	**0.2090**	0.1523	**0.1540**	0.1358	**0.1770**	0.1504
16	**0.094**	0.063	**0.191**	0.185	**0.208**	0.181	**0.2020**	0.1541	**0.1640**	0.1552	**0.2090**	0.1930
17	**0.099**	0.064	**0.176**	0.152	**0.213**	0.194	**0.2150**	0.1899	**0.1590**	0.1483	**0.2080**	0.1964
18	**0.101**	0.064	**0.143**	0.142	**0.24**	0.214	**0.1990**	0.1649	**0.1600**	0.1288	**0.2080**	0.1926
19	**0.105**	0.080	**0.143**	0.142	**0.23**	0.185	**0.2270**	0.2077	**0.1540**	0.1168	**0.1900**	0.1797
20	**0.093**	0.071	**0.153**	0.144	**0.238**	0.203	**0.2090**	0.1541	**0.0870**	0.0782	**0.1960**	0.1732
21	**0.157**	0.139	**0.158**	0.150	**0.232**	0.169	**0.2150**	0.1919	**0.0870**	0.0812	**0.1800**	0.1422
22	**0.155**	0.110	**0.167**	0.158	**0.222**	0.212	**0.2260**	0.1656	**0.1550**	0.1073	**0.2060**	0.1952
23	**0.097**	0.045	**0.174**	0.165	**0.241**	0.227	**0.2430**	0.1700	**0.1630**	0.1570	**0.2060**	0.2006
24	**0.085**	0.028	**0.153**	0.145	**0.233**	0.190	**0.2100**	0.1602	**0.1670**	0.1567	**0.2010**	0.1883
25	**0.09**	0.057	**0.148**	0.142	**0.214**	0.207	**0.2120**	0.1641	**0.1580**	0.1144	**0.1910**	0.1531
26	**0.096**	0.060	**0.179**	0.126	**0.231**	0.227	**0.2070**	0.1792	**0.1440**	0.1083	**0.2030**	0.1921
27	**0.093**	0.087	**0.212**	0.193	**0.227**	0.212	**0.1930**	0.1591	**0.1460**	0.1088	**0.2040**	0.1867
28	**0.102**	0.093	**0.199**	0.177	**0.213**	0.204	**0.1990**	0.1851	**0.1500**	0.0888	**0.2000**	0.1887
29	**0.094**	0.059	**0.193**	0.171	**0.222**	0.210	**0.1910**	0.1585			**0.2030**	0.1866
30	**0.1**	0.090	**0.162**	0.156	**0.216**	0.176	**0.1890**	0.1657			**0.2070**	0.1925
31	**0.098**	0.051			**0.23**	0.215	**0.1580**	0.1511			**0.2030**	0.1961
Monthly Max	0.1570		0.2120		0.2410		0.2820		0.2040		0.2090	
Monthly Avg		0.0731		0.1378		0.1734		0.1796		0.1332		0.1723

P = Permit Limit Exceedance

Bold = TSS composite sample is required: **monthly** - no decant flow, **weekly** when max daily flow < 0.054m^3/s & **daily** when max daily flow > 0.054m^3/s

PNC = Permit Non-compliance

Table 31
2018-2019 Annual Report

EMS ID	E218582											
DISCHARGE FROM SETTLING POND # 1 (SPD)												
Date	**April**	**April**	**May**	**May**	**June**	**June**	**July**	**July**	**August**	**August**	**September**	**September**
	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)
1	**0.0490**	0.0287	0.0400	0.0197	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
2	**0.0480**	0.0222	0.0240	0.0135	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
3	**0.0640**	0.0431	0.0460	0.0291	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
4	0.0340	0.0281	0.0360	0.0245	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
5	**0.0670**	0.0516	0.0220	0.0119	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
6	0.0450	0.0336	**0.0570**	0.0336	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
7	**0.0860**	0.0571	0.0340	0.0183	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
8	**0.0750**	0.0556	0.0220	0.0158	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
9	**0.0660**	0.0579	0.0250	0.0187	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
10	**0.0710**	0.0479	0.0250	0.0180	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
11	**0.1000**	0.0840	0.0250	0.0143	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
12	**0.0910**	0.0630	0.0200	0.0108	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
13	**0.0940**	0.0733	0.0180	0.0094	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
14	**0.0910**	0.0640	0.0170	0.0087	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
15	**0.0820**	0.0592	0.0150	0.0075	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
16	**0.0710**	0.0481	0.0130	0.0056	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
17	**0.0680**	0.0487	0.0090	0.0038	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
18	**0.0510**	0.0320	0.0070	0.0031	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
19	**0.0540**	0.0445	0.0060	0.0037	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
20	0.0430	0.0318	0.0060	0.0038	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
21	0.0370	0.0282	0.0060	0.0021	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
22	**0.0610**	0.0284	0.0060	0.0025	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
23	**0.0590**	0.0282	0.0030	0.0009	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
24	0.0270	0.0157	0.0020	0.0002	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
25	**0.0480**	0.0307	0.0010	0.0001	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
26	0.0350	0.0188	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
27	**0.0560**	0.0200	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
28	**0.0590**	0.0390	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**
29	0.0320	0.0240	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**0.0050**	**0.0006**
30	0.0440	0.0298	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**0.0220**	**0.0066**
31			**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**	**NF**		
Monthly Max	0.1000		0.0570		0.0000		0.0000		0.0000		0.0050	
Monthly Avg		0.04124		0.01118		0.0000		0.0000		0.00000		0.00360

PNC = Permit Non-compliance

Bold = TSS composite sample is required: **monthly** - no decant flow, **weekly** when max daily flow < 0.046m^3/s & **daily** when max daily flow > 0.046m^3/s

No Flow= NF

Table 32
2018-2019 Annual Report

EMS ID	E218582											
DISCHARGE FROM SETTLING POND # 1 (SPD)												
Date	**October**	**October**	**November**	**November**	**December**	**December**	**January**	**January**	**February**	**February**	**March**	**March**
	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)	Max. (m3/s)	Daily (m3/s)
1	**0.0620**	0.0454	**0.0630**	0.0320	**0.0480**	0.0382	**0.0570**	0.0468	0.0080	0.0064	0.0370	0.0088
2	**0.0490**	0.0339	**0.0810**	0.0667	**0.0520**	0.0274	**0.0810**	0.0655	0.0080	0.0053	0.0320	0.0042
3	**0.0610**	0.0456	**0.0910**	0.0517	**0.0570**	0.0436	**0.1990**	0.1525	0.0060	0.0035	0.0340	0.0100
4	0.0420	0.0223	**0.0980**	0.0857	0.0220	0.0108	**0.1870**	0.1679	0.0040	0.0017	0.0380	0.0242
5	**0.0610**	0.0318	**0.0820**	0.0532	0.0100	0.0063	**0.1410**	0.1217	0.0020	0.0006	0.0380	0.0271
6	**0.0630**	0.0357	**0.0650**	0.0378	**0.0650**	0.0252	**0.1120**	0.1008	0.0410	0.0167	0.0380	0.0250
7	**0.0720**	0.0384	**0.0520**	0.0304	**0.0670**	0.0363	**0.1000**	0.0904	0.0410	0.0364	0.0390	0.0255
8	**0.0830**	0.0620	**0.0480**	0.0256	**0.0480**	0.0266	**0.0910**	0.0897	0.0410	0.0384	0.0390	0.0284
9	**0.0860**	0.0563	0.0380	0.0190	**0.0840**	0.0595	**0.1510**	0.1046	0.0400	0.0279	0.0360	0.0233
10	**0.0670**	0.0427	0.0460	0.0284	**0.0740**	0.0540	**0.1550**	0.1231	0.0450	0.0218	0.0390	0.0283
11	**0.0550**	0.0284	0.0460	0.0230	**0.0950**	0.0644	**0.0920**	0.0784	0.0250	0.0009	0.0390	0.0320
12	**0.0600**	0.0334	0.0430	0.0165	**0.0950**	0.0684	**0.0700**	0.0642	0.0000	0.0000	0.0410	0.0123
13	0.0440	0.0233	**0.0470**	0.0239	**0.1210**	0.1048	**0.0620**	0.0547	0.0000	0.0000	**0.0710**	0.0391
14	0.0380	0.0240	**0.0740**	0.0507	**0.2200**	0.1082	**0.0560**	0.0372	0.0000	0.0000	**0.0810**	0.0690
15	0.0320	0.0167	**0.0750**	0.0528	**0.2230**	0.1813	0.0340	0.0141	0.0000	0.0000	**0.0560**	0.0495
16	**0.0530**	0.0252	**0.0660**	0.0419	**0.2440**	0.0299	0.0460	0.0338	**0.0490**	0.0214	**0.0490**	0.0458
17	0.0370	0.0224	**0.0480**	0.0279	**0.2140**	0.0727	**0.0520**	0.0224	0.0390	0.0251	**0.0550**	0.0405
18	**0.0620**	0.0361	**0.0480**	0.0286	**0.2030**	0.1815	**0.0540**	0.0357	0.0410	0.0302	**0.0570**	0.0435
19	0.0360	0.0205	**0.0470**	0.0244	**0.1480**	0.1270	**0.0700**	0.0569	0.0450	0.0219	**0.0570**	0.0445
20	**0.0480**	0.0329	0.0440	0.0209	**0.2120**	0.1830	**0.0620**	0.0483	0.0450	0.0107	**0.0550**	0.0417
21	0.0400	0.0222	**0.0470**	0.0298	**0.1720**	0.1351	**0.0540**	0.0341	0.0410	0.0048	**0.0540**	0.0417
22	**0.0560**	0.0216	**0.0540**	0.0269	**0.1210**	0.1158	0.0400	0.0277	0.0400	0.0086	**0.0520**	0.0459
23	**0.0580**	0.0407	**0.0590**	0.0414	**0.1330**	0.1268	**0.0610**	0.0364	0.0430	0.0188	**0.0500**	0.0425
24	0.0320	0.0181	**0.0650**	0.0562	**0.1240**	0.1167	**0.0630**	0.0541	0.0400	0.0260	**0.0480**	0.0367
25	0.0320	0.0146	**0.0620**	0.0407	**0.1120**	0.1048	**0.0540**	0.0380	0.0400	0.0258	**0.0890**	0.0537
26	0.0250	0.0102	**0.1030**	0.0745	**0.1090**	0.0990	**0.0490**	0.0326	0.0390	0.0265	**0.0980**	0.0908
27	0.0090	0.0059	**0.1150**	0.1074	**0.0940**	0.0891	0.0390	0.0251	0.0410	0.0293	**0.0990**	0.0579
28	0.0230	0.0149	**0.1010**	0.0854	**0.0920**	0.0681	0.0410	0.0189	0.0380	0.0103	**0.0510**	0.0410
29	0.0380	0.0134	**0.0810**	0.0740	**0.1170**	0.1058	**0.0470**	0.0218			0.0450	0.0330
30	0.0400	0.0205	**0.0700**	0.0551	**0.1150**	0.0909	0.0120	0.0079			0.0440	0.0320
31	0.0410	0.0188			**0.1000**	0.0814	0.0110	0.0070			0.0420	0.0300
Monthly Ma	0.086		0.115		0.244		0.199		0.049		0.099	
Monthly Avg		0.028		0.044		0.083		0.058		0.015		0.036

PNC = Permit Non-compliance

Bold = TSS composite sample is required: **monthly** - no decant flow, **weekly** when max daily flow < 0.046m^3/s & **daily** when max daily flow > 0.046m^3/s

No Flow= NF

Table 33
2018-2019 Annual Report

EMS ID E292069
DISCHARGE FROM 7-SOUTH SURFACE DECANT (7SSD)

Date	April	May	June	July	August	September	October	November	December	January	February	March
	Daily Average L/S											
1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND= No Discharge
Cummulative Daily Totalizer Value (m^3/day)
For Maximum Decant Flow (5.00 L/s)

Table 34
2018-2019 Annual Report

Weekly / Monthly Sulphate Results WD & SPD (mg/L)			
EMS ID:	**E207409**	**EMS ID:**	**E218582**
Site Name	**Settling Pond #4**	**Site Name**	**Settling Pond #1**
Site Code	**WD**	**Site Code**	**SPD**
Date	**Sulphate**	**Date**	**Sulphate**
3-Apr-18	483	**3-Apr-18**	349
10-Apr-18	435	**10-Apr-18**	276
17-Apr-18	535	**17-Apr-18**	217
23-Apr-18	569	**23-Apr-18**	223
30-Apr-18	631	**30-Apr-18**	278
8-May-18	619	**8-May-18**	307
14-May-18	622	**14-May-18**	326
22-May-18	564	**22-May-18**	293
28-May-18	478	**4-Jun-18**	339
11-Jun-18	467	**3-Jul-18**	252
18-Jun-18	688	**8-Aug-18**	255
25-Jun-18	530	**4-Sep-18**	262
3-Jul-18	520	**1-Oct-18**	297
9-Jul-18	494	**24-Oct-18**	366
17-Jul-18	581	**29-Oct-18**	368
23-Jul-18	485	**5-Nov-18**	174
30-Jul-18	635	**13-Nov-18**	304
8-Aug-18	708	**19-Nov-18**	59
13-Aug-18	700	**27-Nov-18**	88
20-Aug-18	505	**5-Dec-18**	190
27-Aug-18	471	**10-Dec-18**	220
4-Sep-18	651	**17-Dec-18**	88
10-Sep-18	697	**27-Dec-18**	279
17-Sep-18	562	**2-Jan-19**	25
24-Sep-18	411	**8-Jan-19**	128
1-Oct-18	541	**14-Jan-19**	56
9-Oct-18	460	**21-Jan-19**	46
16-Oct-18	495	**28-Jan-19**	144
24-Oct-18	491	**4-Feb-19**	129
29-Oct-18	466	**11-Feb-19**	122
5-Nov-18	575	**19-Feb-19**	92
13-Nov-18	589	**25-Feb-19**	43
19-Nov-18	529	**4-Mar-19**	55
27-Nov-18	566	**11-Mar-19**	104
6-Dec-18	560	**18-Mar-19**	46
10-Dec-18	489	**25-Mar-19**	143
17-Dec-18	423		
27-Dec-18	571		
2-Jan-19	506		
8-Jan-19	499		
14-Jan-19	625		
21-Jan-19	539		
28-Jan-19	664		
4-Feb-19	657		
11-Feb-19	707		
19-Feb-19	653		
25-Feb-19	661		
4-Mar-19	736		
11-Mar-19	778		
18-Mar-19	764		
19-Mar-19	745		
25-Mar-19	798		
Annual Min	411	**Annual Min**	25
Annual Max	798	**Annual Max**	368
Annual Average	579	**Annual Average**	193
Count:	52	**Count:**	36

Notes: Frequency of sampling for sulphate is weekly when discharging for both Settling Ponds. Settling Pond #1 was not discharging from mid-May to mid-October.

Table 35
2018-2019 Annual Report

Weekly Sulphate Results and Rolling Averages at LLE & LLO (mg/L)

EMS ID	E292130			EMS ID	E219412		
Site Name	Long Lake Entry of 2-South mine effluent near the outlet of Long Lake			Site Name	Long Lake Outlet		
Site Code	LLE			Site Code	LLO		
Date	Hardness	Sulphate	Sulphate Rolling Average	Date	Hardness	Sulphate	Sulphate Rolling Average
7-Mar-18	110	90		7-Mar-18		47	
12-Mar-18		89		12-Mar-18		51	
21-Mar-18		116		21-Mar-18		104	
26-Mar-18		120		26-Mar-18		84	
3-Apr-18		171	117	3-Apr-18		70	71
10-Apr-18	90	79	115	12-Apr-18	64	48	71
17-Apr-18		76	112	18-Apr-18	39.1	29	58
23-Apr-18		108	111	25-Apr-18	43.3	32	45
30-Apr-18		139	115	1-May-18	44.5	32	35
14-May-18		256		8-May-18	56.7	40	33
22-May-18		423		14-May-18		49	36
28-May-18		571		22-May-18		60	42
4-Jun-18	601	600		28-May-18		75	51
11-Jun-18		363	**443**	7-Jun-18		79	60
18-Jun-18		388	**469**	11-Jun-18		87	70
25-Jun-18		397	**464**	18-Jun-18		87	78
3-Jul-18	432	452	**440**	25-Jun-18		84	83
9-Jul-18		389	**398**	9-Jul-18		89	
23-Jul-18		568	**439**	17-Jul-18	102	90	
1/Aug/18	No Flow			24-Jul-18	102	89	
7/Aug/18				1-Aug-18	103	93	
14/Aug/18				7-Aug-18	100	92	91
25/Aug/18				14-Aug-18	105	93	91
11-Sep-18		631		17-Sep-18		110	
17-Sep-18	324	310		25-Sep-18		91	
25-Sep-18		76		2-Oct-18		65	
1-Oct-18	118	102		9-Oct-18		71	
9-Oct-18		136	**251**	11-Oct-18	81.9	67	81
16-Oct-18		145	**154**	16-Oct-18	75.1	60	71
24-Oct-18		164	125	24-Oct-18	70.8	59	64
29-Oct-18		163	**142**	29-Oct-18	74.5	59	63
5-Nov-18	139	132	**148**	6-Nov-18	42.9	30	55
13-Nov-18		133	**147**	13-Nov-18		44	50
19-Nov-18		122	**143**	19-Nov-18		38	46
27-Nov-18		92	128	27-Nov-18		32	41
5-Dec-18	145	128	121	5-Dec-18		17	32
10-Dec-18		164	128	10-Dec-18		24	31
17-Dec-18		44	110	17-Dec-18		21	26
27-Dec-18		153	116	27-Dec-18		13	21
2-Jan-19		106	119	2-Jan-19		19	19
10-Jan-19	88	84	110	10-Jan-19		30	21
14-Jan-19		151	108	14-Jan-19		22	21
21-Jan-19		95	118	21-Jan-19		23	21
28-Jan-19		92	105	30-Jan-19		34	25
5-Feb-19	94	77	100	5-Feb-19		34	29
11-Feb-19		98	103	11-Feb-19		24	27
19-Feb-19		100	92	19-Feb-19		28	29
25-Feb-19		101	94	28-Feb-19		34	31
4-Mar-19	125	123	100	4-Mar-19		44	33
11-Mar-19		146	114	11-Mar-19		55	37
18-Mar-19		68	108	18-Mar-19		61	44
25-Mar-19		69	101	25-Mar-19		69	53
Annual Min	87.8	44	Weekly rolling average sulphate ambient WQG for 5 in 30 calculations using the previous 5 weeks of results.	Annual Min	39.1	13	Weekly rolling average sulphate ambient WQG for 5 in 30 calculations use the previous 5 weeks of results.
Annual Max	601	631		Annual Max	105	110	
Annual Average	216	204		Annual Average	74	54	
Count:	10	44		Count:	15	48	

Notes: WQG applies background hardness of 30 mg/L deriving a sulphate guideline of 128 mg/L. If the hardness concentrations from LLE were used for this calculation the WQG applied would range from 309 mg/L to 429 mg/L. Concentrations increase with decreased flow rates. All statistics were based on April 1st, 2018 to March 31st, 2019. Green Bold is a WQG exceedance.

Table 36
2018-2019 Annual Report

Weekly / Biweekly TSS Results From WC, SPC, SPEFF and BDS

EMS ID	E207411	E217014		
Site Date	WC	SPC	SPEFF	BDS
2-Apr-18	<4.0	<4.0	<4.0	<4.0
9-Apr-18	<4.0	<4.0	<4.0	<8.0
16-Apr-18	<4.0	4.8	<4.0	<4.0
23-Apr-18	-	<4.0	<4.0	<4.0
1-May-18	PNC	<4.0	6.5	13.3
7-May-18	<4.0	<4.0	<4.0	71.0
14-May-18	PNC	9.0	NA	NA
21-May-18	-	ND		
28-May-18	<4.0	ND		
4-Jun-18	<4.0	ND	Treatment system was not operating or discharging. In September all discharge was directed to 2S pit eliminating these two sites.	
11-Jun-18	<4.0	ND		
18-Jun-18	<4.0	ND		
25-Jun-18	PNC	ND		
3-Jul-18	<4.0	ND		
17-Jul-18	<4.0	ND		
30-Jul-18	<4.0	ND		
8-Aug-18	<4.0	ND		
13-Aug-18	<4.0	ND		
27-Aug-18	<4.0	ND		
11-Sep-18	<4.0	ND		
24-Sep-18	<4.0	ND		
1-Oct-18	<4.0	<4.0		
8-Oct-18	<4.0	<4.0		
22-Oct-18	<4.0	5		
5-Nov-18	<4.0	<4.0		
19-Nov-18	<4.0	<4.0		
3-Dec-18	<4.0	<4.0		
17-Dec-18	<4.0	<4.0		
2-Jan-19	<4.0	<4.0		
8-Jan-19	<4.0	<4.0		
14-Jan-19	4.8	<4.0		
28-Jan-19	<4.0	<4.0		
4-Feb-19	<4.0	<4.0		
11-Feb-19	<4.0	<4.0		
25-Feb-19	<4.0	<4.0		
4-Mar-19	<4.0	<4.0		
19-Mar-19	<4.0	<4.0		
25-Mar-19	<4.0	<4.0		

NA= Not Applicable. All sites are based on discharge from Settling Ponds. WC is dependant on WD discharge & SPC is dependant on SPD discharge.

Table 37
2018-2019 Annual Report

Field Conductivity (uS/cm) & pH (North Mine Area & 7-South)

EMS ID	E283433		E207409		E207412		E207411						E292069		E292109		GW and SW from 2N Area at Road		E292126	
Site Name	2-N-Portal Sump		Settling Pond #4		2 North Pit Sump		North Pit Culvert		7 South Portal Sump		Underground Water 7SA5		Settling Pond at 7S		Stream 1 -7S				South Dyke Sump	
Site Code	2NPS		WD		WP		WC		7SPS		7SA5		7SSD		7S		PDSR		SDS	
	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH
April 2018	2.15	7.60	1834	8.10	1686	8.10	1753	8.50	850	7.70			456	8.00	47	8.30	1289	8.10	2.74	7.90
	2.13	7.80	1759	8.00	1670	8.40	1598	8.50	782	7.80			381	8.00	42	8.20			1970	8.20
	2.1	7.70	1800	8.10	1696	8.30	1666	8.50	765	7.70			366	8.10	43	8.20			2.25	8.10
	2.1	7.30	1904	8.10	1770	8.30	1793	8.50	808	7.80			356	8.20	44	8.30			2.30	8.00
	2151	7.10	1870	7.90	1703	8.20	1878	8.50	850	8.10			320	8.40	52	8.20	1406	8.20	2.52	8.00
May 2018	2160	7.70	2.11	8.10	1916	8.50	2.02	8.50	800	7.90			321	8.50	58	8.10			2.44	8.20
	2.1	7.90	1963	7.80	1806	8.50	1897	8.20	886	8.30			315	8.50	66	8.20			2.74	8.40
	2.15	7.80	1913	8.00	1801	8.40	1755	8.30	932	8.00			312	8.40					2.74	8.40
	2.2	8.10	1739	8.40	1800	8.20	1764	8.00	912	8.00			291	8.60			2.03	8.10	2.55	8.40
June 2018	2.25	8.40	1818	8.30	1782	8.50	1603	8.50	957	6.80			288	8.00					2.33	8.30
	2.13	8.40	1720	8.30	1653	8.40	1763	8.40	967	6.90			294	6.80					2.44	7.90
	2.11	7.70	1824	8.10	1689	8.30	1643	8.50	1370	6.60			290	8.10					2.51	7.80
	2.18	7.80	1727	8.10	1688	8.00	1642	8.30	1412	6.50			292	8.00					2.61	7.70
July 2018	2.27	7.90	1895	8.00	1818	8.30	1797	8.10	2.00	3.90			274	8.60					825	8.10
	2.15	7.90	1874	8.20	1813	8.30	1742	8.50	1930	3.30			260	7.80					2.68	8.10
	2.25	7.80	1944	8.00	1850	8.20	1843	7.80	1500	6.50			260	8.70					2.82	8.10
	2.05	8.00	1806	7.80	1710	8.00	1727	8.40	1443	6.30			234	8.00	Dry/ No Flow				2.71	7.00
August 2018	2.15	8.00	1886	7.70	1715	8.00	1735	8.30	2.31	3.00			250	8.70					2.05	7.50
	2.11	8.10	2.07	7.50	1763	8.30	1845	8.50	1541	6.10			237	8.80					2.10	7.40
	2.05	7.90	2047	7.90	1750	8.30	1755	8.23	1535	6.40			235	8.80			Dry/ No Flow		2.00	7.50
	2.1	7.80	1992	8.00	1762	8.40	1702	8.20	1382	7.10			239	7.60					2.10	7.80
September 2018	2.08	7.80	1897	7.80	1750	8.30	1877	7.70	1341	7.60			240	9.20					2.05	7.80
	2.08	7.70	2.12	8.00	1980	8.20	1934	8.20	1245	7.60			223	9.10					2.68	8.10
	2.07	7.70	2.04	8.00	1990	8.20	1925	8.20	1133	7.60			223	8.50					2.79	8.20
	2.10	7.70	1617	7.60	1977	8.10	1650	8.10	2.75	3.30			225	8.50					826	8.10
	2.16	7.60	1503	8.00	1670	8.20	1300	8.30	923	6.50									831	8.10
October 2018	2.05	8.00	1473	8.30	1469	8.30	1446	7.90	815	6.90			216	8.10	56	7.30	1334	7.70	2.01	8.20
	2.1	8.00	1597	8.20	1462	8.20	1286	8.40	889	5.80					54	7.30			2.05	8.20
	2.07	8.10	1584	7.90	1465	8.20	1275	8.50	970	6.50					60	7.40			2.06	8.20
	2.05	8.00	1698	8.10	1766	8.20	1270	8.50	1130	7.20					62	7.40			2.1	8.20
	2.03	8.00	1650	8.00	1755	8.10	1350	8.40	1064	6.90					72	7.50			2.12	8.20
November 2018	1860	7.90	1677	8.00	1793	8.20	1309	8.40	912	7.00			298	8.00	54	8.40	949	7.80	958	7.90
	2.01	8.00	1774	8.20	1785	8.20	1334	8.40	867	6.70					52	7.30			955	7.90
	1950	7.90	1700	8.20	1579	8.10	1547	8.40	900	6.50					50	8.40			933	7.60
	2.05	8.00	1278	7.67	816	7.75	862	7.87	856	6.40					28	7.26			930	7.70
December 2018	2.18	8.10	1927	8.10			1816	8.30	860	6.70			292	8.00	44	8.00	1398	7.90	2.35	8.00
	1957	7.80	1623	7.70	Frozen		1584	7.80	770	7.70					39	7.40			2.17	8.00
	1870	7.90	1185	7.34			900	7.84	844	6.30					62	7.50			2.45	7.89
	2.01	8.00	1700	8.10			1327	8.40	801	7.50					52	7.40			2.1	8.00
January 2019	2.01	7.80	1486	7.40	247	7.40	832	7.50											2.11	7.60
	1892	8.12	1141	7.48	895	7.60	1095	7.40	Dangerous conditions								579	7.35		
	1767	7.67	1528	7.62			1808	7.59	534	6.90										
	2.15	7.70	1649	7.80	Frozen		1958	7.83												
	2.04	7.80	1944	7.62			1985	7.87	Dangerous conditions		309	7.95								
February 2019	2.16	8.12	2.13	8.27	1602	8.45	1977	8.50			335	8.22			29	7.14	1211	8.15		
	2.26	7.31	2.13	7.77			2055	8.31	Ice		363	8.10							Frozen	
	2.14	7.60	2.09	7.75			2001	8.17			329	7.96	Frozen							
	2.16	8.10	2.04	7.60			2026	7.52			340	7.88								
March 2019	2.17	6.78	2.25	7.82	Frozen		2017	7.58	945	7.05	302	7.84			44	7.72	1563	7.58		
	1521	7.10	2.87	7.80			1540	8.17	892	7.2	352	7.55								
	1535	7.47	1582	7.02			1356	8.40	748	7.28	328	7.62								
	2.18	7.80	2.05	7.44			1581	8.15	751	7.3	253	7.75								
Min	**2.01**	**6.78**	**2.04**	**7.02**	**247**	**7.40**	**2.02**	**7.40**	**2.00**	**3.00**	**253**	**7.55**	**216**	**6.80**	**27.9**	**7.14**	**2.03**	**7.35**	**2**	**7.00**
Max	**2160**	**8.40**	**2047**	**8.40**	**1990**	**8.50**	**2055**	**8.50**	**1930**	**8.30**	**363**	**8.22**	**456**	**9.20**	**72**	**8.40**	**1563**	**8.20**	**1970**	**8.40**
Average	**361**	**7.81**	**1357**	**7.90**	**1654**	**8.20**	**1599**	**8.19**	**950**	**6.75**	**323**	**7.87**	**285**	**8.29**	**50**	**7.77**	**1081**	**7.88**	**208**	**7.97**
Count	**52**	**52**	**52**	**52**	**38**	**38**	**52**	**52**	**44**	**44**	**9**	**9**	**28**	**28**	**22**	**22**	**9**	**9**	**40**	**40**

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Field Conductivity (uS/cm) & pH (South Mine Area)

EMS ID	E292127		E217015				E218582				E292128		E292129		E217014		E292130		E292131		E292131	
Site Name	2 South Pit CCR Water Cover		3 South Pit CCR Water Cover		LLSTS Settling Pond Effluent		Settling Pond # 1		Biocell Downstream		3S77		4 South Lower		South Pit Culvert		Long Lake Entry		Seep into Long Lake		Long Lake Middle Seep	
Site Code	2S		3S		SPEFF		SPD		BDS		3S77		4SLO		SPC		LLE		LLS		LLSM	
	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH
April 2018	369	8.00	1330	8.10	1034	8.00	800	8.10	853	8.10	890	8.10	640	7.70	510	7.80	444	7.40	1510	7.30	1262	7.80
	473	8.20	1256	7.90	958	8.50	602	7.70	764	8.30	833	7.90	517	7.90	232	8.30	245	8.00	1320	7.60	983	7.90
	384	8.30	1276	8.00	943	8.30	714	8.30	599	8.20	704	8.20	556	7.70	246	8.30	251	7.90	1453	7.60	1001	7.80
	391	8.40	1300	8.10	931	8.40	737	8.20	712	8.20	684	8.20	559	7.90	384	8.10	280	7.90	1432	7.80	1065	7.80
	408	8.10	1385	8.20	963	7.70	766	8.20	773	8.30	690	8.20	557	7.90	300	8.30	377	7.80	1401	7.70	992	7.90
May 2018	418	7.90	1288	8.40	874	8.20	897	8.40	790	8.30	799	8.30	606	8.10	854	8.20	400	7.90	1422	7.90	1301	8.20
	491	8.10	1275	8.40	853	8.10	827	8.40	893	8.30	812	8.30	594	8.20	380	8.20	405	7.90	1491	8.20	1315	8.10
	772	8.50	1245	8.60	841	8.20	835	8.30	850	8.30	825	7.60	606	7.70	392	8.50	599	8.10	1485	8.20	1420	8.40
	1037	8.40	1091	8.40			796	8.00			825	7.50	653	7.77			959	7.70	1527	8.00	1446	8.20
June 2018	972	8.20	968	8.50			729	8.10			807	8.00	711	8.00			1106	7.60	1515	8.10	1451	8.00
	961	8.40	1005	8.20			711	8.40			804	7.70	567	7.90			1148	7.90	1400	8.00	1431	8.00
	988	8.00	1001	8.20			748	7.80			803	8.20	739	7.10			804	7.90	1405	8.00	1425	8.00
	978	8.00	998	8.20			740	7.90			800	8.00	767	7.50			823	7.00	1600	7.90	1415	8.10
July 2018	1049	7.90	1112	8.20			752	8.30			776	8.10					1115	8.00	1608	7.70	1519	7.90
	1055	8.00	1113	8.20			747	7.90			722	7.20					1143	7.10	1616	7.60	1515	8.10
	1082	8.00	1169	8.00			782	8.10			833	8.10					1012	7.00	1516	8.10	1620	7.70
	1021	8.20	1093	8.00			723	7.80			255	8.00			Dry / No Flow				1490	8.10	1517	7.90
August 2018	1040	8.20	1120	8.00			730	7.90			250	8.10							1488	8.00	1400	8.20
	1084	8.10	1160	8.30			750	8.00			255	8.10							1479	8.00		
	1186	8.10	1225	8.10			757	8.10			300	8.00	Dry / No Flow						1455	8.00		
	1250	8.00	1221	8.10			797	7.50			836	7.60							1467	8.00		
September 2018	1183	8.20	1224	8.10			764	8.00			835	7.90					No Flow		1456	8.00		
	1265	8.20	1136	8.10			716	8.50			822	8.10									No Flow	
	12.1	8.10	1215	7.90			804	7.60			723	8.20										
	1050	8.00	1020	7.70			646	7.90			647	7.80										
	1035	8.30	1100	8.20			646	7.90			650	7.90										
October 2018	1040	8.20	445	8.10			700	7.60			655	7.70	500	7.40	170	7.50	305	7.50	1271	7.80		
	1006	8.30	1091	8.10			574	8.30			785	7.60	516	7.70	365	8.20	356	7.70				
	916	8.30	1035	7.80			726	7.30			767	7.10	563	7.30	386	6.90	359	6.80				
	943	8.00	1238	7.90	Dry		826	7.50	Dry		791	7.40	583	7.50	454	7.50	440	7.10				
	956	7.60	1205	7.90			876	7.30			804	7.40	592	7.50	417	7.40	480	7.50				
November 2018	904	7.90	1042	8.00			435	7.50			810	7.40	490	7.50	330	7.80	359	7.60	1412	6.99	1329	7.40
	904	7.90	1125	8.00			250	7.40			801	7.40	495	7.50	314	7.70	356	7.70				
	955	7.70	1203	7.90			212	7.30			798	7.50	523	7.60	339	7.80	391	8.00				
	489	7.22	651	7.38			157.1	7.36			449.5	6.82	288.5	7.25	195.1	6.88	175.8	6.76				
December 2018	1140	8.00	1456	7.60			650	7.90			758	7.80	463	7.60	267	7.70	350	7.60	1332	7.50	1097	7.30
	1031	8.00	1397	7.70			673	7.10			676	7.50	442	7.40	500	7.40	435	7.40				
	648	7.50	807	7.53			200	7.20			409.4	7.75	232.6	7.23	140	7.42	116.2	7.33				
	765	7.80	822	7.60			248	7.40			509	7.60	450	7.40	251	7.60	310	7.50				
January 2019	622	7.40	1324	7.20			158	7.60			392	7.60	191	6.70	483	7.40	164	6.80				
	465	7.30	819	7.44			321	7.16			355	7.00	222.6	7.13	269.7	7.90	300	7.54	1647	7.07	1378	7.21
	624	7.80	1372	7.42			172.3	6.95					309	7.29	380	7.85	289	7.62				
	502	7.51	1314	7.29			189	7.00					382	7.09	349	7.35	312	7.19				
	466	7.74	1356	8.33			207	6.90			Frozen		426	7.25	289	7.40	321	7.12				
February 2019	585	7.58					359	7.76					409	7.56	223	7.48	282	6.87	1491	7.40	1329	7.53
	604	7.40	Frozen, Pump Frozen				282.9	7.08					396	7.36	237	7.21	265	6.72				
	627	7.49					255.0	6.78			489	7.46	472	7.49	153	7.61	278	6.71				
	609	7.20					106.3	6.75			384	7.50	404	6.83	127	7.18	343	6.69				
March 2019	577	6.59	1356	7.30			152.3	6.84			319	7.38	441	6.67	208	7.08	129	6.82	1605	6.57	1408	6.61
	412	7.28	1363	7.30			171.8	6.45			309	7.29	296	6.71	288	7.19	110	7.37				
	204	7.48	833	7.89			171.1	6.79			394	7.23	264	7.19	110	7.37	214	7.23				
	349	7.47	1093	7.96			171.4	6.63			357	7.23	373	7.10	147	7.66	147	7.66				
Min	**12.1**	**6.59**	**445**	**7.20**	**841**	**7.70**	**106.3**	**6.45**	**599**	**8.10**	**250**	**6.82**	**191**	**6.67**	**110.4**	**6.88**	**110.4**	**6.69**	**1271**	**6.57**	**983**	**6.61**
Max	**1265**	**8.50**	**1456**	**8.60**	**1034**	**8.50**	**897**	**8.50**	**893**	**8.30**	**890**	**8.30**	**767**	**8.20**	**854**	**8.50**	**1148**	**8.10**	**1647**	**8.20**	**1620**	**8.40**
Average	**775**	**7.89**	**1139**	**7.95**	**925**	**8.18**	**553**	**7.64**	**779**	**8.25**	**642**	**7.72**	**482**	**7.45**	**314**	**7.65**	**445**	**7.43**	**1475**	**7.75**	**1331**	**7.83**
Count	**52**	**52**	**48**	**48**	**8**	**8**	**52**	**52**	**8**	**8**	**47**	**47**	**39**	**39**	**34**	**34**	**42**	**42**	**28**	**28**	**23**	**23**

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Field Conductivity (uS/cm) & pH (Rivers & Wetland)

EMS ID	E297230		E297231		E297232		E0126402		E0900504		E217017		E219412		E292112		E286930		E292113		E299256	
Site Name	Iron River Upstream Site 1		Iron River Site 6		Iron River Site 8		Mid Quinsam Lake Inlet		Mid Quinsam Lake Outlet		No Name Lake Outlet		Long Lake Outlet		Lower Wetland Outlet		Quinsam River Downstream 1		7 South Quinsam River		Iron River & Quinsam River	
Site Code	IR1		IR6		IR8		WA		WB		NNO		LLO		LWO		QRDS1		7SQR		IRQR	
	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH	Cond	pH
April 2018									164	8.20	33	8.10	240	7.70	73	6.70	179	8.20				
	63	7.90	52	8.10	51	8.30	34	8.00	187	8.40	36	8.20	188	7.60	87	7.10	143	8.30	153	7.90		
	73	8.00	68	8.00	77	8.00	41	8.10	146	8.20	34	8.20	117	8.10	90	6.80	152	8.10	183	8.00	100	8.20
	69	7.50	61	7.60	70	7.60	33	7.90	133	8.00	40	8.10	132	8.10	108	6.50	148	8.00	172	8.00	120	8.10
May 2018	85	7.50	71	7.70	73	7.70	49	8.00	138	8.10	38	8.10	135	8.50	98	6.60	150	8.00	160	8.10	94	8.10
	66	7.90	83	8.00	84	8.00	51	8.00	195	7.50			171	7.50					184	7.90	123	8.00
									210	8.50			168	8.30							119	8.00
									209	8.20			214	8.00								
June 2018									190	8.00			250	8.30								
									176	8.50			275	8.30								
									155	8.50			272	7.90								
									156	8.20			271	8.00								
July 2018	131	7.90	124	8.10	125	7.90	40	6.80	157	8.50	39	8.30	272	8.00			130	7.50	161	8.10	156	8.00
	141	8.10	135	8.10	141	8.20	45	7.80	158	8.10	37	7.90	308	8.00			130	7.80	147	8.50	148	8.10
	160	8.30	157	8.00	162	8.30	46	7.75	143	7.30	38	7.80	302	8.00			165	8.40	147	8.10	147	7.90
	169	8.00	167	7.80	170	8.00	46	7.40	146	7.80	40	8.50	296	8.30			142	8.00	142	7.60	142	7.60
August 2018	187	7.70	182	7.90	193	7.30	48	7.80	143	7.70	52	7.80	285	7.80			148	8.00	130	6.70	134	7.00
													295	7.50								
													283	7.50	Dry							
September 2018													No Flow									
October 2018	74	7.30	62	7.20	61	7.20	89	7.60	140	7.40	44	7.20	219	7.40			149	7.20	128	6.70	118	7.80
	96	7.90	77	8.20	110	8.20	85	7.60	140	7.50	46	7.80	197	7.00			140	7.20	126	7.70	113	7.90
	94	7.80	94	7.80	101	7.80	63	7.60	129	7.40	46	7.70	200	7.80			139	7.20	130	7.50	122	7.70
	79	7.80	63	7.60	67	7.60	46	7.60	129	7.80	60	7.30	218	8.00			131	7.40	128	7.40	117	7.00
November 2018	82	7.50	67	7.50	63	7.20	46	7.80	131	7.70	37	7.20	116	7.00			127	7.50	117	7.40	99	7.30
December 2018																						
	106	7.6	58	7.6	58	7.60													131	7.80	162	7.70
January 2019																						
	64.1	7.66	53.8	7.54	40.1	7.60													112	7.41	96.7	7.56
February 2019																						
March 2019																						
	78	7.82	64	7.81	66	7.80													122	7.57	98.1	7.86
Min	**63**	**7.30**	**52**	**7.20**	**40.1**	**7.20**	**33**	**6.80**	**129**	**7.30**	**33**	**7.20**	**116**	**7.00**	**73**	**6.50**	**127**	**7.20**	**112.1**	**6.70**	**94**	**7.00**
Max	**187**	**8.30**	**182**	**8.20**	**193**	**8.30**	**89**	**8.10**	**210**	**8.50**	**60**	**8.50**	**308**	**8.50**	**108**	**7.10**	**179**	**8.40**	**184**	**8.50**	**162**	**8.20**
Average	**101**	**7.79**	**91**	**7.81**	**95**	**7.79**	**51**	**7.72**	**158**	**7.98**	**41**	**7.88**	**226**	**7.86**	**91**	**6.74**	**145**	**7.79**	**143**	**7.69**	**123**	**7.77**
Count	**18**	**18**	**18**	**18**	**18**	**18**	**15**	**15**	**22**	**22**	**15**	**15**	**24**	**24**	**5**	**5**	**15**	**15**	**18**	**18**	**18**	**18**

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2018-2019 Annual Report

Relative Percent Difference Values Greater Than 20 %								
Station	**Date**	**Parameter**	**Detection Limit**	**Result1**	**Result2**	RPD	**Detection Limit X5**	**Any Result > 5XDL?**
QU0813A	5-Jun-2018	Ca-D	0.05	32.8	40.4	21	0.25	Yes
MW001D	20-Aug-2018	Sr-D	0.001	0.0318	0.0393	21	0.005	Yes
QU0813A	25-Mar-2019	Turb	0.1	5.33	4.29	22	0.5	Yes
QRDS1	8-May-2018	Al-T	0.003	0.0336	0.0268	23	0.015	Yes
5SMW	30-Aug-2018	H2S	0.005	0.035	0.044	23	0.025	Yes
MQL9	3-May-2018	N-T	0.02	0.091	0.115	23	0.1	Yes
MQL9	3-May-2018	N-TKN	0.02	0.091	0.115	23	0.1	Yes
LLO	25-Apr-2018	Ba-D	0.001	0.0129	0.0102	23	0.005	Yes
QU1109M	30-Jul-2018	Turb	0.1	150	118	24	0.5	Yes
LQL9	17-Aug-2018	Al-D	0.003	0.02	0.0157	24	0.015	Yes
QU1410	19-Apr-2018	Acidity83	1	15.5	19.8	24	5	Yes
QU1105S	12-Mar-2019	As-D	0.0005	0.00778	0.00609	24	0.0025	Yes
QU1101	19-Mar-2019	Acidity83	1	140	108	26	5	Yes
NNLB	8-Nov-2018	Mn-T	0.001	0.0232	0.0301	26	0.005	Yes
QU1101	19-Mar-2019	Turb	0.1	232	302	26	0.5	Yes
NNLB	8-Nov-2018	Mn-D	0.001	0.0204	0.0268	27	0.005	Yes
MW001D	20-Aug-2018	DOC	0.5	2.19	2.89	28	2.5	Yes
242MW	12-Dec-2018	N-D	0.02	0.096	0.127	28	0.1	Yes
IR1	31-Oct-2018	SO4-D	1	5.3	4	28	5	Yes
QU1410	19-Apr-2018	P-D	0.002	0.0157	0.0118	28	0.01	Yes
3S	3-Jul-2018	Mn-T	0.001	0.0302	0.0402	28	0.005	Yes
QU1109S	18-Mar-2019	N-D	0.02	0.388	0.518	29	0.1	Yes
QU0813A	13-Dec-2018	N-D	0.02	0.155	0.207	29	0.1	Yes
LLM1	23-Oct-2018	Al-T	0.003	0.018	0.0243	30	0.015	Yes
QU1105S	11-Dec-2018	H2S	0.002	0.081	0.11	30	0.01	Yes
QU1136D	27-Feb-2019	N-D	0.02	0.237	0.322	30	0.1	Yes
QU0813A	25-Mar-2019	Se-D	0.0001	0.00048	0.00066	32	0.0005	Yes
MW001D	21-Feb-2019	DOC	0.5	2.1	2.9	32	2.5	Yes
5M#2	9-Oct-2018	Fe-D	0.005	0.216	0.299	32	0.025	Yes
NNL9	23-May-2018	Turb	0.1	0.39	0.54	32	0.5	Yes
QU1109M	18-Mar-2019	Se-D	0.0001	0.00366	0.00263	33	0.0005	Yes
QU1105S	12-Mar-2019	Se-D	0.0005	0.0636	0.045	34	0.0025	Yes
QU1101	19-Mar-2019	P-D	0.002	0.0153	0.0107	35	0.01	Yes
MQL4	17-May-2018	Mn-T	0.001	0.0037	0.0053	36	0.005	Yes
QU1410	26-Feb-2019	Acidity83	1	5.7	8.2	36	5	Yes
SDS	1-Oct-2018	Zr-T	0.0001	0.0009	0.00062	37	0.0005	Yes
QU1105D	11-Dec-2018	As-D	0.0001	0.0202	0.0139	37	0.0005	Yes
QU1105D	12-Mar-2019	N-D	0.02	0.123	0.18	38	0.1	Yes
3S	3-Jul-2018	Fe-T	0.01	0.057	0.084	38	0.05	Yes
QRDS1	8-May-2018	Fe-T	0.01	0.062	0.042	38	0.05	Yes
QU1105S	18-Sep-2018	P-D	0.002	0.0351	0.0237	39	0.01	Yes
IR6	19-Jun-2018	K-T	0.05	0.38	0.256	39	0.25	Yes
SDS	1-Oct-2018	Si-T	0.1	4.41	2.95	40	0.5	Yes
QU0813A	25-Mar-2019	H2S	0.0019	0.15	0.1	40	0.0095	Yes
SDS	1-Oct-2018	Ni-T	0.001	0.0063	0.004	45	0.005	Yes
QU0813A	13-Dec-2018	H2S	0.002	0.10	0.16	46	0.01	Yes
SDS	1-Oct-2018	Mn-T	0.001	0.18	0.11	48	0.005	Yes
MW002	4-Jul-2018	P-D	0.002	0.0106	0.0064	49	0.01	Yes

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Relative Percent Difference Values Greater Than 50 %

Station	Date	Parameter	Detection Limit	Result1	Result2	RPD	Detection Limit X5	Any Result > 5XDL?
3S	3-Jul-2018	Al-T	0.003	0.02	0.0337	51	0.015	Yes
MW004	5-Jul-2018	N-D	0.02	0.09	0.152	51	0.1	Yes
LLO	25-Apr-2018	Al-T	0.003	0.0705	0.0417	51	0.015	Yes
MQL4	17-May-2018	N-T	0.02	0.062	0.106	52	0.1	Yes
MQL4	17-May-2018	N-TKN	0.02	0.062	0.106	52	0.1	Yes
QU1136D	27-Feb-2019	H2S	0.002	0.018	0.031	53	0.01	Yes
QU1410	19-Apr-2018	N-D	0.02	0.138	0.238	53	0.1	Yes
QU1013D	14-Mar-2019	Carb	1	4.6	8.1	55	5	Yes
QU1013D	14-Mar-2019	Alk-PP	1	3.8	6.8	57	5	Yes
IR8	7-Aug-2018	Al-T	0.003	0.0188	0.036	63	0.015	Yes
SDS	1-Oct-2018	Co-T	0.0002	0.00266	0.00137	64	0.001	Yes
NNL1	3-May-2018	Al-T	0.003	0.0453	0.0882	64	0.015	Yes
SDS	1-Oct-2018	Cu-T	0.0005	0.011	0.00558	65	0.0025	Yes
NNL1	3-May-2018	Cu-D	0.0002	0.00115	0.00058	66	0.001	Yes
SDS	1-Oct-2018	Al-T	0.003	2.05	1.01	68	0.015	Yes
SDS	1-Oct-2018	As-T	0.0001	0.00152	0.00074	69	0.0005	Yes
LQL1	14-Nov-2018	N-NO23	0.02	1.42	0.69	69	0.1	Yes
LQL1	14-Nov-2018	N-NO3	0.02	1.42	0.69	69	0.1	Yes
MQL4	1-Nov-2018	S-D	3	9.4	19.4	69	15	Yes
5M#2	9-Oct-2018	Fe-T	0.01	0.863	0.408	72	0.05	Yes
MW004	5-Jul-2018	Turb	0.1	0.75	0.35	73	0.5	Yes
SDS	1-Oct-2018	Fe-T	0.01	2.61	1.13	79	0.05	Yes
3S	3-Jul-2018	Al-D	0.003	0.019	0.0081	80	0.015	Yes
LLM1	9-Aug-2018	Al-T	0.003	0.034	0.0142	82	0.015	Yes
LLO	25-Apr-2018	Fe-T	0.01	0.132	0.055	82	0.05	Yes
IR1	23-Jan-2019	Cu-D	0.0002	0.00048	0.00116	83	0.001	Yes
SDS	1-Oct-2018	Ti-T	0.005	0.121	0.0488	85	0.025	Yes
QU1009D	19-Mar-2019	P-D	0.002	0.01	0.0254	87	0.01	Yes
5M#2	9-Oct-2018	H2S	0.0053	0.011	0.029	90	0.0265	Yes
QU1105D	11-Dec-2018	N-D	0.02	0.18	0.476	90	0.1	Yes
QU1105D	11-Dec-2018	H2S	0.4	15	5.6	91	2	Yes
MW001D	20-Aug-2018	Mg-D	0.05	0.108	0.291	92	0.25	Yes
5M#2	9-Oct-2018	Turb	0.1	5.48	1.74	104	0.5	Yes
WB	1-May-2018	Al-T	0.003	0.0672	0.021	105	0.015	Yes
WB	1-May-2018	Al-T	0.003	0.0672	0.021	105	0.015	Yes
5SMW	30-Aug-2018	Acidity83	1	2.9	9.3	105	5	Yes
5M#2	9-Oct-2018	Carb	1	2.6	8.9	110	5	Yes
QU1105D	11-Dec-2018	Se-D	0.0001	0.00172	0.0005	110	0.0025	Yes
5M#2	9-Oct-2018	Alk-PP	1	2.1	7.4	112	5	Yes
QU1410	15-May-2018	DOC	0.5	2.65	0.73	114	2.5	Yes
QU0813A	5-Jun-2018	H2S	0.0053	0.18	0.047	117	0.0265	Yes
LLO	25-Apr-2018	Mn-T	0.001	0.035	0.0091	118	0.005	Yes
NNL1	3-May-2018	Cu-T	0.0005	0.00069	0.00284	122	0.0025	Yes
QU1410	26-Feb-2019	Cd-D	0.00001	0.000084	0.000018	129	0.00005	Yes
MQL4	1-Nov-2018	P-D	0.002	0.011	0.0021	136	0.01	Yes
MW004	5-Jul-2018	P-D	0.002	0.0023	0.0139	143	0.01	Yes
4SLO	5-Dec-2018	Fe-T	0.01	0.107	0.017	145	0.05	Yes
QU1136D	27-Feb-2019	Pb-T	0.0004	0.00054	0.00397	152	0.002	Yes
LQL1	14-Nov-2018	N-T	0.04	2.11	0.262	156	0.1	Yes
SPD	8-Aug-2018	P-T	0.002	0.0209	0.0024	159	0.01	Yes
3S	3-Jul-2018	Zn-D	0.005	0.005	0.0461	161	0.025	Yes
QU1410	15-May-2018	Ba-D	0.005	0.192	0.0206	161	0.025	Yes
5M#2	9-Oct-2018	Pb-T	0.0002	0.00555	0.00056	163	0.001	Yes
QU1136D	27-Feb-2019	Cu-T	0.001	0.0045	0.0503	167	0.005	Yes
LQL1	14-Nov-2018	N-TKN	0.04	0.694	0.02	189	0.1	Yes
QU1009D	19-Mar-2019	Turb	0.1	5.23	290	193	0.5	Yes
QU1009S	20-Dec-2018	Turb	0.1	0.23	38.2	198	0.5	Yes

All values with an RPD > 50% and one or more results greater than 5 X DL

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Daily Precipitation (mm)

DATE	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR
1	0.00	0.20	0.00	1.90	0.0	0.00	19.40	1.00	0.10	0.00	4.20	0.10
2	1.00	0.00	1.00	0.30	3.0	0.00	6.60	23.50	0.00	12.50	0.00	0.00
3	0.00	0.00	3.40	0.00	1.4	4.50	0.70	1.00	0.10	38.40	0.00	0.00
4	0.20	0.00	0.00	0.00	0.0	0.00	0.00	19.80	0.10	14.90	1.50	0.00
5	7.20	0.40	1.10	0.00	0.0	0.00	0.00	2.40	0.10	2.30	0.50	0.00
6	4.40	0.00	0.70	0.80	0.0	0.00	5.00	2.20	0.00	0.10	0.20	0.30
7	0.20	0.10	0.70	2.80	0.0	0.00	0.10	0.10	0.10	0.00	0.10	0.00
8	18.80	0.10	0.80	18.20	0.0	4.00	15.30	0.10	0.00	0.00	0.00	0.50
9	2.00	2.40	12.30	0.00	0.0	1.20	3.50	0.20	0.80	36.60	0.00	0.50
10	0.00	1.50	7.00	2.40	0.0	17.10	0.10	3.00	16.30	0.50	0.00	0.40
11	16.30	2.90	5.10	0.00	0.0	16.00	0.00	0.00	0.30	0.30	0.00	0.10
12	5.20	0.00	0.00	0.00	0.5	5.40	0.10	0.00	13.30	1.50	0.00	8.70
13	0.00	0.00	4.80	0.00	0.0	0.10	0.20	0.00	11.20	0.10	2.40	1.20
14	12.50	0.00	1.50	0.00	0.0	10.90	0.00	12.20	13.40	0.20	0.00	0.00
15	0.70	0.00	0.10	0.00	0.0	5.80	0.00	9.30	21.30	0.10	2.10	0.20
16	0.00	0.00	0.00	0.00	0.0	19.30	0.00	5.50	11.00	0.10	3.00	0.60
17	0.80	0.00	0.00	0.00	0.0	12.00	0.00	0.10	25.40	15.90	8.60	2.10
18	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.10	31.20	8.30	2.60	1.60
19	5.60	0.30	0.00	0.00	0.0	0.00	0.00	0.10	15.20	7.90	1.20	0.30
20	0.00	0.10	0.00	0.00	0.0	0.70	0.00	0.10	2.10	0.10	1.50	0.00
21	0.70	0.10	0.00	0.00	0.0	17.40	0.00	0.00	42.20	0.10	0.00	0.00
22	0.20	0.00	0.00	0.00	0.0	30.70	0.00	5.30	0.20	15.20	1.90	0.00
23	0.00	0.00	1.90	0.00	0.0	5.10	0.10	10.70	13.30	4.70	4.90	0.40
24	0.00	0.00	0.10	0.00	0.0	0.10	0.80	4.10	7.50	0.00	0.90	2.70
25	0.00	0.00	12.80	0.00	0.0	0.00	5.30	1.00	1.70	0.00	0.10	0.10
26	0.00	0.00	2.00	0.00	4.2	0.10	4.60	5.30	0.10	0.20	0.00	0.00
27	0.00	0.00	0.00	0.00	0.0	0.00	2.70	26.10	6.40	0.10	0.00	0.00
28	0.00	0.00	0.00	0.00	0.0	0.00	8.30	9.10	0.40	0.10	0.60	0.00
29	6.60	0.00	1.00	0.00	0.0	0.00	3.80	0.50	6.30	0.00		0.50
30	0.80	0.00	5.40	0.00	0.0	0.00	0.10	0.00	18.80	0.00		0.00
31		0.00		0.00	0.1		5.00		0.00	1.90		0.20
Monthly Total (mm)	**83.20**	**8.10**	**61.70**	**26.40**	**9.20**	**150.40**	**81.70**	**142.80**	**258.90**	**162.10**	**36.30**	**20.50**
2018-19 Annual Total (mm)		**1041.30**										

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2014-15 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
WA			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E0126402	Middle Quinsam Lake Inlet - Quinsam River at Argonaut Road upstream of mining operation.	Average	0.000138	0.000146	0.0253	0.0177	21.6	0.0000074	0.0000034	0.000911	0.00079	0.024	0.01258	0.0015	0.00050	0.0000012	0.0000013	21.5	0.0005	0.00050	0.000100	0.000118	1.024	0.02818	0.00276				
		Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15				
		Minimum	<0.00010	<0.00010	0.0142	0.009	14.3	<0.000005	<0.000005	<0.00050	0.0005	0.01	<0.0050	<0.0010	<0.0010	<0.000002	<0.000002	15.5	<0.0010	<0.0010	<0.00020	<0.00020	<0.50	<0.0050	<0.0050				
		Maximum	0.00031	0.00025	0.0816	0.0592	26	0.000042	0.000008	0.00366	0.00149	0.051	0.0338	0.0054	<0.0010	0.0000028	0.0000031	27.1	<0.0010	<0.0010	<0.00020	0.00037	2.2	0.384	0.0064				
		Geometric Mean	0.00012	0.000135	0.0221	0.0157	21.5	0.00000549	0.00000307	0.000759	0.00076	0.022	0.01015	0.00114	0.0005	0.00000113	0.00000116	21.3	0.0005	0.00050	0.000100	0.000109	0.832	0.00372	0.00266				
		Count <DL	4	2	0	0	0	12	12	1	0	0	2	6	15	13	13	0	15	15	15	14	3	13	14				
		Standard Deviation	0.00007	0.000052	0.0174	0.012	2.5	0.00000966	0.0000019	0.00079	0.00025	0.011	0.00824	0.00127	0	0.00000054	0.00000072	3.2	0	0.00000	0.000000	0.000070	0.602	0.09844	0.00101				
		1st Quartile	0.00008	0.000125	0.0158	0.0126	20.8	<0.000010	<0.000005	0.000625	0.00068	0.014	0.0079	<0.0010	<0.0010	<0.000002	<0.000002	20.3	<0.0010	<0.0010	<0.00020	<0.00020	0.585	<0.0050	<0.0050				
		Median	0.00015	0.00016	0.0188	0.0137	21.7	<0.00001	<0.000005	0.00072	0.00071	0.024	0.0109	0.0016	<0.0010	<0.000002	<0.000002	21.6	<0.0010	<0.0010	<0.00020	<0.00020	0.97	<0.0050	<0.0050				
		3rd Quartile	0.00017	0.00017	0.0262	0.0186	23	<0.00001	<0.000005	0.00081	0.00086	0.03	0.01465	0.0019	<0.0010	<0.0000020	<0.000002	23.2	<0.0010	<0.0010	<0.00020	<0.00020	1.27	<0.0050	<0.0050				
WD	Settling Pond #4	Average	0.00230	0.0016	0.0206	0.00502	343	0.0000085	0.00000688	0.000921	0.00077	0.305	0.01506	0.0562	0.04518	0.00000151	0.00000136	366	0.00117	0.00106	0.000100	0.000100	603	0.05163	0.00278	0.0057		0.01	0.034
E207409		Count	10	10	10	10	17	10	10	10	10	10	10	10	10	9	9	10	10	10	10	10	54	10	10	1		1	1
		Minimum	0.00105	0.00093	0.0063	<0.0030	214	<0.00001	<0.0000050	<0.00050	0.00027	0.053	<0.0050	0.0077	<0.0010	<0.000002	<0.000002	234	<0.0010	<0.0010	<0.00020	<0.00020	320	<0.0050	<0.0050	0.0057		<0.020	0.034
		Maximum	0.00532	0.00316	0.0469	0.0112	418	0.000023	0.0000154	0.00187	0.00135	0.996	0.0286	0.158	0.159	0.0000044	0.0000042	471	0.0024	0.0022	<0.00020	<0.00020	978	0.298	0.0053	0.0057		<0.020	0.034
		Geometric Mean	0.00197	0.00149	0.0164	0.00428	340	0.0000071	0.0000057	0.000749	0.00069	0.167	0.01252	0.035	0.01146	0.00000129	0.00000117	360	0.0010	0.0009	0.000100	0.000100	587	0.00698	0.00270	0.0057		0.01	0.034
		Count <DL	0	0	0	2	0	7	3	2	0	0	1	0	2	7	8	0	3	4	10	10	0	7	9	0		1	0
		Standard Deviation	0.00144	0.00068	0.0147	0.00281	47	0.0000062	0.00000421	0.000577	0.00036	0.364	0.00823	0.0576	0.06051	0.00000115	0.0000011	66	0.00059	0.00058	0.000000	0.000000	139	0.10515	0.00089	0		0.0000	0
		1st Quartile	0.00133	0.00107	0.0098	0.00385	323	<0.000010	0.0000032	0.000585	0.0005	0.069	0.0104	0.0177	0.00318	<0.0000020	<0.0000020	340	0.00065	<0.0010	<0.00020	<0.00020	524	<0.0050	<0.0050	0.0057		<0.020	0.03400
		Median	0.00167	0.00147	0.0157	0.00495	352	<0.000010	0.00000575	0.00075	0.0008	0.112	0.01515	0.0304	0.01935	<0.000002	<0.000002	380	0.0012	0.0011	<0.00020	<0.00020	596	<0.0050	<0.0050	0.0057		<0.020	0.034
		3rd Quartile	0.00324	0.00191	0.0294	0.0056	377	0.000011	0.00000962	0.00129	0.00102	0.416	0.01778	0.0739	0.059	<0.000002	<0.000002	400	0.00145	0.00127	<0.00020	<0.00020	684	0.00648	<0.0050	0.0057		<0.020	0.03400
MW001D	Ex-situ 2-North deep groundwater well below the coal wash plant (Till)	Average		0.0192		0.0322	89.8		0.0000038		0.0026		0.0038		0.00134		0.0000048	21.8		0.00051		0.0000625	28.2		0.0015		0.154		
		Count		2		2	2		2		2		2		2		2	1		2		2	2		2		2		
		Minimum		0.0189		0.0301	86.8		<0.000005		0.00255		<0.0050		0.0011		0.0000045	21.8		<0.0010		<0.000050	27.9		<0.0010		0.151		
		Maximum		0.0195		0.0342	92.8		<0.000010		0.00266		<0.010		0.00158		<0.000010	21.8		0.00052		<0.00020	28.5		<0.0050		0.156		
		Geometric Mean		0.0192		0.0321	89.7		0.0000035		0.0026		0.00354		0.00132		0.0000047	21.8		0.00051		0.00005	28.2		0.00112		0.153		
		Count <DL		0		0	0		2		0		2		0		1	0		1		2	0		2		0		
		Standard Deviation		0.0004		0.0029	4.2		0.0000018		0.00008		0.00177		0.000340		0.0000004	0		0.000014		0.000053	0.4		0.00141		0.004		
		1st Quartile		0.019		0.0311	88.3		0.0000031		0.00258		0.00312		0.00122		0.00000463	21.8		0.000505		0.0000438	28		0.001		0.152		
		Median		0.0192		0.0322	89.8		0.0000038		0.0026		0.0038		0.00134		0.00000475	21.8		0.00051		0.0000625	28.2		0.0015		0.154		
		3rd Quartile		0.0194		0.0332	91.3		0.0000044		0.00263		0.00438		0.00146		0.00000488	21.8		0.000515		0.0000813	28.4		0.002		0.155		
MW001S	Ex-situ 2-North shallow groundwater well below the coal wash plant (Till)	Average	0.0001	0.000185	0.00500	0.001	337	0.000041	0.000088	0.00025	0.00044	0.2860	0.139	1.03	1.928	0.0000050	0.0000038	1100	0.00095	0.00166	0.000025	0.0000625	903	0.0015	0.00185	0.03870	0.01465		0.0306
		Count	1	2	1	2	2	1	2	1	2	1	2	1	2	1	2	1	1	2	1	2	2	1	2	1	2		1
		Minimum	0.0001	<0.00010	0.005	<0.0010	308	0.000041	0.000048	<0.00050	0.00038	0.286	0.101	1.03	0.966	<0.000010	0.0000026	1100	0.00095	0.00093	<0.000050	<0.000050	839	<0.0030	0.0012	0.0387	0.0043		0.0306
		Maximum	0.0001	0.00032	0.005	<0.0030	366	0.000041	0.000129	<0.00050	0.00049	0.286	0.177	1.030	2.89	<0.000010	<0.000010	1100	0.00095	0.0024	<0.000050	<0.00020	967	<0.0030	<0.0050	0.0387	<0.050		0.0306
		Geometric Mean	0.0001	0.00013	0.005	0.00087	335.7	0.000041	0.000079	0.000250	0.00043	0.286	0.134	1.03	1.671	0.0000050	0.0000036	1100	0.00095	0.00149	0.000025	0.0000500	900	0.0015	0.00173	0.0387	0.01037		0.0306
		Count <DL	0	1	0	2	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1	2	0	1	1	0	1		0
		Standard Deviation	0	0.000191	0	0.00071	41	0	0.000057	0	0.00008	0	0.054	0	1.36	0.0000000	0.0000017	0	0	0.00104	0	0.0000530	90	0	0.00092	0	0.01464		0.0000
		1st Quartile	0.0001	0.000118	0.005	0.00075	322.5	0.000041	0.000068	<0.00050	0.00041	0.2860	0.12	1.03	1.447	<0.000010	0.0000032	1100	0.00095	0.0013	<0.000050	0.0000438	871	<0.0030	0.00152	0.03870	0.00948		0.0306
		Median	0.0001	0.000185	0.00500	0.001	337	0.000041	0.000088	<0.00050	0.00044	0.2860	0.139	1.03	1.928	<0.000010	0.0000038	1100	0.00095	0.00166	<0.000050	0.0000625	903	<0.0030	0.00185	0.03870	0.01465		0.0306
		3rd Quartile	0.0001	0.000252	0.00500	0.00125	351.5	0.000041	0.000109	<0.00050	0.00046	0.2860	0.158	1.03	2.409	<0.000010	0.0000044	1100	0.00095	0.00203	<0.000050	0.0000813	935	<0.0030	0.00217	0.03870	0.01983		0.0306
MW006D	Ex-situ 2-North deep groundwater well below the coal wash plant (Till)	Average	0.0288	0.0296	0.0243	0.0186	85.9	0.0000050	0.0000105	0.00087	0.00069	0.005	0.0050	0.00077	0.000302	0.0000050	0.0000050	48.4	0.000250	0.000250	0.000097	0.0000250	12.4	0.0015	0.00125	0.159	0.172		0.0053
		Count	1	2	1	2	2	1	2	1	2	1	2	1	2	1	2	2	1	2	1	2	2	1	2	1	2		1
		Minimum	0.0288	0.0287	0.0243	0.0176	85	<0.000010	<0.000010	0.00087	0.00059	<0.010	<0.010	0.00077	0.000254	<0.000010	<0.000010	48.1	<0.00050	<0.00050	0.000097	<0.000050	12.1	<0.0030	<0.0010	0.159	0.171		0.0053
		Maximum	0.0288	0.0306	0.0243	0.0196	86.8	<0.000010	0.000016	0.00087	0.00079	<0.010	<0.010	0.00077	0.000349	<0.000010	<0.000010	48.7	<0.00050	<0.00050	0.000097	<0.000050	12.8	<0.0030	0.002	0.159	0.173		0.0053
		Geometric Mean	0.0288	0.0296	0.0243	0.0186	85.9	0.000005	0.0000089	0.00087	0.00068	0.005	0.005	0.00077	0.000298	0.0000050	0.0000050	48.4	0.000250	0.000250	0.000097	0.0000250	12.4	0.0015	0.001	0.159	0.172		0.0053
		Count <DL	0	0	0	0	0	1	1	0	0	1	2	0	0	1	2	0	1	2	0	2	0	1	1	0	0		0
		Standard Deviation	0	0.0013	0.0000	0.0014	1.3	0	0.0000078	0	0.00014	0	0	0	0.000067	0.0000000	0.0000000	0.4	0.000000	0.000000	0.000000	0.0000000	0.5	0	0.00106	0	0.001		0.0000
		1st Quartile	0.0288	0.0292	0.0243	0.0181	85.4	<0.000010	0.0000078	0.00087	0.00064	<0.010	<0.010	0.00077	0.000278	<0.000010	<0.000010	48.2	<0.00050	<0.00050	0.000097	<0.000050	12.3	<0.0030	0.00088	0.159	0.172		0.0053
		Median	0.0288	0.0296	0.0243	0.0186	85.9	<0.000010	0.0000105	0.00087	0.00069	<0.010	<0.010	0.00077	0.000302	<0.000010	<0.000010	48.4	<0.00050	<0.00050	0.000097	<0.000050	12.4	<0.0030	0.00125	0.159	0.172		0.0053
		3rd Quartile	0.0288	0.0301	0.0243	0.0191	86.4	<0.000010	0.0000132	0.00087	0.00074	<0.010	<0.010	0.00077	0.000325	<0.000010	<0.000010	48.6	<0.00050	<0.00050	0.000097	<0.000050	12.6	<0.0030	0.00163	0.159	0.172		0.0053
MW006S	Ex-situ 2-North shallow groundwater well below the coal wash plant (Till)	Average	0.00204	0.00197	0.0591	0.00180	232.0	0.00003	0.000022	0.00176	0.00093	0.11	0.0050	0.0927	0.019	0.0000050	0.0000050	529	0.00113	0.00076	0.000122	0.000025	827.0	0.0031	0.00090	0.1490	0.038		0.233
		Count	1	2	1	2	2	1	2	1	2	1	2	1	2	1	2	2	1	2	1	2	2	1	2	1	2		1
		Minimum	0.00204	0.00133	0.0591	0.0015	192	0.00003	0.000018	0.00176	0.00092	0.11	<0.010	0.0927	0.0173	<0.000010	<0.000010	477	0.00113	0.00075	0.000122	<0.000050	699	0.0031	<0.0010	0.149	<0.050		0.233
		Maximum	0.00204	0.00261	0.0591	0.0021	272	0.00003	0.000027	0.00176	0.00094	0.11	<0.010	0.0927	0.0207	<0.000010	<0.000010	581	0.00113	0.00076	0.000122	<0.000050	955	0.0031	0.0013	0.149	0.051		0.2330
		Geometric Mean	0.00204	0.00186	0.0591	0.0018	228.5	0.00003	0.000022	0.00176	0.00093	0.11	0.005	0.0927	0.0189	0.0000050	0.0000050	526	0.00113	0.00075	0.000122	0.0000250	817.0	0.0031	0.00081	0.149	0.0357		0.233
		Count <DL	0	0	0	0	0	0	0	0	0	0	2	0	0	1	2	0	0	0	0	2	0	0	1	0	1		0
		Standard Deviation	0	0.00091	0	0.0004	56.6	0	0.000006	0	0.000010	0	0	0	0.0024	0.0000000	0.0000000	73	0	0.00001	0	0.0000000	181	0	0.00057	0	0.0184		0
		1st Quartile	0.00204	0.00165	0.0591	0.00160	212	0.00003	0.00002	0.00176	0.00092	0.11	<0.010	0.0927	0.0182	<0.000010	<0.000010	503	0.00113	0.00075	0.000122	<0.000050	763	0.0031	0.00070	0.149	0.0315		0.233
		Median	0.00204	0.00197	0.0591	0.00180	232	0.00003	0.000022	0.00176	0.00093	0.11	<0.010	0.0927	0.019	<0.000010	<0.000010	529	0.00113	0.00076	0.000122	<0.000050	827.0	0.0031	0.00090	0.1490	0.038		0.233
		3rd Quartile	0.00204	0.00229	0.0591	0.00200	252	0.00003	0.000025	0.00176	0.00094	0.11	<0.010	0.0927	0.0198	<0.000010	<0.000010	555	0.00113	0.00076	0.000122	<0.000050	891	0.0031	0.00110	0.149	0.0445		0.233
WC		Average	0.00125	0.00114	0.2207	0.0076	335	0.0000047	0.0000025	0.000524	0.00059	0.087	0.0233	0.0104	0.00489	0.00000149	0.00000141	283	0.00081	0.0005	0.000100	0.000100	558	0.00392	0.00250				
E207411	2-North Pit Culvert discharge into Middle Quinsam Lake	Count	8	8	8	8	5	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	13	8	8				
		Minimum	0.00079	0.00074	0.0113	<0.0030	243	<0.000005	<0.000005	<0.00050	0.00028	0.034	0.0082	0.0037	<0.0010	<0.000002	<0.000002	203	<0.0010	<0.0010	<0.00020	<0.00020	376	<0.0050	<0.0050				
		Maximum	0.00185	0.00151	1.67	0.0126	379	<0.00001	<0.000005	0.0009	0.00088	0.231	0.0567	0.0206	0.0112	0.0000049	0.0000043	354	0.0017	<0.0010	<0.00020	<0.00020	755	0.0103	<0.0050				
		Geometric Mean	0.00122	0.00111	0.0245	0.00647	331	0.0000046	0.0000025	0.00046	0.00055	0.0700	0.0186	0.0094	0.00298	0.00000122	0.0000012	278	0.00072	0.0005	0.000100	0.000100	551	0.00334	0.0025				
		Count <DL	0	0	0	1	0	8	8	3	0	0	0	0	2	7	7	0	5	8	8	8	0	6	8				
		Standard Deviation	0.00033	0.00027	0.5856	0.00382	53	0.0000009	0.0000000	0.000267	0.00023	0.068	0.0174	0.005	0.00409	0.00000138	0.00000117	55	0.00047	0	0.000000	0.000000	92	0.00287	3E-11				
		1st Quartile	0.00107	0.00098	0.0113	0.00578	344	<0.000010	<0.000005	<0.00050	0.000390	0.048	0.01080	0.0082	0.002	<0.0000020	<0.0000020	249	<0.0010	<0.0010	<0.00020	<0.00020	543	<0.0050	<0.0050				
		Median	0.00118	0.0011	0.0131	0.0071	347	<0.000010	<0.0000050	0.000515	0.0006	0.058	0.0148	0.0087	0.0038	<0.000002	<0.000002	271	<0.0010	<0.0010	<0.00020	<0.00020	563	<0.0050	<0.0050				
		3rd Quartile	0.0014	0.00129	0.0176	0.0101	364	<0.00001	<0.000005	0.000698	0.000790	0.0990	0.0342	0.0125	0.00792	<0.000002	<0.000002	327	0.00108	<0.0010	<0.00020	<0.00020	600	0.0034	<0.0050				
MQL1	Middle Quinsam Lake 1 metre below surface	Average	0.00023	0.0001810	0.01932	0.0146	35.8	0.0000035	0.00000273	0.00073	0.00074	0.045	0.0195	0.0074	0.00237	0.00000115	0.00000131	34.9	0.0005	0.0005	0.0001	0.000107	26.16	0.00536	0.0025	0.0034		0.0100	
E206618		Count	15	15	15	15	3	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3		1	
		Minimum	0.00012	<0.00010	0.0070	0.0046	31.7	<0.0000050	<0.000005	<0.00050	0.00047	0.026	0.0051	0.0036	<0.0010	<0.0000020	<0.0000020	25.3	<0.0010	<0.0010	<0.00020	<0.00020	9.57	<0.0050	<0.0050	<0.0050		<0.020	
		Maximum	0.00051	0.0003	0.0718	0.0285	41.7	<0.00001	0.000006	0.00245	0.0012	0.097	0.0299	0.0193	0.0101	0.0000033	0.0000038	42.2	<0.0010	<0.0010	<0.00020	0.00021	41.8	0.0454	<0.0050	0.0051		<0.020	
		Geometric Mean	0.0002	0.000169	0.01648	0.0135	35.6	0.0000033	0.00000265	0.000632	0.00072	0.042	0.0181	0.0066	0.00139	0.00000108	0.00000117	34.5	0.0005	0.0005	0.0001	0.00010500	23.24	0.00303	0.0025	0.00321		0.01	
		Count <DL	0	1	1	0	0	15	14	2	0	0	0	0	7	14	13	0	15	15	15	14	0	14	15	1		1	
		Standard Deviation	0.00011	0.00006	0.0153	0.0057	5.2	0.00000127	0.0000009	0.000507	0.00019	0.018	0.0065	0.004	0.00265	0.00000059	0.00000084	5.1	0	0	0	0.000028	11.34	0.01108	4E-11	0.00147		0	
		1st Quartile	0.00014	0.00015	0.01245	0.0108	32.9	<0.000005	<0.000005	0.00057	0.000620	0.032	0.0154	0.0046	<0.0010	<0.000002	<0.000002	32	<0.0010	<0.0010	<0.00020	<0.00020	17.65	<0.0050	<0.0050	0.00255		<0.020	
		Median	0.00022	0.0001700	0.0148	0.0144	34.1	<0.000005	<0.000005	0.000620	0.00074	0.043	0.0206	0.0069	0.00180	<0.000002	<0.000002	36.5	<0.0010	<0.0010	<0.00020	<0.00020	28.60	<0.0050	<0.0050	0.0026		<0.020	
		3rd Quartile	0.00024	0.000225	0.01995	0.0176	37.9	<0.00001	<0.000005	0.00072	0.00086	0.052	0.0242	0.0084	0.00310	<0.000002	<0.0000020	38	<0.0010	<0.0010	<0.00020	<0.00020	32.55	<0.0050	<0.0050	0.00385		<0.020	
MQLB	Middle Quinsam Lake 1 metre from bottom	Average	0.000128	0.000151	0.0099	0.00773	42	0.00000517	0.0000025	0.000769	0.00062	0.047	0.0127	0.0745	0.05463	0.00000129	0.00000126	109.3	0.0005	0.0005	0.000124	0.0001	112.1	0.002500	0.0025	0.00293		0.0290	
E206618		Count	15	15	15	15	3	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3		1	
		Minimum	<0.00010	<0.00010	0.0035	<0.0030	30.5	<0.000005	<0.0000050	<0.00050	0.00041	0.0210	<0.0050	0.0056	<0.0010	<0.0000020	<0.0000020	25.4	<0.0010	<0.0010	<0.00020	<0.00020	10	<0.0050	<0.0050	<0.0050		0.029	
		Maximum	0.00019	0.00039	0.0252	0.0198	48.2	0.000025	<0.0000050	0.00524	0.00118	0.081	0.0316	0.234	0.219	0.0000034	0.0000032	192	<0.0010	<0.0010	0.00046	<0.00020	195	<0.0050	<0.0050	0.0036		0.029	
		Geometric Mean	0.00012	0.000137	0.0079	0.00571	41.1	0.00000403	0.0000025	0.000476	0.000600	0.044	0.00945	0.0338	0.01611	0.00000116	0.00000115	85.9	0.0005	0.0005	0.000111	0.0001	69.8	0.0025	0.0025	0.00290		0.029	
		Count <DL	2	1	0	2	0	14	15	7	0	0	3	0	2	13	13	0	15	15	14	15	0	15	15	1		0	
		Standard Deviation	0.00004	0.000076	0.0076	0.00624	9.9	0.00000563	1E-13	0.001255	0.00018	0.017	0.00949	0.0881	0.07345	0.00000076	0.00000069	62.9	0	0	0.000093	0.00000000	74.9	4E-11	4E-11	0.00059		0	
		1st Quartile	0.000115	0.00012	0.0046	0.00410	38.8	<0.000005	<0.000005	<0.00050	0.00048	0.032	0.0072	0.015	0.0047	<0.000002	<0.000002	34	<0.0010	<0.0010	<0.00020	<0.00020	21	<0.0050	<0.0050	0.0026		0.029	
		Median	0.00013	0.0001300	0.0064	0.0047	47.2	<0.000010	<0.000005	0.00051	0.000590	0.048	0.0098	0.024	0.0209	<0.000002	<0.000002	128.0	<0.0010	<0.0010	<0.00020	<0.00020	140	<0.0050	<0.0050	0.0027		0.029	
		3rd Quartile	0.00015	0.00016	0.0132	0.0112	47.7	<0.00001	<0.0000050	0.00068	0.00068	0.057	0.0188	0.1445	0.0804	<0.0000020	<0.0000020	164.5	<0.0010	<0.0010	<0.00020	<0.00020	179.5	<0.0050	<0.0050	0.00315		0.029	

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

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2014-15 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
NNL1			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E217018	No Name Lake 1 metre below surface	Average	0.00032	0.000290	0.0321	0.0244	13.44	0.0000045	0.00000267	0.000850	0.00064	0.078	0.0389	0.0077	0.00355	0.00000113	0.00000145	15.7	0.00055	0.0005	0.0001	0.0001	1.657	0.00267	0.0025	0.00715		0.029	
		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	4		1	
		Minimum	0.0002	0.00017	0.0089	0.0057	9.89	<0.000005	<0.0000050	<0.00050	0.00033	0.04	0.0202	0.0041	<0.0010	<0.0000020	<0.0000020	12.8	<0.0010	<0.0010	<0.00020	<0.00020	<0.50	<0.0050	<0.0050	<0.0050		0.029	
		Maximum	0.00041	0.00038	0.0661	0.0581	17.5	<0.000010	0.000005	0.00322	0.00098	0.217	0.0923	0.0325	0.0269	0.0000029	0.000005	18.3	0.0013	<0.0010	<0.00020	<0.00020	3.01	0.0051	<0.0050	0.0185		0.029	
		Geometric Mean	0.00031	0.00028	0.0257	0.0197	13.14	0.00000435	0.00000262	0.00064	0.00061	0.071	0.0358	0.00650	0.00159	0.00000107	0.00000125	15.6	0.00053	0.0005	0.0001	0.0001	1.313	0.00262	0.0025	0.00504		0.029	
		Count <DL	0	0	0	0	0	15	14	4	0	0	0	0	6	14	12	0	14	15	15	15	2	14	15	1		0	
		Standard Deviation	0.000060	0.00007	0.0207	0.0169	3.2	0.00000104	0.00000065	0.000765	0.00017	0.044	0.0187	0.007	0.00664	0.00000049	0.00000109	2	0.00021	0	0	0	0.878	0.00067	4E-11	0.00761		0	
		1st Quartile	0.00028	0.00024	0.0126	0.0122	10.6	<0.00001	<0.000005	0.000375	0.00054	0.054	0.0278	0.0052	<0.0010	<0.000002	<0.000002	13.9	<0.0010	<0.0010	<0.00020	<0.00020	0.96	<0.0050	<0.0050	0.00295		0.029	
		Median	0.00033	0.000300	0.0282	0.0187	14.5	<0.000010	<0.000005	0.00061	0.00064	0.069	0.0327	0.00570	0.00160	<0.000002	<0.000002	15	<0.0010	<0.0010	<0.00020	<0.00020	1.94	<0.0050	<0.0050	0.0038		0.029	
		3rd Quartile	0.00036	0.00032	0.0468	0.0325	14.7	<0.00001	<0.000005	0.000995	0.00073	0.084	0.0448	0.0068	0.00315	<0.0000020	<0.000002	17.4	<0.0010	<0.0010	<0.00020	<0.00020	2.23	<0.0050	<0.0050	0.008		0.029	
NNLB	No Name Lake 1 metre from bottom	Average	0.00027	0.00022	0.0319	0.0226	14.3	0.00000433	0.0000025	0.00082	0.00063	0.151	0.069	0.0302	0.0204	0.00000138	0.000001	19.8	0.0005	0.0005	0.0001	0.0001	5.66	0.0025	0.002500	0.00425		0.057	
E217018		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	4		1	
		Minimum	0.00022	0.00014	0.0208	0.0118	13.6	<0.000005	<0.0000050	<0.00050	0.00039	0.087	0.0376	0.0084	0.0027	<0.0000020	<0.0000020	13.8	<0.0010	<0.0010	<0.00020	<0.00020	0.61	<0.0050	<0.0050	<0.0050		0.057	
		Maximum	0.00034	0.0005	0.0635	0.0535	15.3	<0.000010	<0.0000050	0.00366	0.00096	0.265	0.106	0.0976	0.0836	0.0000055	<0.0000020	22.4	<0.0010	<0.0010	<0.00020	<0.00020	9.01	<0.0050	<0.0050	0.0057		0.057	
		Geometric Mean	0.00026	0.000210	0.0299	0.0208	14.3	0.00000416	0.0000025	0.000602	0.00061	0.143	0.0657	0.0231	0.0111	0.00000118	0.00000100	19.6	0.0005000	0.0005	0.0001	0.0001	4.41	0.0025	0.0025	0.00407		0.057	
		Count <DL	0	0	0	0	0	15	15	4	0	0	0	0	0	13	15	0	15	15	15	15	0	15	15	1		0	
		Standard Deviation	0.00003	0.00009	0.0134	0.0111	0.6	0.00000114	1E-13	0.000867	0.00017	0.054	0.0219	0.0272	0.0259	0.00000118	0.00000000	2.5	0	0.0000000	0	0	2.71	4E-11	0.000000	0.00133		0	
		1st Quartile	0.00024	0.00019	0.0238	0.0167	14	0.00000375	<0.000005	0.00038	0.00048	0.112	0.0524	0.0156	0.005	<0.000002	<0.000002	19	<0.0010	<0.0010	<0.00020	<0.00020	4.91	<0.0050	<0.0050	0.00377		0.057	
		Median	0.00026	0.0002	0.0268	0.0192	14.1	<0.000010	<0.0000050	0.000590	0.00063	0.147	0.0634	0.0191	0.0075	<0.000002	<0.0000020	20.7	<0.0010	<0.0010	<0.00020	<0.00020	6.73	<0.0050	<0.0050	0.0044		0.057	
		3rd Quartile	0.00028	0.00022	0.0307	0.023	14.5	<0.000010	<0.0000050	0.000770	0.00072	0.161	0.0862	0.024	0.0166	<0.000002	<0.0000020	21.4	<0.0010	<0.0010	<0.00020	<0.00020	7.25	<0.0050	<0.0050	0.00488		0.057	
NNO	No Name Lake Outlet	Average	0.00031	0.00029	0.0388	0.0257	13.64	0.0000048	0.00000341	0.000625	0.0007	0.085	0.0448	0.0097	0.00368	0.0000017	0.0000017	15.6	0.0005	0.00050	0.000107	0.000107	2.07	0.0193	0.0025	0.00456	0.0049	0.029	0.0117
E217017		Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	8	8	8	8
		Minimum	0.00014	0.00017	0.0115	0.0075	9.85	<0.000005	<0.000005	<0.00050	0.00045	0.043	0.0179	0.0038	<0.0010	<0.000002	<0.000002	11.7	<0.0010	<0.0010	<0.00020	<0.00020	0.76	<0.0050	<0.0050	<0.0050	<0.0050	0.022	0.0061
		Maximum	0.00047	0.0005	0.08	0.0524	20.8	0.000010	0.0000078	0.00106	0.00129	0.214	0.0892	0.0286	0.0215	0.0000061	0.0000053	18.1	<0.0010	<0.0010	0.00021	0.00021	3.68	0.14	<0.0050	0.0071	0.0087	0.033	0.019
		Geometric Mean	0.00029	0.00028	0.031	0.0210	13.31	0.0000046	0.00000307	0.000553	0.00067	0.078	0.0408	0.008	0.00171	0.00000136	0.00000136	15.4	0.0005	0.00050	0.000105	0.000105	1.91	0.00423	0.0025	0.00426	0.00426	0.029	0.011
		Count <DL	0	0	0	0	0	14	12	4	0	0	0	0	7	12	12	0	15	15	14	14	0	13	15	2	4	0	0
		Standard Deviation	0.0001	0.00009	0.0254	0.0163	3.36	0.0000018	0.00000192	0.000291	0.00021	0.0410	0.0201	0.0069	0.00541	0.0000016	0.00000154	2.4	0	0.00000	0.000028	0.000028	0.8	0.04455	4E-11	0.00171	0.00264	0.004	0.0043
		1st Quartile	0.00023	0.0002	0.0161	0.0128	11.4	<0.000010	<0.0000050	0.000375	0.00058	0.062	0.0306	0.005	<0.0010	<0.000002	<0.000002	13.6	<0.0010	<0.0010	<0.00020	<0.00020	1.5	<0.0050	<0.0050	0.00295	<0.0050	0.026	0.0079
		Median	0.00034	0.0003	0.0325	0.0204	12.5	<0.000010	<0.000005	0.00063	0.00067	0.079	0.0379	0.0067	0.0024	<0.000002	<0.000002	16.9	<0.0010	<0.0010	<0.00020	<0.00020	2.17	<0.0050	<0.0050	0.005	0.00455	0.032	0.0120
		3rd Quartile	0.00038	0.00036	0.0633	0.0386	15.1	<0.00001	<0.000005	0.00085	0.00078	0.088	0.0588	0.0114	0.0041	<0.000002	<0.000002	17.5	<0.0010	<0.0010	<0.00020	<0.00020	2.52	<0.0050	<0.0050	0.00538	0.00692	0.032	0.014
LLS	Small Seep into Long Lake	Average	0.00319	0.00163	0.0194	0.01219	210	0.00000540	0.00000448	0.000535	0.000402	1.018	0.04735	0.341	0.3277	0.0000012	0.0000011	549	0.00324	0.00305	0.000100	0.0001	518	0.00445	0.0025				
E292131		Count	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11				
		Minimum	0.00036	0.00031	<0.0030	<0.0030	104	<0.000005	<0.0000050	<0.00050	<0.00020	0.128	<0.0050	0.109	0.0948	<0.000002	<0.000002	306	<0.0010	<0.0010	<0.00020	<0.00020	251	<0.0050	<0.0050				
		Maximum	0.00978	0.00335	0.0746	0.0827	256	0.000014	0.0000143	0.00138	0.00137	3.72	0.472	0.638	0.634	0.0000028	0.0000024	780	0.0067	0.0063	<0.00020	<0.00020	755	0.021	<0.0050				
		Geometric Mean	0.00213	0.00135	0.0097	0.00414	204	0.0000048	0.00000368	0.000413	0.000303	0.653	0.00642	0.296	0.2749	0.0000011	0.00000108	524	0.00235	0.00226	0.000100	0.0001	486	0.00325	0.0025				
		Count <DL	0	0	1	5	0	10	7	7	2	0	5	0	0	10	10	0	2	2	11	11	0	9	11				
		Standard Deviation	0.00288	0.00095	0.02404	0.02437	44	0.000003	0.00000363	0.000435	0.00036	1.053	0.14087	0.182	0.1889	0.00000054	0.00000042	169	0.00221	0.002	0.000000	0.000000	179	0.00556	1E-10				
		1st Quartile	0.00108	0.00092	0.00385	<0.0030	194	<0.000010	<0.000005	<0.00050	0.00021	0.355	<0.0050	0.196	0.186	<0.000002	<0.0000020	416	0.00135	0.00125	<0.00020	<0.00020	367	<0.0050	<0.0050				
		Median	0.00217	0.0013	0.0078	0.0032	220	<0.000010	<0.0000050	<0.00050	0.000310	0.474	0.0051	0.306	0.287	<0.000002	<0.000002	517	0.0026	0.0031	<0.00020	<0.00020	531	<0.0050	<0.0050				
		3rd Quartile	0.00511	0.00226	0.0272	0.00605	238	<0.000010	0.00000525	0.00076	0.000485	1.51	0.00675	0.501	0.489	<0.000002	<0.000002	716	0.0051	0.0045	<0.00020	<0.00020	675	<0.0050	<0.0050				
LLSM	Long Lake Middle Seep	Average	0.00106	0.00075	0.0156	0.01019	177.5	0.0000067	0.00000669	0.001799	0.00056	0.397	0.00954	0.1863	0.1822	0.00000149	0.000001	494	0.00359	0.00319	0.0001	0.0001	450	0.0029	0.0025				
E292131		Count	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
		Minimum	0.0002	0.00023	0.0045	<0.0030	96.3	<0.00001	<0.0000050	<0.00050	0.00032	0.104	<0.0050	0.0458	0.0434	<0.000002	<0.000002	336	<0.0010	<0.0010	<0.00020	<0.00020	275	<0.0050	<0.0050				
		Maximum	0.00226	0.00145	0.0541	0.0335	216	0.0000140	0.000018	0.0116	0.00096	0.853	0.0408	0.35	0.346	0.0000054	<0.000002	643	0.007	0.0061	<0.00020	<0.00020	566	0.0061	<0.0050				
		Geometric Mean	0.00083	0.00062	0.0103	0.00676	171.6	0.0000061	0.00000535	0.000693	0.00052	0.320	0.00576	0.153	0.1488	0.00000121	0.000001	481	0.0026	0.00236	0.000100	0.0001	436	0.00276	0.00250				
		Count <DL	0	0	0	1	0	7	3	3	0	0	4	0	0	8	9	0	2	2	9	9	0	8	9				
		Standard Deviation	0.00068	0.00045	0.01760	0.01059	44	0.0000034	0.00000503	0.003691	0.00024	0.25	0.01242	0.1127	0.1121	0.0000015	0.0000000	118	0.00234	0.00205	0	0	113	0.0012	4E-11				
		1st Quartile	0.00048	0.00035	0.0063	0.0039	157	<0.000010	<0.000005	<0.00050	0.00042	0.154	<0.0050	0.0832	0.0818	<0.0000020	<0.0000020	385	0.0024	0.002	<0.00020	<0.00020	368	<0.0050	<0.0050				
		Median	0.00101	0.00089	0.0076	0.0057	201	<0.00001	0.0000052	0.00064	0.00044	0.406	0.00630	0.165	0.1560	<0.000002	<0.000002	529	0.0034	0.0028	<0.00020	<0.00020	468	<0.0050	<0.0050				
		3rd Quartile	0.00137	0.00095	0.01100	0.0104	211	<0.000010	0.000008	0.000690	0.00061	0.488	0.007	0.2620	0.242	<0.000002	<0.000002	589	0.0057	0.0051	<0.00020	<0.00020	550	<0.0050	<0.0050				

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

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2014-15 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW002	Ex-situ 2-3 South shallow groundwater well beside 3-South Pit (1 Seam)	Average	0.00085	0.00042	0.00300	0.0018	211.8	0.0000680	0.0000258	0.00050	0.000308	3.26	1.97	3.01	2.91	0.0000050	0.0000043	1220	0.0032	0.0032	0.000050	0.000062	1167	0.01020	0.00352	0.00100	0.01938		0.109
		Count	1	4	1	4	4	1	4	1	4	1	4	1	4	1	4	3	1	4	1	4	4	1	4	1	4		1
		Minimum	0.00085	0.00034	<0.0060	<0.0020	194	0.000068	<0.000020	<0.0010	<0.00040	3.26	1.46	3.01	2.58	<0.000010	0.0000023	1200	0.0032	0.0029	<0.00010	<0.00010	1110	0.0102	<0.0020	<0.0020	0.0025		0.109
		Maximum	0.00085	0.00052	<0.0060	0.0042	225	0.000068	0.000073	<0.0010	0.00062	3.26	2.28	3.01	3.22	<0.000010	<0.000010	1240	0.0032	0.0036	<0.00010	<0.00020	1240	0.0102	0.0096	<0.0020	<0.050		0.109
		Geometric Mean	0.00085	0.00041	0.00300	0.00143	211.4	0.0000680	0.0000164	0.00050	0.000269	3.26	1.95	3.01	2.9	0.0000050	0.0000041	1219.9	0.0032	0.0032	0.000050	0.000059	1166	0.01020	0.00221	0.001	0.01406		0.109
		Count <DL	0	0	1	3	0	0	2	1	2	0	0	0	0	1	3	0	0	0	1	4	0	0	3	1	3		0
		Standard Deviation	0.00000	0.00008	0.00000	0.0016	12.9	0.0000000	0.0000315	0.00000	0.000208	0	0.36	0.00	0.26	0.0000000	0.0000014	20	0	0.0003	0.000000	0.000025	54	0.00000	0.00411	0.00000	0.01125		0
		1st Quartile	0.00085	0.00036	<0.0060	<0.0020	208.2	0.000068	<0.000020	<0.0010	<0.00040	3.26	1.91	3.01	2.81	<0.000010	0.00000432	1210	0.0032	0.003	<0.00010	<0.00010	1140	0.0102	<0.0020	<0.0020	0.01938		0.109
		Median	0.00085	0.00041	<0.0060	<0.0020	214	0.000068	<0.000020	<0.0010	0.000205	3.26	2.08	3.01	2.92	<0.000010	<0.000010	1220	0.0032	0.0031	<0.00010	<0.00010	1160	0.0102	0.00175	<0.0020	<0.050		0.109
		3rd Quartile	0.00085	0.00048	<0.0060	0.0018	217.5	0.000068	0.00002575	<0.0010	0.000312	3.26	2.14	3.01	3.01	<0.000010	<0.000010	1230	0.0032	0.0032	<0.00010	0.000062	1187	0.0102	0.00427	<0.0020	<0.050		0.109
QU1009D	Ex-situ 4-South deep groundwater well. Down gradient of 4-South Mine. Base of Dunsmuir Member. Assesses vertical gradients & water quality down gradient of the 4-South Mine workings. Just outside of mine pool. (Below 3 Seam)	Average		0.132		0.00100	190		0.0000038		0.000245		0.190		0.0201		0.0000030	152		0.000375		0.0000625	85.4		0.00150		0.0180		
		Count		2		2	2		2		2		2		2		2	1		2		2	2		2		2		
		Minimum		0.131		<0.0010	187		<0.000005		<0.00020		0.178		0.0143		<0.000002	152		<0.00050		<0.000050	85		<0.0010		0.011		
		Maximum		0.133		<0.0030	193		<0.000010		0.00039		0.203		0.0259		<0.000010	152		<0.0010		<0.00020	85.9		<0.0050		<0.050		
		Geometric Mean		0.132		0.00087	190		0.0000035		0.000197		0.19		0.0192		0.0000022	152		0.000354		0.0000500	85.4		0.00112		0.0166		
		Count <DL		0		2	0		2		1		0		0		2	0		2		2	0		2		1		
		Standard Deviation		0.001		0.00071	4.2		0.0000018		0.000205		0.018		0.0082		0.0000028	0		0.000177		0.0000530	0.6		0.00141		0.0099		
		1st Quartile		0.132		0.00075	188.5		0.0000031		0.000173		0.184		0.0172		0.000002	152		0.000312		0.0000438	85.2		0.001		0.0145		
		Median		0.132		0.00100	190		0.0000038		0.000245		0.190		0.0201		0.000003	152		0.000375		0.0000625	85.4		0.0015		0.018		
		3rd Quartile		0.132		0.00125	191.5		0.0000044		0.000318		0.197		0.023		0.000004	152		0.000438		0.0000813	85.7		0.002		0.0215		
QU1009S	Ex-situ 4-South shallow groundwater well. Fracture zone 10 m below till. Assesses vertical gradients & water quality down gradient of the 4-South Mine workings. Just outside of mine pool. (Below 3 Seam)	Average		0.025		0.00110	71.6		0.0000050		0.000100		0.112		0.376		0.0000050	238.0		0.000250		0.0000250	93.3		0.00050		0.0250		
		Count		1		1	1		1		1		1		1		1	1		1		1	1		1		1		
		Minimum		0.025		0.0011	71.6		<0.000010		<0.00020		0.112		0.376		<0.000010	238		<0.00050		<0.000050	93.3		<0.0010		<0.050		
		Maximum		0.025		0.0011	71.6		<0.000010		<0.00020		0.112		0.376		<0.000010	238		<0.00050		<0.000050	93.3		<0.0010		<0.050		
		Geometric Mean		0.025		0.0011	71.6		0.0000050		0.000100		0.112		0.376		0.0000050	238.0		0.00025		0.0000250	93.3		0.00050		0.0250		
		Count <DL		0		0	0		1		1		0		0		1	0		1		1	0		1		1		
		Standard Deviation		0		0	0		0.0000000		0.000000		0		0		0.0000000	0		0		0.0000000	0.0		0.00000		0.0000		
		1st Quartile		0.025		0.0011	71.6		<0.000010		<0.00020		0.112		0.376		<0.000010	238.0		<0.00050		<0.000050	93.3		<0.0010		<0.050		
		Median		0.025		0.00110	71.6		<0.000010		<0.00020		0.112		0.376		<0.000010	238.0		<0.00050		<0.000050	93.3		<0.0010		<0.050		
		3rd Quartile		0.025		0.0011	71.6		<0.000010		<0.00020		0.112		0.376		<0.000010	238.0		<0.00050		<0.000050	93.3		<0.0010		<0.050		
SPD	Settling Pond # 1		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E218582		Average	0.0012	0.00096	0.0444	0.01561	81.80	0.0000096	0.00000504	0.000932	0.00065	0.271	0.0598	0.0667	0.02794	0.00000184	0.00000118	391	0.0021	0.0022	0.0001	0.000100	325.5	0.00381	0.00319	0.0105	0.0072	0.2575	0.02361
		Count	12	12	12	12	16	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	44	12	12	8	3	8	8
		Minimum	0.00047	0.00031	0.005	<0.0030	29.40	<0.00001	<0.000005	<0.00050	0.00029	0.15	0.01	0.023	<0.0010	<0.000002	<0.000002	135	0.0012	0.0013	<0.00020	<0.00020	48.8	<0.0050	<0.0050	0.003	0.0053	<0.020	<0.0050
		Maximum	0.0024	0.00204	0.104	0.048	119.0	0.000039	0.000013	0.00185	0.00129	0.563	0.142	0.185	0.144	0.0000059	0.0000021	661	0.0045	0.0044	<0.00020	<0.00020	836	0.0146	0.0108	0.0191	0.0106	<2.0	0.0501
		Geometric Mean	0.00103	0.00081	0.0285	0.01121	78.6	0.0000074	0.00000426	0.000804	0.00059	0.252	0.0438	0.0542	0.00639	0.0000014	0.0000011	365	0.00200	0.002	0.0001	0.000100	289.40	0.00312	0.00282	0.0089	0.00680	0.0316	0.01737
		Count <DL	0	0	0	1	0	8	6	1	0	0	0	0	4	9	10	0	0	0	12	12	0	10	11	0	0	8	1
		Standard Deviation	0.00067	0.0006	0.0366	0.01299	20.9	0.0000098	0.00000319	0.000525	0.00031	0.118	0.0457	0.0495	0.04132	0.0000017	0.00000041	139.0	0.001	0.0011	0.000000	0.000000	149.4	0.00355	0.0024	0.0059	0.003	0.4583	0.01561
		1st Quartile	0.00061	0.00057	0.0111	0.00702	69.7	<0.000010	<0.0000050	0.000585	0.00045	0.192	0.0198	0.0331	<0.0010	<0.000002	<0.000002	332	0.0013	0.0015	<0.00020	<0.00020	267.8	<0.0050	<0.0050	0.0059	0.0055	<0.020	0.01665
		Median	0.00104	0.00072	0.034	0.0117	80.8	<0.00001	0.00000375	0.000715	0.0006	0.255	0.0505	0.0507	0.0122	<0.000002	<0.000002	368	0.002	0.0017	<0.00020	<0.00020	318.00	<0.0050	<0.0050	0.01	0.0057	<0.020	0.02185
		3rd Quartile	0.00166	0.00129	0.0739	0.02087	96.6	0.000010	0.00000700	0.001202	0.00072	0.305	0.0869	0.0734	0.04118	0.00000135	<0.000002	455	0.0026	0.0022	<0.00020	<0.00020	365.2	<0.0050	<0.0050	0.01280	0.0082	0.2575	0.03000
LLE	Long Lake Entrance (LLE)	Average	0.00098	0.000751	0.08278	0.01978	65.4	0.00000500	0.00000250	0.000643	0.00057	0.972	0.40385	0.1172	0.0958	0.00000186	0.0000011	297	0.00075	0.0005	0.000109	0.000100	282.8	0.00723	0.00250	0.0079		0.043	0.02730
E292130		Count	12	12	12	12	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	53	12	12	5		5	5
		Minimum	0.00061	<0.00010	<0.0030	<0.0030	30.1	<0.00001	<0.000005	<0.00050	0.00028	0.211	<0.0050	0.0278	<0.0010	<0.000002	<0.000002	124	<0.0010	<0.0010	<0.00020	<0.00020	27.8	<0.0050	<0.0050	0.0025		0.027	0.0086
		Maximum	0.0014	0.00137	0.246	0.0485	138	<0.00001	<0.000005	0.00122	0.00083	3.48	1.23	0.537	0.405	0.0000113	0.0000024	867	0.0017	<0.0010	0.00021	<0.00020	817	0.0506	<0.0050	0.015		0.052	0.0780
		Geometric Mean	0.00096	0.000616	0.0552	0.01145	58.8	0.000005	0.0000025	0.000529	0.00054	0.734	0.1927	0.0832	0.05037	0.00000122	0.00000108	239.0	0.00066	0.0005	0.000106	0.000100	220.7	0.0038	0.00250	0.0066		0.042	0.0197
		Count <DL	0	1	1	3	0	12	12	5	0	0	1	0	1	11	11	0	9	12	11	12	0	9	12	0		0	0
		Standard Deviation	0.00023	0.000338	0.06208	0.01633	33.2	1E-13	5E-14	0.000378	0.00018	0.881	0.35764	0.1373	0.10515	0.00000297	0.0000004	236	0.00046	0	0.000032	0.000000	213	0.01376	0.00000	0.0051		0.009	0.0287
		1st Quartile	0.00081	0.00059	0.05315	0.00728	42.1	<0.000010	<0.0000050	<0.00050	0.00043	0.551	0.149	0.0541	0.04748	<0.0000020	<0.0000020	150	<0.0010	<0.0010	<0.00020	<0.00020	133	<0.0050	<0.0050	0.0048		0.0430	0.01420
		Median	0.00096	0.000815	0.06955	0.0186	54.5	<0.000010	<0.000005	0.00071	0.0006	0.667	0.389	0.0795	0.0693	<0.000002	<0.000002	193	<0.0010	<0.0010	<0.00020	<0.00020	172	<0.0050	<0.0050	0.0061		0.045	0.0147
		3rd Quartile	0.00116	0.000962	0.09825	0.02582	83.7	<0.00001	<0.000005	0.00096	0.00069	1.048	0.4865	0.117	0.10445	<0.0000020	<0.0000020	308	0.00072	<0.0010	<0.00020	<0.00020	428	0.00345	<0.0050	0.01110		0.0460	0.02110
LLM1	Long Lake Middle 1 metre below Surface	Average	0.00051	0.00048	0.0295	0.0179	32.9	0.00000470	0.00000267	0.000593	0.00074	0.081	0.037	0.0197	0.01189	0.00000287	0.00000145	68.1	0.00059	0.00050	0.000100	0.000100	54.4	0.01853	0.00250	0.00377		0.0300	
E206619		Count	15	15	15	15	4	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3		1	
		Minimum	0.00028	0.00031	0.0075	0.0049	23.9	<0.000005	<0.0000050	<0.00050	0.00031	0.029	0.0101	0.0054	<0.0010	<0.0000020	<0.0000020	29.4	<0.0010	<0.0010	<0.00020	<0.00020	17.5	<0.0050	<0.0050	<0.0050		0.03	
		Maximum	0.00071	0.0007	0.0659	0.0477	36.9	<0.000010	0.000005	0.0016	0.00161	0.133	0.0734	0.0605	0.0571	<0.000050	0.0000054	94.4	0.0019	<0.0010	<0.00020	<0.00020	88.1	0.237	<0.0050	0.0063		0.03	
		Geometric Mean	0.00049	0.00046	0.0226	0.0144	32.4	0.0000046	0.00000262	0.00051	0.00065	0.07	0.032	0.015	0.00385	0.00000143	0.00000121	65.2	0.00055	0.00050	0.000100	0.000100	50.4	0.00376	0.00250	0.0034		0.0300	
		Count <DL	0	0	0	0	0	15	14	5	0	0	0	0	6	13	13	0	14	15	15	15	0	12	15	1		0	
		Standard Deviation	0.00013	0.00013	0.0205	0.0125	6.1	0.00000090	0.00000065	0.000358	0.00041	0.04	0.0187	0.0154	0.01537	0.00000616	0.00000124	18.8	0.00036	0.00000	0.000000	0.000000	19.4	0.06045	0.00000	0.00219		0.0000	
		1st Quartile	0.00042	0.00036	0.0107	0.0094	31.8	<0.000010	<0.000005	<0.00050	0.00044	0.038	0.0207	0.007	<0.0010	<0.000002	<0.000002	53.2	<0.0010	<0.0010	<0.00020	<0.00020	36.7	<0.0050	<0.0050	<0.0050		0.03	
		Median	0.00047	0.00043	0.0288	0.0135	35.3	<0.000010	<0.0000050	0.00059	0.00065	0.102	0.04	0.0154	0.0075	<0.000002	<0.000002	72.7	<0.0010	<0.0010	<0.00020	<0.00020	63.9	<0.0050	<0.0050	0.0025		0.03	
		3rd Quartile	0.00062	0.00059	0.0389	0.0239	36.4	<0.000010	<0.0000050	0.0007	0.0008	0.1130	0.0482	0.0258	0.019	<0.000002	<0.000002	83.5	<0.0010	<0.0010	<0.00020	<0.00020	66.7	<0.0050	<0.0050	0.0044		0.03	

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 46
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2014-15 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LLMB	Long Lake Middle 1 metre From Bottom	Average	0.00028	0.00021	0.0118	0.00624	54.3	0.00000633	0.0000037	0.000463	0.00052	0.127	0.01330	2.483	2.186	0.00000142	0.00000165	127.7	0.00050	0.00050	0.000100	0.000100	116.5	0.00250	0.00250	0.00330		0.066	
E206619		Count	15	15	15	15	4	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3		1	
		Minimum	0.0002	0.00011	0.0038	<0.0030	52.1	<0.000005	<0.0000050	<0.00050	0.00021	0.05	0.0053	0.921	0.59	<0.0000020	<0.0000020	121	<0.0010	<0.0010	<0.00020	<0.00020	109	<0.0050	<0.0050	0.0022		0.066	
		Maximum	0.00041	0.00034	0.0224	0.0094	57.8	0.000019	0.000016	0.001	0.00096	0.318	0.0218	5.58	5.49	0.0000036	0.0000067	135	<0.0010	<0.0010	<0.00020	<0.00020	131	<0.0050	<0.0050	0.0052		0.066	
		Geometric Mean	0.00028	0.0002	0.0103	0.0054	54.3	0.00000546	0.00000303	0.000401	0.00048	0.103	0.0119	2.052	1.748	0.00000125	0.00000131	127.7	0.00050	0.00050	0.000100	0.000100	116.4	0.00250	0.00250	0.00306		0.066	
		Count <DL	0	0	0	2	0	12	13	8	0	0	0	0	0	12	12	0	15	15	15	15	0	15	15	1		0	
		Standard Deviation	0.00005	0.00006	0.0057	0.00281	2.5	0.00000437	0.00000359	0.000263	0.00022	0.095	0.006	1.661	1.5490	0.00000093	0.00000158	4.4	0.00000	0.00000	0.000000	0.000000	5.1	4E-11	0.00000	0.00165		0	
		1st Quartile	0.00024	0.00017	0.0068	0.00385	52.9	<0.000010	<0.000005	<0.00050	0.00037	0.068	0.0066	1.29	1.13	<0.000002	<0.000002	124.5	<0.0010	<0.0010	<0.00020	<0.00020	113	<0.0050	<0.0050	0.00235		0.066	
		Median	0.00028	0.00019	0.0112	0.0076	53.7	<0.00001	<0.0000050	<0.00050	0.00045	0.081	0.01450	1.56	1.46	<0.000002	<0.000002	128	<0.0010	<0.0010	<0.00020	<0.00020	117.0	<0.0050	<0.0050	<0.0050		0.066	
		3rd Quartile	0.00032	0.00024	0.016	0.00835	55.1	<0.000010	<0.0000050	0.000625	0.00062	0.15	0.01870	4.02	3.545	<0.000002	<0.0000020	130.5	<0.0010	<0.0010	<0.00020	<0.00020	118	<0.0050	<0.0050	0.00385		0.066	
LLO	Long Lake Outlet	Average	0.00054	0.00046	0.0407	0.0151	31.8	0.0000067	0.00000546	0.000639	0.00068	0.0980	0.03234	0.0223	0.00493	0.00000212	0.00000147	72.5	0.0005	0.00050	0.000100	0.000100	55.5	0.00324	0.00250				
E219412		Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	53	15	15				
		Minimum	0.00034	0.00031	0.0075	0.0034	17.5	<0.000005	<0.000005	<0.00050	0.00033	0.012	<0.0050	0.0048	<0.0010	<0.000002	<0.000002	39.7	<0.0010	<0.0010	<0.00020	<0.00020	15.3	<0.0050	<0.0050				
		Maximum	0.00093	0.00059	0.107	0.0382	41.2	0.000041	0.000039	0.00161	0.00119	0.291	0.065	0.122	0.0139	0.0000114	0.0000034	110	<0.0010	<0.0010	<0.00020	<0.00020	108	0.0092	<0.0050				
		Geometric Mean	0.00052	0.00045	0.0328	0.0117	30.9	0.0000048	0.0000034	0.000539	0.00064	0.077	0.02076	0.0158	0.00235	0.0000015	0.0000013	69.8	0.0005	0.00050	0.000100	0.000100	51.3	0.00292	0.00250				
		Count <DL	0	0	0	0	0	14	12	5	0	0	3	0	6	11	11	0	15	15	15	15	0	13	15				
		Standard Deviation	0.00015	0.00009	0.0268	0.0111	7.1	0.0000095	0.0000094	0.000377	0.00024	0.071	0.02217	0.0284	0.00477	0.00000275	0.00000083	20.3	0	0.00000	0.000000	0.000000	20.4	0.002	4E-11				
		1st Quartile	0.00044	0.00038	0.0204	0.0057	26.2	0.0000038	<0.000005	<0.00050	0.0005	0.05	0.01405	0.0112	<0.0010	<0.000002	<0.000002	55.6	<0.0010	<0.0010	<0.00020	<0.00020	38.5	<0.0050	<0.0050				
		Median	0.00054	0.00044	0.034	0.0131	35	<0.00001	<0.000005	0.00067	0.00062	0.09	0.033	0.0158	0.0045	<0.000002	<0.000002	73.7	<0.0010	<0.0010	<0.00020	<0.00020	55.4	<0.0050	<0.0050				
		3rd Quartile	0.00061	0.00052	0.0507	0.0168	36.8	<0.00001	<0.000005	0.000795	0.00082	0.106	0.0511	0.0204	0.0089	0.00000155	0.00000165	84.9	<0.0010	<0.0010	<0.00020	<0.00020	69.5	<0.0050	<0.0050				
WB	Middle Quinsam Lake Outlet	Average	0.00024	0.00024	0.0199	0.0131	34.8	0.0000052	0.0000035	0.000699	0.00093	0.048	0.0202	0.0075	0.00119	0.0000011	0.0000014	41.9	0.00050	0.00050	0.000100	0.000100	33.7	0.00250	0.00250				
E0900504		Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15				
		Minimum	0.00015	0.00014	0.0111	0.0041	23.4	<0.000005	<0.000005	<0.00050	0.00052	0.024	0.0095	0.0034	<0.0010	<0.000002	<0.000002	29.4	<0.0010	<0.0010	<0.00020	<0.00020	11	<0.0050	<0.0050				
		Maximum	0.00043	0.00046	0.0336	0.0216	42.9	0.000016	0.000015	0.00108	0.00448	0.083	0.0446	0.0156	0.0041	0.0000028	0.0000068	83.8	<0.0010	<0.0010	<0.00020	<0.00020	73	<0.0050	<0.0050				
		Geometric Mean	0.00023	0.000230	0.0189	0.0121	34.2	0.0000047	0.00000295	0.000666	0.00075	0.046	0.0190	0.0068	0.00089	0.00000107	0.00000114	40.6	0.00050	0.00050	0.000100	0.000100	30.5	0.00250	0.00250				
		Count <DL	0	0	0	0	0	14	13	1	0	0	0	0	9	14	14	0	15	15	15	15	0	15	15				
		Standard Deviation	0.00008	0.00008	0.0065	0.0051	6.3	0.0000032	0.00000325	0.000206	0.001	0.0140	0.0081	0.0034	0.00104	0.00000046	0.0000015	12.5	0.00000	0.00000	0.000000	0.000000	15	4E-11	4E-11				
		1st Quartile	0.00019	0.00018	0.0166	0.0104	33	<0.000010	<0.000005	0.00059	0.00056	0.039	0.0154	0.0046	<0.0010	<0.000002	<0.000002	36.3	<0.0010	<0.0010	<0.00020	<0.00020	27.8	<0.0050	<0.0050				
		Median	0.0002	0.000220	0.0178	0.0118	36.1	<0.000010	<0.000005	0.00067	0.00064	0.049	0.0183	0.0071	<0.0010	<0.000002	<0.000002	38.6	<0.0010	<0.0010	<0.00020	<0.00020	31.1	<0.0050	<0.0050				
		3rd Quartile	0.00026	0.000260	0.0243	0.0186	38.4	<0.00001	<0.000005	0.000785	0.00074	0.056	0.0228	0.0096	0.00185	<0.000002	<0.000002	42.5	<0.0010	<0.0010	<0.00020	<0.00020	40.8	<0.0050	<0.0050				
7SSD	Settling Pond at 7S- Discharge to Stream 1 -7S		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E292069		Average	0.00132	0.00081	0.2149	0.00928	124.8	0.0000247	0.00001833	0.00164	0.00091	0.499	0.0683	0.3139	0.26288	0.00000164	0.00000118	225	0.00156	0.00051	0.000117	0.000106	117.4	0.01019	0.00269	0.0039	0.0025	0.261	0.0163
		Count	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	1	1	1	1
		Minimum	0.0004	0.00024	0.0057	<0.0030	56.2	<0.000005	<0.000005	0.00074	0.00042	0.065	<0.0050	0.041	<0.0010	<0.000002	<0.000002	126	<0.0010	<0.0010	<0.00020	<0.00020	17.3	<0.0050	<0.0050	0.0039	<0.0050	0.261	0.0163
		Maximum	0.00448	0.00364	2.89	0.0515	208	0.00058	0.000519	0.00608	0.00352	2.27	0.333	5.14	4.08	0.0000086	0.0000051	343	0.0317	0.001	0.00044	0.00037	219	0.0831	0.0069	0.0039	<0.0050	0.261	0.0163
		Geometric Mean	0.0011	0.00065	0.0799	0.00613	119.6	0.00000920	0.0000053	0.00137	0.00084	0.392	0.032	0.1731	0.1043	0.00000129	0.00000109	217	0.00075	0.00051	0.000109	0.000103	99.3	0.00536	0.00262	0.0039	0.0025	0.261	0.0163
		Count <DL	0	0	0	7	0	24	20	0	0	0	4	0	3	35	40	0	31	42	40	42	0	25	41	0	1	0	0
		Standard Deviation	0.00097	0.00066	0.4635	0.00972	35.2	0.0000874	0.00007844	0.00127	0.0005	0.401	0.07754	0.765	0.6110	0.00000165	0.00000076	60	0.00475	0.00008	0.000067	0.000041	56.5	0.01572	0.00088	0	0	0	0
		1st Quartile	0.00074	0.0004	0.032	0.00355	101	<0.000010	<0.0000050	0.00094	0.00064	0.348	0.0109	0.098	0.0637	<0.0000020	<0.0000020	180.0	<0.0010	<0.0010	<0.00020	<0.00020	74.8	<0.0050	<0.0050	0.0039	<0.0050	0.261	0.0163
		Median	0.00102	0.0006	0.0806	0.0058	125	<0.000010	0.000005	0.00115	0.00082	0.427	0.0433	0.174	0.136	<0.000002	<0.000002	224	<0.0010	<0.0010	<0.00020	<0.00020	123.0	<0.0050	<0.0050	0.0039	<0.0050	0.261	0.0163
		3rd Quartile	0.00148	0.0009	0.215	0.0095	145.5	0.0000130	0.0000080	0.00173	0.00098	0.565	0.09335	0.2825	0.256	<0.0000020	<0.000002	277.0	0.0011	<0.0010	<0.00020	<0.00020	161.5	0.01225	<0.0050	0.0039	<0.0050	0.261	0.0163
7S	Stream 1-7S discharge to LWO	Average	0.000125	0.000109	0.0253	0.0193	27.7	0.00000779	0.00000656	0.000756	0.00058	0.0128	0.00469	0.00078	0.0005	0.00000152	0.0000012	50.6	0.00078	0.00057	0.000100	0.000100	30.280	0.00994	0.00294	0.002	0.0025	0.044	0.0112
E292109		Count	39	39	39	39	36	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	39	1	1	1	1
		Minimum	<0.00010	<0.00010	0.0078	0.0078	16.1	<0.000005	<0.000005	<0.00050	0.00025	<0.010	<0.0050	<0.0010	<0.0010	<0.000002	<0.000002	21.9	<0.0010	<0.0010	<0.00020	<0.00020	5.08	<0.0050	<0.0050	0.002	<0.0050	0.044	0.0112
		Maximum	0.00046	0.00029	0.0715	0.0599	51.4	0.0000390	0.000035	0.0063	0.00157	0.116	0.020	0.0051	<0.0010	0.000018	0.0000057	116	0.0074	0.0025	<0.00020	<0.00020	88.50	0.165	0.0085	0.0020	<0.0050	0.044	0.0112
		Geometric Mean	0.000108	0.000096	0.0222	0.0173	26.4	0.00000612	0.00000445	0.000491	0.00054	0.0081	0.00371	0.00063	0.0005	0.00000112	0.00000108	45.1	0.00057	0.00053	0.000100	0.000100	23.57	0.00397	0.00277	0.002	0.0025	0.044	0.0112
		Count <DL	9	12	0	0	0	30	24	20	0	26	26	31	39	37	37	0	37	37	39	39	0	30	35	0	1	0	0
		Standard Deviation	0.000078	0.000057	0.0145	0.0101	9.3	0.0000073	0.00000726	0.001069	0.00025	0.0196	0.00413	0.00082	0	0.00000276	0.00000089	25.7	0.00126	0.00034	0.000000	0.000000	20.71	0.02694	0.00139	0	0	0	0
		1st Quartile	0.0001	<0.00010	0.0156	0.012	21.4	<0.000010	<0.000005	<0.00050	0.00044	<0.010	<0.0050	<0.0010	<0.0010	<0.000002	<0.0000020	31.2	<0.0010	<0.0010	<0.00020	<0.00020	14.48	<0.0050	<0.0050	0.002	<0.0050	0.044	0.0112
		Median	0.00011	0.00011	0.0216	0.0175	23.9	<0.000010	<0.000005	<0.00050	0.00050	<0.010	<0.0050	<0.0010	<0.0010	<0.000002	<0.000002	47.0	<0.0010	<0.0010	<0.00020	<0.00020	28.3	<0.0050	<0.0050	0.00200	<0.0050	0.0440	0.01120
		3rd Quartile	0.00013	0.000125	0.0312	0.0237	31.9	<0.000010	0.00000915	0.00086	0.00063	0.0115	0.0057	<0.0010	<0.0010	<0.000002	<0.000002	61.8	<0.0010	<0.0010	<0.00020	<0.00020	42.18	<0.0050	<0.0050	0.002	<0.0050	0.044	0.0112
QU0813A	Ex-situ 7-South groundwater well down gradient of the CCR backfill towards QR (No. 4 Seam)	Average	0.43	0.433	0.0322	0.00192	186.0	0.0000050	0.000005	0.000250	0.000200	0.224	0.189	0.0387	0.0471	0.0000050	0.0000050	115.8	0.000250	0.000312	0.0000250	0.0000812	14.8	0.00470	0.00100	0.0167	0.0250		0.156
		Count	1	4	1	4	4	1	4	1	4	1	4	1	4	1	4	4	1	4	1	4	4	1	4	1	3		1
		Minimum	0.430	0.42	0.0322	0.0012	183	<0.000010	<0.000010	<0.00050	<0.00020	0.224	0.182	0.0387	0.0371	<0.000010	<0.000010	112	<0.00050	<0.00050	<0.000050	<0.000050	14	0.0047	<0.0010	0.0167	<0.050		0.156
		Maximum	0.43	0.45	0.0322	<0.0050	188	<0.000010	<0.000010	<0.00050	<0.0010	0.224	0.198	0.0387	0.0588	<0.000010	<0.000010	119	<0.00050	<0.0010	<0.000050	<0.00050	15.3	0.0047	<0.0050	0.0167	<0.050		0.156
		Geometric Mean	0.43	0.433	0.0322	0.00186	186.0	0.0000050	0.000005	0.00025	0.000150	0.224	0.189	0.0387	0.0465	0.0000050	0.0000050	115.7	0.000250	0.000297	0.0000250	0.0000445	14.8	0.0047	0.00075	0.0167	0.0250		0.156
		Count <DL	0	0	0	1	0	1	4	1	4	0	0	0	0	1	4	0	1	4	1	4	0	0	4	0	3		0
		Standard Deviation	0	0.015	0	0.00054	2.2	0.0000000	0	0	0.000200	0.000	0.008	0	0.0089	0.0000000	0.0000000	2.9	0.000000	0.000125	0.0000000	0.0001125	0.6	0	0.00100	0	0.0000		0
		1st Quartile	0.43	0.422	0.0322	0.00172	185.2	<0.000010	<0.000010	<0.00050	<0.00020	0.224	0.184	0.0387	0.0435	<0.000010	<0.000010	115	<0.00050	<0.00050	<0.000050	<0.000050	14.7	0.0047	<0.0010	0.0167	<0.050		0.156
		Median	0.43	0.432	0.0322	0.002	186.5	<0.000010	<0.000010	<0.00050	<0.00020	0.224	0.188	0.0387	0.0462	<0.000010	<0.000010	116	<0.00050	<0.00050	<0.000050	<0.000050	15	0.00470	<0.0010	0.0167	<0.050		0.156
		3rd Quartile	0.43	0.443	0.0322	0.0022	187.2	<0.000010	<0.000010	<0.00050	0.0002	0.224	0.194	0.0387	0.0499	<0.000010	<0.000010	116.8	<0.00050	0.000312	<0.000050	0.0000812	15.2	0.0047	0.001	0.0167	<0.050		0.156
QU0813B	Ex-situ 7-South groundwater well down gradient of the CCR backfill towards QR (Till & SST contact)	Average	0.439	0.5	1.85	0.00432	110.5	0.0000240	0.0000050	0.00483	0.000200	2.77	0.077	0.143	0.0826	0.0000050	0.0000050	72.8	0.00219	0.000312	0.000238	0.0000812	9.73	0.0061	0.00183	0.117	0.0250		0.111
		Count	1	4	1	4	4	1	4	1	4	1	4	1	4	1	4	4	1	4	1	4	4	1	4	1	3		1
		Minimum	0.439	0.446	1.85	<0.0050	48.1	0.000024	<0.000010	0.00483	<0.00020	2.77	0.068	0.143	0.0752	<0.000010	<0.000010	68.6	0.00219	<0.00050	0.000238	<0.000050	8.89	0.0061	<0.0010	0.117	<0.050		0.111
		Maximum	0.439	0.522	1.85	0.0059	138	0.000024	<0.000010	0.00483	<0.0010	2.77	0.084	0.143	0.0937	<0.000010	<0.000010	75.3	0.00219	<0.0010	0.000238	<0.000050	10.3	0.0061	0.0038	0.117	<0.050		0.111
		Geometric Mean	0.439	0.499	1.85	0.00412	102.1	0.0000240	0.0000050	0.00483	0.000150	2.77	0.077	0.143	0.0823	0.0000050	0.0000050	72.7	0.00219	0.000297	0.000238	0.0000445	9.72	0.0061	0.00124	0.117	0.0250		0.111
		Count <DL	0	0	0	1	0	0	4	0	4	0	0	0	0	1	4	0	0	4	0	4	0	0	3	0	3		0
		Standard Deviation	0.000	0.036	0.00	0.0015	42	0.0000000	0.0000000	0.00000	0.000200	0.00	0.007	0.000	0.0079	0.0000000	0.0000000	3.1	0.00000	0.000125	0.000000	0.0001125	0.6	0.0000	0.00162	0.0000	0.0000		0.000
		1st Quartile	0.439	0.494	1.85	0.00355	105.8	0.000024	<0.000010	0.00483	<0.00020	2.77	0.074	0.143	0.0784	<0.000010	<0.000010	71.2	0.00219	<0.00050	0.000238	<0.000050	9.53	0.0061	<0.0010	0.117	<0.050		0.111
		Median	0.439	0.516	1.85	0.00445	128	0.000024	<0.000010	0.00483	<0.00020	2.77	0.078	0.143	0.0808	<0.000010	<0.000010	73.6	0.00219	<0.00050	0.000238	<0.000050	9.87	0.0061	0.0015	0.117	<0.050		0.111
		3rd Quartile	0.439	0.521	1.85	0.00522	132.8	0.000024	<0.000010	0.00483	0.0002	2.77	0.082	0.143	0.085	<0.000010	<0.000010	75.1	0.00219	0.000312	0.000238	0.0000812	10.07	0.0061	0.00282	0.117	<0.050		0.111

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 47
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2014-15 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU0821GD	Ex-situ 2-North groundwater well down gradient of u/g tailings disposal, measures water quality & hydraulic gradients downstream of Forjan Fault (No. 4 Seam)	Average		0.173		0.0041	201.0		0.000005		0.0001		1.05		0.177		0.0000010			0.0005		0.0001	0.25		0.0025		0.0504		
		Count		1		1	1		1		1		1		1		1			1		1	1		1		1		
		Minimum		0.173		0.0041	201		0.000005		<0.00020		1.05		0.177		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.0504		
		Maximum		0.173		0.0041	201		0.000005		<0.00020		1.05		0.177		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.0504		
		Geometric Mean		0.173		0.0041	201.0		0.000005		0.000100		1.05		0.177		0.0000010			0.0005		0.0001	0.25		0.0025		0.0504		
		Count <DL		0		0	0		0		1		0		0		1			1		1	1		1		0		
		Standard Deviation		0		0.00000	0.0		0		0		0		0		0.0000000			0		0	0		0.00000		0		
		1st Quartile		0.173		0.0041	201		0.000005		<0.00020		1.05		0.177		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.0504		
		Median		0.173		0.0041	201		0.000005		<0.00020		1.05		0.177		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.0504		
		3rd Quartile		0.173		0.0041	201		0.000005		<0.00020		1.05		0.177		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.0504		
QU0821GS	Ex-situ 2-North groundwater well down gradient of u/g tailings disposal, measures water quality & hydraulic gradients downstream of Forjan Fault (No. 1 Seam)	Average	**(ND) Only the deep well was sampled on an annual basis.**																										
		Count																											
		Minimum																											
		Maximum																											
		Geometric Mean																											
		Count <DL																											
		Standard Deviation																											
		1st Quartile																											
		Median																											
		3rd Quartile																											
QU1010D	Ex-situ 2-North deep groundwater well. Down gradient of u/g tailings disposal, measures water quality & hydraulic head downstream of 2-North workings. (No. 1 Seam / Mudstone).	Average	0.0225	0.0174	1.35	0.0049	100.3	0.000025	0.000025	0.0078	0.00050	11.0	12.3	1.03	0.745	0.0000050	0.0000050	1580.0	0.00125	0.00125	0.00096	0.000125	6.375	0.0075	0.0025	0.153	0.08500		0.659
		Count	1	2	1	2	2	1	2	1	2	1	2	1	2	1	2	2	1	2	1	2	2	1	2	1	2		1
		Minimum	0.0225	0.0166	1.35	<0.0050	98.6	<0.000050	<0.000050	0.0078	<0.0010	11.0	12.1	1.03	0.73	<0.000010	<0.000010	1560	<0.0025	<0.0025	0.00096	<0.000025	<0.50	<0.015	<0.0050	0.153	<0.10		0.659
		Maximum	0.0225	0.0181	1.35	0.0073	102	<0.000050	<0.000050	0.0078	<0.0010	11.0	12.5	1.03	0.76	<0.000010	<0.000010	1600	<0.0025	<0.0025	0.00096	<0.000025	<25	<0.015	<0.0050	0.153	0.12		0.659
		Geometric Mean	0.0225	0.0173	1.35	0.0043	100.3	0.000025	0.000025	0.0078	0.00050	11.0	12.3	1.03	0.745	0.0000050	0.0000050	1579.9	0.00125	0.00125	0.00096	0.000125	1.768	0.0075	0.0025	0.153	0.07700		0.659
		Count <DL	0	0	0	1	0	1	2	0	2	0	0	0	0	1	2	0	1	2	0	2	2	1	2	0	1		0
		Standard Deviation	0.0000	0.0011	0.00	0.0034	2.4	0.000000	0.000000	0.0000	0.00000	0.0	0.3	0.00	0.02	0.0000000	0.0000000	28.3	0.00000	0.00000	0.00000	0.000000	8.7	0.0000	0.0000	0.000	0.04900		0.000
		1st Quartile	0.0225	0.017	1.35	0.0037	99.4	<0.000050	<0.000050	0.0078	<0.0010	11.0	12.2	1.03	0.738	<0.000010	<0.000010	1570	<0.0025	<0.0025	0.00096	<0.00025	3.312	<0.015	<0.0050	0.153	0.068		0.659
		Median	0.0225	0.0174	1.35	0.0049	100.3	<0.000050	<0.000050	0.0078	<0.0010	11.0	12.3	1.03	0.745	<0.000010	<0.000010	1580	<0.0025	<0.0025	0.00096	<0.00025	6.375	<0.015	<0.0050	0.153	0.085		0.659
		3rd Quartile	0.0225	0.0177	1.35	0.0061	101.2	<0.000050	<0.000050	0.0078	<0.0010	11.0	12.4	1.03	0.752	<0.000010	<0.000010	1590	<0.0025	<0.0025	0.00096	<0.00025	9.438	<0.015	<0.0050	0.153	0.102		0.659
QU1010S	Ex-situ 2-North shallow groundwater well. Down gradient of u/g tailings disposal, measures water quality & hydraulic head downstream of 2-North workings. (No. 1 Seam / Sandstone).	Average	0.141	0.136	13.5	0.0018	151.0	0.0000780	0.0000050	0.0127	0.0001	6.22	0.254	0.113	0.0491	0.0000050	0.0000050	76.1	0.005170	0.000250	0.00459	0.0000250	15.2	0.02180	0.00085	0.107	0.025		0.204
		Count	1	2	1	2	2	1	2	1	2	1	2	1	2	1	2	2	1	2	1	2	2	1	2	1	2		1
		Minimum	0.141	0.133	13.5	0.0013	151	0.000078	<0.000010	0.0127	<0.00020	6.22	0.252	0.113	0.0478	<0.000010	<0.000010	74.9	0.00517	<0.00050	0.004590	<0.000050	14.9	0.0218	<0.0010	0.107	<0.050		0.204
		Maximum	0.141	0.138	13.50	0.0024	151	0.000078	<0.000010	0.0127	<0.00020	6.22	0.256	0.113	0.0504	<0.000010	<0.000010	77.2	0.00517	<0.00050	0.00459	<0.000050	15.6	0.0218	0.0012	0.1070	<0.050		0.204
		Geometric Mean	0.141	0.135	13.5	0.00180	151.0	0.000078	0.0000050	0.0127	0.0001	6.22	0.254	0.113	0.0491	0.0000050	0.0000050	76	0.00517	0.000250	0.00459	0.0000250	15.2	0.02180	0.00077	0.107	0.025		0.204
		Count <DL	0	0	0	0	0	0	2	0	2	0	0	0	0	1	2	0	0	2	0	2	0	0	1	0	2		0
		Standard Deviation	0	0.004	0	0.0008	0.0	0	0.0000000	0	0	0	0.003	0	0.0018	0.0000000	0.0000000	1.6	0	0.000000	0	0.0000000	0.5	0.00000	0.00049	0	0		0
		1st Quartile	0.141	0.134	13.5	0.0016	151	0.000078	<0.000010	0.0127	<0.00020	6.22	0.253	0.113	0.0484	<0.000010	<0.000010	75.5	0.005170	<0.00050	0.00459	<0.000050	15.1	0.0218	0.00068	0.107	<0.050		0.204
		Median	0.141	0.136	13.5	0.0018	151	0.0000780	<0.000010	0.0127	<0.00020	6.22	0.254	0.113	0.0491	<0.000010	<0.000010	76.1	0.005170	<0.00050	0.00459	<0.000050	15.2	0.0218	0.00085	0.107	<0.050		0.204
		3rd Quartile	0.141	0.137	13.5	0.0021	151	0.000078	<0.000010	0.0127	<0.00020	6.22	0.255	0.113	0.0498	<0.000010	<0.000010	76.6	0.005170	<0.00050	0.00459	<0.000050	15.4	0.0218	0.00102	0.107	<0.050		0.204
QU1011D	Ex-situ 2-North deep groundwater well. Measures water quality & hydraulic gradient in Forjian Fault (Fractured sandstone).	Average	**ND -** well was not sampled in between April 1, 2013 through March 31, 2014. Well was sampled in April 2014.																										
		Count																											
		Minimum																											
		Maximum																											
		Geometric Mean																											
		Count <DL																											
		Standard Deviation																											
		1st Quartile																											
		Median																											
		3rd Quartile																											
QU1011S	Ex-situ 2-North shallow groundwater well. Measures water quality & hydraulic gradient in Forjian Fault (Fractured sandstone).	Average		0.00140		0.0093	87.7		0.0000050		0.00026		0.226		0.0793		0.0000050	69.3		0.00052		0.0000250	4.09		0.00050		0.025		
		Count		1		1	1		1		1		1		1		1	1		1		1	1		1		1		
		Minimum		0.0014		0.0093	87.7		<0.000010		0.00026		0.226		0.0793		<0.000010	69.3		0.00052		<0.000050	4.09		<0.0010		<0.050		
		Maximum		0.0014		0.0093	87.7		<0.000010		0.00026		0.226		0.0793		<0.000010	69.3		0.00052		<0.000050	4.09		<0.0010		<0.050		
		Geometric Mean		0.0014		0.0093	87.7		0.0000050		0.00026		0.226		0.0793		0.0000050	69.3		0.00052		0.0000250	4.09		0.0005		0.025		
		Count <DL		0		0	0		1		0		0		0		1	0		0		1	0		1		1		
		Standard Deviation		0		0	0		0.0000000		0		0		0		0.0000000	0		0		0.0000000	0		0		0		
		1st Quartile		0.0014		0.0093	87.7		<0.000010		0.00026		0.226		0.0793		<0.000010	69.3		0.00052		<0.000050	4.09		<0.0010		<0.050		
		Median		0.00140		0.0093	87.7		<0.000010		0.00026		0.226		0.0793		<0.000010	69.3		0.00052		<0.000050	4.09		<0.0010		<0.050		
		3rd Quartile		0.0014		0.0093	87.7		<0.000010		0.00026		0.226		0.0793		<0.000010	69.3		0.00052		<0.000050	4.09		<0.0010		<0.050		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 48
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2014-15 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU1105S	Ex-situ River Barrier Pillar (RBP) shallow groundwater well. Monitors water quality & gradients above the RBP & 2-North Mine. (Sandstone)	Average		0.0998		0.0030	164		0.0000050		0.000100		0.675		0.2049		0.0000050	103.6		0.000250		0.0000250	108.7		0.00705		0.025		
		Count		2		2	2		2		2		2		2		2	2		2		2	2		2		2		
		Minimum		0.0856		0.0028	102		<0.000010		<0.00020		0.15		0.0288		<0.000010	40.2		<0.00050		<0.000050	27.4		<0.0010		<0.050		
		Maximum		0.114		0.0031	227		<0.000010		<0.00020		1.2		0.381		<0.000010	167		<0.00050		<0.000050	190		0.0136		<0.050		
		Geometric Mean		0.0988		0.00290	152		0.0000050		0.000100		0.424		0.1048		0.0000050	81.9		0.000250		0.0000250	72.2		0.00261		0.025		
		Count <DL		0		0	0		2		2		0		0		2	0		2		2	0		1		2		
		Standard Deviation		0.0201		0.00020	88		0.0000000		0.000000		0.742		0.2490		0.0000000	89.7		0.000000		0.0000000	115.0		0.00926		0.000		
		1st Quartile		0.0927		0.0029	133		<0.000010		<0.00020		0.412		0.1168		<0.000010	71.9		<0.00050		<0.000050	68		0.00377		<0.050		
		Median		0.0998		0.003	164		<0.000010		<0.00020		0.675		0.2049		<0.000010	103.6		<0.00050		<0.000050	108.7		0.00705		<0.050		
		3rd Quartile		0.1069		0.003	195		<0.000010		<0.00020		0.938		0.293		<0.000010	135.3		<0.00050		<0.000050	149.4		0.01032		<0.050		
QU1109S	Ex-situ River Barrier Pillar (RBP) shallow groundwater well. Monitors water quality & gradients above the RBP & 2-North Mine. (Sandstone)	Average	0.146	0.144	51.2	0.00318	208	0.000236	0.0000056	0.0234	0.000162	20.5	0.0630	0.455	0.00888	0.000005	0.0000043	8.37	0.008	0.000375	0.0602	0.00005	86.24	0.0787	0.00113	0.74	0.075		0.175
		Count	1	4	1	4	4	1	4	1	4	1	4	1	4	1	4	3	1	4	1	4	4	1	4	1	4		1
		Minimum	0.146	0.122	51.2	<0.0030	134	0.000236	<0.000005	0.0234	<0.00020	20.5	0.013	0.455	0.00503	<0.000010	0.0000021	6.21	0.008	<0.00050	0.0602	<0.000050	9.38	0.0787	<0.0010	0.74	0.0286		0.175
		Maximum	0.146	0.157	51.2	0.0051	382	0.000236	<0.000020	0.0234	0.00025	20.5	0.199	0.455	0.0193	<0.000010	<0.000010	12.6	0.008	<0.0010	0.0602	<0.00020	284	0.0787	<0.0050	0.74	0.106		0.175
		Geometric Mean	0.146	0.143	51.2	0.0029	188	0.000236	0.0000050	0.0234	0.00015	20.5	0.0320	0.455	0.00741	0.000005	0.0000040	7.9	0.008	0.000354	0.0602	0.000042	36.08	0.0787	0.00089	0.74	0.066		0.175
		Count <DL	0	0	0	1	0	0	4	0	3	0	0	0	0	1	3	0	0	4	0	4	0	0	4	0	0		0
		Standard Deviation	0.000	0.015	0.0	0.0015	117	0.000000	0.0000031	0.0000	0.00008	0.0	0.0910	0.00	0.00696	0.00000	0.0000015	3.67	0.0000	0.00014	0.000	0.000035	132.1	0.000	0.0010	0.000	0.038		0.000
		1st Quartile	0.146	0.142	51.2	0.00255	137	0.000236	0.0000044	0.0234	<0.00020	20.5	0.016	0.455	0.00505	<0.000010	0.00000428	6.25	0.008	<0.00050	0.0602	<0.000050	17.64	0.0787	<0.0010	0.74	0.0522		0.175
		Median	0.146	0.148	51.2	0.00305	159	0.000236	<0.000010	0.0234	0.00015	20.5	0.02	0.455	0.0056	<0.000010	<0.000010	6.29	0.008	0.000375	0.0602	0.0000375	25.8	0.0787	0.00075	0.74	0.0825		0.175
		3rd Quartile	0.146	0.151	51.2	0.00368	229	0.000236	0.0000062	0.0234	0.000213	20.5	0.067	0.455	0.00943	<0.000010	<0.000010	9.44	0.008	<0.0010	0.0602	0.0000625	94.4	0.0787	0.00138	0.74	0.1052		0.175
7SQR	7-South Quinsam River downstream of 7-South Mining Operation	Average	0.00036	0.00031	0.0322	0.0148	34	0.00000763	0.00000588	0.000905	0.00075	0.103	0.0445	0.0058	0.00204	0.00000118	0.00000126	37.5	0.00050	0.00050	0.000100	0.000100	27.1	0.00708	0.00315	0.00720	0.00850	0.037	0.0086
E292113		Count	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	2	1	2	2
		Minimum	0.00021	0.00014	0.0111	0.0039	22.4	<0.000005	<0.000005	<0.00050	0.00032	0.053	0.0266	0.003	<0.0010	<0.000002	<0.000002	27.2	<0.0010	<0.0010	<0.00020	<0.00020	10.8	<0.0050	<0.0050	0.0056	0.0085	0.031	0.0069
		Maximum	0.00098	0.00048	0.062	0.0326	44.1	0.000034	0.0000351	0.00248	0.003	0.242	0.0801	0.0112	0.0086	0.0000053	0.0000043	54.6	<0.0010	<0.0010	<0.00020	<0.00020	43.5	0.0466	0.0135	0.0088	0.0085	0.042	0.0103
		Geometric Mean	0.00033	0.0003	0.0285	0.0129	33.5	0.00000583	0.0000037	0.000812	0.00067	0.098	0.0428	0.0056	0.00144	0.00000107	0.00000115	37.1	0.00050	0.00050	0.000100	0.000100	25	0.00387	0.0028	0.00700	0.00850	0.036	0.0084
		Count <DL	0	0	0	0	0	20	19	2	0	0	0	0	8	23	21	0	24	24	24	24	0	19	22	0	0	0	0
		Standard Deviation	0.00016	0.00008	0.0156	0.0075	6	0.00000795	0.00000812	0.000449	0.00051	0.038	0.0133	0.0018	0.00182	0.00000088	0.00000078	6	0.00000	0.00000	0.000000	0.000000	9.9	0.01108	0.00239	0.0023	0	0.008	0.0024
		1st Quartile	0.00026	0.00024	0.0184	0.0096	30.4	<0.000010	<0.000005	0.000695	0.00053	0.085	0.0361	0.0047	<0.0010	<0.000002	<0.000002	34.5	<0.0010	<0.0010	<0.00020	<0.00020	17.6	<0.0050	<0.0050	0.0064	0.0085	0.034	0.0078
		Median	0.00032	0.00031	0.0305	0.0123	34.8	<0.00001	<0.000005	0.000865	0.00063	0.098	0.0413	0.0054	0.00165	<0.0000020	<0.000002	38	<0.0010	<0.0010	<0.00020	<0.00020	27.8	<0.0050	<0.0050	0.0072	0.0085	0.037	0.0086
		3rd Quartile	0.0004	0.00037	0.0403	0.0204	38.1	<0.000010	<0.000005	0.000968	0.00074	0.11	0.0499	0.0064	0.00285	<0.000002	<0.000002	40.6	<0.0010	<0.0010	<0.00020	<0.00020	35.80	<0.0050	<0.0050	0.008	0.0085	0.039	0.0094
LQL1	Lower Quinsam Lake 1 metre below surface	Average	0.00080	0.00053	0.0407	0.0236	32.2	0.0000055	0.00000373	0.00082	0.00106	0.103	0.0455	0.0084	0.00262	0.00000157	0.00000169	33.6	0.00050	0.00050	0.000100	0.000100	16.33	0.02009	0.00250	0.00317		0.028	
E292118		Count	15	15	15	15	3	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3		1	
		Minimum	0.00046	0.00031	0.0096	0.0079	27.2	<0.000005	<0.000005	0.00053	0.00047	0.051	0.0152	0.0037	<0.0010	<0.0000020	<0.0000020	28.6	<0.0010	<0.0010	<0.00020	<0.00020	1.40	<0.0050	<0.0050	<0.0020		0.028	
		Maximum	0.00388	0.00079	0.139	0.0508	36.7	0.000022	0.0000060	0.00129	0.00485	0.223	0.0793	0.0210	0.0100	0.0000066	0.0000064	38.5	<0.0010	<0.0010	<0.00020	<0.00020	22.3	0.215	<0.0050	0.0060		0.028	
		Geometric Mean	0.00065	0.00051	0.0311	0.0207	32.0	0.0000046	0.00000344	0.00079	0.00087	0.094	0.0419	0.0072	0.00134	0.00000124	0.00000137	33.4	0.00050	0.00050	0.000100	0.000100	13.99	0.00435	0.00250	0.00247		0.028	
		Count <DL	0	0	0	0	0	14	9	0	0	0	0	0	8	13	11	0	15	15	15	15	0	12	15	2		0	
		Standard Deviation	0.00086	0.00014	0.0330	0.0120	4.8	0.0000047	0.00000158	0.00023	0.00106	0.047	0.0179	0.0053	0.00310	0.00000159	0.00000150	3.5	0.00000	0.00000	0.000000	0.000000	6.50	0.05531	4E-11	0.00257		0.000	
		1st Quartile	0.00049	0.00042	0.0152	0.0146	30.0	0.0000038	<0.000005	0.00066	0.00068	0.069	0.0375	0.0046	<0.0010	<0.000002	<0.000002	31.2	<0.0010	<0.0010	<0.00020	<0.00020	11.04	<0.0050	<0.0050	0.00175		0.028	
		Median	0.00056	0.00050	0.0360	0.0235	32.8	<0.000010	<0.000005	0.00079	0.00085	0.085	0.0441	0.0058	<0.0010	<0.000002	<0.000002	32.3	<0.0010	<0.0010	<0.00020	<0.00020	19.2	<0.0050	<0.0050	<0.0050		0.028	
		3rd Quartile	0.00070	0.00066	0.0509	0.0290	34.8	<0.00001	0.00000525	0.00092	0.00090	0.136	0.0522	0.0092	0.00415	<0.000002	0.00000160	37.0	<0.0010	<0.0010	<0.00020	<0.00020	21.30	<0.0050	<0.0050	0.00425		0.028	
LQLB	LQLB 1 metre from Bottom	Average	0.00088	0.00064	0.0420	0.0254	32.7	0.00000783	0.00000633	0.000649	0.00092	0.538	0.2397	0.1814	0.1597	0.00000115	0.00000149	32.2	0.00050	0.00050	0.000100	0.000100	15.49	0.00326	0.00409	0.00550		0.031	
E292118		Count	15	15	15	15	3	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3		1	
		Minimum	0.00045	0.00032	0.0170	0.0069	27.7	<0.000005	<0.000005	<0.00050	0.00045	0.081	0.0432	0.0057	0.0012	<0.0000020	<0.0000020	27.3	<0.0010	<0.0010	<0.00020	<0.00020	8.26	<0.0050	<0.0050	<0.0050		0.031	
		Maximum	0.00187	0.00104	0.151	0.0543	38.1	0.000016	0.0000140	0.00120	0.00276	2.23	0.669	0.635	0.496	0.0000021	0.0000066	35.9	<0.0010	<0.0010	<0.00020	<0.00020	20.1	0.0098	0.0223	0.0088		0.031	
		Geometric Mean	0.00077	0.00060	0.0347	0.0229	32.4	0.00000693	0.00000549	0.000605	0.00084	0.295	0.1469	0.0427	0.0269	0.00000110	0.00000121	32.1	0.00050	0.00050	0.000100	0.000100	14.78	0.00292	0.00309	0.00485		0.031	
		Count <DL	0	0	0	0	0	6	4	2	0	0	0	0	0	13	13	0	15	15	15	15	0	13	13	1		0	
		Standard Deviation	0.00048	0.00023	0.0334	0.0117	5.2	0.00000415	0.00000339	0.000231	0.00054	0.610	0.2260	0.2273	0.2003	0.00000039	0.00000149	2.4	0.00000	0.00000	0.000000	0.000000	4.45	0.00209	0.00515	0.00316		0.000	
		1st Quartile	0.00050	0.00044	0.0216	0.0176	30.0	<0.000010	0.00000375	0.000565	0.00063	0.118	0.0605	0.0079	0.0042	<0.000002	<0.000002	30.5	<0.0010	<0.0010	<0.00020	<0.00020	11.06	<0.0050	<0.0050	0.00385		0.031	
		Median	0.00053	0.00055	0.0357	0.0254	32.3	0.0000070	0.0000060	0.00066	0.00087	0.168	0.0857	0.0151	0.0101	<0.000002	<0.000002	33.0	<0.0010	<0.0010	<0.00020	<0.00020	17.3	<0.0050	<0.0050	0.0052		0.031	
		3rd Quartile	0.00130	0.00086	0.0456	0.0294	35.2	0.00000950	0.00000820	0.000715	0.00093	0.856	0.4585	0.3760	0.3670	<0.000002	<0.000002	34.2	<0.0010	<0.0010	<0.00020	<0.00020	19.2	<0.0050	<0.0050	0.00700		0.031	

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 49
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2015-16 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
WA			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E0126402	Middle Quinsam Lake Inlet - Quinsam River at Argonaut Road upstream of mining operation.	Average	0.00014	0.000153	0.025	0.0215	20	0.00000732	0.00001318	0.000889	0.00075	0.025	0.0143	0.00121	0.00059	0.0000011	0.0000010	21.7	0.0005	0.00050	0.000100	0.000100	1.071	0.00396	0.0025	0.00300		0.013	0.0079
		Count	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	4		4	4
		Minimum	<0.00010	<0.00010	0.0141	0.0122	16.9	<0.0000050	<0.0000050	<0.00050	0.00049	0.013	0.0094	<0.0010	<0.0010	<0.0000020	<0.0000020	18.5	<0.0010	<0.0010	<0.00020	<0.00020	<0.50	<0.0050	<0.0050	<0.0050		<0.020	0.0054
		Maximum	0.00029	0.00023	0.0373	0.0414	23.2	0.000033	0.000123	0.00199	0.00154	0.065	0.0234	0.0023	0.0018	0.0000022	<0.0000020	33.4	<0.0010	<0.0010	<0.00020	<0.00020	1.73	0.023	<0.0050	0.0045		0.022	0.0106
		Geometric Mean	0.000123	0.000138	0.0243	0.0204	19.9	0.00000586	0.00000429	0.000798	0.00070	0.023	0.0135	0.00107	0.00055	0.00000106	0.000001	21.5	0.0005	0.00050	0.000100	0.000100	0.991	0.00293	0.0025	0.00290		0.0122	0.0076
		Count <DL	3	2	0	0	0	11	11	1	0	0	0	4	13	13	14	0	14	14	14	14	1	13	14	3		3	0
		Standard Deviation	0.000067	0.000061	0.0061	0.0077	2.3	0.00000756	0.00003216	0.000434	0.0003	0.013	0.0053	0.00058	0.00035	0.00000032	0	3.6	0	0.00000	0.000000	0.000000	0.363	0.00548	1E-10	0.00100		0.006	0.0028
		1st Quartile	0.000102	0.000108	0.021	0.0168	17.9	<0.000010	<0.0000050	0.000655	0.00058	0.018	0.0100	0.00065	<0.0010	<0.0000020	<0.000002	19.8	<0.0010	<0.0010	<0.00020	<0.00020	0.835	<0.0050	<0.0050	<0.0050		<0.020	0.0056
		Median	0.00014	0.00016	0.0234	0.0196	20.8	<0.000010	<0.0000050	0.00077	0.00065	0.022	0.0117	0.00125	<0.0010	<0.0000020	<0.000002	21.2	<0.0010	<0.0010	<0.00020	<0.00020	1.175	<0.0050	<0.0050	<0.0050		<0.020	0.0078
		3rd Quartile	0.000175	0.0002	0.0302	0.0244	22	<0.000010	<0.0000050	0.00108	0.00072	0.028	0.019	0.00148	<0.0010	<0.0000020	<0.0000020	22	<0.0010	<0.0010	<0.00020	<0.00020	1.248	<0.0050	<0.0050	0.003		0.013	0.01020
WD	Settling Pond #4	Average	0.00331	0.00195	0.0164	0.01384	376	0.000009	0.00000431	0.00072	0.00046	0.440	0.01146	0.047	0.03862	0.00000125	0.000001	312	0.00065	0.00071	0.000100	0.000100	526	0.01061	0.00250	0.0038		0.01	0.0306
E207409		Count	8	8	8	8	12	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	52	8	8	1		1	1
		Minimum	0.00193	0.00118	0.0038	<0.0030	320	<0.000010	<0.0000050	<0.00050	<0.00020	0.203	<0.0050	0.0117	<0.0010	<0.0000020	<0.0000020	264	<0.0010	<0.0010	<0.00020	<0.00020	258	<0.0050	<0.0050	0.0038		<0.020	0.0306
		Maximum	0.00439	0.00259	0.0556	0.0682	434	0.000029	0.000012	0.00143	0.00162	0.651	0.0233	0.0838	0.0783	0.000003	<0.0000020	375	0.0011	0.0016	<0.00020	<0.00020	820	0.0674	<0.0050	0.0038		<0.020	0.0306
		Geometric Mean	0.00322	0.00189	0.0112	0.00733	375	0.000007	0.0000035	0.000609	0.000342	0.414	0.00959	0.0391	0.01506	0.00000115	0.000001	309	0.0006	0.0006	0.000100	0.000100	515	0.00377	0.00250	0.0038		0.01	0.0306
		Count <DL	0	0	0	1	0	6	6	2	1	0	1	0	2	7	8	0	6	6	8	8	0	7	8	0		1	0
		Standard Deviation	0.00074	0.00048	0.0176	0.02211	33	0.0000086	0.00000357	0.000421	0.000479	0.148	0.00666	0.0277	0.03026	0.00000071	0.0000000	43	0.00028	0.00042	0.000000	0.000000	106	0.02295	3E-11	0		0.0000	0
		1st Quartile	0.00308	0.0017	0.0068	0.00518	360	<0.000010	<0.0000050	0.000452	0.00026	0.333	0.0072	0.0268	0.0191	<0.0000020	<0.0000020	269	<0.0010	<0.0010	<0.00020	<0.00020	454	<0.0050	<0.0050	0.0038		<0.020	0.03060
		Median	0.0034	0.00208	0.0099	0.00625	374	<0.000010	<0.0000050	0.00065	0.000305	0.492	0.01075	0.0403	0.0355	<0.0000020	<0.0000020	311	<0.0010	<0.0010	<0.00020	<0.00020	515	<0.0050	<0.0050	0.0038		<0.020	0.031
		3rd Quartile	0.00364	0.00221	0.0152	0.0093	396	0.000007	0.00000375	0.000907	0.00043	0.516	0.01385	0.0691	0.0642	<0.0000020	<0.0000020	342	0.00065	0.00065	<0.00020	<0.00020	582	<0.0050	<0.0050	0.0038		<0.020	0.03060
MW001D	Ex-situ 2-North deep groundwater well below the coal wash plant (Till)	Average		0.0195		0.0314	91.6		0.00000775		0.00179		0.0058		0.0106		0.0000056			0.0005		0.0001	25.7		0.0025		0.178		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.0186		0.0302	89.8		<0.0000050		0.00131		<0.0050		0.006		0.0000048			<0.0010		<0.00020	24.8		<0.0050		0.174		
		Maximum		0.0205		0.0326	93.4		0.000013		0.00227		0.0091		0.0153		0.0000064			<0.0010		<0.00020	26.6		<0.0050		0.182		
		Geometric Mean		0.0195		0.0314	91.6		0.0000057		0.00172		0.00477		0.0096		0.0000055			0.0005		0.0001	25.7		0.0025		0.178		
		Count <DL		0		0	0		1		0		1		0		0			2		2	0		2		0		
		Standard Deviation		0.0013		0.0017	2.5		0.00000742		0.00068		0.00467		0.006600		0.0000011			0		0	1.3		0		0.006		
		1st Quartile		0.0191		0.0308	90.7		0.00000512		0.00155		0.00415		0.0083		0.0000052			<0.0010		<0.00020	25.2		<0.0050		0.176		
		Median		0.0195		0.0314	91.6		0.00000775		0.00179		0.0058		0.0106		0.0000056			<0.0010		<0.00020	25.7		<0.0050		0.178		
		3rd Quartile		0.02		0.032	92.5		0.00001038		0.00203		0.00745		0.013		0.000006			<0.0010		<0.00020	26.2		<0.0050		0.180		
MW001S	Ex-situ 2-North shallow groundwater well below the coal wash plant (Till)	Average		0.00024		0.0015	361		0.000093		0.00046		0.107		1.79		0.0000037			0.0022		0.0001000	884		0.0025		0.00280		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.00015		<0.0030	356		0.000076		0.00038		0.055		1.59		0.0000035			0.0017		<0.00020	790		<0.0050		0.0023		
		Maximum		0.00032		<0.0030	366		0.000109		0.00055		0.159		1.99		0.0000039			0.0027		<0.00020	979		<0.0050		0.0032		
		Geometric Mean		0.00022		0.0015	361		0.000091		0.00046		0.0935		1.78		0.0000037			0.0021		0.0001000	879		0.0025		0.0027		
		Count <DL		0		2	0		0		0		0		0		0			0		2	0		2		0		
		Standard Deviation		0.00012		0	7.1		0.0000233		0.00012		0.0735		0.28		0.0000003			0.0007		0.0000000	133		0		0.00060		
		1st Quartile		0.00019		<0.0030	358.5		0.0000842		0.00042		0.081		1.69		0.0000036			0.002		<0.00020	837		<0.0050		0.00250		
		Median		0.00024		<0.0030	361		0.000093		0.00046		0.107		1.79		0.0000037			0.0022		<0.00020	884		<0.0050		0.00280		
				0.00028		<0.0030	363.5		0.000101		0.00051		0.133		1.89		0.0000038			0.0024		<0.00020	931		<0.0050		0.00300		
MW006D	Ex-situ 2-North deep groundwater well below the coal wash plant (Till)	Average		0.0287		0.0326	81.3		0.0000043		0.00068		0.0034		0.0009		0.0000045			0.000500		0.0001000	11.8		0.00250		0.156		
		Count		3		3	3		3		3		3		3		3			3		3	3		3		3		
		Minimum		0.0278		0.022	77.7		<0.0000050		0.0005		<0.0050		<0.0010		0.0000036			<0.0010		<0.00020	11.1		<0.0050		0.147		
		Maximum		0.0292		0.0506	84.1		0.000008		0.00082		0.0051		0.0017		0.0000054			<0.0010		<0.00020	12.7		<0.0050		0.16		
		Geometric Mean		0.0287		0.0303	81.3		0.0000037		0.00067		0.00317		0.00075		0.0000044			0.000500		0.0001000	11.7		0.0025		0.156		
		Count <DL		0		0	0		2		0		2		2		0			3		3	0		3		0		
		Standard Deviation		0.0008		0.0157	3.3		0.0000032		0.00017		0.0015		0.00069		0.0000009			0.0000000		0.0000000	0.8		4E-11		0.008		
		1st Quartile		0.0284		0.0236	80		<0.0000050		0.00062		<0.0050		<0.0010		0.000004			<0.0010		<0.00020	11.3		<0.0050		0.154		
		Median		0.029		0.0251	82.2		<0.0000050		0.00073		<0.0050		<0.0010		0.0000044			<0.0010		<0.00020	11.5		<0.0050		0.16		
		3rd Quartile		0.0291		0.0378	83.2		0.00000525		0.00078		0.0038		0.0011		0.0000049			<0.0010		<0.00020	12.1		<0.0050		0.16		
MW006S	Ex-situ 2-North shallow groundwater well below the coal wash plant (Till)	Average		0.0018		0.01640	191.3		0.000021		0.00118		0.0142		0.0201		0.0000049			0.0007		0.0001	573.7		0.00250		0.0561		
		Count		3		3	3		3		3		3		3		3			3		3	3		3		3		
		Minimum		0.00157		0.0069	180		0.0000107		0.00078		0.0052		0.0122		<0.000002			<0.0010		<0.00020	559		<0.0050		0.0525		
		Maximum		0.00202		0.034	199		0.0000283		0.00141		0.0226		0.0302		0.0000071			0.0011		<0.00020	585		<0.0050		0.063		
		Geometric Mean		0.00179		0.0125	191.2		0.0000194		0.00114		0.0121		0.0188		0.0000036			0.00065		0.0001000	573.6		0.0025		0.0559		
		Count <DL		0		0	0		0		0		0		0		1			2		3	0		3		0		
		Standard Deviation		0.00023		0.0153	10.0		0.000009		0.000350		0.0087		0.0092		0.0000034			0.00035		0.0000000	13.3		4E-11		0.0059		
		1st Quartile		0.00168		0.00760	187.5		0.0000174		0.00107		0.01		0.0150		0.00000385			<0.0010		<0.00020	568		<0.0050		0.0528		
		Median		0.0018		0.00830	195		0.000024		0.00136		0.0149		0.0179		0.0000067			<0.0010		<0.00020	577.0		<0.0050		0.053		
		3rd Quartile		0.00191		0.02120	197		0.0000262		0.00138		0.0188		0.0241		0.0000069			0.0008		<0.00020	581		<0.0050		0.058		
WC		Average	0.00111	0.00102	0.0151	0.01532	307	0.0000056	0.00000294	0.001084	0.000328	0.085	0.0142	0.0072	0.00512	0.000001	0.00000115	263	0.0005	0.00059	0.000123	0.000100	504	0.00250	0.00250				
E207411	2-North Pit Culvert discharge into Middle Quinsam Lake	Count	8	8	8	8	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12	8	8				
		Minimum	0.00039	0.00073	<0.0030	<0.0030	231	<0.000010	<0.0000050	<0.00050	<0.00020	0.045	0.0079	0.0037	<0.0010	<0.0000020	<0.0000020	163	<0.0010	<0.0010	<0.00020	<0.00020	348	<0.0050	<0.0050				
		Maximum	0.00155	0.00133	0.0283	0.059	365	0.000010	0.000006	0.00692	0.00074	0.125	0.0266	0.0123	0.0087	<0.0000020	0.0000022	329	<0.0010	0.0012	0.00028	<0.00020	670	<0.0050	<0.0050				
		Geometric Mean	0.00104	0.00101	0.01127	0.00942	304	0.0000055	0.00000279	0.00038	0.000253	0.0810	0.0128	0.0068	0.00414	0.000001	0.0000011	257	0.0005	0.00056	0.000114	0.000100	495	0.00250	0.0025				
		Count <DL	0	0	1	1	0	7	7	7	3	0	0	0	1	8	7	0	8	7	7	8	0	8	8				
		Standard Deviation	0.00033	0.00021	0.00993	0.01848	47	0.0000018	0.0000012	0.002358	0.000228	0.026	0.0073	0.0027	0.00238	0	0.0000042	57	0	0.00025	0.000064	0.000000	97	3E-11	3E-11				
		1st Quartile	0.00109	0.00084	0.00865	0.00628	287	<0.000010	<0.0000050	<0.00050	<0.00020	0.067	0.00840	0.0059	0.00423	<0.0000020	<0.0000020	229	<0.0010	<0.0010	<0.00020	<0.00020	443	<0.0050	<0.0050				
		Median	0.00114	0.00108	0.0116	0.0085	297	<0.000010	<0.0000050	<0.00050	0.000325	0.092	0.0113	0.0072	0.0057	<0.0000020	<0.0000020	266	<0.0010	<0.0010	<0.00020	<0.00020	488	<0.0050	<0.0050				
		3rd Quartile	0.00124	0.00114	0.02455	0.01435	343	<0.000010	<0.0000050	<0.00050	0.000452	0.0980	0.0183	0.0083	0.00605	<0.0000020	<0.0000020	306	<0.0010	<0.0010	<0.00020	<0.00020	562	<0.0050	<0.0050				
MQL1	Middle Quinsam Lake 1 metre below surface	Average	0.00027	0.0002200	0.0198	0.0161	40.3	0.0000066	0.00000273	0.00098	0.0006	0.135	0.0225	0.0104	0.00167	0.0000001	0.00000100	38.1	0.0005	0.0005	0.000159	0.0001	31.9	0.00363	0.0025	0.00335			
E206618		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	4			
		Minimum	0.00011	0.00011	0.0064	0.0078	31	<0.000010	<0.000005	0.00055	0.00043	0.029	0.0073	0.0034	<0.0010	<0.000002	<0.000002	30.8	<0.0010	<0.0010	<0.00020	<0.00020	22.8	<0.0050	<0.0050	<0.0020			
		Maximum	0.00069	0.00034	0.0352	0.0216	49.4	0.000029	0.000006	0.00429	0.00086	1.48	0.0404	0.0283	0.0052	<0.000002	<0.000002	59.3	<0.0010	<0.0010	0.00074	<0.00020	38.9	0.0169	<0.0050	0.007			
		Geometric Mean	0.00023	0.00021	0.018	0.0153	39.8	0.0000056	0.00000265	0.00082	0.00059	0.048	0.0206	0.0082	0.00113	0.000001	0.000001	37.6	0.0005	0.0005	0.000124	0.00010000	31.4	0.00297	0.0025	0.00236			
		Count <DL	0	0	0	0	0	14	14	0	0	0	0	0	7	15	15	0	15	15	13	15	0	13	15	2			
		Standard Deviation	0.00016	0.00008	0.0083	0.0047	7	0.0000062	0.0000009	0.00093	0.00014	0.372	0.0095	0.008	0.00162	0	0	6.9	0	0	0.000173	0	5.6	0.00373	4E-11	0.00291			
		1st Quartile	0.00016	0.00016	0.0138	0.012	36.9	<0.000010	<0.0000050	0.00062	0.000500	0.034	0.0158	0.0044	<0.0010	<0.0000020	<0.0000020	34.4	<0.0010	<0.0010	<0.00020	<0.00020	26.6	<0.0050	<0.0050	<0.0020			
		Median	0.0002	0.0002000	0.0204	0.0179	39.9	<0.000010	<0.000005	0.000660	0.00058	0.037	0.0218	0.0077	0.00100	<0.0000020	<0.0000020	36.8	<0.0010	<0.0010	<0.00020	<0.00020	34.10	<0.0050	<0.0050	0.0027			
		3rd Quartile	0.00035	0.00027	0.0254	0.0194	44.2	<0.000010	<0.000005	0.00086	0.00067	0.045	0.0282	0.0124	0.00205	<0.000002	<0.000002	40	<0.0010	<0.0010	<0.00020	<0.00020	35.9	<0.0050	<0.0050	0.00505			
MQLB	Middle Quinsam Lake 1 metre from bottom	Average	0.0002	0.00019	0.01115	0.00678	40.8	0.004658	0.00003567	0.000527	0.00046	0.493	0.0813	0.429	0.3947	0.000001	0.00000100	54.8	0.00057	0.0005	0.0001	0.0001	45.6	0.004450	0.0025	0.00390			
E206618		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	4			
		Minimum	0.00013	0.0001	<0.0030	<0.0030	36.1	<0.000010	<0.000005	<0.00050	0.00034	0.0590	0.01	0.0192	0.0028	<0.000002	<0.000002	37.1	<0.0010	<0.0010	<0.00020	<0.00020	31.6	<0.0050	<0.0050	0.0023			
		Maximum	0.00037	0.00041	0.0211	0.0106	47.3	0.0698	0.000484	0.00092	0.00068	2.75	0.534	1.58	1.5	<0.000002	<0.000002	63.2	0.0016	<0.0010	<0.00020	<0.00020	53.5	0.0317	<0.0050	0.0053			
		Geometric Mean	0.00019	0.00018	0.00927	0.00559	40.7	0.0000094	0.0000043	0.000473	0.000450	0.192	0.0383	0.1332	0.0877	0.000001	0.000001	54.5	0.00054	0.0005	0.0001	0.0001	45.3	0.00296	0.0025	0.00380			
		Count <DL	0	0	1	3	0	14	12	5	0	0	0	0	0	15	15	0	14	15	15	15	0	14	15	0			
		Standard Deviation	0.00007	0.00008	0.00592	0.00336	4.1	0.018021	0.00012406	0.000238	0.0001	0.862	0.1342	0.6029	0.5804	0	0	6	0.00028	0	0	0.00000000	5.8	0.00754	4E-11	0.00130			
		1st Quartile	0.00015	0.00013	0.00595	0.00445	39.6	<0.000010	<0.0000050	<0.00050	0.00039	0.07	0.0142	0.028	0.0182	<0.0000020	<0.0000020	53.1	<0.0010	<0.0010	<0.00020	<0.00020	44	<0.0050	<0.0050	0.0033			
		Median	0.00019	0.0001600	0.0106	0.0078	40.4	<0.000010	<0.000005	0.00054	0.000420	0.118	0.0284	0.0796	0.0768	<0.0000020	<0.0000020	55.8	<0.0010	<0.0010	<0.00020	<0.00020	45.4	<0.0050	<0.0050	0.0041			
		3rd Quartile	0.00024	0.00021	0.016	0.00955	40.8	<0.000010	<0.0000050	0.00069	0.00048	0.31	0.0874	0.6370	0.572	<0.000002	<0.000002	56.7	<0.0010	<0.0010	<0.00020	<0.00020	48.7	<0.0050	<0.0050	0.0048			

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

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2015-16 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
NNL1			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E217018	No Name Lake 1 metre below surface	Average	0.00029	0.000290	0.0245	0.0208	12.9	0.0000062	0.00000267	0.000339	0.00053	0.042	0.0303	0.004	0.00289	0.000001	0.000001	15	0.0005	0.0005	0.0001	0.0001	2.31	0.0142	0.00279	0.0068			
		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	4			
		Minimum	0.00019	0.00019	0.0059	0.006	11.4	<0.000010	<0.0000050	<0.00050	0.00023	0.023	0.0112	0.0024	<0.0010	<0.0000020	<0.0000020	11.2	<0.0010	<0.0010	<0.00020	<0.00020	1.32	<0.0050	<0.0050	0.0038			
		Maximum	0.00045	0.00036	0.0486	0.0343	14.6	0.000023	0.000005	0.00068	0.00091	0.078	0.0611	0.0095	0.0084	<0.0000020	<0.0000020	17.0	<0.0010	<0.0010	<0.00020	<0.00020	3.95	0.125	0.0068	0.0133			
		Geometric Mean	0.00029	0.00028	0.0215	0.0186	12.8	0.00000550	0.00000262	0.000313	0.0005	0.04	0.0266	0.00360	0.00188	0.00000100	0.00000100	14.9	0.0005	0.0005	0.0001	0.0001	2.2	0.00462	0.00267	0.00600			
		Count <DL	0	0	0	0	0	14	14	11	0	0	0	0	5	15	15	0	15	15	15	15	0	11	14	0			
		Standard Deviation	0.000070	0.00005	0.0118	0.0090	1.5	0.0000046	0.00000065	0.000158	0.00019	0.014	0.0146	0.0019	0.00237	0.00000000	0.00000000	1.6	0	0	0.00000000	0	0.78	0.03242	0.00111	0.0044			
		1st Quartile	0.00023	0.00024	0.0136	0.0122	11.5	<0.000010	<0.000005	<0.00050	0.0004	0.03	0.0174	0.0028	<0.0010	<0.000002	<0.000002	13.8	<0.0010	<0.0010	<0.00020	<0.00020	1.72	<0.0050	<0.0050	0.0044			
		Median	0.00031	0.000310	0.0227	0.0218	12.8	<0.000010	<0.0000050	<0.00050	0.00054	0.044	0.0331	0.00320	0.00280	<0.0000020	<0.0000020	15	<0.0010	<0.0010	<0.00020	<0.00020	2.03	<0.0050	<0.0050	0.005			
		3rd Quartile	0.00034	0.00032	0.033	0.0274	14.1	<0.000010	<0.0000050	0.000375	0.00066	0.047	0.0390	0.0044	0.00415	<0.0000020	<0.0000020	16.4	<0.0010	<0.0010	<0.00020	<0.00020	2.52	0.0051	<0.0050	0.0074			
NNLB	No Name Lake 1 metre from bottom	Average	0.00025	0.00022	0.0335	0.0274	11.4	0.000005	0.0000025	0.000416	0.00055	0.184	0.1027	0.0303	0.0237	0.000001	0.000001	16.7	0.0005	0.0005	0.0001	0.0001	4.82	0.0025	0.002500	0.00420			
E217018		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	4			
		Minimum	0.00015	0.00016	0.0249	0.0202	10.2	<0.000010	<0.0000050	<0.00050	0.00029	0.092	0.0438	0.0061	0.0023	<0.0000020	<0.0000020	15.1	<0.0010	<0.0010	<0.00020	<0.00020	4.06	<0.0050	<0.0050	0.0024			
		Maximum	0.00035	0.00031	0.0434	0.0333	12.7	<0.000010	<0.0000050	0.00077	0.00139	0.416	0.197	0.094	0.0807	<0.0000020	<0.0000020	19.1	<0.0010	<0.0010	<0.00020	<0.00020	5.81	<0.0050	<0.0050	0.0067			
		Geometric Mean	0.00024	0.000210	0.0331	0.027	11.4	0.000005	0.0000025	0.000368	0.00051	0.164	0.0896	0.0161	0.0087	0.00000100	0.00000100	16.7	0.0005000	0.0005	0.0001	0.0001	4.8	0.0025	0.0025	0.00400			
		Count <DL	0	0	0	0	0	15	15	9	0	0	0	0	0	15	15	0	15	15	15	15	0	15	15	0			
		Standard Deviation	0.00006	0.00004	0.0057	0.0044	1	1E-13	1E-13	0.000218	0.00026	0.099	0.0557	0.0345	0.031	0.00000000	0.00000000	1.1	0	0.0000000	0	0	0.46	4E-11	0.000000	0.00180			
		1st Quartile	0.00023	0.0002	0.0289	0.0243	10.6	<0.000010	<0.000005	<0.00050	0.00042	0.12	0.0516	0.0074	0.003	<0.000002	<0.000002	16	<0.0010	<0.0010	<0.00020	<0.00020	4.51	<0.0050	<0.0050	0.0032			
		Median	0.00025	0.00021	0.0345	0.0286	11.5	<0.000010	<0.0000050	<0.00050	0.00048	0.136	0.0844	0.0077	0.0036	<0.0000020	<0.0000020	16.4	<0.0010	<0.0010	<0.00020	<0.00020	4.84	<0.0050	<0.0050	0.0039			
		3rd Quartile	0.00026	0.00023	0.0377	0.031	12.1	<0.000010	<0.0000050	0.000640	0.0006	0.254	0.159	0.0596	0.0505	<0.0000020	<0.0000020	17.4	<0.0010	<0.0010	<0.00020	<0.00020	5.08	<0.0050	<0.0050	0.005			
NNO	No Name Lake Outlet	Average	0.00026	0.00026	0.0358	0.0302	12.36	0.0000055	0.00000275	0.0007	0.00073	0.061	0.0386	0.006	0.00432	0.0000010	0.0000013	14.5	0.0005	0.00050	0.000100	0.000100	1.8	0.00324	0.0025	0.00274	0.0028	0.0122	0.009
E217017		Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	5	5	5	5
		Minimum	0.00021	0.00019	0.02	0.0167	9.55	<0.000005	<0.000005	<0.00050	0.00034	0.044	0.0223	0.0026	<0.0010	<0.000002	<0.000002	12.4	<0.0010	<0.0010	<0.00020	<0.00020	1.19	<0.0050	<0.0050	<0.0020	<0.0020	<0.020	0.0051
		Maximum	0.00031	0.00039	0.0501	0.0434	15.3	0.000015	0.0000050	0.00193	0.00262	0.101	0.0719	0.0151	0.0137	<0.000002	0.000004	17.1	<0.0010	<0.0010	<0.00020	<0.00020	2.69	0.0099	<0.0050	0.0039	0.0042	0.021	0.0154
		Geometric Mean	0.00026	0.00025	0.0347	0.0295	12.25	0.00000486	0.00000268	0.000543	0.0006	0.059	0.0352	0.0048	0.0024	0.000001	0.00000115	14.5	0.0005	0.00050	0.000100	0.000100	1.72	0.00287	0.0025	0.0025	0.00253	0.0116	0.0082
		Count <DL	0	0	0	0	0	9	9	4	0	0	0	0	3	10	9	0	10	10	10	10	0	9	10	1	1	4	0
		Standard Deviation	0.00004	0.00006	0.0089	0.0068	1.77	0.0000035	0.00000079	0.000542	0.00067	0.0190	0.0181	0.0045	0.00448	0	0.00000095	1.5	0	0.00000	0.000000	0.000000	0.59	0.00234	4E-11	0.00107	0.0012	0.0049	0.0043
		1st Quartile	0.00024	0.0002	0.0304	0.0277	11.18	<0.000010	<0.0000050	<0.00050	0.00045	0.05	0.0234	0.0027	0.00078	<0.000002	<0.0000020	13.8	<0.0010	<0.0010	<0.00020	<0.00020	1.36	<0.0050	<0.0050	0.0027	0.0025	<0.020	0.0058
		Median	0.00027	0.00026	0.0357	0.03	12.05	<0.000010	<0.000005	0.00061	0.00050	0.054	0.0327	0.0042	0.003	<0.0000020	<0.000002	14.2	<0.0010	<0.0010	<0.00020	<0.00020	1.44	<0.0050	<0.0050	0.0029	0.0028	<0.020	0.0074
		3rd Quartile	0.00029	0.0003	0.0408	0.0320	13.23	<0.000010	<0.000005	0.000893	0.00067	0.06	0.0495	0.0073	0.00578	<0.000002	<0.0000020	15.7	<0.0010	<0.0010	<0.00020	<0.00020	2.26	<0.0050	<0.0050	0.0032	0.0035	<0.020	0.011
LLS	Small Seep into Long Lake	Average	0.00474	0.00196	0.0398	0.01257	228	0.00001200	0.00001014	0.000967	0.000681	1.777	0.00836	0.4052	0.394	0.0000010	0.0000010	604	0.0036	0.0034	0.000100	0.0001	533	0.00338	0.00309				
E292131		Count	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12				
		Minimum	0.00078	0.00037	<0.0030	<0.0030	159	<0.000010	<0.0000050	<0.00050	<0.00020	0.271	<0.0050	0.0966	0.0949	<0.0000020	<0.0000020	393	0.0015	0.0015	<0.00020	<0.00020	281	<0.0050	<0.0050				
		Maximum	0.0113	0.0038	0.226	0.0651	263	0.000072	0.0000693	0.00364	0.00324	5.48	0.0334	0.602	0.58	<0.0000020	<0.0000020	791	0.0121	0.0108	<0.00020	<0.00020	709	0.0104	0.0096				
		Geometric Mean	0.00388	0.00157	0.0114	0.00559	226	0.0000073	0.00000476	0.000642	0.000268	1.265	0.00604	0.3645	0.3528	0.000001	0.000001	591	0.003	0.0029	0.000100	0.0001	511	0.00299	0.0028				
		Count <DL	0	0	2	3	0	9	7	5	7	0	4	0	0	12	12	0	0	0	12	12	0	10	11				
		Standard Deviation	0.0028	0.00117	0.06927	0.02002	32	0.0000192	0.00001914	0.000985	0.001047	1.562	0.00852	0.1543	0.1562	0	0	126	0.0029	0.0025	0.000000	0.000000	148	0.00234	0.00205				
		1st Quartile	0.00285	0.00115	0.00532	0.00278	211	<0.000010	<0.0000050	<0.00050	<0.00020	0.777	<0.0050	0.357	0.2978	<0.0000020	<0.0000020	535	0.0022	0.002	<0.00020	<0.00020	405	<0.0050	<0.0050				
		Median	0.00468	0.0016	0.0083	0.0050	243	<0.000010	<0.000005	0.000755	<0.00020	1.21	0.0065	0.447	0.438	<0.0000020	<0.0000020	648	0.0024	0.0024	<0.00020	<0.00020	580	<0.0050	<0.0050				
		3rd Quartile	0.00559	0.00282	0.02655	0.00808	249	0.0000062	0.00000592	0.001132	0.000677	2.418	0.00902	0.5075	0.5108	<0.0000020	<0.0000020	694	0.0039	0.0039	<0.00020	<0.00020	660	<0.0050	<0.0050				
LLSM	Long Lake Middle Seep	Average	0.00137	0.00096	0.02277	0.01510	195.1	0.000005	0.00000434	0.000583	0.000446	0.445	0.00489	0.1838	0.1805	0.000001	0.00000151	509	0.0027	0.0026	0.0001	0.0001	459	0.0025	0.0025				
E292131		Count	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7				
		Minimum	0.00059	0.00036	<0.0030	0.004	173	<0.000010	<0.0000050	<0.00050	<0.00020	0.249	<0.0050	0.0722	0.0591	<0.0000020	<0.0000020	455	0.0018	0.0015	<0.00020	<0.00020	370	<0.0050	<0.0050				
		Maximum	0.00188	0.00140	0.0549	0.0396	228	<0.000010	0.000009	0.00141	0.00101	0.669	0.0123	0.285	0.298	<0.0000020	0.0000032	561	0.0044	0.0041	<0.00020	<0.00020	617	<0.0050	<0.0050				
		Geometric Mean	0.00127	0.00087	0.01168	0.011	194	0.000005	0.00000379	0.000451	0.00034	0.419	0.00402	0.1628	0.1557	0.000001	0.00000134	508	0.0026	0.0025	0.000100	0.0001	451	0.0025	0.00250				
		Count <DL	0	0	2	0	0	7	4	4	1	0	4	0	0	7	5	0	0	0	7	7	0	7	7				
		Standard Deviation	0.0005	0.00041	0.02073	0.0129	22.6	1E-13	0.00000256	0.000461	0.00036	0.158	0.00366	0.0901	0.0952	0.0000000	0.0000009	39	0.0008	0.0009	0	0	90	0	0				
		1st Quartile	0.001	0.00064	0.00705	0.0053	174	<0.000010	<0.0000050	<0.00050	0.00023	0.344	<0.0050	0.1177	0.1122	<0.0000020	<0.0000020	487	0.0023	0.0021	<0.00020	<0.00020	382	<0.0050	<0.0050				
		Median	0.00156	0.00117	0.0134	0.012	193	<0.000010	<0.000005	<0.00050	0.00024	0.445	<0.0050	0.154	0.1540	<0.0000020	<0.0000020	504	0.0026	0.0023	<0.00020	<0.00020	453	<0.0050	<0.0050				
		3rd Quartile	0.00176	0.00126	0.03775	0.0199	212	<0.000010	0.00000575	0.000835	0.000655	0.531	0.00595	0.2700	0.264	<0.0000020	0.0000017	537	0.0027	0.003	<0.00020	<0.00020	505	<0.0050	<0.0050				

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 51
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2015-16 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW002	Ex-situ 2-3 South shallow groundwater well beside 3-South Pit (1 Seam)	Average		0.0005		0.0032	200		0.0000074		0.000997		2.38		2.56		0.0000032			0.0026		0.000100	1195		0.0025		0.00330		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.00037		<0.0030	193		0.000005		<0.00020		2.06		2.29		0.0000024			0.0023		<0.00020	1150		<0.0050		0.0023		
		Maximum		0.00069		0.0059	210		0.000011		0.00369		2.77		2.69		0.0000037			0.0028		<0.00020	1220		<0.0050		0.0053		
		Geometric Mean		0.00049		0.00268	199.9		0.0000071		0.000246		2.36		2.55		0.0000031			0.0026		0.000100	1194.7		0.0025		0.0031		
		Count <DL		0		2	0		0		3		0		0		0			0		4	0		4		0		
		Standard Deviation		0.00014		0.00213	7.7		0.0000026		0.001795		0.3		0.18		0.0000006			0.0002		0.000000	31.1		0		0.0014		
		1st Quartile		0.0004		<0.0030	194.5		0.0000058		<0.00020		2.23		2.54		0.0000028			0.0026		<0.00020	1187.5		<0.0050		0.0024		
		Median		0.00047		0.0027	198.5		0.0000068		<0.00020		2.34		2.63		0.0000032			0.0028		<0.00020	1205		<0.0050		0.0028		
		3rd Quartile		0.00057		0.0044	204		0.0000084		0.000998		2.48		2.65		0.0000036			0.0028		<0.00020	1212.5		<0.0050		0.00380		
QU1009D	Ex-situ 4-South deep groundwater well. Down gradient of 4-South Mine. Base of Dunsmuir Member. Assesses vertical gradients & water quality down gradient of the 4-South Mine workings. Just outside of mine pool. (Below 3 Seam)	Average		0.122		0.02190	185.5		0.0000025		0.000100		0.205		0.0164		0.0000010			0.000500		0.0001000	80.6		0.00250		0.0340		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.118		0.0046	185		<0.0000050		<0.00020		0.194		0.0147		<0.0000020			<0.0010		<0.00020	76.8		<0.0050		0.03		
		Maximum		0.125		0.0392	186		<0.0000050		<0.00020		0.216		0.018		<0.0000020			<0.0010		<0.00020	84.4		<0.0050		0.038		
		Geometric Mean		0.121		0.0134	185.5		0.0000025		0.000100		0.205		0.0163		0.0000010			0.000500		0.0001000	80.5		0.00250		0.0338		
		Count <DL		0		0	0		2		2		0		0		2			2		2	0		2		0		
		Standard Deviation		0.005		0.0245	0.7		0.0000000		0.000000		0.016		0.0023		0.0000000			0.000000		0.0000000	5.4		0.00000		0.0057		
		1st Quartile		0.12		0.01320	185.2		<0.0000050		<0.00020		0.2		0.0155		<0.0000020			<0.0010		<0.00020	78.7		<0.0050		0.032		
		Median		0.122		0.02190	185.5		<0.0000050		<0.00020		0.205		0.0164		<0.0000020			<0.0010		<0.00020	80.6		<0.0050		0.034		
		3rd Quartile		0.123		0.03060	185.8		<0.0000050		<0.00020		0.21		0.0172		<0.0000020			<0.0010		<0.00020	82.5		<0.0050		0.036		
QU1009S	Ex-situ 4-South shallow groundwater well. Fracture zone 10 m below till. Assesses vertical gradients & water quality down gradient of the 4-South Mine workings. Just outside of mine pool. (Below 3 Seam)	Average		0.0857		0.00150	134.5		0.0000025		0.000100		5.42		0.366		0.0000043			0.000500		0.0001000	111.9		0.00250		0.0335		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.0787		<0.0030	129		<0.0000050		<0.00020		5.01		0.326		0.0000033			<0.0010		<0.00020	97.8		<0.0050		0.0333		
		Maximum		0.0927		<0.0030	140		<0.0000050		<0.00020		5.84		0.406		0.0000053			<0.0010		<0.00020	126		<0.0050		0.0338		
		Geometric Mean		0.0854		0.0015	134.4		0.0000025		0.000100		5.41		0.364		0.0000042			0.0005		0.0001000	111.0		0.00250		0.0335		
		Count <DL		0		2	0		2		2		0		0		0			2		2	0		2		0		
		Standard Deviation		0.0099		0	7.8		0.0000000		0.000000		0.59		0.057		0.0000014			0		0.0000000	19.9		0.00000		0.0004		
		1st Quartile		0.0822		<0.0030	131.8		<0.0000050		<0.00020		5.22		0.346		0.0000038			<0.0010		<0.00020	104.8		<0.0050		0.0334		
		Median		0.0857		<0.0030	134.5		<0.0000050		<0.00020		5.42		0.366		0.0000043			<0.0010		<0.00020	111.9		<0.0050		0.0335		
		3rd Quartile		0.0892		<0.0030	137.2		<0.0000050		<0.00020		5.63		0.386		0.0000048			<0.0010		<0.00020	119		<0.0050		0.0337		
SPD	Settling Pond # 1		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E218582		Average	0.00159	0.00125	0.0362	0.0179	80.00	0.0000108	0.00000818	0.00117	0.00054	0.568	0.0871	0.1744	0.15571	0.000001	0.0000001	448	0.0043	0.0042	0.0001	0.000108	337.4	0.00361	0.00394	0.0131		0.5050	0.0147
		Count	13	13	13	13	10	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	36	13	13	2		2	2
		Minimum	0.00034	0.00018	0.0077	0.0031	46.20	<0.000010	<0.0000050	0.00062	0.00028	0.092	0.0103	0.0219	<0.0020	<0.0000020	<0.0000020	305	0.001	<0.0020	<0.00020	<0.00020	41.9	<0.0050	<0.0050	0.0078		<0.020	0.0053
		Maximum	0.00414	0.00333	0.0893	0.0447	110.0	0.00003	0.000020	0.0041	0.00093	1.64	0.226	0.647	0.571	<0.0000020	<0.0000020	584	0.0105	0.0116	<0.00020	<0.00040	505	0.0083	0.0079	0.0184		<2.0	0.0241
		Geometric Mean	0.00124	0.00089	0.0267	0.0131	78.1	0.0000087	0.00000596	0.00098	0.00051	0.37	0.0605	0.1008	0.04528	0.0000010	0.0000010	440	0.00310	0.00309	0.0001	0.000105	299.50	0.0032	0.00353	0.012		0.1000	0.0113
		Count <DL	0	0	0	0	0	7	5	0	0	0	0	0	1	13	13	0	0	1	13	13	0	10	9	0		2	0
		Standard Deviation	0.00114	0.00102	0.0266	0.0147	17.3	0.0000081	0.00000664	0.00096	0.00018	0.519	0.0675	0.1942	0.19427	0.0000000	0	90.0	0.0035	0.00349	0.000000	0.000028	125.7	0.00214	0.00202	0.0075		0.7	0.0133
		1st Quartile	0.00068	0.00053	0.0114	0.0075	70.7	<0.000010	<0.0000050	0.00068	0.00042	0.161	0.0305	0.0383	0.0125	<0.0000020	<0.0000020	362	0.0017	0.0017	<0.00020	<0.00020	288.8	<0.0050	<0.0050	0.0104		0.2575	0.01
		Median	0.00130	0.00083	0.029	0.0111	80.2	<0.000010	0.0000054	0.00079	0.00049	0.267	0.0777	0.124	0.106	<0.0000020	<0.0000020	475	0.0021	0.0024	<0.00020	<0.00020	359.00	<0.0050	<0.0050	0.0131		0.505	0.01470
		3rd Quartile	0.00205	0.00203	0.0547	0.0242	89.4	0.000018	0.00001100	0.00104	0.00066	0.94	0.1150	0.157	0.161	<0.0000020	<0.0000020	502	0.0071	0.0058	<0.00020	<0.00020	426	<0.0050	0.0054	0.01580		0.7525	0.01940
LLE	Long Lake Entrance (LLE)	Average	0.00092	0.00072	0.0889	0.03440	55.9	0.00000700	0.00000361	0.001265	0.00079	0.418	0.1551	0.107	0.0912	0.000001	0.0000010	250	0.00082	0.00072	0.000115	0.000100	210.4	0.00353	0.00250	0.0092	0.0045	0.0392	0.01736
E292130		Count	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	11	11	11	11	41	11	11	19	1	12	12
		Minimum	0.00027	0.00025	0.0137	0.0044	39.2	<0.000010	<0.0000050	<0.00050	0.00022	0.268	0.0239	0.0171	0.0019	<0.0000020	<0.0000020	140	<0.0010	<0.0010	<0.00020	<0.00020	64.6	<0.0050	<0.0050	0.004	0.0045	<0.020	<0.0050
		Maximum	0.00197	0.00133	0.235	0.0803	82.1	0.0000270	0.0000062	0.00568	0.00343	0.753	0.406	0.26	0.258	<0.0000020	<0.0000020	416	0.0023	0.0019	0.00026	<0.00020	481	0.0109	<0.0050	0.0319	0.0045	0.11	0.0470
		Geometric Mean	0.00078	0.00064	0.0648	0.0226	54.2	0.0000058	0.00000334	0.000859	0.00053	0.403	0.1124	0.0766	0.0511	0.000001	0.000001	233.0	0.00066	0.00062	0.000109	0.000100	192.9	0.00307	0.00250	0.0079	0.0045	0.0263	0.0113
		Count <DL	0	0	0	0	0	10	7	2	0	0	0	0	0	10	11	0	9	9	10	11	0	9	11	0	0	5	2
		Standard Deviation	0.00055	0.00037	0.0655	0.02750	14.9	0.0000066	0.00000158	0.001516	0.00094	0.131	0.1212	0.0836	0.0821	0	0	101	0.00071	0.00049	0.000048	0.000000	91.5	0.0026	0.00000	0.0062	0	0.0351	0.01594
		1st Quartile	0.00051	0.00046	0.0385	0.008	46.1	<0.000010	<0.0000050	0.000665	0.00027	0.332	0.067	0.0377	0.031	<0.0000020	<0.0000020	184	<0.0010	<0.0010	<0.00020	<0.00020	145	<0.0050	<0.0050	0.0053	0.0045	<0.020	0.00575
		Median	0.00085	0.00064	0.0917	0.0345	49.2	<0.000010	<0.000005	0.00084	0.00042	0.411	0.105	0.0839	0.0785	<0.0000020	<0.0000020	215	<0.0010	<0.0010	<0.00020	<0.00020	189	<0.0050	<0.0050	0.0083	0.0045	0.028	0.01145
		3rd Quartile	0.00122	0.00094	0.114	0.049	64.2	<0.000010	0.000005	0.0012	0.00072	0.452	0.2205	0.173	0.129	<0.0000020	<0.0000020	314	<0.0010	<0.0010	<0.00020	<0.00020	235	<0.0050	<0.0050	0.01050	0.0045	0.0555	0.02232
LLM1	Long Lake Middle 1 metre below Surface	Average	0.00056	0.00052	0.0147	0.0102	33.3	0.00005470	0.0000025	0.000579	0.00040	0.037	0.015	0.0082	0.0012	0.000001	0.000001	94	0.00059	0.00050	0.000213	0.000100	81.1	0.00415	0.00250	0.00268			
E206619		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	4			
		Minimum	0.00037	0.00034	0.0064	0.0035	26	<0.000010	<0.0000050	<0.00050	0.00029	0.018	0.0057	0.0036	<0.0010	<0.0000020	<0.0000020	66	<0.0010	<0.0010	<0.00020	<0.00020	44.8	<0.0050	<0.0050	<0.0020			
		Maximum	0.00084	0.00094	0.0327	0.0175	39.5	0.000699	<0.0000050	0.00219	0.00054	0.08	0.0306	0.0193	0.0053	<0.0000020	<0.0000020	125	0.0019	<0.0010	0.00179	<0.00020	108	0.0128	<0.0050	0.0046			
		Geometric Mean	0.00054	0.0005	0.0131	0.0094	32.8	0.0000093	0.0000025	0.00039	0.00039	0.034	0.0132	0.0071	0.00083	0.000001	0.000001	91.6	0.00055	0.00050	0.000121	0.000100	78.2	0.00345	0.00250	0.00234			
		Count <DL	0	0	0	0	0	11	15	11	0	0	0	0	10	15	15	0	14	15	14	15	0	11	15	1			
		Standard Deviation	0.00015	0.00015	0.0076	0.0039	6.3	0.00017840	1E-13	0.000671	0.00009	0.019	0.0073	0.0049	0.00134	0	0	21.6	0.00036	0.00000	0.000436	0.000000	20.9	0.00313	0.00000	0.00148			
		1st Quartile	0.00044	0.00042	0.0096	0.0079	27.5	<0.000010	<0.0000050	<0.00050	0.00035	0.024	0.009	0.0048	<0.0010	<0.0000020	<0.0000020	73.4	<0.0010	<0.0010	<0.00020	<0.00020	59.6	<0.0050	<0.0050	0.00205			
		Median	0.00051	0.00048	0.0133	0.01	34.6	<0.000010	<0.0000050	<0.00050	0.00037	0.033	0.016	0.0069	<0.0010	<0.0000020	<0.0000020	90.5	<0.0010	<0.0010	<0.00020	<0.00020	88.3	<0.0050	<0.0050	0.00255			
		3rd Quartile	0.00064	0.00058	0.0176	0.0128	38.8	0.00001100	<0.0000050	0.000485	0.00048	0.0420	0.019	0.0086	0.00135	<0.0000020	<0.0000020	114	<0.0010	<0.0010	<0.00020	<0.00020	97.4	0.0045	<0.0050	0.00318			

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 52
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2015-16 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LLMB	Long Lake Middle 1 metre From Bottom	Average	0.00032	0.00026	0.0126	0.00773	46.1	0.00000500	0.00000283	0.000432	0.00041	0.059	0.01377	2.345	2.141	0.000001	0.000001	124.2	0.00050	0.00050	0.000100	0.000109	107.8	0.00271	0.00250	0.00310			
E206619		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	4			
		Minimum	0.00024	0.00021	0.0032	<0.0030	43.2	<0.000010	<0.0000050	<0.00050	0.00023	0.021	<0.0050	0.291	0.238	<0.0000020	<0.0000020	114	<0.0010	<0.0010	<0.00020	<0.00020	104	<0.0050	<0.0050	0.0025			
		Maximum	0.00044	0.00033	0.0211	0.0127	49.6	<0.000010	0.000005	0.00107	0.00064	0.116	0.0402	5.69	5.41	<0.0000020	<0.0000020	132	<0.0010	<0.0010	<0.00020	0.00023	115	0.0056	<0.0050	0.0034			
		Geometric Mean	0.00031	0.00026	0.0112	0.00615	46.1	0.000005	0.00000274	0.000364	0.0004	0.052	0.00974	1.35	1.206	0.000001	0.000001	124.1	0.00050	0.00050	0.000100	0.000106	107.8	0.00264	0.00250	0.00300			
		Count <DL	0	0	0	3	0	15	13	10	0	0	2	0	0	15	15	0	15	15	15	14	0	14	15	0			
		Standard Deviation	0.00006	0.00004	0.0056	0.00418	2.4	1E-13	0.00000088	0.00029	0.00013	0.031	0.01174	2.09	1.9470	0	0	5.1	0.00000	0.00000	0.000000	0.000034	3.4	0.0008	0.00000	0.00040			
		1st Quartile	0.00027	0.00024	0.0092	0.0049	44.8	<0.000010	<0.0000050	<0.00050	0.00033	0.034	0.0058	0.391	0.335	<0.0000020	<0.0000020	120	<0.0010	<0.0010	<0.00020	<0.00020	105	<0.0050	<0.0050	0.0029			
		Median	0.00032	0.00026	0.0114	0.0084	46.4	<0.000010	<0.000005	<0.00050	0.00038	0.053	0.00890	1.91	1.83	<0.0000020	<0.0000020	125	<0.0010	<0.0010	<0.00020	<0.00020	108.0	<0.0050	<0.0050	0.0032			
		3rd Quartile	0.00035	0.0003	0.0166	0.0115	46.6	<0.000010	<0.0000050	0.000585	0.00046	0.076	0.02410	4.165	3.615	<0.0000020	<0.0000020	128.5	<0.0010	<0.0010	<0.00020	<0.00020	109	<0.0050	<0.0050	0.0033			
LLO	Long Lake Outlet	Average	0.00044	0.0004	0.0179	0.0117	32.7	0.0000048	0.00000250	0.000735	0.00047	0.0429	0.01723	0.0094	0.00186	0.000001	0.000001	91.2	0.00321	0.00050	0.000212	0.000100	66.2	0.00405	0.00250	0.00506		0.088	0.00588
E219412		Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	52	15	15	5		5	5
		Minimum	0.00035	0.00027	0.0039	0.0038	20.8	<0.000005	<0.0000050	<0.00050	0.00027	<0.010	<0.0050	0.0031	<0.0010	<0.0000020	<0.0000020	44.4	<0.0010	<0.0010	<0.00020	<0.00020	11.7	<0.0050	<0.0050	<0.0050		<0.020	<0.0050
		Maximum	0.00059	0.00049	0.0371	0.025	40.6	<0.000010	<0.0000050	0.00559	0.00129	0.099	0.039	0.0229	0.0056	<0.0000020	<0.0000020	123	0.0412	<0.0010	0.00178	<0.00020	113	0.0258	<0.0050	0.0098		0.295	0.009
		Geometric Mean	0.00044	0.00039	0.0145	0.0098	32.1	0.0000048	0.0000025	0.000407	0.00043	0.0314	0.01251	0.0078	0.00129	0.0000010	0.0000010	87.6	0.00067	0.00050	0.000121	0.000100	57.9	0.00292	0.00250	0.00442		0.0372	0.00504
		Count <DL	0	0	0	0	0	15	15	10	0	2	2	0	6	15	15	0	14	15	14	15	0	14	15	2		2	2
		Standard Deviation	0.00007	0.00007	0.011	0.0066	6.1	0.0000006	1E-13	0.001364	0.00025	0.0294	0.01226	0.0059	0.00165	0	0	24.9	0.01051	0.00000	0.000434	0.000000	29.2	0.00602	4E-11	0.00299		0.1217	0.00323
		1st Quartile	0.00038	0.00035	0.0084	0.0056	27.7	<0.000010	<0.000005	<0.00050	0.00034	0.0195	0.0064	0.0047	<0.0010	<0.000002	<0.000002	67.9	<0.0010	<0.0010	<0.00020	<0.00020	42.1	<0.0050	<0.0050	<0.0050		<0.020	<0.0050
		Median	0.00045	0.00041	0.0158	0.0125	35.2	<0.000010	<0.0000050	<0.00050	0.0004	0.034	0.0138	0.0091	0.0016	<0.0000020	<0.0000020	101	<0.0010	<0.0010	<0.00020	<0.00020	66.1	<0.0050	<0.0050	0.0051		0.024	0.0066
		3rd Quartile	0.00048	0.00046	0.0278	0.0168	37.7	<0.000010	<0.0000050	0.0006	0.00044	0.064	0.0292	0.0120	0.0022	<0.0000020	<0.0000020	112.5	<0.0010	<0.0010	<0.00020	<0.00020	90.8	<0.0050	<0.0050	0.0054		0.101	0.00880
WB	Middle Quinsam Lake Outlet	Average	0.00024	0.00022	0.0185	0.015	39	0.0000049	0.0000028	0.000687	0.00057	0.045	0.0196	0.0109	0.00107	0.0000010	0.0000010	40.9	0.00073	0.00050	0.000100	0.000100	34.6	0.00250	0.00250	0.00536		0.0100	0.00892
E0900504		Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	5		5	5
		Minimum	0.00012	0.00013	0.0068	0.0072	26.4	<0.000005	<0.0000050	<0.00050	0.00046	0.03	0.0093	0.0027	<0.0010	<0.0000020	<0.0000020	27.5	<0.0010	<0.0010	<0.00020	<0.00020	18.3	<0.0050	<0.0050	<0.0050		<0.020	<0.0050
		Maximum	0.00044	0.00034	0.0257	0.0211	48	0.000006	0.000007	0.00169	0.00086	0.094	0.0392	0.0188	0.0059	<0.0000020	<0.0000020	62.2	0.0026	<0.0010	<0.00020	<0.00020	48.7	<0.0050	<0.0050	0.0102		<0.020	0.016
		Geometric Mean	0.00023	0.000210	0.0175	0.0143	38.3	0.00000483	0.00000268	0.000599	0.00056	0.042	0.0185	0.009	0.00073	0.000001	0.000001	39.8	0.00061	0.00050	0.000100	0.000100	33.5	0.00250	0.00250	0.00458		0.0100	0.00664
		Count <DL	0	0	0	0	0	14	14	3	0	0	0	0	11	15	15	0	13	15	15	15	0	15	15	2		5	2
		Standard Deviation	0.00009	0.00008	0.0058	0.0046	7.3	0.00000071	0.00000116	0.000379	0.0001	0.0180	0.0073	0.0057	0.00141	0	0	10	0.00062	0.00000	0.000000	0.000000	8.5	4E-11	4E-11	0.00332		0	0.00651
		1st Quartile	0.00018	0.00015	0.0144	0.0108	32.2	<0.000010	<0.000005	0.000535	0.00052	0.032	0.0154	0.0046	<0.0010	<0.000002	<0.000002	35.4	<0.0010	<0.0010	<0.00020	<0.00020	29.3	<0.0050	<0.0050	<0.0050		<0.020	<0.0050
		Median	0.00025	0.000230	0.0202	0.0157	40.9	<0.000010	<0.0000050	0.00062	0.00055	0.041	0.0179	0.0122	<0.0010	<0.0000020	<0.0000020	37	<0.0010	<0.0010	<0.00020	<0.00020	35.0	<0.0050	<0.0050	0.0044		<0.020	0.0086
		3rd Quartile	0.00029	0.000280	0.0234	0.019	46	<0.000010	<0.000005	0.00072	0.00058	0.045	0.0238	0.0152	0.0008	<0.0000020	<0.0000020	44	<0.0010	<0.0010	<0.00020	<0.00020	38.7	<0.0050	<0.0050	0.0072		<0.020	0.015
7SSD	Settling Pond at 7S- Discharge to Stream 1 -7S		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E292069		Average	0.00265	0.00224	0.2187	0.0147	134.2	0.0000096	0.00000485	0.00181	0.00093	0.34	0.01843	0.0741	0.03816	0.00000109	0.00000116	172	0.00063	0.00071	0.00011	0.0001	35.3	0.00845	0.00308				
		Count	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20				
		Minimum	0.00067	0.00037	0.0088	<0.0030	50.1	<0.000005	<0.0000050	0.00087	0.00049	0.037	<0.0050	0.0109	<0.0010	<0.0000020	<0.0000020	60.2	<0.0010	<0.0010	<0.00020	<0.00020	10.5	<0.0050	<0.0050				
		Maximum	0.00952	0.00921	0.927	0.0508	208	0.000031	0.000021	0.00371	0.00202	1.16	0.0547	0.16	0.0962	0.0000028	0.0000042	298	0.0012	0.0046	0.00029	<0.00020	98.6	0.0912	0.0142				
		Geometric Mean	0.00198	0.00139	0.0953	0.00797	122.4	0.00000740	0.00000358	0.00167	0.00087	0.203	0.0117	0.0601	0.01342	0.00000105	0.00000107	157	0.00059	0.00056	0.000105	0.000100	29.2	0.00379	0.00273				
		Count <DL	0	0	0	5	0	13	15	0	0	0	3	0	4	19	19	0	16	19	19	20	0	16	19				
		Standard Deviation	0.00243	0.00252	0.2831	0.01484	51.4	0.0000082	0.0000051	0.00079	0.00038	0.366	0.01779	0.0428	0.0341	0.0000004	0.00000072	69.2	0.00026	0.00092	0.000042	0.000000	23.9	0.01987	0.00262				
		1st Quartile	0.00123	0.00066	0.032	0.00278	89	<0.000010	<0.0000050	0.0014	0.00071	0.109	0.00622	0.0369	0.0025	<0.0000020	<0.0000020	125.0	<0.0010	<0.0010	<0.00020	<0.00020	20	<0.0050	<0.0050				
		Median	0.00171	0.00117	0.0872	0.0083	153	<0.000010	<0.000005	0.0016	0.0008	0.162	0.0105	0.0844	0.040	<0.0000020	<0.0000020	177	<0.0010	<0.0010	<0.00020	<0.00020	25.6	<0.0050	<0.0050				
		3rd Quartile	0.00268	0.00241	0.276	0.0219	166.5	0.0000105	0.0000031	0.00186	0.00117	0.446	0.02672	0.0925	0.06542	<0.000002	<0.000002	204.8	<0.0010	<0.0010	<0.00020	<0.00020	41.8	<0.0050	<0.0050				
7S	Stream 1-7S discharge to LWO	Average	0.000108	0.000149	0.0474	0.0396	18.9	0.00000622	0.0000035	0.009704	0.00055	0.0235	0.00976	0.00057	0.0005	0.00000111	0.00000112	20.1	0.00050	0.00050	0.000100	0.000100	4.280	0.00250	0.00250				
E292109		Count	18	18	18	18	17	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18				
		Minimum	<0.00010	<0.00010	0.0163	0.0129	11.4	<0.000005	<0.0000050	<0.00050	0.00027	<0.010	<0.0050	<0.0010	<0.0010	<0.0000020	<0.0000020	13	<0.0010	<0.0010	<0.00020	<0.00020	2.19	<0.0050	<0.0050				
		Maximum	0.00022	0.00039	0.134	0.0948	38	0.0000320	0.000008	0.165	0.00197	0.09	0.032	0.0018	<0.0010	0.0000029	0.0000022	40.9	<0.0010	<0.0010	<0.00020	<0.00020	7.65	<0.0050	<0.0050				
		Geometric Mean	0.000098	0.000114	0.0372	0.032	17.7	0.00000513	0.00000314	0.000643	0.00046	0.0152	0.00647	0.00054	0.0005	0.00000106	0.00000109	19.2	0.00050	0.00050	0.000100	0.000100	4.08	0.00250	0.00250				
		Count <DL	5	7	0	0	0	17	14	8	0	6	7	17	18	17	16	0	18	18	18	18	0	18	18				
		Standard Deviation	0.000047	0.000110	0.0363	0.0273	7.4	0.00000648	0.00000196	0.038758	0.00042	0.0243	0.00953	0.00031	0	0.00000045	0.00000036	7	0.00000	0.00000	0.000000	0.000000	1.45	3E-11	3E-11				
		1st Quartile	0.000062	<0.00010	0.0187	0.0173	12.3	<0.000010	<0.0000050	<0.00050	0.00033	<0.010	<0.0050	<0.0010	<0.0010	<0.0000020	<0.0000020	14.8	<0.0010	<0.0010	<0.00020	<0.00020	3.26	<0.0050	<0.0050				
		Median	0.00011	0.00012	0.0374	0.0337	16	<0.000010	<0.000005	0.00053	0.00038	0.015	0.0064	<0.0010	<0.0010	<0.0000020	<0.0000020	18.6	<0.0010	<0.0010	<0.00020	<0.00020	3.99	<0.0050	<0.0050				
		3rd Quartile	0.00013	0.000205	0.0604	0.0511	23.9	<0.000010	<0.0000050	0.000932	0.00055	0.0265	0.01078	<0.0010	<0.0010	<0.000002	<0.0000020	23.4	<0.0010	<0.0010	<0.00020	<0.00020	4.84	<0.0050	<0.0050				
QU0813A	Ex-situ 7-South groundwater well down gradient of the CCR backfill towards QR (No. 4 Seam)	Average		0.4		0.0099	171.5		0.0000025		0.000100		0.21		0.052		0.0000018			0.000500		0.0001000	18.4		0.00250		0.1750		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.393		0.0032	162		<0.0000050		<0.00020		0.176		0.0346		<0.0000020			<0.0010		<0.00020	14.5		<0.0050		0.137		
		Maximum		0.415		0.0251	179		<0.0000050		<0.00020		0.262		0.0739		0.0000041			<0.0010		<0.00020	24.3		<0.0050		0.216		
		Geometric Mean		0.4		0.0069	171.4		0.0000025		0.000100		0.208		0.0501		0.0000014			0.000500		0.0001000	18		0.00250		0.1720		
		Count <DL		0		0	0		4		4		0		0		3			4		4	0		4		0		
		Standard Deviation		0.01		0.0103	7.1		0		0.000000		0.037		0.0163		0.0000016			0.000000		0.0000000	4.7		0.00000		0.0330		
		1st Quartile		0.395		0.0038	168.8		<0.0000050		<0.00020		0.193		0.0446		<0.0000020			<0.0010		<0.00020	14.7		<0.0050		0.16		
		Median		0.396		0.0056	172.5		<0.0000050		<0.00020		0.202		0.0497		<0.000002			<0.0010		<0.00020	17.5		<0.0050		0.173		
		3rd Quartile		0.402		0.0116	175.2		<0.0000050		<0.00020		0.219		0.057		0.00000178			<0.0010		<0.00020	21.2		<0.0050		0.188		
QU0813B	Ex-situ 7-South groundwater well down gradient of the CCR backfill towards QR (Till & SST contact)	Average		0.468		0.0332	120.2		0.0000034		0.000100		0.1124		0.0896		0.0000028			0.000500		0.0001000	9.19		0.00250		0.1920		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.455		0.0057	116		<0.0000050		<0.00020		0.084		0.0808		<0.0000020			<0.0010		<0.00020	8.72		<0.0050		0.155		
		Maximum		0.487		0.112	125		0.000006		<0.00020		0.156		0.107		0.0000069			<0.0010		<0.00020	9.44		<0.0050		0.208		
		Geometric Mean		0.467		0.0137	120.2		0.0000031		0.000100		0.1089		0.0891		0.0000020			0.000500		0.0001000	9.19		0.00250		0.1910		
		Count <DL		0		0	0		3		4		0		0		2			4		4	0		4		0		
		Standard Deviation		0.015		0.0526	4.4		0.0000018		0.000000		0.033		0.0119		0.0000028			0.000000		0.0000000	0.3		0.00000		0.0250		
		1st Quartile		0.457		0.0062	116.8		<0.0000050		<0.00020		0.088		0.0824		<0.000002			<0.0010		<0.00020	9.11		<0.0050		0.19		
		Median		0.464		0.0074	120		<0.000005		<0.00020		0.1047		0.0854		0.00000165			<0.0010		<0.00020	9.3		<0.0050		0.203		
		3rd Quartile		0.474		0.0344	123.5		0.00000338		<0.00020		0.129		0.0926		0.00000345			<0.0010		<0.00020	9.39		<0.0050		0.206		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 53
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2015-16 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU0821GD	Ex-situ 2-North groundwater well down gradient of u/g tailings disposal, measures water quality & hydraulic gradients downstream of Forjan Fault (No. 4 Seam)	Average		0.161		0.0116	206.0		0.000006		0.000133		1.075		0.171		0.0000021			0.00067		0.000133	0.25		0.00333		0.049		
		Count		3		3	3		3		3		3		3		3			3		3	3		3		3		
		Minimum		0.116		0.0034	191		<0.000010		<0.00020		0.735		0.127		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.0224		
		Maximum		0.222		0.0174	216		0.000007		<0.00040		1.41		0.194		0.0000032			<0.0020		<0.00040	<0.50		<0.010		0.0703		
		Geometric Mean		0.155		0.0094	205.7		0.00000594		0.000126		1.038		0.168		0.0000019			0.00063		0.000126	0.25		0.00315		0.0441		
		Count <DL		0		0	0		1		3		0		0		1			3		3	3		3		0		
		Standard Deviation		0.055		0.00730	13.2		0.000001		0.000058		0.338		0.038		0.0000011			0.00029		0.000058	0		0.00144		0.0244		
		1st Quartile		0.131		0.0087	201		0.0000055		<0.00020		0.908		0.159		0.0000016			<0.0010		<0.00020	<0.50		<0.0050		0.0383		
		Median		0.146		0.0141	211		0.000006		<0.00020		1.08		0.191		0.0000022			<0.0010		<0.00020	<0.50		<0.0050		0.0543		
		3rd Quartile		0.184		0.0158	213.5		0.0000065		0.00015		1.245		0.192		0.0000027			0.00075		0.00015	<0.50		0.00375		0.0623		
QU0821GS	Ex-situ 2-North groundwater well down gradient of u/g tailings disposal, measures water quality & hydraulic gradients downstream of Forjan Fault (No. 1 Seam)	Average		0.274		0.009	196.5		0.0000034		0.0001		0.786		0.1498		0.0000024			0.000500		0.0001000	0.725		0.00685		0.205		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		3		
		Minimum		0.215		0.0044	190		<0.0000050		<0.00020		0.381		0.0831		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.127		
		Maximum		0.365		0.0177	201		0.000006		<0.00020		1.06		0.191		0.0000044			<0.0010		<0.00020	2.15		0.0199		0.249		
		Geometric Mean		0.267		0.0078	196.4		0.0000031		0.0001		0.726		0.1426		0.0000020			0.000500		0.0001000	0.428		0.0042		0.197		
		Count <DL		0		0	0		3		4		0		0		2			4		4	3		3		0		
		Standard Deviation		0.069		0.0059	5.4		0.0000018		0		0.326		0.0491		0.0000017			0.000000		0.0000000	0.95		0.0087		0.068		
		1st Quartile		0.223		0.006	193		<0.0000050		<0.00020		0.592		0.128		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.184		
		Median		0.257		0.007	197.5		<0.0000050		<0.00020		0.852		0.1625		0.00000215			<0.0010		<0.00020	<0.50		<0.0050		0.24		
		3rd Quartile		0.307		0.0099	201		0.00000338		<0.00020		1.045		0.1842		0.00000358			<0.0010		<0.00020	0.725		0.00685		0.244		
QU1010D	Ex-situ 2-North deep groundwater well. Down gradient of u/g tailings disposal, measures water quality & hydraulic head downstream of 2-North workings. (No. 1 Seam / Mudstone).	Average		0.0148		0.0128	95.1		0.000006		0.00010		10.9		0.514		0.0000053			0.00050		0.000100	1.087		0.0025		0.07560		
		Count		3		3	3		3		3		3		3		3			3		3	3		3		3		
		Minimum		0.0143		0.0053	91.2		0.000005		<0.00020		10.1		0.51		0.0000039			<0.0010		<0.00020	<0.50		<0.0050		0.0688		
		Maximum		0.0151		0.0271	97.3		0.000007		<0.00020		11.3		0.517		0.0000061			<0.0010		<0.00020	<5.0		<0.0050		0.0814		
		Geometric Mean		0.0148		0.0095	95.1		0.000006		0.00010		10.9		0.514		0.0000052			0.00050		0.000100	0.683		0.0025		0.07550		
		Count <DL		0		0	0		0		3		0		0		0			3		3	2		3		0		
		Standard Deviation		0.0005		0.0124	3.4		0.000001		0.00000		0.7		0.00		0.0000012			0.00000		0.000000	1.2		0.0000		0.00640		
		1st Quartile		0.0147		0.0056	94		0.000006		<0.00020		10.6		0.512		0.0000005			<0.0010		<0.00020	0.38		<0.0050		0.0728		
		Median		0.0151		0.0059	96.8		0.000007		<0.00020		11.2		0.514		0.000006			<0.0010		<0.00020	0.51		<0.0050		0.0767		
		3rd Quartile		0.0151		0.0165	97		0.000007		<0.00020		11.2		0.516		0.000006			<0.0010		<0.00020	1.505		<0.0050		0.0791		
QU1010S	Ex-situ 2-North shallow groundwater well. Down gradient of u/g tailings disposal, measures water quality & hydraulic head downstream of 2-North workings. (No. 1 Seam / Sandstone).	Average		0.122		0.01023	147.7		0.0000025		0.0001		0.278		0.0347		0.0000010			0.000500		0.0001000	16.6		0.00250		0.0532		
		Count		3		3	3		3		3		3		3		3			3		3	3		3		3		
		Minimum		0.121		<0.0030	144		<0.000005		<0.00020		0.217		0.0318		<0.000002			<0.0010		<0.00020	14.8		<0.0050		0.0516		
		Maximum		0.123		0.0225	152		<0.000005		<0.00020		0.339		0.0385		<0.000002			<0.0010		<0.00020	18		<0.0050		0.0545		
		Geometric Mean		0.122		0.00609	147.6		0.0000025		0.0001		0.273		0.0346		0.0000010			0.000500		0.0001000	16.5		0.0025		0.0532		
		Count <DL		0		1	0		3		3		0		0		3			3		3	0		3		0		
		Standard Deviation		0.001		0.01094	4.0		0.0000000		0		0.061		0.0035		0.0000000			0.000000		0.0000000	1.6		4E-11		0.0015		
		1st Quartile		0.122		0.0041	145.5		<0.0000050		<0.00020		0.248		0.0328		<0.0000020			<0.0010		<0.00020	15.9		<0.0050		0.0525		
		Median		0.123		0.0067	147		<0.0000050		<0.00020		0.278		0.0337		<0.0000020			<0.0010		<0.00020	17		<0.0050		0.0534		
		3rd Quartile		0.123		0.0146	149.5		<0.0000050		<0.00020		0.308		0.0361		<0.0000020			<0.0010		<0.00020	17.5		<0.0050		0.054		
QU1011D	Ex-situ 2-North deep groundwater well. Measures water quality & hydraulic gradient in Forjian Fault (Fractured sandstone).	Average		0.0169		0.0143	205		0.0000025		0.00226		0.747		0.22		0.0000042			0.0005		0.0001	5.9		0.0025		0.030		
		Count		1		1	1		1		1		1		1		1			1		1	1		1		1		
		Minimum		0.0169		0.0143	205		<0.0000050		0.00226		0.747		0.22		0.0000042			<0.0010		<0.00020	5.89		<0.0050		0.0304		
		Maximum		0.0169		0.0143	205		<0.0000050		0.00226		0.747		0.22		0.0000042			<0.0010		<0.00020	5.89		<0.0050		0.0304		
		Geometric Mean		0.0169		0.0143	205		0.0000025		0.00226		0.747		0.22		0.0000042			0.0005		0.0001	5.9		0.0025		0.030		
		Count <DL		0		0	0		1		0		0		0		0			1		1	0		1		0		
		Standard Deviation		0.00000		0.0000	0		0.0000000		0.00000		0.00		0.000		0.0000000			0.00000		0.000000	0.0		0.0000		0.000		
		1st Quartile		0.0169		0.0143	205		<0.0000050		0.00226		0.747		0.22		0.0000042			<0.0010		<0.00020	5.89		<0.0050		0.0304		
		Median		0.0169		0.0143	205		<0.0000050		0.00226		0.747		0.22		0.0000042			<0.0010		<0.00020	5.89		<0.0050		0.0304		
		3rd Quartile		0.0169		0.0143	205		<0.0000050		0.00226		0.747		0.22		0.0000042			<0.0010		<0.00020	5.89		<0.0050		0.0304		
QU1011S	Ex-situ 2-North shallow groundwater well. Measures water quality & hydraulic gradient in Forjian Fault (Fractured sandstone).	Average		0.00223		0.0168	86		0.0000060		0.00041		0.227		0.0564		0.0000052			0.0005		0.0001000	4.26		0.00250		0.0073		
		Count		1		1	1		1		1		1		1		1			1		1	1		1		1		
		Minimum		0.00223		0.0168	86		0.000006		0.00041		0.227		0.0564		0.0000052			<0.0010		<0.00020	4.26		<0.0050		0.0073		
		Maximum		0.00223		0.0168	86		0.000006		0.00041		0.227		0.0564		0.0000052			<0.0010		<0.00020	4.26		<0.0050		0.0073		
		Geometric Mean		0.00223		0.0168	86		0.0000060		0.00041		0.227		0.0564		0.0000052			0.0005		0.0001000	4.26		0.0025		0.0073		
		Count <DL		0		0	0		0		0		0		0		0			1		1	0		1		0		
		Standard Deviation		0		0	0		0.0000000		0		0		0		0.0000000			0		0.0000000	0		0		0		
		1st Quartile		0.00223		0.0168	86		0.000006		0.00041		0.227		0.0564		0.0000052			<0.0010		<0.00020	4.26		<0.0050		0.0073		
		Median		0.00223		0.0168	86		0.000006		0.00041		0.227		0.0564		0.0000052			<0.0010		<0.00020	4.26		<0.0050		0.0073		
		3rd Quartile		0.00223		0.0168	86		0.000006		0.00041		0.227		0.0564		0.0000052			<0.0010		<0.00020	4.26		<0.0050		0.0073		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 54
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2015-16 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU1105S	Ex-situ River Barrier Pillar (RBP) shallow groundwater well. Monitors water quality & gradients above the RBP & 2-North Mine. (Sandstone)	Average		0.0782		0.00920	229		0.0000025		0.000125		1.25		0.3147		0.0000044			0.000500		0.0001000	151.3		0.00250		0.031		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.0456		0.0032	126		<0.0000050		<0.00020		0.189		0.037		<0.0000020			<0.0010		<0.00020	55.3		<0.0050		0.0178		
		Maximum		0.0913		0.0243	335		<0.0000050		0.0002		2.64		0.736		0.0000063			<0.0010		<0.00020	303		<0.0050		0.0394		
		Geometric Mean		0.0753		0.00640	213		0.0000025		0.000119		0.707		0.1852		0.0000036			0.000500		0.0001000	123.4		0.00250		0.030		
		Count <DL		0		0	0		4		3		0		0		1			4		4	0		4		0		
		Standard Deviation		0.0219		0.01010	97		0.0000000		0.000050		1.221		0.3145		0.0000023			0.000000		0.0000000	110.5		0.00000		0.010		
		1st Quartile		0.0754		0.004	160		<0.0000050		<0.00020		0.244		0.097		0.0000037			<0.0010		<0.00020	78.2		<0.0050		0.0265		
		Median		0.0878		0.0046	229		<0.0000050		<0.00020		1.086		0.243		0.00000505			<0.0010		<0.00020	123.4		<0.0050		0.0332		
		3rd Quartile		0.0906		0.0098	298		<0.0000050		0.000125		2.092		0.4608		0.0000057			<0.0010		<0.00020	196.5		<0.0050		0.0375		
QU1109S	Ex-situ River Barrier Pillar (RBP) shallow groundwater well. Monitors water quality & gradients above the RBP & 2-North Mine. (Sandstone)	Average		0.108		0.0062	401		0.0000025		0.0001		0.1647		0.0156		0.0000020			0.0005		0.0001	284		0.0025		0.071		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.080		<0.0030	280		<0.0000050		<0.00020		0.0889		0.0087		<0.0000020			<0.0010		<0.00020	166		<0.0050		0.0445		
		Maximum		0.126		0.0165	516		<0.0000050		<0.00020		0.214		0.02		0.0000031			<0.0010		<0.00020	442		<0.0050		0.0906		
		Geometric Mean		0.107		0.00411	391		0.0000025		0.0001		0.1557		0.0149		0.0000017			0.0005		0.0001	266		0.0025		0.069		
		Count <DL		0		1	0		4		4		0		0		2			4		4	0		4		0		
		Standard Deviation		0.020		0.0069	97		0.0000000		0.00000		0.0580		0.00490		0.0000012			0.00000		0.000000	118.0		0.0000		0.019		
		1st Quartile		0.103		0.00285	359		<0.000005		<0.00020		0.1347		0.0142		<0.0000020			<0.0010		<0.00020	212		<0.0050		0.0669		
		Median		0.114		0.0034	404		<0.0000050		<0.00020		0.178		0.017		0.00000195			<0.0010		<0.00020	265		<0.0050		0.075		
		3rd Quartile		0.119		0.00675	445		<0.0000050		<0.00020		0.208		0.0183		0.00000295			<0.0010		<0.00020	337		<0.0050		0.0794		
7SQR	7-South Quinsam River downstream of 7-South Mining Operation	Average	0.00049	0.00044	0.0374	0.0201	38.8	0.00001321	0.00001043	0.00088	0.00082	0.11	0.0536	0.0072	0.00301	0.0000011	0.00000116	40.7	0.00074	0.00050	0.000100	0.000100	31	0.00277	0.0025	0.00780		0.0152	0.015
E292113		Count	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	5		5	5
		Minimum	0.00027	0.00023	0.0114	0.0095	24	<0.0000050	<0.0000050	0.00053	0.00045	0.051	0.0286	0.003	<0.0010	<0.0000020	<0.0000020	26.9	<0.0010	<0.0010	<0.00020	<0.00020	14	<0.0050	<0.0050	0.0053		<0.020	0.0069
		Maximum	0.00094	0.00067	0.156	0.0908	51.5	0.00018	0.000161	0.00194	0.004	0.215	0.0903	0.0129	0.0062	0.000003	0.0000043	67.2	0.0056	<0.0010	<0.00020	<0.00020	45.8	0.0081	<0.0050	0.0103		0.025	0.024
		Geometric Mean	0.00046	0.00042	0.0294	0.017	38	0.00000555	0.00000334	0.0008	0.0007	0.101	0.0506	0.0067	0.00243	0.00000105	0.00000107	39.8	0.00056	0.00050	0.000100	0.000100	29.9	0.00264	0.0025	0.00760		0.0139	0.0135
		Count <DL	0	0	0	0	0	19	18	0	0	0	0	0	3	20	20	0	20	21	21	21	0	20	21	0		3	0
		Standard Deviation	0.00017	0.00013	0.0353	0.0173	8.2	0.00003824	0.00003452	0.00044	0.00075	0.045	0.0184	0.0026	0.00162	0.00000044	0.00000072	9	0.00111	0.00000	0.000000	0.000000	7.9	0.00122	0	0.0019		0.0073	0.0075
		1st Quartile	0.00037	0.00035	0.0208	0.0125	32.7	<0.000010	<0.0000050	0.00061	0.00054	0.069	0.0398	0.0054	0.0017	<0.0000020	<0.0000020	35.1	<0.0010	<0.0010	<0.00020	<0.00020	25	<0.0050	<0.0050	0.0073		<0.020	0.01
		Median	0.00044	0.00040	0.025	0.0152	36.3	<0.000010	<0.0000050	0.00069	0.00061	0.113	0.0507	0.0072	0.0034	<0.0000020	<0.0000020	37.7	<0.0010	<0.0010	<0.00020	<0.00020	32.3	<0.0050	<0.0050	0.0074		<0.020	0.0123
		3rd Quartile	0.00058	0.00054	0.0393	0.0196	47.7	<0.000010	<0.0000050	0.00087	0.00085	0.129	0.0649	0.0085	0.0041	<0.0000020	<0.0000020	43.9	<0.0010	<0.0010	<0.00020	<0.00020	36.60	<0.0050	<0.0050	0.0088		0.021	0.022
LQL1	Lower Quinsam Lake 1 metre below surface	Average	0.00067	0.00061	0.0185	0.0142	35.9	0.0000057	0.00000363	0.000633	0.00055	0.080	0.0414	0.0135	0.00563	0.00000100	0.00000100	34.3	0.00050	0.00050	0.000100	0.000100	21.3	0.01197	0.00250	0.00330			
E292118		Count	15	15	15	15	9	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	7			
		Minimum	0.00046	0.00042	0.0079	0.0065	27.3	<0.000005	<0.000005	<0.00050	0.00040	0.025	0.0096	0.0029	<0.0010	<0.000002	<0.000002	24.1	<0.0010	<0.0010	<0.00020	<0.00020	15.6	<0.0050	<0.0050	<0.0020			
		Maximum	0.00114	0.00084	0.0344	0.0239	42.7	0.000018	0.0000080	0.00110	0.00077	0.222	0.132	0.0586	0.0361	<0.000002	<0.000002	40.6	<0.0010	<0.0010	<0.00020	<0.00020	24.0	0.124	<0.0050	0.0047			
		Geometric Mean	0.00065	0.00060	0.0161	0.0134	35.6	0.0000052	0.00000325	0.000578	0.00054	0.067	0.0322	0.0091	0.00156	0.00000100	0.00000100	34.0	0.00050	0.00050	0.000100	0.000100	21.1	0.00411	0.00250	0.00302			
		Count <DL	0	0	0	0	0	14	11	3	0	0	0	0	8	15	15	0	15	15	15	15	0	11	15	1			
		Standard Deviation	0.00018	0.00013	0.0101	0.0050	4.9	0.0000035	0.00000200	0.000251	0.00010	0.052	0.0313	0.0149	0.01007	0.00000000	0.00000000	4.3	0.00000	0.00000	0.000000	0.000000	2.6	0.03121	4E-11	0.00117			
		1st Quartile	0.00052	0.00048	0.0102	0.0116	34.4	<0.000010	<0.0000050	0.00058	0.00050	0.040	0.0168	0.0054	<0.0010	<0.0000020	<0.0000020	32.0	<0.0010	<0.0010	<0.00020	<0.00020	19.8	<0.0050	<0.0050	0.00300			
		Median	0.00069	0.00065	0.0131	0.0130	36.8	<0.000010	<0.0000050	0.00062	0.00055	0.068	0.0388	0.0062	<0.0010	<0.0000020	<0.0000020	35.4	<0.0010	<0.0010	<0.00020	<0.00020	22.2	<0.0050	<0.0050	0.0037			
		3rd Quartile	0.00075	0.00068	0.0280	0.0170	38.8	<0.000010	0.00000425	0.000760	0.00062	0.103	0.0479	0.0161	0.00460	<0.000002	<0.000002	36.6	<0.0010	<0.0010	<0.00020	<0.00020	23.4	0.00410	<0.0050	0.00385			
LQLB	LQLB 1 metre from Bottom	Average	0.00206	0.00097	0.0317	0.0181	34.1	0.0000089	0.00000605	0.00106	0.00070	1.184	0.2998	0.3515	0.2078	0.00000100	0.00000100	34.6	0.00050	0.00050	0.000100	0.000100	15.6	0.00431	0.00250	0.00587			
E292118		Count	15	15	15	15	8	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	7			
		Minimum	0.00048	0.00041	0.0193	0.0074	25.4	<0.000005	<0.000005	0.00063	0.00040	0.074	0.0425	0.0059	0.0016	<0.000002	<0.000002	28.1	<0.0010	<0.0010	<0.00020	<0.00020	12.0	<0.0050	<0.0050	<0.0020			
		Maximum	0.00598	0.00141	0.0475	0.0377	37.4	0.000017	0.0000130	0.00342	0.00151	4.19	0.599	0.980	0.750	<0.000002	<0.000002	41.9	<0.0010	<0.0010	<0.00020	<0.00020	20.4	0.0203	<0.0050	0.0098			
		Geometric Mean	0.00162	0.00091	0.0307	0.0169	33.9	0.0000076	0.00000520	0.00094	0.00067	0.662	0.2212	0.1549	0.0894	0.00000100	0.00000100	34.4	0.00050	0.00050	0.000100	0.000100	15.5	0.00319	0.00250	0.00498			
		Count <DL	0	0	0	0	0	8	5	0	0	0	0	0	0	15	15	0	15	15	15	15	0	13	15	1			
		Standard Deviation	0.00152	0.00035	0.0084	0.0074	4.1	0.0000049	0.00000327	0.00070	0.00027	1.198	0.1944	0.3377	0.2188	0.00000000	0.00000000	4.1	0.00000	0.00000	0.000000	0.000000	2.2	0.00503	4E-11	0.00268			
		1st Quartile	0.00089	0.00062	0.0260	0.0132	33.6	<0.000010	<0.000005	0.00070	0.00056	0.260	0.0937	0.0446	0.0347	<0.0000020	<0.0000020	32.2	<0.0010	<0.0010	<0.00020	<0.00020	14.4	<0.0050	<0.0050	0.00510			
		Median	0.00154	0.00106	0.0314	0.0169	35.6	<0.000010	0.0000060	0.00081	0.00065	0.774	0.314	0.270	0.156	<0.0000020	<0.0000020	34.9	<0.0010	<0.0010	<0.00020	<0.00020	15.3	<0.0050	<0.0050	0.0063			
		3rd Quartile	0.00274	0.00124	0.0351	0.0200	36.9	0.0000135	0.0000080	0.00116	0.00076	1.860	0.4270	0.6080	0.3465	<0.000002	<0.000002	37.2	<0.0010	<0.0010	<0.00020	<0.00020	16.2	<0.0050	<0.0050	0.00690			

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 55
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2016-17 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
WA			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E0126402	Middle Quinsam Lake Inlet - Quinsam River at Argonaut Road upstream of mining operation.	Average	0.000124	0.000151	0.0266	0.0212	21	0.0000056	0.00000272	0.000879	0.00068	0.021	0.01248	0.00146	0.00058	0.0000011	0.0000014	20.4	0.0005	0.00054	0.000118	0.000117	1.34	0.00250	0.0025				
		Count	16	16	16	16	15	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16				
		Minimum	<0.00010	<0.00010	0.0172	0.0142	17.2	<0.000010	<0.0000050	<0.00050	0.00035	0.01	<0.0050	<0.0010	<0.0010	<0.000002	<0.000002	18.4	<0.0010	<0.0010	<0.00020	<0.00020	0.97	<0.0050	<0.0050				
		Maximum	0.00029	0.00028	0.0536	0.0343	24.2	0.000014	0.000006	0.00356	0.0017	0.046	0.0238	0.0042	0.0018	0.0000032	0.0000031	22.2	<0.0010	0.0012	0.00039	0.00037	2.12	<0.0050	<0.0050				
		Geometric Mean	0.000113	0.000141	0.025	0.0207	20.9	0.0000053	0.00000264	0.000749	0.00064	0.019	0.0112	0.00122	0.00054	0.00000108	0.00000128	20.4	0.0005	0.00053	0.000109	0.000109	1.32	0.00250	0.0025				
		Count <DL	3	1	0	0	0	15	15	1	0	0	1	4	15	15	12	0	16	15	15	15	0	16	16				
		Standard Deviation	0.000058	0.000056	0.0111	0.0049	1.5	0.0000023	0.00000088	0.000734	0.00031	0.009	0.00538	0.00096	0.00032	0.00000055	0.00000079	1.3	0	0.00017	0.000072	0.000067	0.28	4E-11	4E-11				
		1st Quartile	0.000108	0.00012	0.0199	0.0174	20.2	<0.000010	<0.0000050	0.000658	0.00054	0.016	0.0093	0.00095	<0.0010	<0.0000020	<0.0000020	19.5	<0.0010	<0.0010	<0.00020	<0.00020	1.21	<0.0050	<0.0050				
		Median	0.00012	0.000145	0.0232	0.0218	21.0	<0.000010	<0.0000050	0.00071	0.00058	0.02	0.0124	0.00135	<0.0010	<0.0000020	<0.000002	20.3	<0.0010	<0.0010	<0.00020	<0.00020	1.3	<0.0050	<0.0050				
		3rd Quartile	0.000132	0.000155	0.0274	0.0236	21.8	<0.000010	<0.0000050	0.000772	0.0007	0.024	0.01498	0.00152	<0.0010	<0.0000020	0.0000014	21.4	<0.0010	<0.0010	<0.00020	<0.00020	1.44	<0.0050	<0.0050				
WD	Settling Pond #4	Average	0.00203	0.00108	0.0467	0.01319	366.5	0.0000282	0.00000775	0.00193	0.00059	0.637	0.0132	0.2017	0.09038	0.000001	0.000001	403	0.01831	0.00395	0.000100	0.000100	733	0.01471	0.00325				
E207409		Count	9	8	9	8	13	9	8	9	8	9	8	9	8	8	8	9	9	8	9	8	53	9	8				
		Minimum	0.00093	0.00032	0.0045	<0.0030	321	<0.000010	<0.0000050	0.00055	0.00024	0.215	0.0094	0.009	<0.0010	<0.0000020	<0.0000020	292	<0.0010	<0.0010	<0.00020	<0.00020	320	<0.0050	<0.0050				
		Maximum	0.00361	0.00181	0.178	0.0297	413	0.000115	0.000033	0.00369	0.00095	1.33	0.0180	0.551	0.362	<0.0000020	<0.0000020	664	0.0925	0.0263	<0.00020	<0.00020	1170	0.0507	0.0085				
		Geometric Mean	0.00182	0.00095	0.0236	0.00967	365.4	0.0000131	0.0000048	0.00147	0.00054	0.506	0.0129	0.1103	0.02302	0.000001	0.000001	390	0.0031	0.0011	0.000100	0.000100	703	0.00701	0.00291				
		Count <DL	0	0	0	1	0	5	4	0	0	0	0	0	1	8	8	0	3	5	9	8	0	5	7				
		Standard Deviation	0.00101	0.00053	0.0564	0.00952	28.7	0.0000383	0.00001045	0.00139	0.00023	0.438	0.003	0.1889	0.12317	0	0.0000000	118	0.03134	0.00904	0.000000	0.000000	211	0.01837	0.00212				
		1st Quartile	0.00133	0.00076	0.0064	0.00695	337	<0.000010	<0.0000050	0.00069	0.00044	0.279	0.0106	0.0893	0.00422	<0.0000020	<0.0000020	304	<0.0010	<0.0010	<0.00020	<0.00020	579	<0.0050	<0.0050				
		Median	0.00157	0.00103	0.0268	0.0102	375	<0.000010	0.00000375	0.00119	0.00056	0.42	0.0134	0.137	0.0403	<0.0000020	<0.0000020	389	0.0013	<0.0010	<0.00020	<0.00020	676	<0.0050	<0.0050				
		3rd Quartile	0.00248	0.00153	0.0521	0.01992	387	0.000038	0.000006	0.00332	0.00073	0.893	0.0152	0.366	0.1335	<0.0000020	<0.0000020	419	0.0267	0.00135	<0.00020	<0.00020	896	0.0168	<0.0050				
MW001D	Ex-situ 2-North deep groundwater well below the coal wash plant (Till)	Average		0.0208		0.1134	87.8		0.00000425		0.00204		0.0968		0.0078		0.0000058			0.0005		0.0001	26.8		0.0025		0.168		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.0193		0.0989	87.1		<0.0000050		0.00177		0.0746		0.0051		0.0000048			<0.0010		<0.00020	25.8		<0.0050		0.164		
		Maximum		0.0223		0.128	88.4		0.000006		0.0023		0.119		0.0106		0.0000067			<0.0010		<0.00020	27.9		<0.0050		0.172		
		Geometric Mean		0.0207		0.1125	87.7		0.00000387		0.00202		0.0942		0.0074		0.0000057			0.0005		0.0001	26.8		0.0025		0.168		
		Count <DL		0		0	0		1		0		0		0		0			2		2	0		2		0		
		Standard Deviation		0.0021		0.0206	0.9		0.00000247		0.00037		0.0314		0.003900		0.0000013			0		0	1.5		0		0.006		
		1st Quartile		0.0201		0.1062	87.4		0.00000338		0.0019		0.0857		0.0065		0.0000053			<0.0010		<0.00020	26.3		<0.0050		0.166		
		Median		0.0208		0.1134	87.8		0.00000425		0.00204		0.0968		0.0078		0.0000058			<0.0010		<0.00020	26.8		<0.0050		0.168		
		3rd Quartile		0.0216		0.1207	88.1		0.00000512		0.00217		0.1079		0.0092		0.0000062			<0.0010		<0.00020	27.4		<0.0050		0.170		
MW001S	Ex-situ 2-North shallow groundwater well below the coal wash plant (Till)	Average		0.00009		0.01045	355.5		0.000066		0.0001		0.057		1.316		0.0000043			0.002		0.0001000	810		0.0025		0.00330		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		<0.00010		<0.0030	348		0.0000291		<0.00020		0.0284		0.681		0.0000032			0.0012		<0.00020	644		<0.0050		0.003		
		Maximum		0.00013		0.0194	363		0.000103		<0.00020		0.0857		1.95		0.0000054			0.0027		<0.00020	977		<0.0050		0.0036		
		Geometric Mean		0.00008		0.00539	355.4		0.0000547		0.0001		0.0493		1.152		0.0000042			0.0018		0.0001000	793		0.0025		0.0033		
		Count <DL		1		1	0		0		2		0		0		0			0		2	0		2		0		
		Standard Deviation		0.000057		0.01266	10.6		0.0000523		0		0.0405		0.897		0.0000016			0.0011		0.0000000	235		0		0.00040		
		1st Quartile		0.00007		0.00597	351.8		0.0000476		<0.00020		0.0427		0.998		0.0000038			0.0016		<0.00020	727		<0.0050		0.00320		
		Median		0.00009		0.01045	355.5		0.000066		<0.00020		0.057		1.316		0.0000043			0.002		<0.00020	810		<0.0050		0.00330		
				0.00011		0.01492	359.2		0.000085		<0.00020		0.0714		1.633		0.0000048			0.0023		<0.00020	893		<0.0050		0.00340		
MW006D	Ex-situ 2-North deep groundwater well below the coal wash plant (Till)	Average		0.0284		0.021	80.2		0.0000025		0.00088		0.0087		0.001		0.0000069			0.000500		0.0001000	11.8		0.00515		0.165		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.0277		0.0194	78.1		<0.0000050		0.00064		<0.0050		<0.0010		0.0000059			<0.0010		<0.00020	11.6		<0.0050		0.165		
		Maximum		0.0291		0.0226	82.4		<0.0000050		0.00111		0.0148		0.0015		0.0000079			<0.0010		<0.00020	12		0.0078		0.165		
		Geometric Mean		0.0284		0.0209	80.2		0.0000025		0.00084		0.00608		0.00087		0.0000068			0.000500		0.0001000	11.8		0.00442		0.165		
		Count <DL		0		0	0		2		0		1		1		0			2		2	0		1		0		
		Standard Deviation		0.001		0.0023	3.0		0.0000000		0.00033		0.0087		0.00071		0.0000014			0.000000		0.0000000	0.3		0.00375		0		
		1st Quartile		0.028		0.0202	79.2		<0.0000050		0.00076		0.00558		0.00075		0.0000064			<0.0010		<0.00020	11.7		0.00382		0.165		
		Median		0.0284		0.021	80.2		<0.0000050		0.00088		0.0087		0.001		0.0000069			<0.0010		<0.00020	11.8		0.00515		0.165		
		3rd Quartile		0.0288		0.0218	81.3		<0.0000050		0.00099		0.01172		0.00125		0.0000074			<0.0010		<0.00020	11.9		0.00648		0.165		
MW006S	Ex-situ 2-North shallow groundwater well below the coal wash plant (Till)	Average		0.00164		0.00540	179.0		0.0000225		0.00082		0.0156		0.0501		0.0000058			0.0005		0.0001	606.5		0.00250		0.0556		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.00156		0.0041	172		0.000015		0.0008		0.0073		0.0451		0.0000053			<0.0010		<0.00020	606		<0.0050		0.0536		
		Maximum		0.00173		0.0067	186		0.00003		0.00084		0.0239		0.0551		0.0000064			<0.0010		<0.00020	607		<0.0050		0.058		
		Geometric Mean		0.00164		0.0052	178.9		0.0000212		0.00082		0.0132		0.0498		0.0000058			0.00050		0.0001000	606.5		0.0025		0.0556		
		Count <DL		0		0	0		0		0		0		0		0			2		2	0		2		0		
		Standard Deviation		0.00012		0.0018	9.9		0.000011		0.000030		0.0117		0.0071		0.0000008			0		0.0000000	0.7		0		0.0028		
		1st Quartile		0.0016		0.00480	175.5		0.0000188		0.00081		0.0114		0.0476		0.0000056			<0.0010		<0.00020	606.2		<0.0050		0.0546		
		Median		0.00164		0.00540	179		0.0000225		0.00082		0.0156		0.0501		0.0000058			<0.0010		<0.00020	606.5		<0.0050		0.0556		
		3rd Quartile		0.00169		0.00600	182.5		0.0000262		0.00083		0.0198		0.0526		0.0000061			<0.0010		<0.00020	606.8		<0.0050		0.0566		
WC		Average	0.0008	0.00067	0.019	0.0112	315	0.000024	0.0000205	0.000751	0.000413	0.19	0.0214	0.1125	0.1117	0.000001	0.000001	391	0.01929	0.0191	0.000100	0.000100	691	0.01013	0.00884				
E207411	2-North Pit Culvert discharge into Middle Quinsam Lake	Count	7	7	7	7	2	7	7	7	7	7	7	7	7	6	6	7	7	7	7	7	12	7	7				
		Minimum	0.00054	0.00035	0.0063	0.0037	282	<0.000010	<0.0000050	<0.00050	<0.00020	0.039	0.0095	0.0075	0.0031	<0.0000020	<0.0000020	290	<0.0010	<0.0010	<0.00020	<0.00020	482	<0.0050	<0.0050				
		Maximum	0.00111	0.00096	0.0416	0.0179	348	0.000116	0.000096	0.00176	0.00075	0.451	0.0506	0.533	0.545	<0.0000020	<0.0000020	524	0.114	0.111	<0.00020	<0.00020	1080	0.0507	0.0438				
		Geometric Mean	0.00078	0.00064	0.0149	0.0098	313.3	0.00001	0.00000776	0.00055	0.000348	0.1480	0.0171	0.036	0.0251	0.000001	0.000001	381	0.00219	0.00218	0.000100	0.000100	664	0.00451	0.00422				
		Count <DL	0	0	0	0	0	5	3	3	1	0	0	0	0	6	6	0	4	4	7	7	0	5	5				
		Standard Deviation	0.00022	0.00019	0.0142	0.0055	46.7	0.0000414	0.0000344	0.000631	0.000231	0.143	0.0166	0.1928	0.1998	2E-14	2E-14	94	0.0422	0.04109	0.000000	0.000000	209	0.01799	0.01546				
		1st Quartile	0.00062	0.00058	0.0082	0.0068	298.5	<0.000010	<0.0000050	<0.00050	0.000270	0.107	0.01020	0.0132	0.006	<0.0000020	<0.0000020	314	<0.0010	<0.0010	<0.00020	<0.00020	535	<0.0050	<0.0050				
		Median	0.00084	0.00066	0.0136	0.0117	315	<0.000010	0.000006	0.00056	0.00035	0.132	0.0132	0.0213	0.0166	<0.0000020	<0.0000020	370	<0.0010	<0.0010	<0.00020	<0.00020	600	<0.0050	<0.0050				
		3rd Quartile	0.00095	0.00078	0.0274	0.0158	331.5	0.000016	0.000017	0.001095	0.000575	0.2470	0.028	0.0998	0.1026	<0.0000020	<0.0000020	463	0.00950	0.01035	<0.00020	<0.00020	853	0.0051	0.00405				
MQL1	Middle Quinsam Lake 1 metre below surface	Average	0.00019	0.0001600	0.0256	0.0194	32.6	0.000005	0.00000303	0.000703	0.00061	0.043	0.0187	0.0059	0.00153	0.00001134	0.00000112	34.3	0.00067	0.00065	0.0001	0.0001	27.64	0.0025	0.00276	0.0036		
E206618		Count	15	15	15	15	4	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3		
		Minimum	0.00011	0.00011	0.0134	0.0113	29	<0.000010	<0.0000050	<0.00050	0.0004	0.028	0.0064	0.0039	<0.0010	<0.0000020	<0.0000020	22.8	<0.0010	<0.0010	<0.00020	<0.00020	7.66	<0.0050	<0.0050	0.0029		
		Maximum	0.0008	0.0002	0.0635	0.0323	37.1	<0.000010	0.000008	0.00114	0.00142	0.065	0.0309	0.0072	0.0051	0.0000042	0.0000028	39.5	0.0018	0.0017	<0.00020	<0.00020	38.7	<0.0050	0.0064	0.0042		
		Geometric Mean	0.00016	0.00016	0.0228	0.0186	32.5	0.000005	0.00000283	0.000663	0.00058	0.041	0.0175	0.0058	0.00094	0.00000118	0.00000107	34	0.00059	0.00059	0.0001	0.00010000	26.24	0.0025	0.00266	0.0035		
		Count <DL	0	0	0	0	0	15	13	1	0	0	0	0	10	13	14	0	13	13	15	15	0	15	14	0		
		Standard Deviation	0.00017	0.00003	0.0144	0.0061	3.4	1E-13	0.00000152	0.000239	0.00024	0.013	0.0066	0.0011	0.00168	0.00000093	0.00000046	4.2	0.00044	0.00041	0	0	7.44	4E-11	0.00101	0.0007		
		1st Quartile	0.00013	0.00014	0.0165	0.0152	30.9	<0.000010	<0.0000050	0.000565	0.000480	0.032	0.0148	0.0048	<0.0010	<0.0000020	<0.0000020	32.4	<0.0010	<0.0010	<0.00020	<0.00020	24.45	<0.0050	<0.0050	0.0032		
		Median	0.00015	0.0001700	0.0203	0.0175	32.2	<0.000010	<0.0000050	0.000680	0.00053	0.038	0.0176	0.0061	<0.0010	<0.0000020	<0.0000020	34.8	<0.0010	<0.0010	<0.00020	<0.00020	28.30	<0.0050	<0.0050	0.0036		
		3rd Quartile	0.00018	0.00018	0.031	0.0231	34	<0.000010	<0.0000050	0.00073	0.00064	0.052	0.0220	0.0068	0.00230	<0.0000020	<0.0000020	37.7	<0.0010	<0.0010	<0.00020	<0.00020	31.35	<0.0050	<0.0050	0.0039		
MQLB	Middle Quinsam Lake 1 metre from bottom	Average	0.000154	0.000133	0.0202	0.0164	34.6	0.000005	0.00000274	0.000559	0.00058	0.071	0.0238	0.033	0.02559	0.000001	0.00000100	34.2	0.00068	0.00067	0.0001	0.0001	25.8	0.002500	0.0025	0.00430		
E206618		Count	15	15	15	15	4	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3		
		Minimum	<0.00010	<0.00010	0.0076	0.0047	32.6	<0.000010	<0.0000050	<0.00050	0.00032	0.0160	0.0082	0.0017	<0.0010	<0.0000020	<0.0000020	28.6	<0.0010	<0.0010	<0.00020	<0.00020	17	<0.0050	<0.0050	0.0031		
		Maximum	0.00034	0.00017	0.043	0.0291	36	<0.000010	0.0000061	0.00079	0.00093	0.231	0.0498	0.159	0.131	<0.0000020	<0.0000020	39.7	0.0019	0.0018	<0.00020	<0.00020	40	<0.0050	<0.0050	0.0059		
		Geometric Mean	0.000142	0.000128	0.017	0.0144	34.5	0.000005	0.00000265	0.000534	0.000570	0.05	0.0209	0.0115	0.00414	0.000001	0.000001	34.1	0.0006	0.00059	0.0001	0.0001	25.2	0.0025	0.0025	0.00410		
		Count <DL	1	1	0	0	0	15	14	2	0	0	0	0	5	15	15	0	13	13	15	15	0	15	15	0		
		Standard Deviation	0.000065	0.000033	0.0123	0.0078	1.6	1E-13	0.00000093	0.00015	0.00014	0.07	0.0126	0.0484	0.04098	0	0	3	0.00048	0.00046	0	0.00000000	6.2	4E-11	4E-11	0.00150		
		1st Quartile	0.000115	0.00011	0.0102	0.00860	33.6	<0.000010	<0.0000050	0.000525	0.0005	0.029	0.0142	0.0042	<0.0010	<0.0000020	<0.0000020	32.4	<0.0010	<0.0010	<0.00020	<0.00020	23	<0.0050	<0.0050	0.0034		
		Median	0.00014	0.0001400	0.0166	0.0175	34.8	<0.000010	<0.0000050	0.00055	0.000580	0.038	0.0174	0.0066	0.0014	<0.0000020	<0.0000020	34.0	<0.0010	<0.0010	<0.00020	<0.00020	23.8	<0.0050	<0.0050	0.0038		
		3rd Quartile	0.000185	0.00016	0.0248	0.022	35.8	<0.000010	<0.0000050	0.00064	0.00065	0.076	0.0318	0.0506	0.04005	<0.0000020	<0.0000020	36.3	<0.0010	<0.0010	<0.00020	<0.00020	24.6	<0.0050	<0.0050	0.0048		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 56
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2016-17 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
NNL1			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E217018	No Name Lake 1 metre below surface	Average	0.00033	0.000350	0.0418	0.035	13.6	0.000005	0.0000025	0.000517	0.00073	0.086	0.0603	0.005	0.00291	0.00000128	0.00000119	13.9	0.0005	0.00066	0.0001	0.0001	1.025	0.0025	0.0025	0.0087			
		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3			
		Minimum	0.00018	0.00022	0.0221	0.017	11.3	<0.000010	<0.0000050	<0.00050	0.00037	0.035	0.0325	0.0032	<0.0010	<0.0000020	<0.0000020	9.96	<0.0010	<0.0010	<0.00020	<0.00020	<0.50	<0.0050	<0.0050	<0.0020			
		Maximum	0.00055	0.00053	0.0803	0.0603	16.8	<0.000010	<0.0000050	0.00112	0.00279	0.127	0.0817	0.0081	0.0053	0.000004	0.0000025	19.4	<0.0010	0.0029	<0.00020	<0.00020	1.95	<0.0050	<0.0050	0.0163			
		Geometric Mean	0.00031	0.00033	0.0376	0.0327	13.4	0.00000500	0.0000025	0.000454	0.00063	0.08	0.058	0.00480	0.00248	0.00000116	0.00000112	13.64	0.0005	0.00056	0.0001	0.0001	0.849	0.0025	0.0025	0.00523			
		Count <DL	0	0	0	0	0	15	15	6	0	0	0	0	1	13	13	0	15	14	15	15	3	15	15	1			
		Standard Deviation	0.000130	0.00012	0.0208	0.0135	2.7	1E-13	1E-13	0.00027	0.00059	0.03	0.0162	0.0014	0.00148	0.00000081	0.00000049	2.87	0	0.00062	0.00000000	0	0.553	4E-11	4E-11	0.00765			
		1st Quartile	0.00024	0.00025	0.0256	0.0232	11.6	<0.000010	<0.0000050	<0.00050	0.00048	0.058	0.0501	0.0043	0.00195	<0.0000020	<0.0000020	11.95	<0.0010	<0.0010	<0.00020	<0.00020	0.755	<0.0050	<0.0050	0.0049			
		Median	0.00028	0.000310	0.0305	0.0317	12.2	<0.000010	<0.0000050	0.00056	0.00055	0.093	0.0635	0.00460	0.00310	<0.0000020	<0.0000020	12.3	<0.0010	<0.0010	<0.00020	<0.00020	0.97	<0.0050	<0.0050	0.0088			
		3rd Quartile	0.00046	0.00048	0.0639	0.0487	16.3	<0.000010	<0.0000050	0.00064	0.0007	0.107	0.0718	0.0055	0.00425	<0.0000020	<0.0000020	16.8	<0.0010	<0.0010	<0.00020	<0.00020	1.42	<0.0050	<0.0050	0.01255			
NNLB	No Name Lake 1 metre from bottom	Average	0.00025	0.00022	0.0478	0.0384	10.4	0.000005	0.0000025	0.000441	0.00049	0.136	0.0812	0.011	0.00672	0.00000107	0.00000109	12.6	0.0005	0.00068	0.0001	0.0001	2.62	0.0025	0.003070	0.00500			
E217018		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	3			
		Minimum	0.00017	0.00017	0.0338	0.0309	9.72	<0.000010	<0.0000050	<0.00050	0.00026	0.049	0.0303	0.0024	<0.0010	<0.0000020	<0.0000020	11	<0.0010	<0.0010	<0.00020	<0.00020	0.68	<0.0050	<0.0050	0.0027			
		Maximum	0.00037	0.00029	0.0756	0.0549	11.3	<0.000010	<0.0000050	0.00111	0.00091	0.255	0.168	0.0364	0.0291	0.0000021	0.0000023	14.5	<0.0010	0.0032	<0.00020	<0.00020	3.77	<0.0050	0.0111	0.0065			
		Geometric Mean	0.00024	0.000220	0.0466	0.0377	10.39	0.000005	0.0000025	0.000387	0.00046	0.119	0.0721	0.0079	0.00383	0.00000105	0.00000106	12.5	0.0005000	0.00057	0.0001	0.0001	2.36	0.0025	0.00276	0.00470			
		Count <DL	0	0	0	0	0	15	15	8	0	0	0	0	1	14	14	0	15	14	15	15	0	15	14	0			
		Standard Deviation	0.00006	0.00004	0.0118	0.0076	0.59	1E-13	1E-13	0.00025	0.00017	0.067	0.0401	0.0097	0.00756	0.00000028	0.00000034	1.1	0	0.0007000	0	0	0.99	4E-11	0.002220	0.00200			
		1st Quartile	0.0002	0.00019	0.0408	0.0327	10.1	<0.000010	<0.0000050	<0.00050	0.00037	0.065	0.0507	0.0036	0.00145	<0.0000020	<0.0000020	11.9	<0.0010	<0.0010	<0.00020	<0.00020	2.49	<0.0050	<0.0050	0.0043			
		Median	0.00023	0.0002	0.0438	0.0358	10.3	<0.000010	<0.0000050	<0.00050	0.00048	0.141	0.0830	0.0092	0.0059	<0.0000020	<0.0000020	12.4	<0.0010	<0.0010	<0.00020	<0.00020	2.78	<0.0050	<0.0050	0.0059			
		3rd Quartile	0.0003	0.00026	0.0528	0.0395	10.6	<0.000010	<0.0000050	0.000585	0.00054	0.181	0.0957	0.0138	0.0088	<0.0000020	<0.0000020	13.2	<0.0010	<0.0010	<0.00020	<0.00020	3.32	<0.0050	<0.0050	0.0062			
NNO	No Name Lake Outlet	Average	0.00036	0.00034	0.0457	0.0352	13.16	0.0000077	0.00000283	0.000591	0.00054	0.091	0.0582	0.006	0.00256	0.0000024	0.0000013	14	0.0005	0.00050	0.000100	0.000100	1.2	0.0025	0.0025	0.0082	0.0097		
E217017		Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	2	2		
		Minimum	0.00017	0.0002	0.0257	0.0192	9.74	<0.000010	<0.0000050	<0.00050	0.00021	0.03	0.0252	0.0031	<0.0010	<0.000002	<0.000002	10.3	<0.0010	<0.0010	<0.00020	<0.00020	0.58	<0.0050	<0.0050	0.0066	0.0084		
		Maximum	0.00061	0.00055	0.0766	0.0588	17.5	0.000046	0.0000050	0.00188	0.00094	0.152	0.084	0.0166	0.0051	0.0000074	0.0000033	18	<0.0010	<0.0010	<0.00020	<0.00020	2.06	<0.0050	<0.0050	0.0099	0.011		
		Geometric Mean	0.00033	0.00033	0.0423	0.0330	12.93	0.0000058	0.00000274	0.000484	0.00052	0.082	0.0546	0.0054	0.00203	0.00000169	0.00000117	13.8	0.0005	0.00050	0.000100	0.000100	1.11	0.0025	0.0025	0.0081	0.0096		
		Count <DL	0	0	0	0	0	14	13	6	0	0	0	0	3	10	13	0	15	15	15	15	0	15	15	0	0		
		Standard Deviation	0.00015	0.00012	0.0189	0.0135	2.6	0.0000106	0.00000088	0.000434	0.00017	0.0390	0.0193	0.0033	0.00144	0.00000229	0.00000079	2.5	0	0.00000	0.000000	0.000000	0.5	4E-11	4E-11	0.0023	0.0018		
		1st Quartile	0.00022	0.00026	0.0309	0.0247	11.1	<0.000010	<0.0000050	<0.00050	0.00047	0.056	0.0434	0.0044	0.00165	<0.0000020	<0.0000020	12.1	<0.0010	<0.0010	<0.00020	<0.00020	0.88	<0.0050	<0.0050	0.0074	0.009		
		Median	0.00031	0.0003	0.0374	0.0307	12.5	<0.000010	<0.0000050	0.00056	0.00053	0.095	0.0624	0.0051	0.0026	<0.0000020	<0.0000020	12.7	<0.0010	<0.0010	<0.00020	<0.00020	1.05	<0.0050	<0.0050	0.0082	0.0097		
		3rd Quartile	0.00048	0.00044	0.0655	0.0454	15.5	<0.000010	<0.0000050	0.00066	0.00055	0.118	0.0728	0.0066	0.0033	0.00000315	<0.0000020	16.5	<0.0010	<0.0010	<0.00020	<0.00020	1.68	<0.0050	<0.0050	0.0091	0.0104		
LLS	Small Seep into Long Lake	Average	0.00376	0.0017	0.0081	0.0065	233.4	0.00000500	0.00000667	0.000273	0.000236	1.159	0.00598	0.288	0.286	0.0000011	0.0000010	556	0.0016	0.0015	0.000100	0.0001	500	0.00282	0.0025	0.0021			
E292131		Count	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	3			
		Minimum	0.00077	0.00055	<0.0030	<0.0030	201	<0.000010	<0.0000050	<0.00050	<0.00020	0.255	<0.0050	0.159	0.152	<0.0000020	<0.0000020	431	0.0011	0.0011	<0.00020	<0.00020	333	<0.0050	<0.0050	<0.0020			
		Maximum	0.00939	0.00292	0.0206	0.0128	256	<0.000010	0.000049	0.00053	0.00051	3.6	0.022	0.439	0.443	0.0000025	<0.0000020	744	0.0028	0.0025	<0.00020	<0.00020	656	0.0064	<0.0050	0.003			
		Geometric Mean	0.00292	0.00148	0.00551	0.00533	232.8	0.000005	0.00000345	0.000266	0.00019	0.857	0.00384	0.272	0.27	0.00000108	0.000001	548	0.0015	0.0015	0.000100	0.0001	488	0.0027	0.0025	0.0019			
		Count <DL	0	0	3	2	0	12	10	11	6	0	9	0	0	11	12	0	0	0	12	12	0	11	12	1			
		Standard Deviation	0.00257	0.00083	0.00669	0.00383	17	1E-13	0.00001337	0.000081	0.000158	0.968	0.00745	0.096	0.095	0.00000043	0	96	0.0005	0.0005	0.000000	0.000000	114	0.00113	1E-10	0.00101			
		1st Quartile	0.00176	0.00089	0.00285	0.00428	226	<0.000010	<0.0000050	<0.00050	<0.00020	0.492	<0.0050	0.22	0.222	<0.0000020	<0.0000020	458	0.0013	0.0013	<0.00020	<0.00020	393	<0.0050	<0.0050	0.00165			
		Median	0.00348	0.00172	0.0056	0.0054	231.5	<0.000010	<0.0000050	<0.00050	0.000170	0.91	<0.0050	0.300	0.289	<0.0000020	<0.0000020	574	0.0014	0.0013	<0.00020	<0.00020	543	<0.0050	<0.0050	0.0023			
		3rd Quartile	0.00537	0.00237	0.01478	0.0094	246.5	<0.000010	<0.0000050	<0.00050	0.000360	1.56	0.00328	0.359	0.354	<0.0000020	<0.0000020	612	0.0016	0.0016	<0.00020	<0.00020	571	<0.0050	<0.0050	0.00265			
LLSM	Long Lake Middle Seep	Average	0.00181	0.00122	0.02865	0.01710	212.9	0.000005	0.00000531	0.000483	0.000408	0.562	0.00579	0.1786	0.1749	0.000001	0.000001	525	0.0021	0.0021	0.0001	0.0001	470	0.0025	0.0025				
E292131		Count	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8			
		Minimum	0.00111	0.00048	<0.0030	0.004	163	<0.000010	<0.0000050	<0.00050	<0.00020	0.288	<0.0050	0.0842	0.0902	<0.0000020	<0.0000020	377	0.0016	0.0016	<0.00020	<0.00020	320	<0.0050	<0.0050				
		Maximum	0.00282	0.00178	0.107	0.0613	235	<0.000010	0.000017	0.00154	0.00081	0.758	0.0144	0.281	0.252	<0.0000020	<0.0000020	653	0.0035	0.0032	<0.00020	<0.00020	519	<0.0050	<0.0050				
		Geometric Mean	0.00172	0.00115	0.01314	0.0113	211.7	0.000005	0.00000401	0.000364	0.00035	0.532	0.00434	0.1671	0.164	0.000001	0.000001	518	0.002	0.0021	0.000100	0.0001	466	0.0025	0.00250				
		Count <DL	0	0	1	0	0	8	5	6	1	0	5	0	0	8	8	0	0	0	8	8	0	8	8				
		Standard Deviation	0.00061	0.00042	0.03627	0.0191	22.6	1E-13	0.00000512	0.000472	0.00022	0.182	0.00491	0.0661	0.0629	0.0000000	0.0000000	86	0.0006	0.0005	0	0	66	3E-11	3E-11				
		1st Quartile	0.00128	0.00107	0.00402	0.0052	209	<0.000010	<0.0000050	<0.00050	0.000235	0.414	<0.0050	0.1360	0.1272	<0.0000020	<0.0000020	473	0.0017	0.0018	<0.00020	<0.00020	459	<0.0050	<0.0050				
		Median	0.00176	0.0011	0.01645	0.0108	216.5	<0.000010	<0.0000050	<0.00050	0.00043	0.602	<0.0050	0.1775	0.1790	<0.0000020	<0.0000020	535	0.002	0.002	<0.00020	<0.00020	491	<0.0050	<0.0050				
		3rd Quartile	0.0022	0.00153	0.03158	0.0173	227	<0.000010	0.00000575	0.000392	0.000508	0.72	0.0086	0.2222	0.2275	<0.0000020	<0.0000020	580	0.0021	0.0022	<0.00020	<0.00020	512	<0.0050	<0.0050				

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 57
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2016-17 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW002	Ex-situ 2-3 South shallow groundwater well beside 3-South Pit (1 Seam)	Average		0.0006		0.00395	203.2		0.0000081		0.000100		2.68		2.53		0.0000031			0.0027		0.000100	1265		0.0025		0.00190		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.0004		<0.0030	187		<0.0000050		<0.00020		2.39		2.4		<0.0000020			0.0025		<0.00020	1210		<0.0050		<0.0020		
		Maximum		0.00082		0.0097	215		0.000012		<0.00020		3.07		2.68		0.0000051			0.0029		<0.00020	1320		<0.0050		0.0046		
		Geometric Mean		0.00058		0.00287	203		0.0000068		0.0001		2.67		2.53		0.0000027			0.0027		0.000100	1264		0.0025		0.00146		
		Count <DL		0		2	0		1		4		0		0		1			0		4	0		4		3		
		Standard Deviation		0.0002		0.00391	11.7		0.0000047		0		0.29		0.12		0.0000017			0.0002		0.000000	49		0		0.0018		
		1st Quartile		0.00046		<0.0030	200.5		0.00000512		<0.00020		2.51		2.48		0.0000025			0.0026		<0.00020	1232		<0.0050		<0.0020		
		Median		0.0006		0.0023	205.5		0.000009		<0.00020		2.62		2.51		0.00000315			0.0026		<0.00020	1265		<0.0050		<0.0020		
		3rd Quartile		0.00074		0.00475	208.2		0.000012		<0.00020		2.79		2.56		0.00000375			0.0028		<0.00020	1297		<0.0050		0.00190		
QU1009D	Ex-situ 4-South deep groundwater well. Down gradient of 4-South Mine. Base of Dunsmuir Member. Assesses vertical gradients & water quality down gradient of the 4-South Mine workings. Just outside of mine pool. (Below 3 Seam)	Average		0.0988		0.00150	186		0.0000025		0.000100		0.544		0.131		0.0000028			0.000500		0.0001000	89.3		0.00250		0.0403		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.098		<0.0030	184		<0.0000050		<0.00020		0.346		0.115		<0.0000020			<0.0010		<0.00020	84.8		<0.0050		0.0338		
		Maximum		0.1		<0.0030	188		<0.0000050		<0.00020		0.741		0.147		0.0000045			<0.0010		<0.00020	93.8		<0.0050		0.0468		
		Geometric Mean		0.0988		0.0015	186		0.0000025		0.000100		0.506		0.13		0.0000021			0.000500		0.0001000	89.2		0.00250		0.0398		
		Count <DL		0		2	0		2		2		0		0		1			2		2	0		2		0		
		Standard Deviation		0.0016		0	2.8		0.0000000		0.000000		0.279		0.023		0.0000025			0.000000		0.0000000	6.4		0.00000		0.0092		
		1st Quartile		0.0983		<0.0030	185		<0.0000050		<0.00020		0.445		0.123		0.00000188			<0.0010		<0.00020	87		<0.0050		0.037		
		Median		0.0988		<0.0030	186		<0.0000050		<0.00020		0.544		0.131		0.00000275			<0.0010		<0.00020	89.3		<0.0050		0.0403		
		3rd Quartile		0.0994		<0.0030	187		<0.0000050		<0.00020		0.642		0.139		0.00000362			<0.0010		<0.00020	91.6		<0.0050		0.0436		
QU1009S	Ex-situ 4-South shallow groundwater well. Fracture zone 10 m below till. Assesses vertical gradients & water quality down gradient of the 4-South Mine workings. Just outside of mine pool. (Below 3 Seam)	Average		0.0868		0.00150	144.5		0.0000025		0.000100		5.4		0.38		0.0000046			0.000500		0.0001000	112.5		0.00250		0.0290		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.0829		<0.0030	132		<0.0000050		<0.00020		5.07		0.354		0.0000033			<0.0010		<0.00020	109		<0.0050		0.0232		
		Maximum		0.0907		<0.0030	157		<0.0000050		<0.00020		5.72		0.405		0.0000058			<0.0010		<0.00020	116		<0.0050		0.0347		
		Geometric Mean		0.0867		0.0015	144		0.0000025		0.000100		5.39		0.379		0.0000044			0.0005		0.0001000	112.4		0.00250		0.0284		
		Count <DL		0		2	0		2		2		0		0		0			2		2	0		2		0		
		Standard Deviation		0.0055		0	17.7		0.0000000		0.000000		0.46		0.036		0.0000018			0		0.0000000	4.9		0.00000		0.0081		
		1st Quartile		0.0849		<0.0030	138.2		<0.0000050		<0.00020		5.23		0.367		0.0000039			<0.0010		<0.00020	110.8		<0.0050		0.0261		
		Median		0.0868		<0.0030	144.5		<0.0000050		<0.00020		5.4		0.38		0.0000046			<0.0010		<0.00020	112.5		<0.0050		0.029		
		3rd Quartile		0.0888		<0.0030	150.8		<0.0000050		<0.00020		5.56		0.392		0.0000052			<0.0010		<0.00020	114.2		<0.0050		0.0318		
SPD	Settling Pond # 1		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E218582		Average	0.00093	0.00064	0.0597	0.01586	102.00	0.000005	0.00000438	0.001293	0.00076	0.893	0.0812	0.1021	0.09174	0.00000116	0.000001	318.3	0.00269	0.00255	0.0001	0.000100	282.6	0.00250	0.0025	0.0105	0.0073		
		Count	12	12	12	12	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	45	12	12	10	11		
		Minimum	0.0003	0.00023	0.0032	<0.0030	22.50	<0.000010	<0.0000050	<0.00050	0.00031	0.145	0.0102	0.0059	<0.0010	<0.0000020	<0.0000020	37.4	<0.0010	<0.0010	<0.00020	<0.00020	32.8	<0.0050	<0.0050	0.0053	0.0026		
		Maximum	0.00335	0.00273	0.254	0.0768	280.0	<0.000010	0.000015	0.00321	0.00153	2.85	0.138	0.544	0.56	0.0000029	<0.0000020	520	0.0067	0.0073	<0.00020	<0.00020	632	<0.0050	<0.0050	0.0218	0.0228		
		Geometric Mean	0.00075	0.00049	0.0284	0.00978	81	0.000005	0.00000357	0.001085	0.00071	0.501	0.0619	0.0541	0.0194	0.0000011	0.0000010	266.6	0.00189	0.00171	0.0001	0.000100	225.40	0.0025	0.0025	0.0095	0.00600		
		Count <DL	0	0	0	1	0	12	8	1	0	0	0	0	3	11	12	0	2	3	12	12	0	12	12	0	0		
		Standard Deviation	0.00080	0.00068	0.0715	0.02031	74.1	1E-13	0.00000371	0.000791	0.00031	0.969	0.0507	0.1468	0.15459	0.0000006	0	150.4	0.00226	0.00228	0.000000	0.000000	163.3	1E-10	1E-10	0.0053	0.0058		
		1st Quartile	0.00055	0.00032	0.0069	0.00538	48.8	<0.000010	<0.0000050	0.00091	0.00058	0.202	0.0331	0.0271	0.0044	<0.0000020	<0.0000020	183.5	0.001	0.00095	<0.00020	<0.00020	151	<0.0050	<0.0050	0.0071	0.004		
		Median	0.00074	0.0004	0.0386	0.0106	92	<0.000010	<0.0000050	0.00103	0.00074	0.298	0.0934	0.0607	0.04905	<0.0000020	<0.0000020	341.5	0.00165	0.0014	<0.00020	<0.00020	267.00	<0.0050	<0.0050	0.0088	0.0055		
		3rd Quartile	0.00099	0.00063	0.0866	0.01485	118.5	<0.000010	0.00000500	0.001655	0.00082	1.748	0.1260	0.0921	0.09335	<0.0000020	<0.0000020	440.5	0.0037	0.00342	<0.00020	<0.00020	441	<0.0050	<0.0050	0.01040	0.0087		
LLE	Long Lake Entrance (LLE)	Average	0.00085	0.00072	0.065	0.02323	71.9	0.00000500	0.00000282	0.000583	0.00046	0.327	0.165	0.0499	0.0472	0.00000135	0.0000014	268.8	0.00050	0.0005	0.0001	0.000100	229.6	0.0025	0.00250	0.0081	0.0084	0.0395	0.01663
E292130		Count	14	14	14	14	12	14	14	14	14	14	14	14	14	13	13	14	14	14	14	14	52	14	14	13	2	12	12
		Minimum	0.00055	0.00049	0.0071	<0.0030	38.1	<0.000010	<0.0000050	<0.00050	<0.00020	0.142	0.0306	0.0184	0.0024	<0.0000020	<0.0000020	95.8	<0.0010	<0.0010	<0.00020	<0.00020	81.3	<0.0050	<0.0050	0.004	0.0063	<0.020	<0.0050
		Maximum	0.00144	0.00119	0.192	0.0676	106	<0.000010	0.000007	0.00131	0.00072	0.812	0.595	0.107	0.119	0.0000028	0.0000058	610	<0.0010	<0.0010	<0.00020	<0.00020	566	<0.0050	<0.0050	0.0182	0.0106	0.105	0.0560
		Geometric Mean	0.00082	0.0007	0.0402	0.01441	68.8	0.000005	0.00000269	0.0005	0.000423	0.298	0.1246	0.0453	0.0355	0.00000123	0.00000114	219.9	0.0005	0.0005	0.0001	0.000100	198.6	0.0025	0.00250	0.0074	0.0082	0.0269	0.0109
		Count <DL	0	0	0	1	0	14	13	5	1	0	0	0	0	10	12	0	14	14	14	14	0	14	14	0	0	5	3
		Standard Deviation	0.00024	0.00019	0.0572	0.01985	21.2	1E-13	0.0000012	0.000328	0.000158	0.166	0.1477	0.0232	0.0299	0.00000067	0.00000133	179.1	0	0	0	0.000000	133.7	1E-10	0.00000	0.0038	0.003	0.0328	0.01515
		1st Quartile	0.00067	0.00056	0.0141	0.0062	58.8	<0.000010	<0.0000050	<0.00050	0.00038	0.24	0.093	0.035	0.0273	<0.0000020	<0.0000020	135.5	<0.0010	<0.0010	<0.00020	<0.00020	139.8	<0.0050	<0.0050	0.0062	0.0074	<0.020	0.00542
		Median	0.0008	0.00072	0.0601	0.02075	73.1	<0.000010	<0.0000050	0.00055	0.00047	0.302	0.119	0.0468	0.0496	<0.0000020	<0.0000020	197.5	<0.0010	<0.0010	<0.00020	<0.00020	183.5	<0.0050	<0.0050	0.007	0.0084	0.028	0.015
		3rd Quartile	0.00091	0.00076	0.0959	0.03645	87.4	<0.000010	<0.0000050	0.000742	0.000568	0.326	0.1755	0.060	0.0598	<0.0000020	<0.0000020	397.5	<0.0010	<0.0010	<0.00020	<0.00020	267.2	<0.0050	<0.0050	0.00970	0.0095	0.0652	0.02325
LLM1	Long Lake Middle 1 metre below Surface	Average	0.00047	0.00044	0.0324	0.0256	31.9	0.00000500	0.00000485	0.000433	0.00053	0.068	0.0407	0.0084	0.0027	0.00000108	0.00000126	63.1	0.00050	0.00050	0.000100	0.000100	50.43	0.00250	0.00250	0.0038			
E206619		Count	15	15	15	15	6	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	5			
		Minimum	0.00034	0.0003	0.0073	0.0066	13.4	<0.000010	<0.0000050	<0.00050	<0.00020	0.032	0.0193	0.0043	<0.0010	<0.000002	<0.0000002	12.8	<0.0010	<0.0010	<0.00020	<0.00020	3.6	<0.0050	<0.0050	0.0027			
		Maximum	0.00071	0.00063	0.0775	0.0513	37.8	<0.000010	0.0000241	0.00132	0.001	0.127	0.0719	0.0204	0.0107	0.0000022	0.0000035	91.8	<0.0010	<0.0010	<0.00020	<0.00020	81.1	<0.0050	<0.0050	0.0057			
		Geometric Mean	0.00045	0.00043	0.0233	0.0206	30.2	0.000005	0.00000341	0.00037	0.000469	0.062	0.0371	0.0076	0.0016	0.00000105	0.00000115	52.5	0.00050	0.00050	0.000100	0.000100	35.94	0.0025	0.00250	0.0037			
		Count <DL	0	0	0	0	0	15	12	9	1	0	0	0	6	14	13	0	15	15	15	15	0	15	15	0			
		Standard Deviation	0.00012	0.00011	0.0265	0.0170	9.3	0.00000000	0.00000606	0.000295	0.000225	0.032	0.0185	0.0044	0.00288	0.00000031	0.00000072	29.7	0.00000	0.00000	0.000000	0.000000	27.88	4E-11	0.00000	0.0012			
		1st Quartile	0.00038	0.00036	0.0114	0.0124	33.2	<0.000010	<0.0000050	<0.00050	0.000385	0.044	0.0276	0.0052	<0.0010	<0.0000020	<0.0000020	39	<0.0010	<0.0010	<0.00020	<0.00020	30.85	<0.0050	<0.0050	0.003			
		Median	0.0004	0.0004	0.018	0.018	35.4	<0.000010	<0.0000050	<0.00050	0.0005	0.059	0.033	0.0077	0.002	<0.0000020	<0.000002	76.6	<0.0010	<0.0010	<0.00020	<0.00020	62.5	<0.0050	<0.0050	0.0033			
		3rd Quartile	0.0006	0.00055	0.0584	0.0445	36.8	<0.000010	<0.0000050	0.000565	0.000615	0.0940	0.0562	0.0088	0.0034	<0.0000020	<0.0000020	84.8	<0.0010	<0.0010	<0.00020	<0.00020	69.45	<0.0050	<0.0050	0.0043			

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 58
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2016-17 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LLMB	Long Lake Middle 1 metre From Bottom	Average	0.00029	0.00024	0.0168	0.0119	48.8	0.00000500	0.00000411	0.00039	0.000419	0.052	0.01493	0.3531	0.1721	0.000001	0.000001	134	0.00050	0.00050	0.000100	0.000100		0.00250	0.00250	0.00360			
E206619		Count	15	15	15	15	6	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	5			
		Minimum	0.00017	0.00019	0.0095	0.0044	47.1	<0.000010	<0.0000050	<0.00050	<0.00020	0.026	<0.0050	0.0378	<0.0010	<0.000002	<0.000002	87.6	<0.0010	<0.0010	<0.00020	<0.00020	123	<0.0050	<0.0050	0.003			
		Maximum	0.00034	0.00029	0.0278	0.0236	50.3	<0.000010	0.0000186	0.00085	0.00091	0.075	0.0317	1.02	0.62	<0.000002	<0.000002	158	<0.0010	<0.0010	<0.00020	<0.00020	138	<0.0050	<0.0050	0.0047			
		Geometric Mean	0.00029	0.00024	0.016	0.0101	48.7	0.000005	0.00000314	0.000346	0.000385	0.05	0.01112	0.2128	0.03415	0.000001	0.000001	133	0.00050	0.00050	0.000100	0.000100	131.1	0.00250	0.00250	0.00360			
		Count <DL	0	0	0	0	0	15	13	10	1	0	2	0	3	15	15	0	15	15	15	15	0	15	15	0			
		Standard Deviation	0.00004	0.00003	0.0057	0.0068	1.3	1E-13	0.00000451	0.000214	0.000172	0.013	0.0106	0.337	0.2069	0	0	15.4	0.00000	0.00000	0.000000	0.000000	3.4	4E-11	0.00000	0.00070			
		1st Quartile	0.00028	0.00022	0.013	0.0051	48	<0.000010	<0.0000050	<0.00050	0.00035	0.043	0.00605	0.0754	0.02275	<0.0000020	<0.0000020	131	<0.0010	<0.0010	<0.00020	<0.00020	130	<0.0050	<0.0050	0.0031			
		Median	0.00029	0.00024	0.0144	0.0107	48.4	<0.000010	<0.0000050	<0.00050	0.00041	0.05	0.01180	0.174	0.0506	<0.0000020	<0.0000020	134	<0.0010	<0.0010	<0.00020	<0.00020	132.0	<0.0050	<0.0050	0.0033			
		3rd Quartile	0.0003	0.00026	0.0201	0.0176	49.9	<0.000010	<0.0000050	0.00058	0.00046	0.06	0.02400	0.4845	0.361	<0.000002	<0.000002	143.5	<0.0010	<0.0010	<0.00020	<0.00020	132.5	<0.0050	<0.0050	0.004			
LLO	Long Lake Outlet	Average	0.00045	0.00043	0.0383	0.0241	29.1	0.0000056	0.00000250	0.000458	0.00051	0.0680	0.0397	0.0075	0.00198	0.00000149	0.00000165	64.7	0.0005	0.00050	0.000100	0.000100	57	0.00250	0.00250	0.00401	0.00530		
E219412		Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	52	15	15	7	2		
		Minimum	0.00034	0.0003	0.0088	0.0046	15	<0.000010	<0.0000050	<0.00050	<0.00020	0.015	0.0116	0.0033	<0.0010	<0.000002	<0.000002	18.3	<0.0010	<0.0010	<0.00020	<0.00020	10.7	<0.0050	<0.0050	<0.0020	0.0027		
		Maximum	0.00057	0.00057	0.102	0.0568	38.6	0.000014	<0.0000050	0.001	0.00108	0.158	0.087	0.0152	0.0052	0.0000047	0.000006	91.1	<0.0010	<0.0010	<0.00020	<0.00020	101	<0.0050	<0.0050	0.007	0.0079		
		Geometric Mean	0.00044	0.00042	0.0258	0.0177	27.9	0.0000054	0.0000025	0.000399	0.000443	0.055	0.0323	0.0067	0.00146	0.0000013	0.0000014	58.2	0.0005	0.00050	0.000100	0.000100	49.8	0.00250	0.00250	0.00346	0.00460		
		Count <DL	0	0	0	0	0	14	15	8	1	0	0	0	5	12	11	0	15	15	15	15	0	15	15	1	0		
		Standard Deviation	0.00007	0.00007	0.0345	0.0185	7.9	0.0000023	1E-13	0.000255	0.000272	0.046	0.0264	0.0035	0.00142	0.00000113	0.00000141	24.6	0	0.00000	0.000000	0.000000	26.2	4E-11	4E-11	0.00202	0.0037		
		1st Quartile	0.00039	0.00038	0.0113	0.0086	25.1	<0.000010	<0.0000050	<0.00050	0.00037	0.036	0.0199	0.0048	<0.0010	<0.0000020	<0.0000020	48.6	<0.0010	<0.0010	<0.00020	<0.00020	32.6	<0.0050	<0.0050	0.0028	0.004		
		Median	0.00043	0.00041	0.0209	0.016	32.9	<0.000010	<0.0000050	<0.00050	0.00042	0.043	0.0285	0.0072	0.0017	<0.000002	<0.000002	76.9	<0.0010	<0.0010	<0.00020	<0.00020	62.5	<0.0050	<0.0050	0.0039	0.0053		
		3rd Quartile	0.0005	0.00047	0.0712	0.04	34.2	<0.000010	<0.0000050	0.000605	0.00056	0.110	0.0635	0.0100	0.00295	<0.0000020	0.0000015	80.1	<0.0010	<0.0010	<0.00020	<0.00020	77.5	<0.0050	<0.0050	0.0053	0.0066		
WB	Middle Quinsam Lake Outlet	Average	0.00021	0.00021	0.0265	0.0202	30.9	0.000005	0.00000323	0.000641	0.00066	0.049	0.0265	0.0072	0.00185	0.0000013	0.0000011	35.3	0.00050	0.00050	0.000100	0.000100	28.6	0.00250	0.00250	0.00320			
E0900504		Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	4			
		Minimum	0.0001	0.00014	0.0137	0.0129	22.3	<0.000010	<0.0000050	<0.00050	0.00045	0.023	0.0114	0.0038	<0.0010	<0.000002	<0.000002	27.6	<0.0010	<0.0010	<0.00020	<0.00020	17.7	<0.0050	<0.0050	0.0021			
		Maximum	0.00037	0.00025	0.0506	0.0385	35.7	<0.000010	0.00001	0.00135	0.00147	0.099	0.0568	0.0103	0.0071	0.0000048	0.0000022	44.7	<0.0010	<0.0010	<0.00020	<0.00020	40.4	<0.0050	<0.0050	0.005			
		Geometric Mean	0.0002	0.000210	0.0237	0.019	30.7	0.000005	0.00000291	0.000591	0.00062	0.045	0.0241	0.007	0.00122	0.00000111	0.00000105	35.1	0.00050	0.00050	0.000100	0.000100	27.9	0.00250	0.00250	0.00310			
		Count <DL	0	0	0	0	0	15	13	2	0	0	0	0	7	14	14	0	15	15	15	15	0	15	15	0			
		Standard Deviation	0.00007	0.00004	0.0136	0.0078	3.8	1E-13	0.00000208	0.000267	0.00027	0.0230	0.013	0.0019	0.00182	0.00000098	0.00000031	4.3	0.00000	0.00000	0.000000	0.000000	6.3	4E-11	4E-11	0.0013			
		1st Quartile	0.00016	0.00018	0.0169	0.0152	30.4	<0.000010	<0.0000050	0.000535	0.00052	0.034	0.0174	0.0058	<0.0010	<0.0000020	<0.0000020	32.6	<0.0010	<0.0010	<0.00020	<0.00020	24.4	<0.0050	<0.0050	0.0025			
		Median	0.0002	0.000220	0.0182	0.0177	31.5	<0.000010	<0.0000050	0.00057	0.00054	0.044	0.0245	0.0075	0.0014	<0.0000020	<0.0000020	34.6	<0.0010	<0.0010	<0.00020	<0.00020	28.9	<0.0050	<0.0050	0.0029			
		3rd Quartile	0.00026	0.000240	0.0382	0.0227	33.5	<0.000010	<0.0000050	0.00073	0.00068	0.056	0.0286	0.0087	0.00285	<0.0000002	<0.0000020	38.5	<0.0010	<0.0010	<0.00020	<0.00020	31.4	<0.0050	<0.0050	0.0036			
7SSD	Settling Pond at 7S- Discharge to Stream 1 -7S		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E292069		Average	0.00251	0.00204	0.1667	0.00909	141.8	0.0000064	0.00000368	0.00161	0.001	0.248	0.01791	0.0834	0.05288	0.00000119	0.000001	147	0.00059	0.0005	0.0001	0.0001	15.82	0.0025	0.0025				
		Count	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	17	17	17	17	17	17	17				
		Minimum	0.00063	0.00029	0.0228	<0.0030	50.7	<0.000010	<0.0000050	0.00055	0.00043	0.057	<0.0050	0.01	<0.0010	<0.0000020	<0.0000020	63.5	<0.0010	<0.0010	<0.00020	<0.00020	8.22	<0.0050	<0.0050				
		Maximum	0.0112	0.01	1.03	0.0298	219	0.000019	0.000009	0.00511	0.00347	1.37	0.085	0.479	0.423	0.0000029	<0.0000020	230	0.002	<0.0010	<0.00020	<0.00020	31	<0.0050	<0.0050				
		Geometric Mean	0.0016	0.00114	0.0823	0.00501	130.5	0.00000590	0.00000322	0.00128	0.00084	0.154	0.00975	0.0570	0.01442	0.00000112	0.000001	138.1	0.00054	0.0005	0.000100	0.000100	14.94	0.0025	0.00250				
		Count <DL	0	0	0	6	0	14	13	0	0	0	4	0	2	14	17	0	16	17	17	17	0	17	17				
		Standard Deviation	0.00284	0.00261	0.2564	0.01005	51.3	0.0000036	0.00000231	0.00127	0.00075	0.326	0.02177	0.1071	0.1006	0.00000054	0	49.7	0.00036	0	0	0.000000	5.7	4E-11	0.00000				
		1st Quartile	0.0007	0.0006	0.0443	<0.0030	114	<0.000010	<0.0000050	0.00077	0.0006	0.088	0.005	0.0382	0.0035	<0.0000020	<0.0000020	108.0	<0.0010	<0.0010	<0.00020	<0.00020	11.2	<0.0050	<0.0050				
		Median	0.0012	0.00073	0.0596	0.0046	154	<0.000010	<0.0000050	0.00105	0.00066	0.115	0.0073	0.054	0.024	<0.0000020	<0.0000020	155	<0.0010	<0.0010	<0.00020	<0.00020	15.7	<0.0050	<0.0050				
		3rd Quartile	0.00271	0.0023	0.194	0.0135	174	<0.000010	<0.0000050	0.00176	0.00114	0.293	0.0247	0.0784	0.0482	<0.0000020	<0.0000020	181.0	<0.0010	<0.0010	<0.00020	<0.00020	19.7	<0.0050	<0.0050				
7S	Stream 1-7S discharge to LWO	Average	0.000099	0.000086	0.0489	0.038	15.4	0.000005	0.00000329	0.000409	0.00039	0.0172	0.00975	0.0006	0.00054	0.00000109	0.00000146	16.5	0.00050	0.00050	0.000100	0.000100	2.990	0.00278	0.00250				
E292109		Count	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14				
		Minimum	<0.00010	<0.00010	0.0163	0.0177	10.3	<0.000010	<0.0000050	<0.00050	<0.00020	<0.010	<0.0050	<0.0010	<0.0010	<0.0000020	<0.0000020	12.1	<0.0010	<0.0010	<0.00020	<0.00020	1.26	<0.0050	<0.0050				
		Maximum	0.00018	0.00023	0.13	0.0776	26.8	<0.000010	0.00001	0.00112	0.00062	0.075	0.037	0.0014	0.0011	0.0000022	0.0000046	24.3	<0.0010	<0.0010	<0.00020	<0.00020	4.37	0.0064	<0.0050				
		Geometric Mean	0.00009	0.000073	0.0403	0.034	14.9	0.000005	0.00000294	0.000355	0.000349	0.0104	0.00589	0.00057	0.00053	0.00000106	0.00000127	16.1	0.00050	0.00050	0.000100	0.000100	2.87	0.00267	0.00250				
		Count <DL	5	9	0	0	0	14	12	9	2	8	6	12	13	13	11	0	14	14	14	14	0	13	14				
		Standard Deviation	0.000042	0.000057	0.034	0.0195	4.2	1E-13	0.00000215	0.00026	0.000164	0.0206	0.01134	0.00027	0.00016	0.00000032	0.00000104	3.7	0.00000	0.00000	0.000000	0.000000	0.8	0.00104	1E-10				
		1st Quartile	<0.00010	<0.00010	0.0257	0.0234	13.3	<0.000010	<0.0000050	<0.00050	0.00032	<0.010	<0.0050	<0.0010	<0.0010	<0.0000020	<0.0000020	13.8	<0.0010	<0.0010	<0.00020	<0.00020	2.48	<0.0050	<0.0050				
		Median	0.00011	<0.00010	0.0359	0.0326	14.3	<0.000010	<0.0000050	<0.00050	0.00041	<0.010	0.0051	<0.0010	<0.0010	<0.0000020	<0.0000020	15.5	<0.0010	<0.0010	<0.00020	<0.00020	2.98	<0.0050	<0.0050				
		3rd Quartile	0.000127	0.000108	0.0599	0.0465	16	<0.000010	<0.0000050	0.000568	0.000492	0.0172	0.01052	<0.0010	<0.0010	<0.0000020	<0.0000020	17.8	<0.0010	<0.0010	<0.00020	<0.00020	3.59	<0.0050	<0.0050				
QU0813A	Ex-situ 7-South groundwater well down gradient of the CCR backfill towards QR (No. 4 Seam)	Average	0.458	0.427	0.0178	0.00338	175.8	0.0000050	0.0000025	0.000250	0.000100	0.24	0.216	0.0492	0.0556		0.0000016		0.000500	0.000500	0.0001000	0.0001000	17.8	0.00250	0.00250		0.1480		
		Count	1	4	1	4	4	1	4	1	4	1	4	1	4		4		1	4	1	4	4	1	4		4		
		Minimum	0.458	0.405	0.0178	<0.0030	169	<0.000010	<0.0000050	<0.00050	<0.00020	0.24	0.205	0.0492	0.0431		<0.0000020		<0.0010	<0.0010	<0.00020	<0.00020	17	<0.0050	<0.0050		0.0931		
		Maximum	0.458	0.447	0.0178	0.0057	180	<0.000010	<0.0000050	<0.00050	<0.00020	0.24	0.222	0.0492	0.0813		0.0000034		<0.0010	<0.0010	<0.00020	<0.00020	19.2	<0.0050	<0.0050		0.174		
		Geometric Mean	0.458	0.426	0.0178	0.0028	175.7	0.0000050	0.0000025	0.00025	0.000100	0.24	0.216	0.0492	0.0538		0.0000014		0.000500	0.000500	0.0001000	0.0001000	17.8	0.0025	0.00250		0.1437		
		Count <DL	0	0	0	2	0	1	4	1	4	0	0	0	0		3		1	4	1	4	0	1	4		0		
		Standard Deviation	0	0.017	0	0.0022	5.0	0.0000000	0	0	0.000000	0.000	0.008	0	0.0175		0.0000012		0.000000	0.000000	0.0000000	0.0000000	1	0	0.00000		0.0375		
		1st Quartile	0.458	0.42	0.0178	<0.0030	173.5	<0.000010	<0.0000050	<0.00050	<0.00020	0.24	0.213	0.0492	0.0452		<0.0000020		<0.0010	<0.0010	<0.00020	<0.00020	17.2	<0.0050	<0.0050		0.1395		
		Median	0.458	0.427	0.0178	0.00315	177	<0.000010	<0.0000050	<0.00050	<0.00020	0.24	0.218	0.0492	0.049		<0.0000020		<0.0010	<0.0010	<0.00020	<0.00020	17.4	<0.0050	<0.0050		0.1625		
		3rd Quartile	0.458	0.434	0.0178	0.0050	179.2	<0.000010	<0.0000050	<0.00050	<0.00020	0.24	0.221	0.0492	0.0594		0.0000016		<0.0010	<0.0010	<0.00020	<0.00020	18.1	<0.0050	<0.0050		0.171		
QU0813B	Ex-situ 7-South groundwater well down gradient of the CCR backfill towards QR (Till & SST contact)	Average	0.519	0.497	0.248	0.0124	127.5	0.0000050	0.0000079	0.00086	0.000100	0.411	0.143	0.084	0.0832		0.0000056		0.0005	0.005000	0.0001	0.0001000	9.39	0.0025	0.00512		0.2370		
		Count	1	4	1	4	4	1	4	1	4	1	4	1	4		4		1	4	1	4	4	1	4		4		
		Minimum	0.519	0.469	0.248	0.0073	124	<0.000010	<0.0000050	0.00086	<0.00020	0.411	0.109	0.084	0.0749		0.0000021		<0.0010	<0.0010	<0.00020	<0.00020	9.05	<0.0050	<0.0050		0.213		
		Maximum	0.519	0.528	0.248	0.0201	131	<0.000010	0.000024	0.00086	<0.00020	0.411	0.228	0.084	0.0888		0.0000121		<0.0010	0.0185	<0.00020	<0.00020	9.62	<0.0050	0.013		0.299		
		Geometric Mean	0.519	0.496	0.248	0.0114	127.5	0.0000050	0.0000044	0.00086	0.000100	0.411	0.136	0.084	0.083		0.0000044		0.0005	0.001230	0.0001	0.0001000	9.39	0.0025	0.00378		0.2350		
		Count <DL	0	0	0	0	0	1	3	0	4	0	0	0	0		0		1	3	1	4	0	1	3		0		
		Standard Deviation	0.000	0.026	0.00	0.0059	3.1	0.0000000	0.0000108	0.00000	0.000000	0.00	0.057	0.000	0.0065		0.0000045		0.00000	0.009000	0.000000	0.0000000	0.3	0.0000	0.00525		0.0410		
		1st Quartile	0.519	0.479	0.248	0.0081	125.5	<0.000010	<0.0000050	0.00086	<0.00020	0.411	0.114	0.084	0.0794		0.0000028		<0.0010	<0.0010	<0.00020	<0.00020	9.28	<0.0050	<0.0050		0.215		
		Median	0.519	0.495	0.248	0.0111	127.5	<0.000010	<0.0000050	0.00086	<0.00020	0.411	0.118	0.084	0.0844		0.000004		<0.0010	<0.0010	<0.00020	<0.00020	9.44	<0.0050	<0.0050		0.218		
		3rd Quartile	0.519	0.513	0.248	0.0154	129.5	<0.000010	0.00000788	0.00086	<0.00020	0.411	0.147	0.084	0.0882		0.0000067		<0.0010	0.005	<0.00020	<0.00020	9.56	<0.0050	0.00512		0.24		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

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2016-17 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU0821GD	Ex-situ 2-North groundwater well down gradient of u/g tailings disposal, measures water quality & hydraulic gradients downstream of Forjan Fault (No. 4 Seam)	Average		0.158		0.0056	213.0		0.0000052		0.00013		0.934		0.1111		0.0000027			0.0005		0.0001	0.35		0.0025		0.082		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.111		0.0036	197		<0.0000050		<0.00020		0.303		0.0535		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.0579		
		Maximum		0.208		0.0084	220		0.0000133		0.00022		1.59		0.174		0.0000049			<0.0010		<0.00020	0.64		<0.0050		0.104		
		Geometric Mean		0.155		0.0053	212.8		0.0000038		0.000122		0.799		0.1023		0.0000021			0.0005		0.0001	0.316		0.0025		0.0794		
		Count <DL		0		0	0		3		3		0		0		2			4		4	3		4		0		
		Standard Deviation		0.04		0.00220	10.9		0.0000054		0.00006		0.529		0.0494		0.0000020			0		0	0.195		0.00000		0.0234		
		1st Quartile		0.143		0.004	210.5		<0.0000050		<0.00020		0.714		0.091		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.0639		
		Median		0.158		0.0052	217.5		<0.0000050		<0.00020		0.922		0.1085		0.00000245			<0.0010		<0.00020	<0.50		<0.0050		0.083		
		3rd Quartile		0.174		0.0067	220		0.0000052		0.00013		1.142		0.1282		0.00000415			<0.0010		<0.00020	0.35		<0.0050		0.101		
QU0821GS	Ex-situ 2-North groundwater well down gradient of u/g tailings disposal, measures water quality & hydraulic gradients downstream of Forjan Fault (No. 1 Seam)	Average		0.198		0.008	207.0		0.0000031		0.000125		0.546		0.0912		0.0000041			0.000620		0.0001250	0.512		0.00312		0.0899		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.153		0.0066	200		<0.0000050		<0.00020		0.314		0.0698		0.0000024			<0.0010		<0.00020	<0.50		<0.0050		0.0385		
		Maximum		0.218		0.0097	222		<0.000010		<0.00040		1.01		0.128		0.0000078			<0.0020		<0.00040	1.01		<0.010		0.154		
		Geometric Mean		0.196		0.0079	206.8		0.0000030		0.000119		0.483		0.0884		0.0000036			0.000590		0.0001190	0.43		0.00297		0.0793		
		Count <DL		0		0	0		4		4		0		0		0			4		4	2		4		0		
		Standard Deviation		0.03		0.0016	10.1		0.0000013		0.00005		0.327		0.027		0.0000025			0.000250		0.0000500	0.359		0.00125		0.0498		
		1st Quartile		0.194		0.0068	202.2		<0.0000050		<0.00020		0.316		0.0717		0.0000026			<0.0010		<0.00020	<0.50		<0.0050		0.0592		
		Median		0.21		0.0079	203		<0.0000050		<0.00020		0.43		0.0834		0.000003			<0.0010		<0.00020	0.395		<0.0050		0.0836		
		3rd Quartile		0.214		0.0092	207.8		0.00000312		0.000125		0.66		0.103		0.0000046			0.00062		0.000125	0.658		0.00312		0.1142		
QU1010D	Ex-situ 2-North deep groundwater well. Down gradient of u/g tailings disposal, measures water quality & hydraulic head downstream of 2-North workings. (No. 1 Seam / Mudstone).																												
		Average		0.0152		0.0129	92.3		0.000022		0.00085		10.2		0.433		0.0000023			0.00100		0.000430	0.25		0.0050		0.06650		
		Count		1		1	1		1		1		1		1		1			1		1	1		1		1		
		Minimum		0.0152		0.0129	92.3		0.000022		0.00085		10.2		0.433		0.0000023			<0.0020		0.00043	<0.50		<0.010		0.0665		
		Maximum		0.0152		0.0129	92.3		0.000022		0.00085		10.2		0.433		0.0000023			<0.0020		0.00043	<0.50		<0.010		0.0665		
		Geometric Mean		0.0152		0.0129	92.3		0.000022		0.00085		10.2		0.433		0.0000023			0.00100		0.000430	0.25		0.0050		0.06650		
		Count <DL		0		0	0		0		0		0		0		0			1		0	1		1		0		
		Standard Deviation		0.0000		0.0000	0		0.000000		0.00000		0.0		0.00		0.0000000			0.00000		0.000000	0.0		0.0000		0.00000		
		1st Quartile		0.0152		0.0129	92.3		0.000022		0.00085		10.2		0.433		0.0000023			<0.0020		0.00043	<0.50		<0.010		0.0665		
		Median		0.0152		0.0129	92.3		0.000022		0.00085		10.2		0.433		0.0000023			<0.0020		0.00043	<0.50		<0.010		0.0665		
		3rd Quartile		0.0152		0.0129	92.3		0.000022		0.00085		10.2		0.433		0.0000023			<0.0020		0.00043	<0.50		<0.010		0.0665		
QU1010S	Ex-situ 2-North shallow groundwater well. Down gradient of u/g tailings disposal, measures water quality & hydraulic head downstream of 2-North workings. (No. 1 Seam / Sandstone).	Average		0.133		0.0188	151.0		0.0000025		0.0001		0.351		0.0531		0.0000054			0.000500		0.0001000	49.8		0.00250		0.0686		
		Count		1		1	1		1		1		1		1		1			1		1	1		1		1		
		Minimum		0.133		0.0188	151		<0.0000050		<0.00020		0.351		0.0531		0.0000054			<0.0010		<0.00020	49.8		<0.0050		0.0686		
		Maximum		0.133		0.0188	151		<0.0000050		<0.00020		0.351		0.0531		0.0000054			<0.0010		<0.00020	49.8		<0.0050		0.0686		
		Geometric Mean		0.133		0.01880	151.0		0.0000025		0.0001		0.351		0.0531		0.0000054			0.000500		0.0001000	49.8		0.0025		0.0686		
		Count <DL		0		0	0		1		1		0		0		0			1		1	0		1		0		
		Standard Deviation		0		0	0.0		0.0000000		0		0		0		0.0000000			0.000000		0.0000000	0		0		0		
		1st Quartile		0.133		0.0188	151		<0.0000050		<0.00020		0.351		0.0531		0.0000054			<0.0010		<0.00020	49.8		<0.0050		0.0686		
		Median		0.133		0.0188	151		<0.0000050		<0.00020		0.351		0.0531		0.0000054			<0.0010		<0.00020	49.8		<0.0050		0.0686		
		3rd Quartile		0.133		0.0188	151		<0.0000050		<0.00020		0.351		0.0531		0.0000054			<0.0010		<0.00020	49.8		<0.0050		0.0686		
QU1011D	Ex-situ 2-North deep groundwater well. Measures water quality & hydraulic gradient in Forjian Fault (Fractured sandstone).	Average		0.00905		0.0215	360		0.0000025		0.0001		4.09		0.453		0.0000031			0.0005		0.0001	1.0		0.0025		0.076		
		Count		1		1	1		1		1		1		1		1			1		1	1		1		1		
		Minimum		0.00905		0.0215	360		<0.0000050		<0.00020		4.09		0.453		0.0000031			<0.0010		<0.00020	0.95		<0.0050		0.0764		
		Maximum		0.00905		0.0215	360		<0.0000050		<0.00020		4.09		0.453		0.0000031			<0.0010		<0.00020	0.95		<0.0050		0.0764		
		Geometric Mean		0.00905		0.0215	360		0.0000025		0.0001		4.09		0.453		0.0000031			0.0005		0.0001	1.0		0.0025		0.076		
		Count <DL		0		0	0		1		1		0		0		0			1		1	0		1		0		
		Standard Deviation		0.00000		0.0000	0		0.0000000		0.00000		0.00		0.000		0.0000000			0.00000		0.000000	0.0		0.0000		0.000		
		1st Quartile		0.00905		0.0215	360		<0.0000050		<0.00020		4.09		0.453		0.0000031			<0.0010		<0.00020	0.95		<0.0050		0.0764		
		Median		0.00905		0.0215	360		<0.0000050		<0.00020		4.09		0.453		0.0000031			<0.0010		<0.00020	0.95		<0.0050		0.0764		
		3rd Quartile		0.00905		0.0215	360		<0.0000050		<0.00020		4.09		0.453		0.0000031			<0.0010		<0.00020	0.95		<0.0050		0.0764		
QU1011S	Ex-situ 2-North shallow groundwater well. Measures water quality & hydraulic gradient in Forjian Fault (Fractured sandstone).	Average		0.00495		0.012	106.3		0.0000025		0.000175		0.265		0.0602		0.0000055			0.0005		0.0001000	5.84		0.00250		0.0125		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.00169		0.0056	59.6		<0.0000050		<0.00020		0.179		0.0488		0.0000048			<0.0010		<0.00020	3.94		<0.0050		0.0055		
		Maximum		0.0082		0.0183	153		<0.0000050		0.00025		0.352		0.0716		0.0000063			<0.0010		<0.00020	7.73		<0.0050		0.0195		
		Geometric Mean		0.00372		0.0101	95.5		0.0000025		0.000158		0.251		0.0591		0.0000055			0.0005		0.0001000	5.52		0.0025		0.0104		
		Count <DL		0		0	0		2		1		0		0		0			2		2	0		2		0		
		Standard Deviation		0.0046		0.009	66		0.0000000		0.000106		0.122		0.0161		0.0000011			0		0.0000000	2.68		0		0.0099		
		1st Quartile		0.00332		0.0088	83		<0.0000050		0.000138		0.222		0.0545		0.0000052			<0.0010		<0.00020	4.89		<0.0050		0.009		
		Median		0.00494		0.0119	106.3		<0.0000050		0.000175		0.265		0.0602		0.0000055			<0.0010		<0.00020	5.84		<0.0050		0.0125		
		3rd Quartile		0.00657		0.0151	129.6		<0.0000050		0.000213		0.309		0.0659		0.0000059			<0.0010		<0.00020	6.78		<0.0050		0.016		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 60
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2016-17 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU1105S	Ex-situ River Barrier Pillar (RBP) shallow groundwater well. Monitors water quality & gradients above the RBP & 2-North Mine. (Sandstone)	Average		0.0716		0.00562	207.8		0.0000033		0.000178		1.395		0.176		0.0000049			0.000500		0.0001000	92.9		0.00250		0.030		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.0362		<0.0030	82.8		<0.0000050		<0.00020		0.358		0.0988		0.0000024			<0.0010		<0.00020	42.3		<0.0050		0.0126		
		Maximum		0.103		0.0083	329		0.0000055		0.00027		2.46		0.254		0.0000108			<0.0010		<0.00020	156		<0.0050		0.0479		
		Geometric Mean		0.065		0.00472	170.7		0.0000030		0.000160		1.038		0.1629		0.0000040			0.000500		0.0001000	80.4		0.00250		0.027		
		Count <DL		0		1	0		3		2		0		0		0			4		4	0		4		0		
		Standard Deviation		0.0344		0.00295	136.6		0.0000015		0.000090		1.063		0.0765		0.0000040			0.000000		0.0000000	54.7		0.00000		0.015		
		1st Quartile		0.0452		0.00465	93.1		<0.0000050		<0.00020		0.549		0.117		0.000003			<0.0010		<0.00020	49.8		<0.0050		0.0222		
		Median		0.0737		0.00635	209.8		<0.0000050		0.00017		1.382		0.1755		0.0000032			<0.0010		<0.00020	86.6		<0.0050		0.0298		
		3rd Quartile		0.1001		0.00732	324.5		0.00000325		0.000248		2.228		0.2345		0.0000051			<0.0010		<0.00020	129.8		<0.0050		0.0377		
QU1109S	Ex-situ River Barrier Pillar (RBP) shallow groundwater well. Monitors water quality & gradients above the RBP & 2-North Mine. (Sandstone)	Average		0.077		0.006	512		0.0000054		0.0001		0.2270		0.0217		0.0000015			0.0005		0.0001	477		0.0025		0.029		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.067		0.0045	458		<0.0000050		<0.00020		0.171		0.0193		<0.0000020			<0.0010		<0.00020	435		<0.0050		<0.0020		
		Maximum		0.095		0.0097	554		0.000014		<0.00020		0.292		0.0233		0.0000028			<0.0010		<0.00020	540		<0.0050		0.0469		
		Geometric Mean		0.076		0.0057	510.5		0.0000039		0.0001		0.2220		0.0216		0.0000013			0.0005		0.0001	475		0.0025		0.015		
		Count <DL		0		0	0		3		4		0		0		3			4		4	0		4		1		
		Standard Deviation		0.013		0.0025	45.1		0.0000058		0.00000		0.0560		0.00170		0.0000009			0.00000		0.000000	50.0		0.0000		0.020		
		1st Quartile		0.068		0.0046	483.5		<0.0000050		<0.00020		0.186		0.0213		<0.0000020			<0.0010		<0.00020	436		<0.0050		0.02635		
		Median		0.072		0.0048	518		<0.0000050		<0.00020		0.223		0.0221		<0.0000020			<0.0010		<0.00020	467		<0.0050		0.03485		
		3rd Quartile		0.082		0.0062	546.5		0.00000538		<0.00020		0.264		0.0225		0.00000145			<0.0010		<0.00020	508		<0.0050		0.0379		
7SQR	7-South Quinsam River downstream of 7-South Mining Operation	Average	0.0008	0.00058	0.0419	0.0212	32.2	0.0000053	0.00000332	0.000781	0.00061	0.109	0.0484	0.0075	0.00245	0.00000156	0.00000109	35.9	0.00050	0.00050	0.000100	0.000100	28.9	0.0025	0.0025	0.00610			
E292113		Count	22	22	22	22	21	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	4			
		Minimum	0.00021	0.0002	0.0136	0.009	22.9	<0.000010	<0.0000050	<0.00050	0.00042	0.045	0.0211	0.0028	<0.0010	<0.000002	<0.000002	24.9	<0.0010	<0.0010	<0.00020	<0.00020	12.5	<0.0050	<0.0050	0.0038			
		Maximum	0.00558	0.00244	0.203	0.0448	37.8	0.000012	0.000012	0.00213	0.00089	0.465	0.0804	0.0359	0.0056	0.0000046	0.000003	44.4	<0.0010	<0.0010	<0.00020	<0.00020	39.3	<0.0050	<0.0050	0.0117			
		Geometric Mean	0.0005	0.00045	0.0307	0.0186	32	0.0000052	0.00000293	0.000701	0.0006	0.093	0.0459	0.0064	0.00192	0.00000129	0.00000105	35.6	0.00050	0.00050	0.000100	0.000100	28.2	0.0025	0.0025	0.00540			
		Count <DL	0	0	0	0	0	21	19	1	0	0	0	0	5	18	21	0	22	22	22	22	0	22	22	0			
		Standard Deviation	0.0013	0.00056	0.0432	0.0111	3.8	0.00000150	0.00000236	0.000432	0.00014	0.088	0.0159	0.0066	0.00142	0.00000122	0.00000043	4.8	0.00000	0.00000	0.000000	0.000000	5.7	0	0	0.0038			
		1st Quartile	0.00037	0.00033	0.0171	0.0121	29.6	<0.000010	<0.0000050	0.000552	0.00051	0.065	0.0381	0.0048	0.00142	<0.0000020	<0.0000020	33.2	<0.0010	<0.0010	<0.00020	<0.00020	25.8	<0.0050	<0.0050	0.004			
		Median	0.00042	0.00036	0.0242	0.0164	33.3	<0.000010	<0.0000050	0.00062	0.00058	0.085	0.0462	0.006	0.0028	<0.000002	<0.0000020	37	<0.0010	<0.0010	<0.00020	<0.00020	30	<0.0050	<0.0050	0.0044			
		3rd Quartile	0.00048	0.00046	0.0519	0.0292	34.8	<0.000010	<0.0000050	0.0008	0.00066	0.117	0.0554	0.0078	0.0031	<0.0000020	<0.0000020	38.8	<0.0010	<0.0010	<0.00020	<0.00020	32.60	<0.0050	<0.0050	0.0066			
LQL1	Lower Quinsam Lake 1 metre below surface	Average	0.00054	0.00051	0.0723	0.0321	29.6	0.0000075	0.00000434	0.000851	0.00070	0.133	0.0468	0.0069	0.00186	0.00000116	0.00000129	31.8	0.00091	0.00050	0.000100	0.000100	17.5	0.00250	0.00250	0.0117			
E292118		Count	16	16	16	16	4	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	3			
		Minimum	0.00032	0.00026	0.0069	0.0071	25.2	<0.000010	<0.0000050	<0.00050	0.00036	0.033	0.0161	0.0035	<0.0010	<0.0000020	<0.0000020	25.0	<0.0010	<0.0010	<0.00020	<0.00020	10.5	<0.0050	<0.0050	0.0044			
		Maximum	0.00071	0.00081	0.374	0.0813	34.3	0.000025	0.0000150	0.00195	0.00128	0.587	0.0862	0.0203	0.0053	0.0000024	0.0000028	42.3	0.0070	<0.0010	<0.00020	<0.00020	23.3	<0.0050	<0.0050	0.0220			
		Geometric Mean	0.00053	0.00049	0.0337	0.0241	29.4	0.0000063	0.00000358	0.000711	0.00066	0.092	0.0431	0.0062	0.00117	0.00000111	0.00000119	31.4	0.00059	0.00050	0.000100	0.000100	16.9	0.00250	0.00250	0.0094			
		Count <DL	0	0	0	0	0	13	11	3	0	0	0	0	8	14	13	0	15	16	16	16	0	16	16	0			
		Standard Deviation	0.00011	0.00015	0.1009	0.0245	3.7	0.0000058	0.00000343	0.000512	0.00024	0.145	0.0188	0.0040	0.00184	0.00000043	0.00000062	5.3	0.00162	0.00000	0.000000	0.000000	4.4	4E-11	4E-11	0.0092			
		1st Quartile	0.00045	0.00043	0.0118	0.0113	28.1	<0.000010	<0.0000050	0.000565	0.00049	0.052	0.0384	0.0049	<0.0010	<0.0000020	<0.0000020	28.0	<0.0010	<0.0010	<0.00020	<0.00020	14.5	<0.0050	<0.0050	0.0066			
		Median	0.00052	0.00048	0.0276	0.0244	29.4	<0.000010	<0.0000050	0.000700	0.00065	0.070	0.0435	0.0056	0.00080	<0.0000020	<0.0000020	29.6	<0.0010	<0.0010	<0.00020	<0.00020	16.8	<0.0050	<0.0050	0.0087			
		3rd Quartile	0.00064	0.00063	0.0888	0.0457	30.9	<0.000010	0.0000060	0.000990	0.00085	0.144	0.0516	0.0082	0.0034	<0.0000020	<0.0000020	36.1	<0.0010	<0.0010	<0.00020	<0.00020	21.8	<0.0050	<0.0050	0.0154			
LQLB	LQLB 1 metre from Bottom	Average	0.00119	0.00066	0.0840	0.0331	29.0	0.0000110	0.00000612	0.00100	0.00072	0.684	0.1917	0.2085	0.1350	0.00000107	0.00000134	29.1	0.00050	0.00050	0.000100	0.000100	12.8	0.00321	0.00250	0.0131			
E292118		Count	16	16	16	16	4	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	3			
		Minimum	0.00038	0.00028	0.0259	0.0095	26.7	<0.000010	<0.0000050	0.00062	0.00042	0.102	0.0461	0.0072	0.0016	<0.0000020	<0.0000020	24.5	<0.0010	<0.0010	<0.00020	<0.00020	10.3	<0.0050	<0.0050	0.0042			
		Maximum	0.00271	0.00128	0.437	0.0813	33.6	0.000026	0.0000120	0.00211	0.00119	2.36	0.498	0.689	0.392	0.0000021	0.0000027	34.0	<0.0010	<0.0010	<0.00020	<0.00020	15.2	0.0139	<0.0050	0.0267			
		Geometric Mean	0.00096	0.00061	0.0518	0.0265	28.9	0.0000090	0.00000543	0.00092	0.00069	0.396	0.1405	0.0650	0.0369	0.00000105	0.00000124	29.0	0.00050	0.00050	0.000100	0.000100	12.7	0.00278	0.00250	0.0098			
		Count <DL	0	0	0	0	0	8	4	0	0	0	0	0	0	15	12	0	16	16	16	16	0	15	16	0			
		Standard Deviation	0.00081	0.00028	0.1115	0.0237	3.1	0.0000072	0.00000287	0.00045	0.00021	0.693	0.1533	0.2557	0.1599	0.00000027	0.00000063	3.0	0.00000	0.00000	0.000000	0.000000	1.4	0.00285	4E-11	0.0120			
		1st Quartile	0.00060	0.00050	0.0290	0.0168	27.4	<0.000010	0.00000438	0.00066	0.00058	0.150	0.0789	0.0173	0.0054	<0.0000020	<0.0000020	27.3	<0.0010	<0.0010	<0.00020	<0.00020	12.0	<0.0050	<0.0050	0.0062			
		Median	0.00073	0.00060	0.0332	0.0230	28.0	0.0000085	0.00000590	0.00083	0.00072	0.270	0.0985	0.0438	0.0350	<0.0000020	<0.000002	27.8	<0.0010	<0.0010	<0.00020	<0.00020	12.7	<0.0050	<0.0050	0.0083			
		3rd Quartile	0.00193	0.00078	0.0752	0.0478	29.6	0.0000138	0.00000810	0.00120	0.00083	1.168	0.3492	0.4218	0.3062	<0.0000020	0.00000127	32.0	<0.0010	<0.0010	<0.00020	<0.00020	13.6	<0.0050	<0.0050	0.0175			

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 61
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2017 -18 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
WA			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E0126402	Middle Quinsam Lake Inlet - Quinsam River at Argonaut Road upstream of mining operation.	Average	0.00011	0.000099	0.0288	0.0228	20.9	0.000005	0.0000025	0.000687	0.00068	0.0161	0.0147	0.00114	0.00057	0.0000010	0.0000010	19.8	0.0005	0.00050	0.000100	0.000100	0.916	0.00250	0.0025				
		Count	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16				
		Minimum	<0.00010	<0.00010	0.0174	0.0148	16.9	<0.000010	<0.0000050	<0.00050	0.00055	<0.010	0.0076	<0.0010	<0.0010	<0.0000020	<0.0000020	17	<0.0010	<0.0010	<0.00020	<0.00020	<0.50	<0.0050	<0.0050				
		Maximum	0.0002	0.00017	0.0885	0.0359	23.9	<0.000010	<0.0000050	0.00101	0.001	0.023	0.0308	0.0021	0.0011	<0.0000020	<0.0000020	22.1	<0.0010	<0.0010	<0.00020	<0.00020	1.43	<0.0050	<0.0050				
		Geometric Mean	0.000101	0.00009	0.0262	0.0222	20.8	0.000005	0.0000025	0.00066	0.00067	0.0153	0.0139	0.00101	0.00055	0.000001	0.000001	19.8	0.0005	0.00050	0.000100	0.000100	0.795	0.00250	0.0025				
		Count <DL	4	6	0	0	0	16	16	1	0	1	0	5	14	16	16	0	16	16	16	16	6	16	16				
		Standard Deviation	0.000041	0.000041	0.0171	0.0059	2.2	1E-14	4E-15	0.000182	0.00013	0.0046	0.0057	0.00051	0.00019	0	0	1.5	0	0.00000	0.000000	0.000000	0.424	4E-11	4E-11				
		1st Quartile	0.000095	<0.00010	0.0202	0.0186	20.2	<0.000010	<0.0000050	0.000625	0.00061	0.014	0.0109	<0.0010	<0.0010	<0.0000020	<0.0000020	18.8	<0.0010	<0.0010	<0.00020	<0.00020	<1.0	<0.0050	<0.0050				
		Median	0.00012	0.00011	0.0245	0.0221	21.2	<0.000010	<0.0000050	0.00066	0.00062	0.017	0.0138	0.0012	<0.0010	<0.0000020	<0.0000020	20	<0.0010	<0.0010	<0.00020	<0.00020	1.05	<0.0050	<0.0050				
		3rd Quartile	0.00013	0.00013	0.0293	0.0264	22.7	<0.000010	<0.0000050	0.000762	0.00072	0.0185	0.0159	0.00143	<0.0010	<0.0000020	<0.0000020	21.1	<0.0010	<0.0010	<0.00020	<0.00020	1.275	<0.0050	<0.0050				
WD	Settling Pond #4	Average	0.00234	0.00146	0.03103	0.00926	369	0.0000257	0.00001214	0.00132	0.00061	0.502	0.01539	0.1064	0.0948	0.000001	0.000001	317	0.004	0.00378	0.000200	0.000250	506	0.00558	0.00668				
E207409		Count	8	8	8	8	15	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	52	8	8				
		Minimum	0.0014	0.00097	<0.015	0.0055	321	<0.000010	<0.0000050	0.00061	0.00041	0.166	0.0072	0.0376	0.0314	<0.0000020	<0.0000020	222	<0.0010	<0.0010	<0.00020	<0.00020	229	<0.0050	<0.0050				
		Maximum	0.00305	0.00226	0.14	0.0174	453	0.000068	0.0000271	0.00386	0.00088	1.17	0.0519	0.191	0.167	<0.0000020	<0.0000020	451	0.0117	0.0099	<0.0010	<0.0010	822	<0.025	<0.025				
		Geometric Mean	0.00225	0.0014	0.01864	0.00878	366	0.0000204	0.0000099	0.001094	0.000592	0.427	0.01216	0.0911	0.0781	0.000001	0.000001	310	0.0027	0.0027	0.000150	0.000183	490	0.00426	0.00509				
		Count <DL	0	0	2	3	0	3	4	2	3	0	3	0	0	8	8	0	3	4	8	8	0	7	7				
		Standard Deviation	0.00065	0.00046	0.04453	0.00359	43	0.0000191	0.00000764	0.001065	0.000179	0.315	0.01494	0.0583	0.057	1E-14	0.0000000	70	0.00386	0.00322	0.000185	0.000207	130	0.00456	0.00496				
		1st Quartile	0.00205	0.00109	0.01148	<0.015	337	0.0000163	0.00000725	0.000723	<0.0010	0.298	0.0079	0.0518	0.0408	<0.0000020	<0.0000020	273	0.00167	0.00225	<0.00020	<0.00020	425	<0.0050	<0.0050				
		Median	0.00237	0.00138	0.0155	0.00835	350	0.0000235	<0.000025	0.00107	0.000515	0.452	0.0118	0.107	0.0914	<0.0000020	<0.0000020	319	<0.0050	<0.0050	<0.00020	<0.00020	498	<0.0050	0.0042				
		3rd Quartile	0.00291	0.00171	0.02455	0.00967	398	0.0000267	0.00001363	0.001265	0.000782	0.586	<0.025	0.1442	0.1415	<0.0000020	<0.0000020	342	0.00458	0.00435	0.0002	<0.0010	545	0.00845	<0.025				
MW001D	Ex-situ 2-North deep groundwater well below the coal wash plant (Till)	Average		0.0197		0.0355	92.4		0.00000375		0.00143		0.0080		0.0082		0.0000010			0.0005		0.0001	27.4		0.0025		0.173		
		Count		2		2	1		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.0189		0.0319	92.4		<0.0000050		0.00124		<0.0050		0.0029		<0.0000020			<0.0010		<0.00020	26.6		<0.0050		0.172		
		Maximum		0.0205		0.0391	92.4		0.000005		0.00161		0.0135		0.0134		<0.0000020			<0.0010		<0.00020	28.2		<0.0050		0.175		
		Geometric Mean		0.0197		0.0353	92.4		0.00000354		0.00141		0.00581		0.0062		0.0000010			0.0005		0.0001	27.4		0.0025		0.173		
		Count <DL		0		0	0		1		0		1		0		2			2		2	0		2		0		
		Standard Deviation		0.0011		0.0051	0.0		0.00000177		0.00026		0.00778		0.007400		0.0000000			0		0	1.1		1E-11		0.002		
		1st Quartile		0.0193		0.0337	92.4		0.00000313		0.00133		0.00525		0.0055		<0.0000020			<0.0010		<0.00020	27		<0.0050		0.173		
		Median		0.0197		0.0355	92.4		0.00000375		0.00143		0.0080		0.0082		<0.0000020			<0.0010		<0.00020	27.4		<0.0050		0.173		
		3rd Quartile		0.0201		0.0373	92.4		0.00000438		0.00152		0.01075		0.0108		<0.0000020			<0.0010		<0.00020	27.8		<0.0050		0.174		
MW001S	Ex-situ 2-North shallow groundwater well below the coal wash plant (Till)	Average		0.000215		0.0045	344		0.000100		0.000515		0.0605		2.53		0.0000010			0.0025		0.0003000	754		0.0075		0.00920		
		Count		2		2	1		2		2		2		2		2			2		2	1		2		2		
		Minimum		0.00018		<0.0030	344		0.000092		<0.0010		0.047		1.84		<0.0000020			<0.0050		<0.00020	754		<0.0050		0.0068		
		Maximum		<0.00050		<0.015	344		0.000107		0.00053		0.074		3.22		<0.0000020			0.0025		<0.0010	754		<0.025		0.0117		
		Geometric Mean		0.00021		0.00335	344		0.0000992		0.000515		0.059		2.4341		0.0000010			0.0025		0.0002240	754		0.00559		0.0089		
		Count <DL		1		2	0		0		1		0		0		2			1		2	0		2		0		
		Standard Deviation		0.000049		0.00424	0		0.0000106		0.000021		0.0191		0.9758		0.0000000			1E-11		0.0002830	0		0.00707		0.00350		
		1st Quartile		0.000198		0.003	344		0.0000957		0.000508		0.0537		2.185		<0.0000020			<0.0050		0.0002	754		0.005		0.00800		
		Median		0.000215		0.0045	344		0.000100		0.000515		0.0605		2.53		<0.0000020			<0.0050		0.0003	754		0.0075		0.00920		
		3rd Quartile		0.000233		0.006	344		0.000103		0.000522		0.0673		2.875		<0.0000020			<0.0050		0.0004	754		0.01		0.01050		
MW006D	Ex-situ 2-North deep groundwater well below the coal wash plant (Till)	Average		0.0299		0.0221	76.8		0.0000148		0.00294		0.0025		0.0016		0.0000010			0.000500		0.0001000	16.2		0.00400		0.164		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.0296		0.0189	72.8		<0.0000050		0.00073		<0.0050		0.0014		<0.0000020			<0.0010		<0.00020	12.9		<0.0050		0.156		
		Maximum		0.0301		0.0254	80.9		0.000027		0.00516		<0.0050		0.0019		<0.0000020			<0.0010		<0.00020	19.5		0.0055		0.173		
		Geometric Mean		0.0298		0.0219	76.7		0.0000082		0.00194		0.0025		0.0016		0.0000010			0.000500		0.0001000	15.9		0.00371		0.164		
		Count <DL		0		0	0		1		0		2		0		2			2		2	0		1		0		
		Standard Deviation		0.0004		0.0046	5.7		0.0000173		0.00313		1E-11		0.0004		0.0000000			0.000000		0.0000000	4.7		0.00212		0.012		
		1st Quartile		0.0297		0.0205	74.8		0.00000862		0.00184		<0.0050		0.0015		<0.0000020			<0.0010		<0.00020	14.6		0.00325		0.16		
		Median		0.0299		0.0221	76.8		0.00001475		0.00294		<0.0050		0.0016		<0.0000020			<0.0010		<0.00020	16.2		0.00400		0.164		
		3rd Quartile		0.03		0.0238	78.9		0.00002087		0.00405		<0.0050		0.0018		<0.0000020			<0.0010		<0.00020	17.9		0.00475		0.169		
MW006S	Ex-situ 2-North shallow groundwater well below the coal wash plant (Till)	Average		0.00153		0.00450	167.0		0.00006		0.00153		0.0050		0.0469		0.0000010			0.0005		0.0001	553.5		0.00250		0.0544		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.00151		0.0036	165		0.000027		0.0011		<0.0050		0.03		<0.0000020			<0.0010		<0.00020	533		<0.0050		0.0543		
		Maximum		0.00155		0.0054	169		0.000093		0.00197		0.0075		0.0639		<0.0000020			<0.0010		<0.00020	574		<0.0050		0.055		
		Geometric Mean		0.00153		0.0044	167.0		0.0000501		0.00147		0.00433		0.0438		0.0000010			0.00050		0.0001000	553.1		0.0025		0.0544		
		Count <DL		0		0	0		0		0		1		0		2			2		2	0		2		0		
		Standard Deviation		0.00003		0.0013	2.8		0.000047		0.000620		0.00354		0.024		0.0000000			0		0.0000000	29		1E-11		0.0002		
		1st Quartile		0.00152		0.00400	166		0.0000435		0.00132		0.00375		0.0385		<0.0000020			<0.0010		<0.00020	543.2		<0.0050		0.0544		
		Median		0.00153		0.00450	167		0.00006		0.00153		0.0050		0.0469		<0.0000020			<0.0010		<0.00020	553.5		<0.0050		0.0544		
		3rd Quartile		0.00154		0.00500	168		0.0000765		0.00175		0.00625		0.0554		<0.0000020			<0.0010		<0.00020	563.8		<0.0050		0.0545		
WC		Average	0.0008	0.00065	0.01811	0.01128	381.5	0.0000288	0.00000589	0.000874	0.000609	0.083	0.01293	0.0207	0.01798	0.00000116	0.000001	287	0.00229	0.002	0.000200	0.000213	514	0.00500	0.00531				
E207411	2-North Pit Culvert discharge into Middle Quinsam Lake	Count	8	8	8	8	2	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12	8	8				
		Minimum	0.00047	0.00039	<0.015	0.0061	353	<0.000010	<0.0000050	<0.00050	0.00044	0.034	<0.010	0.0096	<0.0010	<0.0000020	<0.0000020	198	<0.0010	<0.0010	<0.00020	<0.00020	381	<0.0050	<0.0050				
		Maximum	0.00127	0.00121	0.0662	0.0272	410	0.000081	<0.000025	0.00149	0.00141	0.181	0.0297	0.0543	0.0472	0.0000023	<0.0000020	379	0.0058	0.0052	<0.0010	<0.0010	757	<0.025	<0.025				
		Geometric Mean	0.00076	0.00062	0.01334	0.0098	380.4	0.000015	0.00000464	0.00072	0.000562	0.0740	0.01103	0.0174	0.01111	0.00000111	0.000001	282	0.00183	0.0015	0.000150	0.000163	501	0.00374	0.00408				
		Count <DL	0	0	2	2	0	6	7	4	2	0	3	0	1	7	8	0	3	5	8	8	0	8	8				
		Standard Deviation	0.00028	0.00025	0.01983	0.00738	40.3	0.0000328	0.0000044	0.000488	0.000326	0.046	0.0083	0.0149	0.0145	0.00000046	1E-14	57	0.00163	0.00157	0.000185	0.000181	131	0.00463	0.00452				
		1st Quartile	0.00058	0.00054	0.00765	0.00728	367.2	<0.000010	<0.0000050	0.000505	0.000480	0.059	0.00750	0.0117	0.00985	<0.0000020	<0.0000020	254	0.00122	0.00088	<0.00020	<0.00020	434	<0.0050	<0.0050				
		Median	0.00073	0.0006	0.0118	0.0080	381.5	0.000015	0.00000375	0.000955	<0.0010	0.07	0.0106	0.0149	0.0129	<0.0000020	<0.0000020	289	0.0022	0.00185	<0.00020	<0.00020	471	<0.0050	<0.0050				
		3rd Quartile	0.00098	0.00066	0.01473	0.01135	395.8	0.0000385	0.00000845	<0.0025	0.000535	0.0850	0.01448	0.0234	0.02465	<0.0000020	<0.0000020	320	0.00258	0.00252	0.0002	0.000275	538	0.005	0.00688				
MQL1	Middle Quinsam Lake 1 metre below surface	Average	0.00017	0.0001600	0.0185	0.0162	40.6	0.000005	0.00000273	0.0007	0.00111	0.036	0.0211	0.0054	0.00091	0.0000001	0.00000100	35.5	0.0005	0.0005	0.0001	0.0001	32.2	0.00306	0.0025	0.0029		
E206618		Count	15	15	15	15	8	15	15	15	15	15	15	15	15	14	14	15	15	15	15	15	15	15	15	15	6		
		Minimum	0.00011	0.0001	0.0103	0.0076	34.4	<0.000010	<0.0000050	0.00051	0.0004	0.025	0.0141	0.0014	<0.0010	<0.0000020	<0.0000020	31.9	<0.0010	<0.0010	<0.00020	<0.00020	23.3	<0.0050	<0.0050	<0.0020			
		Maximum	0.00021	0.00022	0.0255	0.024	45.7	<0.000010	0.000006	0.00098	0.00854	0.055	0.0318	0.0069	0.0035	<0.0000020	<0.0000020	39.8	<0.0010	<0.0010	<0.00020	<0.00020	36.9	0.0109	<0.0050	0.0042			
		Geometric Mean	0.00016	0.00015	0.0179	0.0155	40.5	0.000005	0.00000265	0.00068	0.00067	0.035	0.0203	0.0051	0.00073	0.000001	0.000001	35.4	0.0005	0.0005	0.0001	0.00010000	32	0.00276	0.0025	0.00264			
		Count <DL	0	0	0	0	0	15	14	0	0	0	0	0	10	14	14	0	15	15	15	15	0	14	15	1			
		Standard Deviation	0.00004	0.00003	0.0048	0.0047	3.7	0	0.0000009	0.00016	0.00206	0.008	0.0061	0.0015	0.00081	0	0	2.1	0	0	0	0	3.8	0.00217	1E-10	0.00116			
		1st Quartile	0.00013	0.00013	0.0153	0.0129	39.4	<0.000010	<0.0000050	0.00057	0.000500	0.03	0.0168	0.0044	<0.0010	<0.0000020	<0.0000020	34.2	<0.0010	<0.0010	<0.00020	<0.00020	31	<0.0050	<0.0050	0.0025			
		Median	0.00017	0.0001700	0.0170	0.0166	40.5	<0.000010	<0.0000050	0.000620	0.00054	0.035	0.0185	0.0058	<0.0010	<0.0000020	<0.0000020	35.3	<0.0010	<0.0010	<0.00020	<0.00020	32.20	<0.0050	<0.0050	0.0029			
		3rd Quartile	0.0002	0.00018	0.0228	0.0202	42.3	<0.000010	<0.0000050	0.0008	0.00061	0.037	0.0251	0.0063	0.00115	<0.0000020	<0.0000020	36.8	<0.0010	<0.0010	<0.00020	<0.00020	35.4	<0.0050	<0.0050	0.00375			
MQLB	Middle Quinsam Lake 1 metre from bottom	Average	0.000117	0.0001	0.0123	0.0104	42.6	0.000005	0.00000267	0.000613	0.00052	0.047	0.0179	0.0176	0.01197	0.000001	0.00000100	61.0	0.0005	0.00058	0.0001	0.0001	61.5	0.003650	0.0025	0.00323		
E206618		Count	15	15	15	15	8	15	15	15	15	15	15	15	15	14	14	15	15	15	15	15	15	15	15	6		
		Minimum	<0.00010	<0.00010	0.0073	0.0046	38.3	<0.000010	<0.0000050	<0.00050	0.00038	0.0170	0.0079	0.0052	<0.0010	<0.0000020	<0.0000020	27.6	<0.0010	<0.0010	<0.00020	<0.00020	23.8	<0.0050	<0.0050	<0.0020			
		Maximum	0.00019	0.00016	0.0185	0.0162	45.5	<0.000010	0.000005	0.00147	0.00069	0.225	0.0347	0.0693	0.0637	<0.0000020	<0.0000020	116	<0.0010	0.0017	<0.00020	<0.00020	136	0.0197	<0.0050	0.0049			
		Geometric Mean	0.000107	0.000091	0.0117	0.0098	42.5	0.000005	0.00000262	0.000549	0.000520	0.037	0.0163	0.0133	0.00581	0.000001	0.000001	56.6	0.0005	0.00054	0.0001	0.0001	55.2	0.00287	0.0025	0.00265			
		Count <DL	3	5	0	0	0	15	14	3	0	0	0	0	1	14	14	0	15	14	15	15	0	14	15	2			
		Standard Deviation	0.00005	0.000042	0.0041	0.0035	2.3	0	0.00000065	0.000306	0.00008	0.05	0.0083	0.0167	0.01655	0	0	23.9	0	0.00031	0	0.00000000	29.4	0.00444	1E-10	0.00179			
		1st Quartile	0.0001	<0.00010	0.0081	0.00730	41.5	<0.000010	<0.0000050	0.000515	0.00047	0.028	0.0127	0.0076	0.00235	<0.0000020	<0.0000020	45.5	<0.0010	<0.0010	<0.00020	<0.00020	44.9	<0.0050	<0.0050	0.00163			
		Median	0.00011	0.0001100	0.0133	0.0107	42.9	<0.000010	<0.0000050	0.00057	0.000520	0.038	0.0141	0.0119	0.0063	<0.0000020	<0.0000020	60.8	<0.0010	<0.0010	<0.00020	<0.00020	58.4	<0.0050	<0.0050	0.00395			
		3rd Quartile	0.00015	0.000125	0.0148	0.0127	44.1	<0.000010	<0.0000050	0.00069	0.00055	0.042	0.0229	0.0204	0.01425	<0.0000020	<0.0000020	72.1	<0.0010	<0.0010	<0.00020	<0.00020	72.7	<0.0050	<0.0050	0.00455			

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 62
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2017 -18 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
NNL1			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E217018	No Name Lake 1 metre below surface	Average	0.00027	0.000260	0.0294	0.0248	13.1	0.0000089	0.0000025	0.000561	0.00054	0.065	0.0418	0.00739	0.00437	0.00000109	0.000001	14.1	0.0005	0.0005	0.000126	0.0001	1.685	0.00438	0.0025	0.0051			
		Count	15	15	15	15	8	15	15	15	15	15	15	15	15	14	14	15	15	15	15	15	15	15	15	6			
		Minimum	0.00016	0.00015	0.0096	0.0092	10.3	<0.000010	<0.0000050	<0.00050	0.00032	0.028	0.0222	<0.0010	<0.0010	<0.0000020	<0.0000020	10.9	<0.0010	<0.0010	<0.00020	<0.00020	<0.50	<0.0050	<0.0050	0.0044			
		Maximum	0.00036	0.00037	0.0755	0.0511	15.2	0.000063	<0.0000050	0.0021	0.0013	0.145	0.0939	0.0285	0.0252	0.0000023	<0.0000020	17.1	<0.0010	<0.0010	0.00049	<0.00020	3.2	0.0307	<0.0050	0.0073			
		Geometric Mean	0.00026	0.00025	0.0239	0.0221	13	0.00000590	0.0000025	0.000418	0.00051	0.058	0.0363	0.00501	0.00185	0.00000106	0.00000100	14	0.0005	0.0005	0.000111	0.0001	1.453	0.00295	0.0025	0.00500			
		Count <DL	0	0	0	0	0	14	15	9	0	0	0	1	5	13	14	0	15	15	14	15	2	14	15	0			
		Standard Deviation	0.000070	0.00008	0.0188	0.0119	2.0	0.000015	0	0.000535	0.00024	0.035	0.0255	0.00788	0.00697	0.00000035	0.00000000	1.8	0	0	0.00010100	0	0.785	0.00728	1E-10	0.0011			
		1st Quartile	0.00019	0.00018	0.0113	0.0131	11.3	<0.000010	<0.0000050	<0.00050	0.00042	0.042	0.0251	0.0036	<0.0010	<0.0000020	<0.0000020	12.8	<0.0010	<0.0010	<0.00020	<0.00020	1.345	<0.0050	<0.0050	0.0045			
		Median	0.00027	0.000270	0.0300	0.0239	14.2	<0.000010	<0.0000050	<0.00050	0.00048	0.055	0.0272	0.00420	0.00180	<0.0000020	<0.0000020	14.5	<0.0010	<0.0010	<0.00020	<0.00020	1.68	<0.0050	<0.0050	0.0047			
		3rd Quartile	0.00032	0.00033	0.0386	0.0309	14.5	<0.000010	<0.0000050	0.00061	0.00063	0.076	0.0519	0.00675	0.00405	<0.0000020	<0.0000020	15.2	<0.0010	<0.0010	<0.00020	<0.00020	1.9	<0.0050	<0.0050	0.005			
NNLB	No Name Lake 1 metre from bottom	Average	0.00021	0.0002	0.0343	0.0285	11.8	0.000005	0.00000267	0.000859	0.0005	0.129	0.0855	0.0282	0.0243	0.00000109	0.00000126	15.5	0.0005	0.0005	0.0001	0.0001	4.08	0.0025	0.002500	0.00620			
E217018		Count	15	15	15	15	8	15	15	15	15	15	15	15	15	14	14	15	15	15	15	15	15	15	15	6			
		Minimum	0.00016	0.00015	0.0138	<0.0030	10.3	<0.000010	<0.0000050	<0.00050	0.00033	0.091	0.0507	0.0078	0.0026	<0.0000020	<0.0000020	12.6	<0.0010	<0.0010	<0.00020	<0.00020	1.7	<0.0050	<0.0050	0.0042			
		Maximum	0.00032	0.00029	0.06	0.0519	14	<0.000010	0.000005	0.00664	0.00134	0.233	0.156	0.0989	0.0984	0.0000022	0.0000034	18.3	<0.0010	<0.0010	<0.00020	<0.00020	5.13	<0.0050	<0.0050	0.0111			
		Geometric Mean	0.00021	0.000190	0.0328	0.02419	11.8	0.000005	0.00000262	0.00047	0.00046	0.124	0.0812	0.0193	0.0134	0.00000106	0.00000115	15.4	0.0005000	0.0005	0.0001	0.0001	3.93	0.0025	0.0025	0.00590			
		Count <DL	0	0	0	1	0	15	14	8	0	0	0	0	0	13	12	0	15	15	15	15	0	15	15	0			
		Standard Deviation	0.00005	0.00004	0.0104	0.01076	1.4	0	0.00000065	0.001616	0.00025	0.043	0.0311	0.0306	0.0311	0.00000032	0.00000069	1.6	0	0.0000000	0	0	1	1E-10	0.000000	0.00250			
		1st Quartile	0.00018	0.00017	0.0297	0.0274	10.6	<0.000010	<0.0000050	<0.00050	0.00038	0.097	0.0653	0.0117	0.0076	<0.0000020	<0.0000020	14.5	<0.0010	<0.0010	<0.00020	<0.00020	3.58	<0.0050	<0.0050	0.0049			
		Median	0.0002	0.00018	0.0312	0.0284	11.6	<0.000010	<0.0000050	<0.00050	0.00042	0.125	0.0791	0.0137	0.0099	<0.0000020	<0.0000020	15.3	<0.0010	<0.0010	<0.00020	<0.00020	4.4	<0.0050	<0.0050	0.0054			
		3rd Quartile	0.00023	0.00022	0.0381	0.03055	13.0	<0.000010	<0.0000050	0.000705	0.00049	0.133	0.0864	0.0226	0.0189	<0.0000020	<0.0000020	16.8	<0.0010	<0.0010	<0.00020	<0.00020	4.84	<0.0050	<0.0050	0.0063			
NNO	No Name Lake Outlet	Average	0.00025	0.00024	0.0544	0.037	11.23	0.0000073	0.00000363	0.000625	0.00056	0.092	0.0564	0.00992	0.00658	0.0000014	0.0000012	13.17	0.0005	0.00050	0.000100	0.000100	1.633	0.00288	0.0025	0.0058	0.00519	0.0349	0.01655
E217017		Count	15	16	15	16	15	15	16	15	16	15	16	15	16	15	15	15	15	16	15	16	15	15	16	14	14	14	14
		Minimum	0.00017	0.00016	0.015	0.0134	6.5	<0.000010	<0.0000050	<0.00050	0.00036	0.042	0.024	<0.0010	<0.0010	<0.0000020	<0.0000020	7.87	<0.0010	<0.0010	<0.00020	<0.00020	<1.0	<0.0050	<0.0050	0.0026	<0.0020	<0.020	0.0058
		Maximum	0.0004	0.00038	0.136	0.0664	16.6	0.000039	0.0000170	0.00111	0.00075	0.205	0.0901	0.0287	0.0231	0.0000028	0.0000027	16.7	<0.0010	<0.0010	<0.00020	<0.00020	2.7	0.0082	<0.0050	0.0136	0.015	0.075	0.042
		Geometric Mean	0.00024	0.00023	0.0462	0.0340	10.95	0.0000057	0.00000298	0.000572	0.00055	0.084	0.0529	0.0069	0.00409	0.00000125	0.00000112	12.87	0.0005	0.00050	0.000100	0.000100	1.43	0.00271	0.0025	0.0053	0.00433	0.0263	0.01364
		Count <DL	0	0	0	0	0	14	14	3	0	0	0	1	1	11	13	0	15	16	15	16	3	14	16	0	1	5	7
		Standard Deviation	0.00007	0.00006	0.0352	0.015	2.58	0.0000088	0.00000367	0.000241	0.00013	0.0430	0.0203	0.00795	0.00665	0.00000063	0.00000051	2.8	0	0.00000	0.000000	0.000000	0.723	0.00147	4E-11	0.0028	0.00347	0.0249	0.01195
		1st Quartile	0.00020	0.00019	0.0341	0.0263	9.86	<0.000010	<0.0000050	0.00052	0.00044	0.063	0.0416	0.00415	0.00245	<0.0000020	<0.0000020	11.4	<0.0010	<0.0010	<0.00020	<0.00020	1.265	<0.0050	<0.0050	0.0043	0.00333	<0.020	<0.020
		Median	0.00025	0.00024	0.0432	0.0351	11.2	<0.000010	<0.0000050	0.00068	0.00055	0.081	0.0524	0.0069	0.00325	<0.0000020	<0.0000020	13.2	<0.0010	<0.0010	<0.00020	<0.00020	1.62	<0.0050	<0.0050	0.0052	0.0044	0.031	<0.020
		3rd Quartile	0.00027	0.00026	0.0625	0.0483	12.4	<0.000010	<0.0000050	0.000765	0.00068	0.119	0.0763	0.01385	0.01103	0.00000155	<0.0000020	15.6	<0.0010	<0.0010	<0.00020	<0.00020	2.08	<0.0050	<0.0050	0.0064	0.00577	0.0573	0.020
LLS	Small Seep into Long Lake	Average	0.00226	0.00163	0.0055	0.00332	213.3	0.00000670	0.00000377	0.000478	0.000324	0.69	0.30810	0.1757	0.1784	0.0000010	0.0000010	526	0.00155	0.00146	0.000133	0.000133	470	0.00333	0.00333	0.0031	0.0025	0.01	0.021
E292131		Count	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	12	12	12	12	12	12	12	12	3	2	1	1
		Minimum	0.00034	0.00026	<0.0030	<0.0030	161	<0.000010	<0.0000050	<0.00050	<0.00020	0.088	<0.0050	0.0343	0.0316	<0.0000020	<0.0000020	405	<0.0010	<0.0010	<0.00020	<0.00020	377	<0.0050	<0.0050	0.0026	0.0021	<0.020	0.021
		Maximum	0.00492	0.00443	0.0129	0.009	252	<0.000050	<0.000025	<0.0025	0.00084	2.05	1.5	0.357	0.358	<0.0000020	<0.0000020	677	<0.0050	<0.0050	<0.0010	<0.0010	567	<0.025	<0.025	0.0036	0.0029	<0.020	0.021
		Geometric Mean	0.00165	0.00117	0.00402	0.00257	210.7	0.0000057	0.00000314	0.000394	0.000256	0.421	0.04709	0.1367	0.1368	0.000001	0.000001	519	0.00144	0.00132	0.000114	0.000114	466	0.00286	0.00286	0.0031	0.0025	0.01	0.021
		Count <DL	0	0	5	8	0	12	11	8	5	0	2	0	0	11	11	0	2	3	12	12	0	12	12	0	0	1	0
		Standard Deviation	0.00171	0.00139	0.00415	0.00267	34	0.0000058	0.00000313	0.000349	0.00022	0.655	0.56137	0.1191	0.1226	0	0	85	0.00057	0.00061	0.000115	0.000115	60	0.00289	0.00289	0.0005	0.0006	0	0
		1st Quartile	0.00093	0.00058	<0.0030	<0.0030	189.8	<0.000010	<0.0000050	<0.00050	<0.00020	0.164	0.01375	0.077	0.0788	<0.0000020	<0.0000020	453	0.00135	0.0012	<0.00020	<0.00020	410	<0.0050	<0.0050	0.0029	0.0023	<0.020	0.021
		Median	0.00147	0.00109	0.0038	<0.0030	211.5	<0.000010	<0.0000050	<0.00050	0.000340	0.429	0.0304	0.150	0.1535	<0.0000020	<0.0000020	529	0.0014	0.0014	<0.00020	<0.00020	480	<0.0050	<0.0050	0.0031	0.0025	<0.020	0.021
		3rd Quartile	0.0037	0.00213	0.00847	0.00465	248.2	<0.000010	<0.0000050	0.000565	0.000410	1.143	0.22225	0.298	0.3155	<0.0000020	<0.0000020	555	0.00202	0.00183	<0.00020	<0.00020	496	<0.0050	<0.0050	0.0033	0.0027	<0.020	0.021
LLSM	Long Lake Middle Seep	Average	0.00226	0.00119	0.0658	0.01168	193.2	0.0000057	0.0000043	0.001088	0.000719	1.006	0.18570	0.1703	0.1634	0.000001	0.00000126	491	0.0024	0.00252	0.0001	0.000133	438	0.00312	0.0039	0.003	0.0029	0.01	0.018
E292131		Count	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	12	12	12	12	12	12	12	12	4	4	2	2
		Minimum	0.0004	0.00025	0.0035	<0.0030	80.4	<0.000010	<0.0000050	<0.00050	<0.00020	0.14	0.0073	0.0376	0.0369	<0.0000020	<0.0000020	304	0.0011	0.0012	<0.00020	<0.00020	288	<0.0050	<0.0050	0.0021	0.0021	<0.020	<0.020
		Maximum	0.00624	0.00258	0.527	0.03	241	0.0000130	<0.000025	0.00655	0.00319	3.63	1.1	0.35	0.296	<0.0000020	0.0000039	631	0.0079	0.008	<0.00020	<0.0010	532	0.0099	<0.025	0.0036	0.0035	<0.020	0.026
		Geometric Mean	0.00159	0.00089	0.0169	0.00847	186.2	0.0000054	0.00000344	0.000593	0.00043	0.627	0.0598	0.1342	0.1313	0.000001	0.00000113	482	0.0021	0.00218	0.000100	0.000114	432	0.0028	0.00319	0.0029	0.0028	0.01	0.0161
		Count <DL	0	0	0	2	0	11	10	5	4	0	0	0	0	11	10	0	0	1	12	12	0	11	11	0	0	2	1
		Standard Deviation	0.00173	0.00081	0.14790	0.0098	47	0.0000023	0.00000369	0.001769	0.00087	1.023	0.32000	0.1106	0.1005	0.0000000	0.0000009	94	0.0018	0.00182	0	0.000115	72	0.00214	0.00334	0.0007	0.0006	4E-11	0.0113
		1st Quartile	0.00077	0.00042	0.0056	0.00652	164.5	<0.000010	<0.0000050	<0.00050	0.000265	0.22	0.02210	0.0790	0.0842	<0.0000020	<0.0000020	445	0.0016	0.00162	<0.00020	<0.00020	400	<0.0050	<0.0050	0.0026	0.0027	<0.020	0.014
		Median	0.00269	0.00119	0.0081	<0.015	204.5	<0.000010	<0.0000050	0.000595	0.00048	0.789	0.04290	0.15	0.1430	<0.0000020	<0.0000020	490	0.0019	0.00205	<0.00020	<0.00020	441	<0.0050	<0.0050	0.0031	0.0029	<0.020	0.018
		3rd Quartile	0.00306	0.00174	0.04240	0.01348	232.8	<0.000010	0.00000313	0.000822	0.00068	1.238	0.1735	0.2662	0.2708	<0.0000020	<0.0000020	542	0.0024	0.0027	<0.00020	<0.00020	490	<0.0050	<0.0050	0.0034	0.0031	<0.020	0.022

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 63
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2017 -18 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW002	Ex-situ 2-3 South shallow groundwater well beside 3-South Pit (1 Seam)	Average	0.00086	0.00098	0.00695	0.0105	229.5	0.0000150	0.0000106	0.00075	0.000445	2.64	2.92	1.77	1.77	0.0000010	0.0000010	1220	0.00225	0.0024	0.000300	0.000400	1282	0.00750	0.01		0.00277		
		Count	2	4	2	4	4	2	4	2	4	2	4	2	4	1	4	2	2	4	2	4	4	2	4		4		
		Minimum	0.00074	0.00066	0.0064	0.005	209	<0.000010	0.000005	<0.00050	0.00028	2.3	2.44	1.69	1.69	<0.0000020	<0.0000020	1170	0.002	0.002	<0.00020	<0.00020	1220	<0.0050	<0.0050		<0.0020		
		Maximum	0.00097	0.00122	<0.015	0.022	249	<0.000050	<0.000025	<0.0025	<0.0010	2.98	3.42	1.85	1.95	<0.0000020	<0.0000020	1270	<0.0050	<0.0050	<0.0010	<0.0010	1360	<0.025	<0.025		0.0038		
		Geometric Mean	0.00085	0.00096	0.00693	0.00887	228.7	0.0000112	0.0000099	0.00056	0.000433	2.62	2.8992	1.77	1.767	0.0000010	0.0000010	1218	0.00224	0.0024	0.000224	0.000334	1280	0.00559	0.00836		0.00247		
		Count <DL	0	0	1	2	0	2	3	2	3	0	0	0	0	1	4	0	1	3	2	4	0	2	4		1		
		Standard Deviation	0.00016	0.00025	0.00078	0.00776	21.4	0.0000141	0.0000038	0.00071	0.00011	0.48	0.4016	0.11	0.1208	0.0000000	0.0000000	70	0.00035	0.00025	0.000283	0.000200	73	0.00707	0.005		0.00126		
		1st Quartile	0.0008	0.00086	0.00668	0.00688	212	0.00001	0.00001063	0.0005	0.000445	2.47	2.7625	1.73	1.7125	<0.0000020	<0.0000020	1195	0.0021	0.00237	0.0002	0.0004	1220	0.005	0.01000		0.00235		
		Median	0.00086	0.00103	0.00695	<0.015	230	0.000015	<0.000025	0.00075	<0.0010	2.64	2.91	1.77	1.72	<0.0000020	<0.0000020	1220	0.00225	<0.0050	0.0003	<0.0010	1275	0.0075	<0.025		0.00315		
		3rd Quartile	0.00091	0.00116	0.00722	0.01112	247.5	0.00002	<0.000025	0.001	<0.0010	2.81	3.0675	1.81	1.7775	<0.0000020	<0.0000020	1245	0.00237	<0.0050	0.0004	<0.0010	1337	0.01	<0.025		0.00358		
QU1009D	Ex-situ 4-South deep groundwater well. Down gradient of 4-South Mine. Base of Dunsmuir Member. Assesses vertical gradients & water quality down gradient of the 4-South Mine workings. Just outside of mine pool. (Below 3 Seam)	Average		0.101		0.00250	185		0.0000063		0.000550		0.655		0.1165		0.0000010			0.000500		0.0001000	83.7		0.00250		0.0265		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.100		<0.0030	184		<0.0000050		0.00033		0.517		0.098		<0.0000020			<0.0010		<0.00020	79		<0.0050		0.0178		
		Maximum		0.102		0.0035	186		0.00001		0.00076		0.793		0.135		<0.0000020			<0.0010		<0.00020	88.4		<0.0050		0.0352		
		Geometric Mean		0.101		0.00229	185		0.0000050		0.000500		0.6403		0.115		0.0000010			0.000500		0.0001000	83.6		0.00250		0.0250		
		Count <DL		0		1	0		1		0		0		0		2			2		2	0		2		0		
		Standard Deviation		0.001		0.00141	1.4		0.0000053		0.000300		0.1952		0.0262		0.0000000			0.000000		0.0000000	6.6		0.00000		0.0123		
		1st Quartile		0.101		0.00200	184.5		0.00000438		0.00044		0.586		0.1073		<0.0000020			<0.0010		<0.00020	81.3		<0.0050		0.0221		
		Median		0.101		0.00250	185		0.00000625		0.00055		0.655		0.1165		<0.0000020			<0.0010		<0.00020	83.7		<0.0050		0.0265		
		3rd Quartile		0.101		0.00300	185.5		0.00000813		0.00065		0.724		0.1258		<0.0000020			<0.0010		<0.00020	86.1		<0.0050		0.0309		
QU1009S	Ex-situ 4-South shallow groundwater well. Fracture zone 10 m below till. Assesses vertical gradients & water quality down gradient of the 4-South Mine workings. Just outside of mine pool. (Below 3 Seam)	Average		0.0838		0.00150	137.5		0.0000025		0.000155		5.55		0.3955		0.0000010			0.000500		0.0001000	128.0		0.00250		0.0295		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.0807		<0.0030	136		<0.0000050		<0.00020		5.37		0.389		<0.0000020			<0.0010		<0.00020	128		<0.0050		0.0283		
		Maximum		0.0869		<0.0030	139		<0.0000050		0.00021		5.73		0.402		<0.0000020			<0.0010		<0.00020	128		<0.0050		0.0307		
		Geometric Mean		0.0837		0.0015	137.5		0.0000025		0.000145		5.5471		0.3954		0.0000010			0.0005		0.0001000	128.0		0.00250		0.0295		
		Count <DL		0		2	0		2		1		0		0		2			2		2	0		2		0		
		Standard Deviation		0.0044		0	2.1		0.0000000		0.000078		0.2546		0.0092		0.0000000			0		0.0000000	0.0		0.00000		0.0017		
		1st Quartile		0.0822		<0.0030	136.8		<0.0000050		0.000128		5.46		0.3922		<0.0000020			<0.0010		<0.00020	128		<0.0050		0.0289		
		Median		0.0838		<0.0030	137.5		<0.0000050		0.000155		5.55		0.3955		<0.0000020			<0.0010		<0.00020	128		<0.0050		0.0295		
		3rd Quartile		0.0854		<0.0030	138.2		<0.0000050		0.000183		5.64		0.3988		<0.0000020			<0.0010		<0.00020	128		<0.0050		0.0301		
SPD																													
E218582	Settling Pond # 1	Average	0.00109	0.00072	0.0599	0.02083	103.30	0.0000076	0.00000538	0.000991	0.00058	0.638	0.1611	0.0668	0.05851	0.00000121	0.00000117	215	0.00136	0.00104	0.0001	0.000100	204.2	0.00250	0.0025	0.113	0.0053	0.3925	0.0396
		Count	14	14	14	14	16	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	40	14	14	12	11	8	8
		Minimum	0.00037	0.0002	0.0045	<0.0030	40.80	<0.000010	<0.0000050	<0.00050	0.0003	0.088	0.0104	0.0142	<0.0010	<0.0000020	<0.0000020	127	<0.0010	<0.0010	<0.00020	<0.00020	94.5	<0.0050	<0.0050	0.0037	0.0032	<0.020	<0.020
		Maximum	0.00282	0.00151	0.249	0.078	275.0	0.000032	0.000021	0.00219	0.00083	2.25	0.614	0.220	0.241	0.0000026	0.0000023	333	0.0031	0.0028	<0.00020	<0.00020	367	<0.0050	<0.0050	1.27	0.0098	<2.0	0.17
		Geometric Mean	0.00088	0.0006	0.0351	0.01169	91.9	0.0000062	0.00000409	0.000883	0.00056	0.411	0.1009	0.0494	0.02626	0.0000011	0.0000011	206	0.00109	0.00086	0.0001	0.000100	196.50	0.0025	0.0025	0.0113	0.00500	0.0750	0.0207
		Count <DL	0	0	0	1	0	12	8	1	0	0	0	0	2	12	12	0	5	7	14	14	0	14	14	0	0	8	5
		Standard Deviation	0.00079	0.00042	0.0641	0.0226	55.9	0.0000075	0.00000522	0.000484	0.00015	0.664	0.1674	0.0554	0.06226	0.0000005	0.00000044	64.0	0.00091	0.0007	0.000000	0.000000	55.9	1E-10	1E-10	0.3644	0.0021	0.504	0.0564
		1st Quartile	0.00049	0.00034	0.0206	0.0053	63.1	<0.000010	<0.0000050	0.000685	0.0005	0.233	0.0592	0.0281	0.0277	<0.0000020	<0.0000020	165	<0.0010	<0.0010	<0.00020	<0.00020	170.2	<0.0050	<0.0050	0.0065	0.0037	<0.020	<0.020
		Median	0.00089	0.00069	0.0423	0.009	101.2	<0.000010	<0.0000050	0.00079	0.0006	0.353	0.102	0.0563	0.04405	<0.0000020	<0.0000020	195	0.00115	0.0008	<0.00020	<0.00020	204.50	<0.0050	<0.0050	0.0076	0.0046	0.055	<0.020
		3rd Quartile	0.00128	0.00101	0.072	0.0363	121.8	<0.000010	0.00000500	0.001267	0.00064	0.772	0.1878	0.077	0.06368	<0.0000020	<0.0000020	268	0.00195	0.00127	<0.00020	<0.00020	236.2	<0.0050	<0.0050	0.01010	0.0059	<2.0	0.03930
LLE	Long Lake Entrance (LLE)	Average	0.000999	0.000814	0.06775	0.02976	72.2	0.00000790	0.00000429	0.000698	0.000586	0.49	0.2533	0.0871	0.0855	0.00000131	0.0000016	289.5	0.00079	0.00079	0.000157	0.000157	261.41	0.00393	0.00648	0.0094	0.0064	0.0502	0.04829
E292130		Count	14	14	14	14	13	14	14	14	14	14	14	14	14	12	12	14	14	14	14	14	48	14	14	10	5	11	11
		Minimum	0.00024	0.00018	<0.015	0.0039	22.8	<0.000010	<0.0000050	<0.00050	0.00029	0.059	0.0524	0.0107	0.0097	<0.0000020	<0.0000020	55.9	<0.0010	<0.0010	<0.00020	<0.00020	4.1	<0.0050	<0.0050	0.0033	0.0029	<0.020	<0.0050
		Maximum	0.00163	0.00136	0.203	0.0734	160	<0.000050	0.000012	<0.0025	0.00088	2.17	1.27	0.251	0.281	0.000003	0.0000042	866	<0.0050	<0.0050	<0.0010	<0.0010	906	<0.025	0.0347	0.0306	0.0093	0.154	0.2500
		Geometric Mean	0.000828	0.000681	0.0515	0.02138	60.4	0.0000063	0.00000352	0.000611	0.000559	0.325	0.1686	0.0501	0.0486	0.00000119	0.0000014	191.4	0.00063	0.00063	0.000126	0.000126	150.17	0.00315	0.00404	0.0077	0.006	0.0261	0.02019
		Count <DL	2	2	1	2	0	14	10	5	2	0	0	0	0	10	8	0	14	14	14	14	0	14	12	0	0	7	4
		Standard Deviation	0.000502	0.000408	0.05007	0.02087	44.3	0.0000073	0.00000331	0.000343	0.000179	0.583	0.3125	0.085	0.0871	0.00000072	0.00000103	296.9	0.00073	0.00073	0.000145	0.000145	281.27	0.00363	0.00889	0.0078	0.0024	0.0555	0.07722
		1st Quartile	0.000612	0.00045	0.03148	0.0085	46.6	<0.000010	<0.0000050	0.000543	0.000455	0.215	0.100	0.0192	0.0189	<0.0000020	<0.0000020	110.5	<0.0010	<0.0010	<0.00020	<0.00020	85	<0.0050	<0.0050	0.0063	0.0057	<0.020	<0.020
		Median	0.001085	0.00087	0.0622	0.0306	60.9	<0.000010	<0.0000050	0.00059	0.000565	0.323	0.144	0.0509	0.0492	<0.0000020	<0.0000020	142	<0.0010	<0.0010	<0.00020	<0.00020	125	<0.0050	<0.0050	0.0075	0.0071	<0.020	0.013
		3rd Quartile	0.001415	0.001112	0.08378	0.04108	84	<0.000010	0.00000513	0.00094	0.000732	0.359	0.2923	0.139	0.123	<0.0000020	0.00000212	315.8	<0.0010	<0.0010	<0.00020	<0.00020	312.5	<0.0050	0.00513	0.00880	0.0071	0.0975	0.03200
LLM1	Long Lake Middle 1 metre below Surface	Average	0.00044	0.00043	0.0202	0.0172	32.4	0.00000500	0.0000025	0.001167	0.00041	0.051	0.031	0.0068	0.00203	0.000001	0.000001	82.2	0.00050	0.00050	0.000100	0.000100	69.6	0.00250	0.00250	0.00319			
E206619		Count	15	15	15	15	10	15	15	15	15	15	15	15	15	14	14	15	15	15	15	15	15	15	15	7			
		Minimum	0.00024	0.00023	0.0065	0.0044	14.8	<0.000010	<0.0000050	<0.00050	0.00022	0.016	0.0088	0.0011	<0.0010	<0.0000020	<0.0000020	23.6	<0.0010	<0.0010	<0.00020	<0.00020	12.6	<0.0050	<0.0050	<0.0020			
		Maximum	0.00062	0.00061	0.0503	0.0449	47.8	<0.000010	<0.0000050	0.00899	0.0007	0.109	0.0774	0.0090	0.0066	<0.0000020	<0.0000020	133	<0.0010	<0.0010	<0.00020	<0.00020	117	<0.0050	<0.0050	0.0060			
		Geometric Mean	0.00042	0.00041	0.0161	0.014	30.3	0.000005	0.0000025	0.00055	0.00038	0.042	0.0251	0.0063	0.00154	0.000001	0.000001	71.3	0.00050	0.00050	0.000100	0.000100	57.7	0.0025	0.00250	0.00264			
		Count <DL	0	0	0	0	0	15	15	7	0	0	0	0	3	14	14	0	15	15	15	15	0	15	15	2			
		Standard Deviation	0.00013	0.00014	0.0137	0.0114	11.4	0.00000000	0	0.002248	0.00015	0.032	0.0218	0.002	0.00167	0	0	39.5	0.00000	0.00000	0.000000	0.000000	36.3	1E-10	0.00000	0.00186			
		1st Quartile	0.00033	0.0003	0.0083	0.0079	26.8	<0.000010	<0.0000050	<0.00050	0.0003	0.022	0.0146	0.0059	0.00115	<0.0000020	<0.0000020	48.4	<0.0010	<0.0010	<0.00020	<0.00020	38.8	<0.0050	<0.0050	0.00205			
		Median	0.00043	0.00043	0.017	0.0125	32.7	<0.000010	<0.0000050	0.00050	0.00037	0.039	0.0261	0.0073	0.0016	<0.0000020	<0.0000020	81.8	<0.0010	<0.0010	<0.00020	<0.00020	72.2	<0.0050	<0.0050	0.0031			
		3rd Quartile	0.00056	0.00057	0.0294	0.0247	40.1	<0.000010	<0.0000050	0.000785	0.0005	0.0720	0.036	0.0083	0.00225	<0.0000020	<0.0000020	122	<0.0010	<0.0010	<0.00020	<0.00020	103.5	<0.0050	<0.0050	0.00405			

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

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2017 -18 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LLMB	Long Lake Middle 1 metre From Bottom	Average	0.00028	0.00023	0.0125	0.009	57.6	0.00000500	0.0000025	0.004655	0.00037	0.07	0.02570	0.5811	0.5005	0.000001	0.000001	133.7	0.00050	0.00050	0.000126	0.000100	127.5	0.00250	0.00250	0.00410			
E206619		Count	15	15	15	15	10	15	15	15	15	15	15	15	15	14	14	15	15	15	15	15	15	15	15	7			
		Minimum	0.0002	0.00017	0.0067	0.0043	55.8	<0.000010	<0.0000050	<0.00050	0.00026	0.013	0.0081	0.0014	0.0014	<0.0000020	<0.0000020	127	<0.0010	<0.0010	<0.00020	<0.00020	122	<0.0050	<0.0050	0.0023			
		Maximum	0.00036	0.0003	0.0216	0.0155	61.7	<0.000010	<0.0000050	0.0655	0.00055	0.156	0.0742	1.63	1.45	<0.0000020	<0.0000020	143	<0.0010	<0.0010	0.00034	<0.00020	134	<0.0050	<0.0050	0.0071			
		Geometric Mean	0.00028	0.00022	0.0114	0.0082	57.6	0.000005	0.0000025	0.000421	0.00036	0.061	0.0185	0.2585	0.1299	0.000001	0.000001	133.6	0.00050	0.00050	0.000115	0.000100	127.5	0.00250	0.00250	0.00380			
		Count <DL	0	0	0	0	0	15	15	11	0	0	0	0	0	14	14	0	15	15	13	15	0	15	15	0			
		Standard Deviation	0.00005	0.00004	0.0056	0.0042	1.9	0	0	0.016833	0.00008	0.037	0.022	0.6065	0.6002	0	0	4.3	0.00000	0.00000	0.000071	0.000000	3.0	1E-10	0.00000	0.00170			
		1st Quartile	0.00024	0.00020	0.0084	0.0056	56.3	<0.000010	<0.0000050	<0.00050	0.00032	0.048	0.0097	0.1435	0.0692	<0.0000020	<0.0000020	132	<0.0010	<0.0010	<0.00020	<0.00020	126	<0.0050	<0.0050	0.003			
		Median	0.00028	0.00022	0.0088	0.0073	57.1	<0.000010	<0.0000050	<0.00050	0.00034	0.054	0.01160	0.258	0.14	<0.0000020	<0.0000020	133	<0.0010	<0.0010	<0.00020	<0.00020	127.0	<0.0050	<0.0050	0.0034			
		3rd Quartile	0.00032	0.00026	0.0188	0.0136	58.7	<0.000010	<0.0000050	0.00038	0.00041	0.097	0.04810	1.26	1.17	<0.0000020	<0.0000020	135	<0.0010	<0.0010	<0.00020	<0.00020	129.5	<0.0050	<0.0050	0.0049			
LLO	Long Lake Outlet	Average	0.00051	0.0004	0.058	0.015	36.6	0.0000054	0.00000275	0.000523	0.00042	0.1270	0.0294	0.0332	0.0048	0.00000122	0.00000109	92.3	0.0005	0.00050	0.000100	0.000100	68.5	0.00250	0.00250	0.0078	0.00540	0.0503	0.00864
E219412		Count	18	18	18	18	19	18	18	18	18	18	18	18	18	18	17	18	18	18	18	18	52	18	18	9	7	8	8
		Minimum	0.00027	0.00023	0.0071	0.004	20.6	<0.000010	<0.0000050	<0.00050	0.00026	0.024	0.0061	0.0047	0.0015	<0.0000020	<0.0000020	37.2	<0.0010	<0.0010	<0.00020	<0.00020	15.9	<0.0050	<0.0050	0.0032	0.0033	<0.020	<0.0050
		Maximum	0.00139	0.0006	0.287	0.054	54.9	0.000012	0.000007	0.00144	0.00098	0.643	0.084	0.279	0.0138	0.0000034	0.0000026	134	<0.0010	<0.0010	<0.00020	<0.00020	119	<0.0050	<0.0050	0.0167	0.0112	0.134	0.015
		Geometric Mean	0.00047	0.00038	0.0294	0.0107	35.2	0.0000052	0.00000265	0.000427	0.00039	0.077	0.0229	0.0147	0.0041	0.0000011	0.0000011	84.7	0.0005	0.00050	0.000100	0.000100	60.6	0.00250	0.00250	0.0069	0.00500	0.0341	0.00729
		Count <DL	0	0	0	0	0	17	17	10	0	0	0	0	0	16	16	0	18	18	18	18	0	18	18	0	0	2	5
		Standard Deviation	0.00026	0.00010	0.0813	0.0136	9.8	0.0000016	0.00000106	0.000357	0.00019	0.161	0.0232	0.0664	0.0029	0.00000065	0.00000039	34.5	0	0.00000	0.000000	0.000000	31.3	3E-11	3E-11	0.0042	0.0027	0.0454	0.00439
		1st Quartile	0.00035	0.00031	0.0132	0.0054	28.8	<0.000010	<0.0000050	<0.00050	0.00031	0.037	0.0153	0.0075	0.0031	<0.0000020	<0.0000020	55.0	<0.0010	<0.0010	<0.00020	<0.00020	42.6	<0.0050	<0.0050	0.0047	0.004	0.0205	0.00595
		Median	0.00044	0.00043	0.0261	0.0094	39.6	<0.000010	<0.0000050	<0.00050	0.00035	0.075	0.0197	0.0103	0.0043	<0.0000020	<0.0000020	107	<0.0010	<0.0010	<0.00020	<0.00020	60.5	<0.0050	<0.0050	0.0066	0.0042	0.0305	<0.020
		3rd Quartile	0.00055	0.00045	0.0523	0.022	43.5	<0.000010	<0.0000050	0.000752	0.00041	0.129	0.036	0.0165	0.0057	<0.0000020	<0.0000020	118.2	<0.0010	<0.0010	<0.00020	<0.00020	97.6	<0.0050	<0.0050	0.0095	0.0057	0.0723	0.01050
WB	Middle Quinsam Lake Outlet	Average	0.00019	0.00018	0.0184	0.0159	41.2	0.000005	0.00000294	0.000564	0.00063	0.036	0.0256	0.0068	0.0024	0.0000012	0.0000010	38.2	0.00050	0.00050	0.000100	0.000100	34.3	0.00250	0.00250	0.00430	0.00350	0.0100	0.00886
E0900504		Count	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	16	16	16	17	16	16	9	7	8	8
		Minimum	0.00013	0.00012	0.0096	0.0082	32.9	<0.000010	<0.0000050	<0.00050	0.00044	0.027	0.0187	0.0032	0.001	<0.0000020	<0.0000020	32.9	<0.0010	<0.0010	<0.00020	<0.00020	28.7	<0.0050	<0.0050	0.0031	0.0023	<0.020	<0.0050
		Maximum	0.00025	0.00022	0.0288	0.0228	45.2	<0.000010	0.000006	0.00094	0.00144	0.051	0.0387	0.0120	0.0056	0.000004	<0.0000020	61.2	<0.0010	<0.0010	<0.00020	<0.00020	54	<0.0050	<0.0050	0.0073	0.0049	<0.020	0.025
		Geometric Mean	0.00018	0.000180	0.0174	0.0151	41	0.000005	0.00000279	0.000539	0.00059	0.036	0.0252	0.0064	0.0022	0.00000109	0.000001	37.8	0.00050	0.00050	0.000100	0.000100	34	0.00250	0.00250	0.00420	0.00350	0.0100	0.0065
		Count <DL	0	0	0	0	0	16	14	2	0	0	0	0	0	15	15	0	16	16	16	16	0	16	16	0	0	8	5
		Standard Deviation	0.00003	0.00003	0.0062	0.0051	3.2	1E-14	0.0000012	0.00016	0.00027	0.0070	0.0053	0.0025	0.0011	0.00000075	0	6.8	0.00000	0.00000	0.000000	0.000000	5.8	4E-11	4E-11	0.0013	0.0009	1E-10	0.00748
		1st Quartile	0.00017	0.00015	0.012	0.0099	39.7	<0.000010	<0.0000050	0.000535	0.00050	0.032	0.0225	0.005	0.0018	<0.0000020	<0.0000020	34.6	<0.0010	<0.0010	<0.00020	<0.00020	30.8	<0.0050	<0.0050	0.0036	0.003	<0.020	<0.0050
		Median	0.00018	0.000190	0.0185	0.0172	41.8	<0.000010	<0.0000050	0.000555	0.00055	0.036	0.024	0.0063	0.0023	<0.0000020	<0.0000020	36.7	<0.0010	<0.0010	<0.00020	<0.00020	32.3	<0.0050	<0.0050	0.004	0.0037	<0.020	0.0087
		3rd Quartile	0.00021	0.000200	0.024	0.02	43	<0.000010	<0.0000050	0.000615	0.0006	0.039	0.0278	0.0085	0.0027	<0.0000020	<0.0000020	38.6	<0.0010	<0.0010	<0.00020	<0.00020	35.5	<0.0050	<0.0050	0.0044	0.004	<0.020	0.01025
7SSD																													
E292069	Settling Pond at 7S- Discharge to Stream 1 -7S	Average	0.00283	0.00223	0.0893	0.00465	143.3	0.0000065	0.00000357	0.00149	0.00127	0.18	0.02697	0.0621	0.03594	0.000001	0.000001	140.4	0.0005	0.0005	0.0001	0.0001	19.26	0.0025	0.0025	0.0232	0.0094	0.01	0.01
		Count	14	14	14	14	14	14	14	14	14	14	14	14	14	12	12	14	14	14	14	14	14	14	14	1	1	1	1
		Minimum	0.00047	0.00029	0.0136	<0.0030	45.4	<0.000010	<0.0000050	0.00064	0.00049	0.026	<0.0050	0.0084	<0.0010	<0.0000020	<0.0000020	43.3	<0.0010	<0.0010	<0.00020	<0.00020	6	<0.0050	<0.0050	0.0232	0.0094	<0.020	<0.020
		Maximum	0.0112	0.00622	0.46	0.0105	195	0.000019	0.000009	0.00271	0.00266	0.592	0.0722	0.174	0.135	<0.0000020	<0.0000020	183	<0.0010	<0.0010	<0.00020	<0.00020	50.4	<0.0050	<0.0050	0.0232	0.0094	<0.020	<0.020
		Geometric Mean	0.0018	0.00149	0.053	0.00382	133.7	0.00000590	0.00000322	0.00132	0.00106	0.128	0.01447	0.0440	0.01773	0.000001	0.000001	132	0.0005	0.0005	0.000100	0.000100	16.14	0.0025	0.00250	0.0232	0.0094	0.01	0.01
		Count <DL	0	0	0	4	0	12	10	0	0	0	2	0	1	12	12	0	14	14	14	14	0	14	14	0	0	1	1
		Standard Deviation	0.00304	0.002	0.1194	0.00285	46.1	0.0000041	0.00000198	0.00077	0.00082	0.165	0.02707	0.0489	0.0424	0	0	42.6	0	0	0	0.000000	12.6	1E-10	0.00000	0	0	0	0
		1st Quartile	0.00087	0.00076	0.0278	0.002	122.5	<0.000010	<0.0000050	0.00088	0.00069	0.072	0.00588	0.0261	0.0097	<0.0000020	<0.0000020	123.0	<0.0010	<0.0010	<0.00020	<0.00020	10.48	<0.0050	<0.0050	0.0232	0.0094	<0.020	<0.020
		Median	0.0015	0.00134	0.0391	0.00425	152	<0.000010	<0.0000050	0.00117	0.00084	0.159	0.00985	0.0446	0.018	<0.0000020	<0.0000020	149	<0.0010	<0.0010	<0.00020	<0.00020	15.3	<0.0050	<0.0050	0.0232	0.0094	<0.020	<0.020
		3rd Quartile	0.00431	0.00329	0.092	0.0056	181.2	<0.000010	0.0000044	0.00223	0.00199	0.176	0.0464	0.092	0.03787	<0.0000020	<0.0000020	178.2	<0.0010	<0.0010	<0.00020	<0.00020	24.45	<0.0050	<0.0050	0.0232	0.0094	<0.020	<0.020
7S	Stream 1-7S discharge to LWO	Average	0.000066	0.000062	0.0361	0.0319	14.1	0.000005	0.00000322	0.000366	0.00038	0.0126	0.0075	0.0005	0.0005	0.00000151	0.00000126	14.8	0.00050	0.00050	0.000100	0.000100	3.070	0.00250	0.00250				
E292109		Count	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	9	9	9	9	9	9	9	9				
		Minimum	<0.00010	<0.00010	0.0158	0.0149	8.4	<0.000010	<0.0000050	<0.00050	0.00023	<0.010	<0.0050	<0.0010	<0.0010	<0.0000020	<0.0000020	11.4	<0.0010	<0.0010	<0.00020	<0.00020	2.3	<0.0050	<0.0050				
		Maximum	0.00014	0.00011	0.104	0.0713	27.2	<0.000010	0.000009	0.00067	0.00052	0.047	0.024	<0.0010	<0.0010	0.0000028	0.0000031	23.6	<0.0010	<0.0010	<0.00020	<0.00020	4.10	<0.0050	<0.0050				
		Geometric Mean	0.000061	0.000059	0.0307	0.029	13.3	0.000005	0.00000288	0.000334	0.00037	0.0079	0.00546	0.0005	0.0005	0.00000138	0.00000115	14.4	0.00050	0.00050	0.000100	0.000100	3.01	0.00250	0.00250				
		Count <DL	7	7	0	0	0	9	8	6	0	7	4	9	9	5	7	0	9	9	9	9	0	9	9				
		Standard Deviation	0.000032	0.000024	0.0267	0.0167	5.4	0	0.00000217	0.000177	0.0001	0.0155	0.00698	0	0	0.00000074	0.00000074	3.7	0.00000	0.00000	0.000000	0.000000	0.62	4E-11	4E-11				
		1st Quartile	<0.00010	<0.00010	0.0212	0.0216	11.5	<0.000010	<0.0000050	<0.00050	0.00031	<0.010	<0.0050	<0.0010	<0.0010	<0.0000020	<0.0000020	13.1	<0.0010	<0.0010	<0.00020	<0.00020	2.5	<0.0050	<0.0050				
		Median	<0.00010	<0.00010	0.0284	0.0267	13.1	<0.000010	<0.0000050	<0.00050	0.00036	<0.010	0.0067	<0.0010	<0.0010	<0.0000020	<0.0000020	13.5	<0.0010	<0.0010	<0.00020	<0.00020	3.2	<0.0050	<0.0050				
		3rd Quartile	<0.00010	<0.00010	0.0381	0.0375	15.3	<0.000010	<0.0000050	0.00052	0.00044	<0.010	0.0092	<0.0010	<0.0010	0.00000212	<0.0000020	15.9	<0.0010	<0.0010	<0.00020	<0.00020	3.5	<0.0050	<0.0050				
QU0813A	Ex-situ 7-South groundwater well down gradient of the CCR backfill towards QR (No. 4 Seam)	Average		0.408		0.00215	177.0		0.0000025		0.000100		0.2307		0.0538		0.0000010			0.000500		0.0001000	22.8		0.00250		0.1480		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.382		<0.0030	171		<0.0000050		<0.00020		0.216		0.0456		<0.0000020			<0.0010		<0.00020	15.2		<0.0050		0.12		
		Maximum		0.435		0.0041	181		<0.0000050		<0.00020		0.249		0.0637		<0.0000020			<0.0010		<0.00020	30.1		<0.0050		0.184		
		Geometric Mean		0.408		0.00193	177.0		0.0000025		0.000100		0.2304		0.0534		0.0000010			0.000500		0.0001000	21.6		0.00250		0.1460		
		Count <DL		0		3	0		4		4		0		0		4			4		4	0		4		0		
		Standard Deviation		0.024		0.0013	4.5		4E-15		0.000000		0.015		0.0082		0.0000000			0.000000		0.0000000	8.3		0.00000		0.0270		
		1st Quartile		0.391		<0.0030	174.8		<0.0000050		<0.00020		0.2213		0.048		<0.0000020			<0.0010		<0.00020	15.8		<0.0050		0.133		
		Median		0.408		<0.0030	178		<0.0000050		<0.00020		0.229		0.053		<0.0000020			<0.0010		<0.00020	22.9		<0.0050		0.144		
		3rd Quartile		0.425		0.0022	180.2		<0.0000050		<0.00020		0.2385		0.0588		<0.0000020			<0.0010		<0.00020	29.9		<0.0050		0.159		
QU0813B	Ex-situ 7-South groundwater well down gradient of the CCR backfill towards QR (Till & SST contact)	Average		0.506		0.0678	135.8		0.0000034		0.000100		0.2425		0.0871		0.0000010			0.000500		0.0001000	67.3		0.00250		0.1362		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.493		0.0035	126		<0.0000050		<0.00020		0.127		0.0615		<0.0000020			<0.0010		<0.00020	10.2		<0.0050		0.0486		
		Maximum		0.518		0.241	147		0.000006		<0.00020		0.524		0.143		<0.0000020			<0.0010		<0.00020	221		<0.0050		0.168		
		Geometric Mean		0.505		0.0174	135.5		0.0000031		0.000100		0.2027		0.0821		0.0000010			0.000500		0.0001000	28.7		0.00250		0.1217		
		Count <DL		0		0	0		3		4		0		0		4			4		4	0		4		0		
		Standard Deviation		0.014		0.1157	9.2		0.0000018		0.000000		0.188		0.0377		0.0000000			0.000000		0.0000000	102.7		0.00000		0.0584		
		1st Quartile		0.493		0.0046	129.8		<0.0000050		<0.00020		0.1457		0.0664		<0.0000020			<0.0010		<0.00020	11		<0.0050		0.1344		
		Median		0.506		0.0135	135		<0.0000050		<0.00020		0.1595		0.072		<0.0000020			<0.0010		<0.00020	19		<0.0050		0.164		
		3rd Quartile		0.518		0.0767	141		0.00000338		<0.00020		0.2563		0.0926		<0.0000020			<0.0010		<0.00020	75.3		<0.0050		0.1658		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 65
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2017 -18 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU0821GD	Ex-situ 2-North groundwater well down gradient of u/g tailings disposal, measures water quality & hydraulic gradients downstream of Forjan Fault (No. 4 Seam)	Average		0.132		0.0076	215.0		0.00001033		0.000367		1.334		0.1573		0.0000010			0.00183		0.000367	1.58		0.00917		0.1014		
		Count		3		3	3		3		3		3		3		3			3		3	3		3		3		
		Minimum		0.121		<0.015	210		0.000006		<0.00020		0.982		0.0799		<0.0000020			<0.0010		<0.00020	<1.0		<0.0050		0.0493		
		Maximum		0.147		0.0078	218		<0.000025		<0.0010		1.73		0.278		<0.0000020			<0.0050		<0.0010	2.3		<0.025		0.141		
		Geometric Mean		0.131		0.0076	215.0		0.00000979		0.000292		1.2989		0.1363		0.0000010			0.00146		0.000292	1.304		0.00731		0.0925		
		Count <DL		0		2	0		2		3		0		0		3			3		3	1		3		0		
		Standard Deviation		0.014		0.00017	4.4		0.00000375		0.000231		0.3759		0.1059		0.0000000			0.00115		0.000231	0.951		0.00577		0.0471		
		1st Quartile		0.124		<0.015	213.5		0.00000925		0.0003		1.136		0.097		<0.0000020			0.0015		0.0003	1.22		0.0075		0.0817		
		Median		0.127		<0.015	217		<0.000025		<0.0010		1.29		0.114		<0.0000020			<0.0050		<0.0010	1.93		<0.025		0.114		
		3rd Quartile		0.137		0.00765	217.5		<0.000025		<0.0010		1.51		0.196		<0.0000020			<0.0050		<0.0010	2.12		<0.025		0.1275		
QU0821GS	Ex-situ 2-North groundwater well down gradient of u/g tailings disposal, measures water quality & hydraulic gradients downstream of Forjan Fault (No. 1 Seam)	Average		0.195		0.00832	201.2		0.0000099		0.000443		0.3953		0.0839		0.0000010			0.001500		0.0003000	0.613		0.00750		0.101		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.178		0.006	194		<0.0000050		0.00033		0.286		0.0493		<0.0000020			<0.0010		<0.00020	<1.0		<0.0050		0.0029		
		Maximum		0.208		0.0123	209		<0.000025		<0.0010		0.555		0.15		<0.0000020			<0.0050		<0.0010	0.95		<0.025		0.155		
		Geometric Mean		0.194		0.00803	201.2		0.0000083		0.000436		0.3825		0.0754		0.0000010			0.001120		0.0002240	0.587		0.00559		0.051		
		Count <DL		0		2	0		3		2		0		0		4			4		4	3		4		0		
		Standard Deviation		0.016		0.00274	6.3		0.0000049		0.00008		0.1194		0.0469		0.0000000			0.001150		0.0002310	0.225		0.00577		0.0673		
		1st Quartile		0.183		0.00712	197.8		0.00000963		0.000412		0.315		0.0512		<0.0000020			<0.0010		<0.00020	<1.0		<0.0050		0.0877		
		Median		0.197		<0.015	201		0.00001225		0.00047		0.37		0.0681		<0.0000020			0.0015		0.0003	<1.0		0.00750		0.123		
		3rd Quartile		0.208		0.0087	204.5		<0.000025		<0.0010		0.45		0.1008		<0.0000020			<0.0050		<0.0010	0.613		<0.025		0.1363		
QU1010D																													
		Average		0.0141		0.0098	92.2		0.000014		0.00061		8.7		0.3745		0.0000010			0.00275		0.000550	0.375		0.0138		0.07380		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.0139		0.0045	91.3		<0.0000050		0.00021		7.95		0.332		<0.0000020			<0.0010		<0.00020	<0.50		<0.0050		0.0711		
		Maximum		0.0144		<0.030	93.2		<0.000050		<0.0020		9.45		0.417		<0.0000020			<0.010		<0.0020	<1.0		<0.050		0.0766		
		Geometric Mean		0.0141		0.0082	92.2		0.000008		0.00046		8.6676		0.3721		0.0000010			0.00158		0.000316	0.354		0.0079		0.07380		
		Count <DL		0		1	0		2		1		0		0		2			2		2	2		2		0		
		Standard Deviation		0.0004		0.0074	1.3		0.000016		0.00056		1.1		0.06		0.0000000			0.00318		0.000636	0.2		0.0159		0.00390		
		1st Quartile		0.014		0.00712	91.8		0.00000813		0.000407		8.325		0.3533		<0.0000020			0.00163		0.000325	0.312		0.00813		0.0725		
		Median		0.0141		0.00975	92.2		0.00001375		0.000605		8.7		0.3745		<0.0000020			0.00275		0.00055	0.375		0.01375		0.0738		
		3rd Quartile		0.0143		0.01237	92.7		0.00001937		0.000803		9.075		0.3957		<0.0000020			0.00387		0.000775	0.438		0.01937		0.0752		
QU1010S	Ex-situ 2-North shallow groundwater well. Down gradient of u/g tailings disposal, measures water quality & hydraulic head downstream of 2-North workings. (No. 1 Seam / Sandstone).	Average		0.113		0.0083	152.0		0.0000025		0.0001		0.2325		0.0407		0.0000010			0.000500		0.0005300	19.9		0.00250		0.0551		
		Count		2		2	2		2		2		2		2		2			2		2	2		2		2		
		Minimum		0.112		<0.0030	152		<0.0000050		<0.00020		0.221		0.0361		<0.0000020			<0.0010		<0.00020	19.6		<0.0050		0.0468		
		Maximum		0.113		0.0151	152		<0.0000050		<0.00020		0.244		0.0453		<0.0000020			<0.0010		0.00096	20.1		<0.0050		0.0634		
		Geometric Mean		0.112		0.00476	152.0		0.0000025		0.0001		0.2322		0.0404		0.0000010			0.000500		0.0003100	19.8		0.0025		0.0545		
		Count <DL		0		1	0		2		2		0		0		2			2		1	0		2		0		
		Standard Deviation		0.001		0.00962	0.0		0.0000000		0		0.0163		0.0065		0.0000000			0.000000		0.0006080	0.4		1E-11		0.0117		
		1st Quartile		0.112		0.0049	152		<0.0000050		<0.00020		0.2268		0.0384		<0.0000020			<0.0010		0.000315	19.7		<0.0050		0.051		
		Median		0.113		0.0083	152		<0.0000050		<0.00020		0.2325		0.0407		<0.0000020			<0.0010		0.00053	19.9		<0.0050		0.0551		
		3rd Quartile		0.113		0.0117	152		<0.0000050		<0.00020		0.2382		0.043		<0.0000020			<0.0010		0.000745	20		<0.0050		0.0592		
QU1011D	Ex-situ 2-North deep groundwater well. Measures water quality & hydraulic gradient in Forjian Fault (Fractured sandstone).	Average		0.0088		0.0075	305		0.0000125		0.0012		4.44		0.502		0.0000010			0.0025		0.0005	0.5		0.0125		0.160		
		Count		1		1	1		1		1		1		1		1			1		1	1		1		1		
		Minimum		0.0088		<0.015	305		<0.000025		0.0012		4.44		0.502		<0.0000020			<0.0050		<0.0010	<1.0		<0.025		0.16		
		Maximum		0.0088		<0.015	305		<0.000025		0.0012		4.44		0.502		<0.0000020			<0.0050		<0.0010	<1.0		<0.025		0.16		
		Geometric Mean		0.0088		0.0075	305		0.0000125		0.0012		4.44		0.502		0.0000010			0.0025		0.0005	0.5		0.0125		0.160		
		Count <DL		0		1	0		1		0		0		0		1			1		1	1		1		0		
		Standard Deviation		0.00000		0.0000	0		0.0000000		0.00000		0.00		0.000		0.0000000			0.00000		0.000000	0.0		0.0000		0.000		
		1st Quartile		0.0088		<0.015	305		<0.000025		0.0012		4.44		0.502		<0.0000020			<0.0050		<0.0010	<1.0		<0.025		0.16		
		Median		0.0088		<0.015	305		<0.000025		0.0012		4.44		0.502		<0.0000020			<0.0050		<0.0010	<1.0		<0.025		0.16		
		3rd Quartile		0.0088		<0.015	305		<0.000025		0.0012		4.44		0.502		<0.0000020			<0.0050		<0.0010	<1.0		<0.025		0.16		
QU1011S	Ex-situ 2-North shallow groundwater well. Measures water quality & hydraulic gradient in Forjian Fault (Fractured sandstone).	Average		0.00145		0.0042	68.7		0.0000025		0.00027		0.177		0.0334		0.0000010			0.0005		0.0001000	5.3		0.00250		0.0076		
		Count		1		1	1		1		1		1		1		1			1		1	1		1		1		
		Minimum		0.00145		0.0042	68.7		<0.0000050		0.00027		0.177		0.0334		<0.0000020			<0.0010		<0.00020	5.3		<0.0050		0.0076		
		Maximum		0.00145		0.0042	68.7		<0.0000050		0.00027		0.177		0.0334		<0.0000020			<0.0010		<0.00020	5.3		<0.0050		0.0076		
		Geometric Mean		0.00145		0.0042	68.7		0.0000025		0.00027		0.177		0.0334		0.0000010			0.0005		0.0001000	5.3		0.0025		0.0076		
		Count <DL		0		0	0		1		0		0		0		1			1		1	0		1		0		
		Standard Deviation		0		0	0		0.0000000		0		0		0		0.0000000			0		0.0000000	0		0		0		
		1st Quartile		0.00145		0.0042	68.7		<0.0000050		0.00027		0.177		0.0334		<0.0000020			<0.0010		<0.00020	5.3		<0.0050		0.0076		
		Median		0.00145		0.0042	68.7		<0.0000050		0.00027		0.177		0.0334		<0.0000020			<0.0010		<0.00020	5.3		<0.0050		0.0076		
		3rd Quartile		0.00145		0.0042	68.7		<0.0000050		0.00027		0.177		0.0334		<0.0000020			<0.0010		<0.00020	5.3		<0.0050		0.0076		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 66
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2017 -18 Statistics Stn.Code EMS. ID	Site Name & Description	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU1105S	Ex-situ River Barrier Pillar (RBP) shallow groundwater well. Monitors water quality & gradients above the RBP & 2-North Mine. (Sandstone)	Average		0.0762		0.00437	252.4		0.0000041		0.000135		1.2705		0.1618		0.0000010			0.000500		0.0001000	108.8		0.00250		0.029		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.0487		<0.0030	89.8		<0.0000050		<0.00020		0.492		0.0751		<0.0000020			<0.0010		<0.00020	50.8		<0.0050		0.0189		
		Maximum		0.0957		0.008	442		0.000009		0.00024		1.55		0.24		<0.0000020			<0.0010		<0.00020	166		<0.0050		0.0396		
		Geometric Mean		0.0739		0.00372	217		0.0000034		0.000124		1.1521		0.1491		0.0000010			0.000500		0.0001000	98.9		0.00250		0.028		
		Count <DL		0		1	0		3		3		0		0		4			4		4	0		4		0		
		Standard Deviation		0.0204		0.00269	147.6		0.0000033		0.000070		0.519		0.0681		0.0000000			0.000000		0.0000000	51.2		0.00000		0.010		
		1st Quartile		0.0676		0.00323	174.7		<0.0000050		<0.00020		1.248		0.135		<0.0000020			<0.0010		<0.00020	76.1		<0.0050		0.0221		
		Median		0.0803		0.004	239		<0.0000050		<0.00020		1.52		0.166		<0.0000020			<0.0010		<0.00020	109.2		<0.0050		0.0289		
		3rd Quartile		0.089		0.00515	316.8		0.00000413		0.000135		1.5425		0.1927		<0.0000020			<0.0010		<0.00020	142		<0.0050		0.0358		
QU1109S	Ex-situ River Barrier Pillar (RBP) shallow groundwater well. Monitors water quality & gradients above the RBP & 2-North Mine. (Sandstone)	Average		0.111		0.00652	470		0.0000100		0.0004		0.3168		0.0429		0.0000010			0.002		0.0004	430.5		0.01		0.060		
		Count		4		4	4		4		4		4		4		4			4		4	4		4		4		
		Minimum		0.071		0.0036	436		<0.0000050		<0.00020		0.162		0.0221		<0.0000020			<0.0010		<0.00020	402		<0.0050		0.0401		
		Maximum		0.140		<0.015	538		<0.000025		<0.0010		0.402		0.0531		<0.0000020			<0.0050		<0.0010	458		<0.025		0.0748		
		Geometric Mean		0.107		0.00624	469		0.0000084		0.000334		0.2992		0.0406		0.0000010			0.00167		0.000334	430		0.00836		0.058		
		Count <DL		0		3	0		4		4		0		0		4			4		4	0		4		0		
		Standard Deviation		0.029		0.0020	45		0.0000050		0.00020		0.1076		0.01430		0.0000000			0.00100		0.000200	24.3		0.0050		0.015		
		1st Quartile		0.103		0.00652	447		0.00001		0.0004		0.2865		0.0394		<0.0000020			0.002		0.0004	416.2		0.01		0.0534		
		Median		0.116		<0.015	454		<0.000025		<0.0010		0.3515		0.0483		<0.0000020			<0.0050		<0.0010	431		<0.025		0.0619		
		3rd Quartile		0.124		<0.015	478		<0.000025		<0.0010		0.3818		0.0518		<0.0000020			<0.0050		<0.0010	445.2		<0.025		0.068		
7SQR	7-South Quinsam River downstream of 7-South Mining Operation	Average	0.00042	0.0004	0.0231	0.0183	39.5	0.000005	0.00000266	0.000671	0.00055	0.073	0.0496	0.0054	0.0044	0.000001	0.000001	37.2	0.00050	0.00050	0.000105	0.000100	31.5	0.00262	0.0025	0.00490	0.00530	0.0252	0.00732
E292113		Count	22	22	22	22	22	22	22	22	22	22	22	22	22	21	20	22	22	22	22	22	22	22	22	12	7	11	11
		Minimum	0.00027	0.00025	0.0102	0.0071	26.4	<0.000010	<0.0000050	<0.00050	0.00041	0.051	0.0324	0.0022	0.0015	<0.0000020	<0.0000020	28.7	<0.0010	<0.0010	<0.00020	<0.00020	17	<0.0050	<0.0050	0.0021	0.0033	<0.020	<0.0050
		Maximum	0.00056	0.00055	0.0529	0.0574	45.2	<0.000010	0.000006	0.00212	0.00099	0.099	0.0822	0.0079	0.0078	<0.0000020	<0.0000020	53.7	<0.0010	<0.0010	0.00021	<0.00020	42.3	0.0051	<0.0050	0.0174	0.0086	0.038	<0.020
		Geometric Mean	0.00041	0.00039	0.0207	0.0159	39.1	0.000005	0.0000026	0.000621	0.00054	0.072	0.0486	0.0051	0.0042	0.000001	0.000001	36.9	0.00050	0.00050	0.000103	0.000100	31.1	0.00258	0.0025	0.00420	0.00510	0.024	0.00633
		Count <DL	0	0	0	0	0	22	21	1	0	0	0	0	0	21	20	0	22	22	21	22	0	21	22	0	0	1	9
		Standard Deviation	0.00009	0.00009	0.0115	0.0115	5.2	0.00000000	0.00000075	0.00035	0.00014	0.014	0.0107	0.0015	0.0014	0	0	5	0.00000	0.00000	0.000023	0.000000	5.2	0.00055	0	0.004	0.0018	0.0075	0.00339
		1st Quartile	0.00037	0.00034	0.0143	0.0107	37	<0.000010	<0.0000050	0.000525	0.00048	0.064	0.0428	0.0043	0.0034	<0.0000020	<0.0000020	34.7	<0.0010	<0.0010	<0.00020	<0.00020	29	<0.0050	<0.0050	0.0036	0.0043	0.0215	0.00425
		Median	0.00043	0.00040	0.0215	0.0152	41.9	<0.000010	<0.0000050	0.00058	0.00052	0.074	0.048	0.0055	0.0045	<0.0000020	<0.0000020	37.2	<0.0010	<0.0010	<0.00020	<0.00020	31.9	<0.0050	<0.0050	0.004	0.0045	0.023	<0.020
		3rd Quartile	0.00047	0.00046	0.027	0.0214	42.9	<0.000010	<0.0000050	0.000702	0.00055	0.083	0.0542	0.0066	0.0053	<0.0000020	<0.0000020	38.9	<0.0010	<0.0010	<0.00020	<0.00020	34.40	<0.0050	<0.0050	0.0046	0.006	0.0305	<0.020
LQL1	Lower Quinsam Lake 1 metre below surface	Average	0.00061	0.00058	0.0329	0.0251	34.9	0.000005	0.0000038	0.00087	0.00069	0.104	0.0652	0.0128	0.00581	0.00000115	0.00000112	32.8	0.0005	0.00050	0.000100	0.000100	21.1	0.00250	0.00250	0.005			
E292118		Count	15	15	15	15	5	15	15	15	15	15	15	15	15	13	13	15	15	15	15	15	15	15	15	6			
		Minimum	0.00047	0.0004	0.0077	0.0079	24.2	<0.000010	<0.0000050	0.00052	0.00042	0.037	0.0242	0.0037	<0.0010	<0.0000020	<0.0000020	27.0	<0.0010	<0.0010	<0.00020	<0.00020	13.8	<0.0050	<0.0050	0.004			
		Maximum	0.00076	0.00068	0.0871	0.0603	43.3	<0.000010	0.0000090	0.0036	0.00167	0.219	0.136	0.0455	0.0291	0.0000029	0.0000026	39.8	<0.0010	<0.0010	<0.00020	<0.00020	27.1	<0.0050	<0.0050	0.0060			
		Geometric Mean	0.0006	0.00057	0.0264	0.0203	34.2	0.000005	0.00000339	0.00074	0.00065	0.088	0.055	0.0092	0.0026	0.00000109	0.00000108	32.5	0.0005	0.00050	0.000100	0.000100	20.5	0.00250	0.00250	0.0049			
		Count <DL	0	0	0	0	0	15	10	0	0	0	0	0	3	12	12	0	15	15	15	15	0	15	15	0			
		Standard Deviation	0.0001	0.0001	0.0213	0.0164	7.8	0	0.0000021	0.00077	0.0003	0.061	0.0392	0.0125	0.00811	0.00000053	0.00000044	4.3	0	0.00000	0.000000	0.000000	5.1	1E-10	1E-10	0.0008			
		1st Quartile	0.00051	0.00049	0.0147	0.0111	30.7	<0.000010	<0.0000050	0.00057	0.00054	0.05	0.0324	0.0056	0.0012	<0.0000020	<0.0000020	29.4	<0.0010	<0.0010	<0.00020	<0.00020	15.6	<0.0050	<0.0050	0.0045			
		Median	0.00066	0.00063	0.0309	0.0184	35.5	<0.000010	<0.0000050	0.000640	0.00063	0.086	0.0522	0.0067	0.00160	<0.0000020	<0.0000020	32	<0.0010	<0.0010	<0.00020	<0.00020	23.4	<0.0050	<0.0050	0.005			
		3rd Quartile	0.0007	0.00065	0.0452	0.0374	41	<0.000010	0.0000050	0.000810	0.0007	0.143	0.0899	0.0148	0.00685	<0.0000020	<0.0000020	36.3	<0.0010	<0.0010	<0.00020	<0.00020	25.4	<0.0050	<0.0050	0.0055			
LQLB	LQLB 1 metre from Bottom	Average	0.001	0.00073	0.0423	0.0303	31.7	0.0000074	0.00000626	0.00097	0.00068	0.44	0.2442	0.1377	0.1297	0.00000114	0.00000112	31.4	0.00050	0.00050	0.000100	0.000100	16.3	0.0025	0.00250	0.0067			
E292118		Count	15	15	15	15	4	15	15	15	15	15	15	15	15	13	13	15	15	15	15	15	15	15	15	6			
		Minimum	0.00048	0.00038	0.0241	0.0157	24.5	<0.000010	<0.0000050	0.0005	0.00056	0.086	0.0514	0.0044	0.0024	<0.0000020	<0.0000020	25.4	<0.0010	<0.0010	<0.00020	<0.00020	12.5	<0.0050	<0.0050	0.0049			
		Maximum	0.00204	0.00119	0.0876	0.0681	35.7	0.000014	0.0000130	0.00268	0.00097	1.15	0.632	0.438	0.43	0.0000028	0.0000026	37.5	<0.0010	<0.0010	<0.00020	<0.00020	24.5	<0.0050	<0.0050	0.0086			
		Geometric Mean	0.00086	0.00068	0.0395	0.0279	31.4	0.0000068	0.00000559	0.0009	0.00067	0.288	0.1668	0.0451	0.0318	0.00000108	0.00000108	31.2	0.00050	0.00050	0.000100	0.000100	15.8	0.0025	0.00250	0.0066			
		Count <DL	0	0	0	0	0	9	3	0	0	0	0	0	0	12	12	0	15	15	15	15	0	15	15	0			
		Standard Deviation	0.00056	0.00029	0.0179	0.0138	4.9	0.0000032	0.00000299	0.00051	0.00011	0.383	0.2063	0.1608	0.1597	0.0000005	0.00000044	3.6	0.00000	0.00000	0.000000	0.000000	4.2	1E-10	1E-10	0.0013			
		1st Quartile	0.00051	0.00050	0.0297	0.0205	31	<0.000010	0.000005	0.00073	0.00061	0.119	0.0809	0.0105	0.0069	<0.0000020	<0.0000020	29.2	<0.0010	<0.0010	<0.00020	<0.00020	12.9	<0.0050	<0.0050	0.0058			
		Median	0.00068	0.00062	0.0368	0.0258	33.3	<0.000010	0.00000520	0.00087	0.00065	0.209	0.125	0.028	0.0147	<0.0000020	<0.0000020	30.9	<0.0010	<0.0010	<0.00020	<0.00020	15.3	<0.0050	<0.0050	0.0071			
		3rd Quartile	0.00153	0.00099	0.0468	0.0378	34	0.00001	0.00000800	0.00091	0.0007	0.772	0.4275	0.2745	0.264	<0.0000020	<0.0000020	33.0	<0.0010	<0.0010	<0.00020	<0.00020	17.8	<0.0050	<0.0050	0.0072			

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 67
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2018 -19 Statistics Stn.Code EMS. ID	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
WA		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E0126402	Average	0.00011	0.000111	0.0247	0.0208	20.2	0.000005	0.00000364	0.00089	0.0007	0.018	0.0139	0.00127	0.00059	0.0000010	0.0000016	19.5	0.0005	0.00050	0.000100	0.000100	1.14	0.00250	0.002398				
	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15				
	Minimum	<0.00010	<0.00010	0.0154	0.0152	15.6	<0.000010	<0.0000050	0.00059	0.00058	0.011	0.0069	<0.0010	<0.0010	<0.0000020	<0.0000020	17.8	<0.0010	<0.0010	<0.00020	<0.00020	<1.0	<0.0050	0.000964				
	Maximum	0.00016	0.00014	0.0317	0.0286	23	<0.000010	0.0000196	0.0016	0.00085	0.028	0.0287	0.002	0.0014	<0.0000020	0.0000031	21	<0.0010	<0.0010	<0.00020	<0.00020	1.9	<0.0050	<0.0050				
	Geometric Mean	0.000101	0.000107	0.0244	0.0205	20.1	0.000005	0.00000287	0.00084	0.00069	0.017	0.0132	0.00119	0.00056	0.000001	0.00000138	19.5	0.0005	0.00050	0.000100	0.000100	1.03	0.00250	0.002346				
	Count <DL	4	2	0	0	0	15	14	0	0	0	0	2	13	15	10	0	15	15	15	15	4	15	14				
	Standard Deviation	0.000041	0.000027	0.0041	0.0037	2.2	0	0.00000442	0.00034	0.0001	0.005	0.0051	0.00043	0.00026	0	0.00000083	0.9	0	0.00000	0.000000	0.000000	0.47	0	0.000397				
	1st Quartile	0.00008	0.00011	0.0218	0.0183	18.8	<0.000010	<0.0000050	0.0007	0.0006	0.014	0.0111	0.0011	<0.0010	<0.0000020	<0.0000020	18.8	<0.0010	<0.0010	<0.00020	<0.00020	0.8	<0.0050	<0.0050				
	Median	0.00012	0.00012	0.0248	0.0204	21.0	<0.000010	<0.0000050	0.00074	0.00068	0.016	0.0139	0.0012	<0.0010	<0.0000020	<0.0000020	19.7	<0.0010	<0.0010	<0.00020	<0.00020	1.2	<0.0050	<0.0050				
	3rd Quartile	0.00014	0.00013	0.0274	0.0225	21.6	<0.000010	<0.0000050	0.00092	0.00077	0.022	0.0154	0.00145	<0.0010	<0.0000020	0.0000022	20.2	<0.0010	<0.0010	<0.00020	<0.00020	1.4	<0.0050	<0.0050				
WD	Average	0.00132	0.00205	0.0209	0.00488	368	0.000006	0.00000417	0.001028	0.00036	0.661	0.0162	0.1403	0.1347	0.000001	0.000001	385	0.0017	0.00182	0.000100	0.000167	579	0.00313	0.00417	0.0052	0.00380	0.024	0.05
E207409	Count	6	6	6	6	12	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	52	6	6	3	1	2	3
	Minimum	0.00079	0.00113	0.0035	<0.0030	252	<0.000010	<0.0000050	<0.00050	<0.00020	0.055	0.0103	0.0412	0.0435	<0.0000020	<0.0000020	313	0.001	<0.0010	<0.00020	<0.00020	411	<0.0050	<0.0050	0.0045	0.0038	<0.020	<0.020
	Maximum	0.00207	0.00272	0.0679	<0.015	437	0.000011	<0.000025	0.00198	<0.0010	1.54	0.0270	0.3	0.278	<0.0000020	<0.0000020	436	0.0041	0.0044	<0.00020	<0.0010	798	0.0063	<0.025	0.0063	0.0038	0.038	0.13
	Geometric Mean	0.00126	0.00193	0.0139	0.00437	363	0.0000057	0.0000033	0.000845	0.000321	0.424	0.0153	0.1125	0.1111	0.000001	0.000001	382	0.0014	0.0014	0.000100	0.000131	571	0.00292	0.00327	0.0051	0.00380	0.0195	0.0235
	Count <DL	0	0	0	2	0	5	6	1	2	0	0	0	0	6	6	0	0	2	6	6	0	5	6	0	0	1	2
	Standard Deviation	0.00045	0.00071	0.0235	0.0021	54	0.0000024	0.00000408	0.000646	0.000155	0.565	0.0062	0.096	0.0865	0	0.0000000	44	0.0012	0.00143	0.000000	0.000163	99	0.00155	0.00408	0.001	0	0.0198	0.0693
	1st Quartile	0.00107	0.00144	0.0107	0.004	358	<0.000010	<0.0000050	0.00072	0.000295	0.306	0.0122	0.0688	0.0697	<0.0000020	<0.0000020	367	0.001	0.00105	<0.00020	<0.00020	494	<0.0050	<0.0050	0.0046	0.0038	0.017	<0.020
	Median	0.00123	0.00226	0.0128	0.00515	382	<0.000010	<0.0000050	0.0008	0.000435	0.49	0.014	0.1295	0.1285	<0.0000020	<0.0000020	389	0.0012	0.00125	<0.00020	<0.00020	565	<0.0050	<0.0050	0.0047	0.0038	0.024	<0.020
	3rd Quartile	0.00147	0.00263	0.017	0.00608	404	<0.000010	<0.0000050	0.001435	0.000455	0.984	0.0184	0.1773	0.167	<0.0000020	<0.0000020	414	0.0014	0.0022	<0.00020	<0.00020	654	<0.0050	<0.0050	0.0055	0.0038	0.031	0.07000
MW001D	Average	0.0214			0.0326	92.2		0.0000025		0.001		0.0074		0.0139		0.0000033			0.0005		0.0001	27.3		0.0025		0.173		
	Count	2			2	2		2		2		2		2		2			2		2	2		2		2		
	Minimum	0.0212			0.0299	90.3		<0.0000050		0.00083		0.0058		0.0061		<0.0000020			<0.0010		<0.00020	26.8		<0.0050		0.173		
	Maximum	0.0215			0.0354	94		<0.0000050		0.00118		0.0091		0.0217		0.0000055			<0.0010		<0.00020	27.8		<0.0050		0.173		
	Geometric Mean	0.0213			0.0325	92.1		0.0000025		0.00099		0.0073		0.0115		0.0000024			0.0005		0.0001	27.3		0.0025		0.173		
	Count <DL	0			0	0		2		0		0		0		1			2		2	0		2		0		
	Standard Deviation	0.0002			0.0039	2.6		0		0.00025		0.0023		0.011000		0.0000032			0		0	0.7		0		0		
	1st Quartile	0.0213			0.0313	91.2		<0.0000050		0.00092		0.0066		0.01		0.00000212			<0.0010		<0.00020	27		<0.0050		0.173		
	Median	0.0214			0.0326	92.2		<0.0000050		0.001		0.0074		0.0139		0.00000325			<0.0010		<0.00020	27.3		<0.0050		0.173		
	3rd Quartile	0.0214			0.034	93.1		<0.0000050		0.00109		0.0083		0.0178		0.00000437			<0.0010		<0.00020	27.6		<0.0050		0.173		
MW001S	Average	0.0001			0.003	327		0.000104		0.00135		0.059		2.83		0.0000010			0.0025		0.0002000	799		0.005		0.00500		
	Count	1			1	1		1		1		1		1		1			1		1	1		1		1		
	Minimum	<0.00020			<0.0060	327		0.000104		0.00135		0.059		2.83		<0.0000020			0.0025		<0.00040	799		<0.010		0.005		
	Maximum	<0.00020			<0.0060	327		0.000104		0.00135		0.059		2.83		<0.0000020			0.0025		<0.00040	799		<0.010		0.005		
	Geometric Mean	0.0001			0.003	327		0.000104		0.00135		0.059		2.83		0.0000010			0.0025		0.0002000	799		0.005		0.005		
	Count <DL	1			1	0		0		0		0		0		1			0		1	0		1		0		
	Standard Deviation	0			0	0		0		0		0		0		0.0000000			0		0.0000000	0		0		0.00000		
	1st Quartile	<0.00020			<0.0060	327		0.000104		0.00135		0.059		2.83		<0.0000020			0.0025		<0.00040	799		<0.010		0.00500		
	Median	<0.00020			<0.0060	327		0.000104		0.00135		0.059		2.83		<0.0000020			0.0025		<0.00040	799		<0.010		0.00500		
	3rd Quartile	<0.00020			<0.0060	327		0.000104		0.00135		0.059		2.83		<0.0000020			0.0025		<0.00040	799		<0.010		0.00500		
MW006D	Average	0.0273			0.0165	81.9		0.0000025		0.00094		0.0025		0.0008		0.0000010			0.000500		0.0001000	12.4		0.00250		0.16		
	Count	2			2	2		2		2		2		2		2			2		2	2		2		2		
	Minimum	0.027			0.016	79.8		<0.0000050		0.00073		<0.0050		<0.0010		<0.0000020			<0.0010		<0.00020	12		<0.0050		0.157		
	Maximum	0.0276			0.017	84		<0.0000050		0.00116		<0.0050		0.0011		<0.0000020			<0.0010		<0.00020	12.7		<0.0050		0.163		
	Geometric Mean	0.0273			0.0165	81.9		0.0000025		0.00092		0.0025		0.00074		0.0000010			0.000500		0.0001000	12.3		0.0025		0.16		
	Count <DL	0			0	0		2		0		2		1		2			2		2	0		2		0		
	Standard Deviation	0.0004			0.0007	3.0		0.0000000		0.0003		0		0.00042		0.0000000			0.0000000		0.0000000	0.5		0		0.004		
	1st Quartile	0.0272			0.0162	80.8		<0.0000050		0.00084		<0.0050		0.00065		<0.0000020			<0.0010		<0.00020	12.2		<0.0050		0.158		
	Median	0.0273			0.0165	81.9		<0.0000050		0.00094		<0.0050		0.0008		<0.0000020			<0.0010		<0.00020	12.4		<0.0050		0.16		
	3rd Quartile	0.0274			0.0168	83		<0.0000050		0.00105		<0.0050		0.00095		<0.0000020			<0.0010		<0.00020	12.5		<0.0050		0.162		
MW006S	Average	0.00158			0.00245	156.5		0.0000168		0.00086		0.0074		0.0215		0.0000010			0.0005		0.0001	546.0		0.00250		0.0537		
	Count	2			2	2		2		2		2		2		2			2		2	2		2		2		
	Minimum	0.00149			<0.0030	155		0.000013		0.00071		<0.0050		0.0108		<0.0000020			<0.0010		<0.00020	519		<0.0050		0.0516		
	Maximum	0.00167			0.0034	158		0.0000205		0.00101		0.0123		0.0322		<0.0000020			<0.0010		<0.00020	573		<0.0050		0.056		
	Geometric Mean	0.00158			0.00226	156.5		0.0000163		0.00085		0.00555		0.0186		0.0000010			0.00050		0.0001000	545.3		0.0025		0.0537		
	Count <DL	0			1	0		0		0		1		0		2			2		2	0		2		0		
	Standard Deviation	0.00013			0.00134	2.1		0.000005		0.000210		0.00693		0.0151		0.0000000			0		0.0000000	38.2		0		0.003		
	1st Quartile	0.00154			0.00198	155.8		0.0000149		0.00078		0.00495		0.0162		<0.0000020			<0.0010		<0.00020	532.5		<0.0050		0.0526		
	Median	0.00158			0.00245	156.5		0.0000168		0.00086		0.0074		0.0215		<0.0000020			<0.0010		<0.00020	546.0		<0.0050		0.0537		
	3rd Quartile	0.00163			0.00292	157.2		0.0000186		0.00094		0.00985		0.0268		<0.0000020			<0.0010		<0.00020	559.5		<0.0050		0.0548		
WC	Average	0.0007	0.00084	0.0083	0.0068	332	0.000005	0.00000417	0.000548	0.00044	0.145	0.0317	0.0247	0.0261	0.000001	0.000001	318	0.00143	0.00163	0.000100	0.000167	518	0.00250	0.00417				
E207411	Count	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	13	6	6				
	Minimum	0.00048	0.00056	0.0043	0.0048	257	<0.000010	<0.0000050	<0.00050	0.00024	0.054	0.0133	0.0068	0.0072	<0.0000020	<0.0000020	274	<0.0010	<0.0010	<0.00020	<0.00020	304	<0.0050	<0.0050				
	Maximum	0.00094	0.00118	0.0149	0.0098	370	<0.000010	<0.000025	0.00098	0.0006	0.366	0.114	0.0594	0.0598	<0.0000020	<0.0000020	393	0.0056	0.0053	<0.00020	<0.0010	729	<0.0050	<0.025				
	Geometric Mean	0.00067	0.00081	0.0078	0.0066	329	0.000005	0.00000327	0.00049	0.00042	0.1130	0.0212	0.0168	0.0182	0.000001	0.000001	315	0.00084	0.00097	0.000100	0.000131	507	0.00250	0.00327				
	Count <DL	0	0	0	1	0	6	6	2	1	0	0	0	0	6	6	0	4	5	6	6	0	6	6				
	Standard Deviation	0.00019	0.00027	0.0036	0.0018	46	0.0000000	0.0000041	0.000275	0.00014	0.119	0.0404	0.0231	0.0236	0	0	45	0.00205	0.00197	0.000000	0.000163	110	0	0.00408				
	1st Quartile	0.00056	0.00060	0.0069	0.0056	321	<0.000010	<0.0000050	0.000322	0.000350	0.061	0.01350	0.0076	0.0091	<0.0000020	<0.0000020	286	<0.0010	<0.0010	<0.00020	<0.00020	448	<0.0050	<0.0050				
	Median	0.00066	0.00085	0.0075	0.0068	343	<0.000010	<0.0000050	0.000585	0.00044	0.108	0.0158	0.0136	0.0142	<0.0000020	<0.0000020	306	<0.0010	<0.0010	<0.00020	<0.00020	524	<0.0050	<0.0050				
	3rd Quartile	0.00086	0.00104	0.0087	0.0074	370	<0.000010	<0.0000050	0.000638	0.000560	0.1700	0.0179	0.0403	0.0438	<0.0000020	<0.0000020	339	0.00088	0.002	<0.00020	<0.00020	593	<0.0050	<0.0050				
MQL1	Average	0.00016	0.0001800	0.0177	0.0145	35.0	0.000005	0.0000025	0.000693	0.00061	0.037	0.0238	0.0071	0.00278	0.00000137	0.00000166	37	0.0005	0.0005	0.0001	0.0001	29.4	0.0025	0.0025	0.00333	0.00376	0.0100	0.02130
E206618	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	14	15	15
	Minimum	0.00012	0.00014	0.0126	0.0093	29.7	<0.000010	<0.0000050	<0.00050	0.00047	0.023	0.0152	0.0045	<0.0010	<0.0000020	<0.0000020	26.1	<0.0010	<0.0010	<0.00020	<0.00020	15.6	<0.0050	<0.0050	<0.0020	<0.0020	<0.020	<0.020
	Maximum	0.0002	0.00023	0.0293	0.0206	41.3	<0.000010	<0.0000050	0.00153	0.00128	0.05	0.0302	0.0099	0.0084	0.000004	0.0000035	51.3	<0.0010	<0.0010	<0.00020	<0.00020	49.1	<0.0050	<0.0050	0.0079	0.0072	<0.020	0.18
	Geometric Mean	0.00016	0.00018	0.0173	0.0142	34.8	0.000005	0.0000025	0.000653	0.00059	0.037	0.0234	0.0069	0.00145	0.00000119	0.00000143	36.3	0.0005	0.0005	0.0001	0.00010000	28	0.0025	0.0025	0.00292	0.00327	0.01	0.0121
	Count <DL	0	0	0	0	0	15	15	1	0	0	0	0	7	13	10	0	15	15	15	15	0	15	15	2	6	15	14
	Standard Deviation	0.00003	0.00003	0.0043	0.003	3.6	0	0	0.000265	0.0002	0.009	0.0039	0.0016	0.00312	0.00000099	0.00000101	7.6	0	0	0	0	9.6	0	0	0.00173	0.00179	0	0.04390
	1st Quartile	0.00014	0.00016	0.0151	0.0119	32.1	<0.000010	<0.0000050	0.0006	0.000520	0.032	0.0226	0.0062	<0.0010	<0.0000020	<0.0000020	32.4	<0.0010	<0.0010	<0.00020	<0.00020	23.4	<0.0050	<0.0050	0.0025	0.00235	<0.020	<0.020
	Median	0.00016	0.0001700	0.0170	0.0156	34.7	<0.000010	<0.0000050	0.000630	0.00053	0.035	0.0237	0.0069	0.00120	<0.0000020	<0.0000020	35.3	<0.0010	<0.0010	<0.00020	<0.00020	27.20	<0.0050	<0.0050	0.0032	0.00385	<0.020	<0.020
	3rd Quartile	0.00018	0.0002	0.0198	0.016	37.4	<0.000010	<0.0000050	0.000745	0.00062	0.044	0.0264	0.0082	0.00515	<0.0000020	0.0000024	40.9	<0.0010	<0.0010	<0.00020	<0.00020	33.5	<0.0050	<0.0050	0.0036	<0.010	<0.020	<0.020
MQLB	Average	0.000108	0.000121	0.0123	0.0088	38.44	0.000005	0.0000025	0.00067	0.00056	0.042	0.0193	0.0859	0.0827	0.00000159	0.00000163	47.2	0.0005	0.0005	0.0001	0.0001	41.5	0.002500	0.0025	0.00440	0.00334	0.0100	0.0247
E206618	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	14	15	15
	Minimum	<0.00010	<0.00010	0.0054	0.0041	<1.0	<0.000010	<0.0000050	0.00056	0.00048	0.0180	0.0093	0.0028	<0.0010	<0.0000020	<0.0000020	35.5	<0.0010	<0.0010	<0.00020	<0.00020	26.7	<0.0050	<0.0050	0.0025	<0.0020	<0.020	<0.020
	Maximum	0.00014	0.00016	0.0308	0.0121	52.2	<0.000010	<0.0000050	0.00085	0.00088	0.124	0.0359	0.634	0.63	0.0000053	0.0000057	53.1	<0.0010	<0.0010	<0.00020	<0.00020	49.3	<0.0050	<0.0050	0.0096	0.005	<0.020	0.13
	Geometric Mean	0.000102	0.000115	0.011	0.0085	30.43	0.000005	0.0000025	0.00066	0.000550	0.035	0.0175	0.0131	0.00429	0.00000134	0.00000136	46.8	0.0005	0.0005	0.0001	0.0001	40.8	0.0025	0.0025	0.00410	0.00294	0.01	0.0139
	Count <DL	3	2	0	0	1	15	15	0	0	0	0	0	3	11	11	0	15	15	15	15	0	15	15	0	6	15	13
	Standard Deviation	0.000032	0.000034	0.0065	0.0024	11.77	0	0	0.00009	0.0001	0.032	0.0089	0.2067	0.21073	0.00000122	0.00000131	5.5	0	0	0	0.00000000	7.8	0	0	0.00180	0.00152	0	0.0389
	1st Quartile	0.00011	0.00011	0.0074	0.00660	36.5	<0.000010	<0.0000050	0.00058	0.0005	0.025	0.0116	0.0068	0.0012	<0.0000020	<0.0000020	45.6	<0.0010	<0.0010	<0.00020	<0.00020	35.4	<0.0050	<0.0050	0.0034	0.00225	<0.020	<0.020
	Median	0.00012	0.0001300	0.0109	0.0098	41	<0.000010	<0.0000050	0.00067	0.000540	0.027	0.0161	0.0089	0.003	<0.0000020	<0.0000020	48.2	<0.0010	<0.0010	<0.00020	<0.00020	45	<0.0050	<0.0050	0.0039	0.00315	<0.020	<0.020
	3rd Quartile	0.00013	0.00014	0.0145	0.0106	42.6	<0.000010	<0.0000050	0.00071	0.00056	0.048	0.0266	0.0107	0.0062	0.0000016	0.0000017	51.4	<0.0010	<0.0010	<0.00020	<0.00020	47.2	<0.0050	<0.0050	0.0046	<0.010	<0.020	<0.020

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

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2018 -19 Statistics Stn.Code EMS. ID	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
NNL1		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
E217018	Average	0.00032	0.000340	0.0322	0.0284	11.23	0.000005	0.0000025	0.000694	0.00059	0.07	0.0511	0.0063	0.00490	0.00000141	0.00000152	14.8	0.0005	0.0005	0.0001	0.0001	1.81	0.0025	0.0025	0.00418	0.00466	0.0847	0.010
	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	15
	Minimum	0.00024	0.00025	0.0127	0.0118	<1.0	<0.000010	<0.0000050	<0.00050	0.00039	0.049	0.0365	0.0028	0.0012	<0.0000020	<0.0000020	13.3	<0.0010	<0.0010	<0.00020	<0.00020	<1.0	<0.0050	<0.0050	<0.0020	<0.0020	<0.020	<0.020
	Maximum	0.00043	0.00043	0.0645	0.0536	16.2	<0.000010	<0.0000050	0.0012	0.00115	0.11	0.0775	0.0146	0.0138	0.0000059	0.0000053	16.7	<0.0010	<0.0010	<0.00020	<0.00020	3.5	<0.0050	<0.0050	0.0069	0.0125	1.130	<0.020
	Geometric Mean	0.00031	0.00034	0.0281	0.0257	9.42	0.00000500	0.0000025	0.000656	0.00057	0.068	0.0497	0.00580	0.004	0.00000119	0.00000130	14.8	0.0005	0.0005	0.0001	0.0001	1.68	0.0025	0.0025	0.00380	0.00413	0.0137	0.01
	Count <DL	0	0	0	0	1	15	15	1	0	0	0	0	0	13	11	0	15	15	15	15	1	15	15	1	6	14	15
	Standard Deviation	0.000060	0.00005	0.0161	0.0124	4.0	0	0	0.000239	0.00018	0.019	0.0128	0.0032	0.0034	0.00000129	0.00000115	1	0	0	0.00000000	0	0.67	0	0	0.00161	0.00250	0.2892	0.000
	1st Quartile	0.00027	0.0003	0.0155	0.0169	10.25	<0.000010	<0.0000050	0.00059	0.0005	0.055	0.0411	0.0048	0.00290	<0.0000020	<0.0000020	14	<0.0010	<0.0010	<0.00020	<0.00020	1.45	<0.0050	<0.0050	0.003	0.00365	<0.020	<0.020
	Median	0.00031	0.000340	0.0319	0.0288	12.1	<0.000010	<0.0000050	0.00066	0.00056	0.07	0.0475	0.00540	0.00380	<0.0000020	<0.0000020	14.9	<0.0010	<0.0010	<0.00020	<0.00020	1.80	<0.0050	<0.0050	0.0043	<0.010	<0.020	<0.020
	3rd Quartile	0.00036	0.00038	0.0428	0.0357	13.45	<0.000010	<0.0000050	0.00071	0.00062	0.079	0.0592	0.006	0.00580	<0.0000020	0.0000015	15.3	<0.0010	<0.0010	<0.00020	<0.00020	2.05	<0.0050	<0.0050	0.0054	<0.010	<0.020	<0.020
NNLB	Average	0.00021	0.00025	0.0403	0.0344	11.3	0.000005	0.0000025	0.0007	0.00054	0.144	0.0854	0.0295	0.0259	0.00000205	0.00000185	15.5	0.0005	0.0005	0.0001	0.0001	4.4	0.0025	0.002500	0.00480	0.00430	0.0409	0.0182
E217018	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	15
	Minimum	0.00017	0.00022	0.0327	0.0256	9.4	<0.000010	<0.0000050	0.00051	0.00038	0.114	0.0668	0.015	0.0134	<0.0000020	<0.0000020	13.7	<0.0010	<0.0010	<0.00020	<0.00020	1	<0.0050	<0.0050	0.0034	0.0026	<0.020	<0.020
	Maximum	0.00028	0.00033	0.0566	0.047	13.6	<0.000010	<0.0000050	0.00103	0.00092	0.216	0.112	0.0774	0.0698	0.0000068	0.0000049	16.8	<0.0010	<0.0010	<0.00020	<0.00020	5.9	<0.0050	<0.0050	0.0066	0.0065	0.051	0.090
	Geometric Mean	0.00021	0.000250	0.0397	0.0339	11.2	0.000005	0.0000025	0.00067	0.00053	0.141	0.0847	0.0239	0.0205	0.00000144	0.00000145	15.5	0.0005000	0.0005	0.0001	0.0001	4.1	0.0025	0.0025	0.00470	0.00420	0.0386	0.0135
	Count <DL	0	0	0	0	0	15	15	0	0	0	0	0	0	12	11	0	15	15	15	15	0	15	15	0	5	1	12
	Standard Deviation	0.00003	0.00003	0.0074	0.0063	1.3	0	0	0.00019	0.00014	0.032	0.0117	0.0239	0.0219	0.00000219	0.00000156	0.7	0	0.0000000	0	0	1.4	0	0.000000	0.00090	0.00100	0.011	0.0212
	1st Quartile	0.00018	0.00023	0.034	0.0301	10.6	<0.000010	<0.0000050	0.00054	0.00043	0.124	0.0774	0.0169	0.0139	<0.0000020	<0.0000020	15.2	<0.0010	<0.0010	<0.00020	<0.00020	4.4	<0.0050	<0.0050	0.0038	0.0036	0.037	<0.020
	Median	0.0002	0.00025	0.037	0.0330	11.2	<0.000010	<0.0000050	0.000600	0.00049	0.135	0.0833	0.0189	0.0158	<0.0000020	<0.0000020	15.6	<0.0010	<0.0010	<0.00020	<0.00020	4.8	<0.0050	<0.0050	0.005	0.0042	0.045	<0.020
	3rd Quartile	0.00022	0.00026	0.044	0.0369	12.0	<0.000010	<0.0000050	0.000840	0.00062	0.147	0.0905	0.0215	0.019	<0.0000020	0.00000175	15.8	<0.0010	<0.0010	<0.00020	<0.00020	5.2	<0.0050	<0.0050	0.0051	<0.010	0.0485	<0.020
NNO	Average	0.00031	0.00032	0.0359	0.0288	13.7	0.000005	0.0000032	0.000709	0.0006	0.075	0.0522	0.0117	0.0135	0.0000021	0.0000020	14.7	0.0005	0.00050	0.000100	0.000100	1.94	0.0025	0.0025				
E217017	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15				
	Minimum	0.00019	0.00021	0.0112	0.0081	8.6	<0.000010	<0.0000050	<0.00050	0.00027	0.048	0.0393	0.004	0.0029	<0.0000020	<0.0000020	12	<0.0010	<0.0010	<0.00020	<0.00020	<1.0	<0.0050	<0.0050				
	Maximum	0.00041	0.00042	0.0551	0.044	22	<0.000010	0.0000070	0.00141	0.00103	0.161	0.075	0.0408	0.086	0.0000074	0.0000073	19.2	<0.0010	<0.0010	<0.00020	<0.00020	2.9	<0.0050	<0.0050				
	Geometric Mean	0.0003	0.00031	0.0321	0.0254	13.4	0.000005	0.00000297	0.000615	0.00057	0.071	0.051	0.0089	0.0073	0.00000151	0.00000148	14.6	0.0005	0.00050	0.000100	0.000100	1.82	0.0025	0.0025				
	Count <DL	0	0	0	0	0	15	12	3	0	0	0	0	0	11	11	0	15	15	15	15	1	15	15				
	Standard Deviation	0.00007	0.00007	0.0147	0.0125	3.2	0	0.0000015	0.000373	0.0002	0.0290	0.0118	0.0109	0.022	0.00000211	0.00000205	1.9	0	0.00000	0.000000	0.000000	0.56	0	0				
	1st Quartile	0.00025	0.00026	0.0276	0.0162	11.6	<0.000010	<0.0000050	0.000505	0.00046	0.056	0.0422	0.0055	0.004	<0.0000020	<0.0000020	13.4	<0.0010	<0.0010	<0.00020	<0.00020	1.8	<0.0050	<0.0050				
	Median	0.00032	0.00034	0.0397	0.0328	14.5	<0.000010	<0.0000050	0.00065	0.00063	0.066	0.0497	0.0068	0.0056	<0.0000020	<0.0000020	14.9	<0.0010	<0.0010	<0.00020	<0.00020	2.00	<0.0050	<0.0050				
	3rd Quartile	0.00035	0.00037	0.0438	0.0387	15	<0.000010	<0.0000050	0.00094	0.00071	0.079	0.0598	0.0114	0.0076	0.00000195	0.0000017	15.4	<0.0010	<0.0010	<0.00020	<0.00020	2.2	<0.0050	<0.0050				
LLS	Average	0.00161	0.00223	0.0324	0.00406	223	0.00002050	0.00000387	0.000764	0.000248	0.808	0.49620	0.375	0.357	0.0000010	0.0000011	577	0.00345	0.0032	0.000138	0.0001	534	0.00489	0.00284				
E292131	Count	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13				
	Minimum	0.00062	0.00087	<0.0030	<0.0030	142	<0.000010	<0.0000050	<0.00050	<0.00020	0.167	0.0373	0.155	0.151	<0.0000020	<0.0000020	505	0.0015	0.0015	<0.00020	<0.00020	376	<0.0050	<0.0050				
	Maximum	0.00385	0.00649	0.267	0.0142	255	0.000134	0.00001	0.00401	0.00065	2.77	1.44	0.546	0.508	<0.0000020	0.0000022	649	0.0095	0.008	<0.0010	<0.00020	640	0.0163	0.0069				
	Geometric Mean	0.0014	0.00188	0.01052	0.00292	220	0.0000095	0.0000034	0.000494	0.000205	0.591	0.297	0.362	0.342	0.000001	0.00000106	575	0.00295	0.0028	0.000119	0.0001	530	0.00374	0.0027				
	Count <DL	0	0	2	6	0	10	9	8	5	0	0	0	0	13	12	0	1	0	13	13	0	11	12				
	Standard Deviation	0.00096	0.00156	0.07143	0.00409	34	0.0000361	0.00000237	0.001026	0.000162	0.721	0.4623	0.094	0.096	0	0.00000033	46	0.00232	0.002	0.000112	0.000000	71	0.00452	0.00122				
	1st Quartile	0.00088	0.00126	0.0045	<0.0030	203	<0.000010	<0.0000050	<0.00050	<0.00020	0.371	0.16	0.339	0.298	<0.0000020	<0.0000020	550	0.0021	0.002	<0.00020	<0.00020	491	<0.0050	<0.0050				
	Median	0.00139	0.00169	0.0080	0.0033	238	<0.000010	<0.0000050	<0.0010	0.000210	0.498	0.373	0.378	0.365	<0.0000020	<0.0000020	577	0.0023	0.0021	<0.00020	<0.00020	546	<0.0050	<0.0050				
	3rd Quartile	0.00177	0.00281	0.0243	0.0035	245	0.000018	0.0000058	0.00063	0.000340	1.13	0.52600	0.419	0.429	<0.0000020	<0.0000020	609	0.0038	0.0035	<0.00020	<0.00020	579	<0.010	<0.0050				
LLSM	Average	0.00056	0.00075	0.0543	0.00635	197	0.000005	0.00000433	0.000837	0.000496	0.432	0.21470	0.1953	0.1964	0.00000134	0.00000115	505	0.003	0.003	0.0001	0.0001	458	0.0025	0.0025				
E292131	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10				
	Minimum	0.00026	0.00038	<0.0030	<0.0030	120	<0.000010	<0.0000050	<0.00050	<0.00020	0.132	0.0265	0.0742	0.0471	<0.0000020	<0.0000020	362	0.0012	0.0012	<0.00020	<0.00020	325	<0.0050	<0.0050				
	Maximum	0.00083	0.00130	0.186	0.0171	244	<0.000010	0.000009	0.00242	0.00159	1.03	0.483	0.348	0.339	0.0000044	0.0000025	573	0.0061	0.0062	<0.00020	<0.00020	545	<0.0050	<0.0050				
	Geometric Mean	0.00054	0.00071	0.01521	0.00377	192	0.000005	0.00000377	0.000564	0.00032	0.375	0.1499	0.1752	0.1709	0.00000116	0.0000011	501	0.0026	0.0027	0.000100	0.0001	453	0.0025	0.00250				
	Count <DL	0	0	2	5	0	10	6	5	3	0	0	0	0	9	9	0	0	0	10	10	0	10	10				
	Standard Deviation	0.00017	0.00025	0.07250	0.00654	47	0	0.00000251	0.000786	0.00048	0.248	0.16180	0.0924	0.0968	0.0000011	0.0000005	65	0.0015	0.0015	0	0	70	0	0				
	1st Quartile	0.0005	0.00059	0.00352	<0.0030	159	<0.000010	<0.0000050	<0.00050	0.00013	0.294	0.08190	0.1342	0.1405	<0.0000020	<0.0000020	472	0.0018	0.0019	<0.00020	<0.00020	418	<0.0050	<0.0050				
	Median	0.00056	0.00074	0.01515	0.00235	220	<0.000010	<0.0000050	0.00044	0.00030	0.434	0.17750	0.169	0.1760	<0.0000020	<0.0000020	535	0.003	0.0027	<0.00020	<0.00020	451	<0.0050	<0.0050				
	3rd Quartile	0.00062	0.00086	0.07505	0.01048	235	<0.000010	0.00000648	0.001135	0.000705	0.489	0.3113	0.2635	0.2785	<0.0000020	<0.0000020	547	0.0034	0.0034	<0.00020	<0.00020	518	<0.0050	<0.0050				

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 69
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2018 -19 Statistics Stn.Code EMS. ID	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW002	Average	0.00125	0.0017	0.01230	0.0085	249.7	0.0000100	0.0000281	0.00050	0.000533	4.04	3.36	1.31	1.63		0.0000010	1220	0.0065	0.0044	0.000200	0.000450	1295	0.00500	0.0197	0.00570	0.00560	0.01	0.44
	Count	6	1	1	6	6	1	6	1	6	1	6	1	6		6	1	1	6	1	6	6	1	6	1	6	1	1
	Minimum	0.00088	0.0017	0.0123	<0.0060	239	<0.000020	<0.000010	<0.0010	<0.00040	4.04	2.61	1.31	1.3		<0.0000020	1220	0.0065	0.002	<0.00040	<0.00040	1240	<0.010	<0.010	0.0057	0.0032	<0.020	0.44
	Maximum	0.00186	0.0017	0.0123	0.018	271	<0.000020	0.000096	<0.0010	0.001	4.04	4.2	1.31	1.83		<0.0000020	1220	0.0065	0.0142	<0.00040	<0.0010	1340	<0.010	0.063	0.0057	0.0106	<0.020	0.44
	Geometric Mean	0.00121	0.0017	0.01230	0.00745	249.4	0.0000100	0.0000174	0.00050	0.000482	4.04	3.32	1.31	1.62		0.0000010	1220	0.0065	0.0032	0.000200	0.000429	1294	0.00500	0.014	0.0057	0.0052	0.01	0.44
	Count <DL	0	0	0	5	0	1	4	1	5	0	0	0	0		6	0	0	4	1	6	0	1	5	0	0	1	0
	Standard Deviation	0.00033	0	0.00000	0.00499	12.2	0.0000000	0.0000343	0.00000	0.000258	0	0.55	0.00	0.2		0.0000000	0	0	0.00482	0.000000	0.000122	38	0.00000	0.0214	0.00000	0.0027	0	0
	1st Quartile	0.00112	0.0017	0.0123	<0.015	241.8	<0.000020	<0.000025	<0.0010	<0.0010	4.04	3.03	1.31	1.55		<0.0000020	1220	0.0065	<0.0050	<0.00040	<0.0010	1280	<0.010	<0.025	0.0057	0.0039	<0.020	0.44
	Median	0.00114	0.0017	0.0123	<0.015	245	<0.000020	<0.000025	<0.0010	<0.0010	4.04	3.46	1.31	1.7		<0.0000020	1220	0.0065	<0.0050	<0.00040	<0.0010	1285	<0.010	<0.025	0.0057	0.005	<0.020	0.44
	3rd Quartile	0.0013	0.0017	0.0123	<0.015	254.2	<0.000020	0.0000256	<0.0010	<0.0010	4.04	3.52	1.31	1.75		<0.0000020	1220	0.0065	<0.0050	<0.00040	<0.0010	1327	<0.010	<0.025	0.00570	0.00610	<0.020	0.44
QU1009D	Average	0.0954			0.00150	173.3		0.0000025		0.000100		0.620		0.0834		0.0000010			0.000500		0.0001000	87.1		0.00250		0.0149		0.110
	Count	3			3	3		3		3		3		3		3			3		3	3		3		3		1
	Minimum	0.0883			<0.0030	158		<0.0000050		<0.00020		0.434		0.0618		<0.0000020			<0.0010		<0.00020	80.1		<0.0050		0.01		0.110
	Maximum	0.101			<0.0030	185		<0.0000050		<0.00020		0.724		0.111		<0.0000020			<0.0010		<0.00020	99.9		<0.0050		0.0227		0.110
	Geometric Mean	0.0953			0.0015	173		0.0000025		0.000100		0.604		0.081		0.0000010			0.000500		0.0001000	86.7		0.00250		0.0140		0.110
	Count <DL	0			3	0		3		3		0		0		3			3		3	0		3		0		0
	Standard Deviation	0.007			0	13.9		0.0000000		0.000000		0.161		0.0251		0.0000000			0.000000		0.0000000	11.1		0.00000		0.0068		0.000
	1st Quartile	0.0927			<0.0030	167.5		<0.0000050		<0.00020		0.568		0.0696		<0.0000020			<0.0010		<0.00020	80.8		<0.0050		0.011		0.110
	Median	0.097			<0.0030	177		<0.0000050		<0.00020		0.701		0.0774		<0.0000020			<0.0010		<0.00020	81.4		<0.0050		0.012		0.110
	3rd Quartile	0.099			<0.0030	181		<0.0000050		<0.00020		0.712		0.0942		<0.0000020			<0.0010		<0.00020	90.6		<0.0050		0.0174		0.110
QU1009S	Average	0.0758			0.00150	143.5		0.0000025		0.000200		4.67		0.36		0.0000010			0.000500		0.0001000	116.5		0.00250		0.0151		
	Count	2			2	2		2		2		2		2		2			2		2	2		2		2		
	Minimum	0.073			<0.0030	130		<0.0000050		<0.00020		4.57		0.353		<0.0000020			<0.0010		<0.00020	109		<0.0050		0.0089		
	Maximum	0.0787			<0.0030	157		<0.0000050		0.0003		4.77		0.368		<0.0000020			<0.0010		<0.00020	124		<0.0050		0.0213		
	Geometric Mean	0.0758			0.0015	142.9		0.0000025		0.000173		4.67		0.36		0.0000010			0.0005		0.0001000	116.3		0.00250		0.0138		
	Count <DL	0			2	0		2		1		0		0		2			2		2	0		2		0		
	Standard Deviation	0.004			0	19.1		0.0000000		0.000141		0.14		0.011		0.0000000			0		0.0000000	10.6		0.00000		0.0088		
	1st Quartile	0.0744			<0.0030	136.8		<0.0000050		0.00015		4.62		0.357		<0.0000020			<0.0010		<0.00020	112.8		<0.0050		0.012		
	Median	0.0758			<0.0030	143.5		<0.0000050		0.0002		4.67		0.36		<0.0000020			<0.0010		<0.00020	116.5		<0.0050		0.0151		
	3rd Quartile	0.0773			<0.0030	150.2		<0.0000050		0.00025		4.72		0.364		<0.0000020			<0.0010		<0.00020	120.2		<0.0050		0.0182		
SPD																												
E218582	Average	0.00096	0.00129	0.0564	0.01979	67.70	0.0000079	0.00000609	0.001126	0.00067	0.398	0.1153	0.0922	0.07257	0.00001129	0.00000151	316	0.00177	0.00166	0.000114	0.000100	196.8	0.00320	0.0031	0.0059	0.0015	0.0100	0.022
	Count	7	7	7	7	11	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	37	7	7	3	1	2	2
	Minimum	0.00032	0.00041	0.008	<0.0030	38.30	<0.000010	<0.0000050	<0.00050	0.00045	0.115	0.0082	0.0183	<0.0010	<0.0000020	<0.0000020	152	<0.0010	<0.0010	<0.00020	<0.00020	25.1	<0.0050	<0.0050	<0.0030	<0.0030	<0.020	<0.020
	Maximum	0.00333	0.00357	0.138	0.0556	99.5	0.000025	0.000020	0.00255	0.00105	0.962	0.238	0.349	0.31	0.000003	0.0000032	401	0.007	0.0067	0.0002	<0.00020	368	0.0074	0.0067	0.0138	<0.0030	<0.020	0.034
	Geometric Mean	0.00068	0.00096	0.0377	0.01152	64.1	0.0000063	0.0000041	0.000868	0.00064	0.314	0.0715	0.0574	0.02425	0.0000012	0.0000013	302	0.00103	0.00091	0.00011	0.000100	158.20	0.00292	0.00288	0.00368	0.00150	0.0100	0.0184
	Count <DL	0	0	0	1	0	6	5	1	0	0	0	0	1	6	5	0	4	5	6	7	0	6	6	1	1	2	1
	Standard Deviation	0.00107	0.00114	0.0449	0.01951	22.4	0.0000076	0.00000681	0.000846	0.00021	0.294	0.0913	0.1162	0.1082	0.0000008	0.00000091	92.0	0.00239	0.00233	0.000038	0.0000000	109.9	0.00185	0.00159	0.00686	0	0	0.017
	1st Quartile	0.00043	0.00052	0.0243	0.00585	48.6	<0.000010	<0.0000050	0.0006	0.00052	0.194	0.0414	0.0313	0.01525	<0.0000020	<0.0000020	283	<0.0010	<0.0010	<0.00020	<0.00020	92.4	<0.0050	<0.0050	0.00195	<0.0030	<0.020	0.016
	Median	0.00055	0.00081	0.055	0.0128	74.4	<0.000010	<0.0000050	0.00065	0.00065	0.347	0.127	0.0481	0.035	<0.0000020	<0.0000020	345	<0.0010	<0.0010	<0.00020	<0.00020	217.00	<0.0050	<0.0050	0.0024	<0.0030	<0.020	0.02200
	3rd Quartile	0.00082	0.0016	0.0725	0.02845	85.6	<0.000010	0.00000620	0.001615	0.00074	0.485	0.1755	0.0838	0.066	<0.0000020	0.0000017	376	0.0017	0.00145	<0.00020	<0.00020	293	<0.0050	<0.0050	0.00810	<0.0030	<0.020	0.02800
LLE	Average	0.00085	0.00103	0.1098	0.03650	50.97	0.00000700	0.00000400	0.000835	0.00054	0.576	0.339	0.127	0.1314	0.00000172	0.0000019	215.6	0.00070	0.0005	0.00014	0.000116	204.2	0.0035	0.00250	0.0086	0.0015	0.0484	0.02190
E292130	Count	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	44	10	10	10	1	10	10
	Minimum	0.00046	0.00051	<0.015	<0.0030	<1.0	<0.000010	<0.0000050	<0.00050	0.00035	0.159	0.0665	0.0075	0.0073	<0.0000020	<0.0000020	87.8	<0.0010	<0.0010	<0.00020	<0.00020	44.3	<0.0050	<0.0050	0.0036	<0.0030	<0.020	<0.015
	Maximum	0.0013	0.00172	0.336	0.0682	110	<0.000050	0.0000084	0.00209	0.00117	1.93	0.869	0.501	0.488	0.0000049	0.0000044	601	<0.0050	<0.0010	<0.0010	0.00026	631	<0.025	<0.0050	0.0207	<0.0030	0.129	0.0550
	Geometric Mean	0.0008	0.00094	0.0802	0.02126	30.86	0.0000059	0.00000358	0.000694	0.0005	0.405	0.2520	0.0653	0.0671	0.00000142	0.00000156	168.7	0.00059	0.0005	0.000117	0.000110	157.9	0.00294	0.00250	0.0075	0.0015	0.0299	0.0171
	Count <DL	0	0	1	1	1	10	6	3	0	0	0	0	0	7	6	0	10	10	10	9	0	10	10	0	1	4	5
	Standard Deviation	0.00031	0.00045	0.0873	0.02538	36.3	0.0000063	0.00000212	0.000538	0.00026	0.568	0.2796	0.1608	0.1624	0.00000132	0.00000136	177.2	0.00063	0	0.000126	0.000051	164	0.00316	0.00000	0.0053	0	0.0453	0.0164
	1st Quartile	0.00064	0.00064	0.0695	0.01165	29.1	<0.000010	<0.0000050	0.000572	0.00038	0.222	0.134	0.0364	0.0369	<0.0000020	<0.0000020	100.1	<0.0010	<0.0010	<0.00020	<0.00020	97.1	<0.0050	<0.0050	0.0051	<0.0030	<0.020	<0.020
	Median	0.00076	0.00092	0.103	0.04255	39.6	<0.000010	<0.0000050	0.00076	0.00045	0.312	0.270	0.0634	0.0699	<0.0000020	<0.0000020	132	<0.0010	<0.0010	<0.00020	<0.00020	134.5	<0.0050	<0.0050	0.0076	<0.0030	0.027	0.016
	3rd Quartile	0.00113	0.00142	0.1118	0.05198	78.65	<0.000010	0.00000545	0.000942	0.0006	0.84	0.3675	0.119	0.1256	0.00000205	0.00000218	279.2	<0.0010	<0.0010	<0.00020	<0.00020	269.5	<0.0050	<0.0050	0.00970	<0.0030	0.0870	0.02920
LLM1	Average	0.000481	0.00053	0.021	0.0175	33.6	0.00000500	0.00000317	0.000658	0.00050	0.05	0.0318	0.0089	0.00505	0.00000177	0.00000183	79.7	0.00050	0.00063	0.000100	0.000127	64.1	0.00250	0.00317	0.00384	0.00491	0.0113	0.0177
E206619	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	15
	Minimum	<0.00050	0.00039	0.0083	0.0081	20.7	<0.000010	<0.0000050	<0.00050	0.00027	0.012	0.0118	0.0036	<0.0010	<0.0000020	<0.0000020	41.7	<0.0010	<0.0010	<0.00020	<0.00020	25.8	<0.0050	<0.0050	<0.0020	<0.0020	<0.020	<0.020
	Maximum	0.00064	0.00066	0.0449	0.037	44	<0.000010	<0.000025	0.00164	0.00088	0.119	0.0703	0.0150	0.0127	0.0000048	0.0000046	112	<0.0010	<0.0050	<0.00020	<0.0010	99.7	<0.0050	<0.025	0.0067	<0.050	0.029	0.056
	Geometric Mean	0.00047	0.00052	0.0188	0.0156	32.6	0.000005	0.00000278	0.00056	0.00048	0.04	0.0271	0.0082	0.0033	0.00000142	0.00000149	76.3	0.00050	0.00056	0.000100	0.000111	59	0.0025	0.00278	0.00341	0.00358	0.0107	0.0141
	Count <DL	1	0	0	0	0	15	15	4	1	0	0	0	2	11	10	0	15	15	15	15	0	15	15	1	7	14	11
	Standard Deviation	0.000102	0.00008	0.0102	0.0091	8.2	0.00000000	0.00000258	0.000398	0.00017	0.032	0.0182	0.0035	0.00405	0.00000144	0.00000138	23.3	0.00000	0.00052	0.000000	0.000103	25.9	0	0.00258	0.00183	0.00572	0.0049	0.0152
	1st Quartile	0.00042	0.00049	0.0144	0.0099	27	<0.000010	<0.0000050	0.00039	0.00039	0.023	0.0168	0.0064	0.00135	<0.0000020	<0.0000020	65	<0.0010	<0.0010	<0.00020	<0.00020	41.6	<0.0050	<0.0050	0.0025	0.0029	<0.020	<0.020
	Median	0.00046	0.0005	0.0188	0.0155	34.1	<0.000010	<0.0000050	0.00056	0.00048	0.047	0.0311	0.0085	0.004	<0.0000020	<0.0000020	76.9	<0.0010	<0.0010	<0.00020	<0.00020	56.4	<0.0050	<0.0050	0.0035	0.0034	<0.020	<0.020
	3rd Quartile	0.000545	0.00059	0.0253	0.0206	42	<0.000010	<0.0000050	0.0008	0.00059	0.0600	0.035	0.0116	0.00755	0.00000155	0.00000215	104.5	<0.0010	<0.0010	<0.00020	<0.00020	92.2	<0.0050	<0.0050	0.0048	<0.010	<0.020	0.015

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 70
2018-2019 Annual Report

2018 -19 Statistics Stn.Code EMS. ID	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LLMB	Average	0.0002	0.00024	0.0136	0.0094	56.8	0.00000500	0.0000025	0.000405	0.00047	0.037	0.01153	0.1771	0.11405	0.0000019	0.00000174	148.9	0.00050	0.00050	0.000100	0.000100	139.1	0.00250	0.00250	0.00384	0.00333	0.082	0.0147
E206619	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	15
	Minimum	0.00016	0.0002	0.0064	0.0048	54	<0.000010	<0.0000050	<0.00050	0.00032	0.012	<0.0050	0.0387	<0.0010	<0.0000020	<0.0000020	138	<0.0010	<0.0010	<0.00020	<0.00020	129	<0.0050	<0.0050	<0.0020	<0.0020	0.049	<0.020
	Maximum	0.00023	0.0003	0.0291	0.0144	58.7	<0.000010	<0.0000050	0.00103	0.00136	0.053	0.0214	0.391	0.391	0.0000059	0.000006	166	<0.0010	<0.0010	<0.00020	<0.00020	147	<0.0050	<0.0050	0.0085	<0.010	0.121	0.039
	Geometric Mean	0.0002	0.00024	0.0121	0.0088	56.7	0.000005	0.0000025	0.000359	0.00044	0.035	0.00915	0.1478	0.02769	0.00000146	0.00000134	148.7	0.00050	0.00050	0.000100	0.000100	139	0.00250	0.00250	0.00331	0.00298	0.078	0.0127
	Count <DL	0	0	0	0	0	15	15	9	0	0	3	0	3	11	12	0	15	15	15	15	0	15	15	2	7	0	12
	Standard Deviation	0.00002	0.00002	0.0069	0.0032	1.6	0	0	0.000229	0.00026	0.01	0.00657	0.106	0.1238	0.00000172	0.00000172	7	0.00000	0.00000	0.000000	0.000000	5.6	0	0.00000	0.00201	0.00144	0.025	0.01
	1st Quartile	0.00019	0.00023	0.0078	0.0066	55.6	<0.000010	<0.0000050	<0.00050	0.00035	0.034	0.00515	0.0915	0.0056	<0.0000020	<0.0000020	145	<0.0010	<0.0010	<0.00020	<0.00020	135	<0.0050	<0.0050	0.0026	0.0026	0.058	<0.020
	Median	0.0002	0.00024	0.0121	0.0093	57.1	<0.000010	<0.0000050	<0.00050	0.0004	0.037	0.01260	0.129	0.0673	<0.0000020	<0.0000020	148	<0.0010	<0.0010	<0.00020	<0.00020	140.0	<0.0050	<0.0050	0.00365	0.0029	0.083	<0.020
	3rd Quartile	0.00021	0.00026	0.0176	0.0121	58	<0.000010	<0.0000050	0.00055	0.00047	0.044	0.01540	0.242	0.207	0.00000155	<0.0000020	152.5	<0.0010	<0.0010	<0.00020	<0.00020	143	<0.0050	<0.0050	0.00492	<0.010	0.106	<0.020
LLO	Average	0.00048	0.00051	0.026	0.0179	32.5	0.000005	0.00000333	0.001834	0.00055	0.0550	0.0307	0.0126	0.004	0.00000171	0.00000177	73.7	0.0005	0.00050	0.000100	0.000100	54.9	0.00250	0.00316				
E219412	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	51	15	15				
	Minimum	0.00036	0.00035	0.0109	0.0054	15.9	<0.000010	<0.0000050	<0.00050	0.00033	0.012	0.0065	0.0048	0.0015	<0.0000020	<0.0000020	39.1	<0.0010	<0.0010	<0.00020	<0.00020	12.7	<0.0050	<0.0050				
	Maximum	0.00064	0.00066	0.0705	0.0403	43.9	<0.000010	0.000008	0.0204	0.00094	0.132	0.052	0.035	0.0085	0.0000067	0.0000076	105	<0.0010	<0.0010	<0.00020	<0.00020	110	<0.0050	0.0124				
	Geometric Mean	0.00048	0.0005	0.0221	0.0151	31.2	0.000005	0.00000303	0.000564	0.00052	0.049	0.0278	0.0106	0.0036	0.0000013	0.0000014	69.5	0.0005	0.00050	0.000100	0.000100	47.8	0.00250	0.00278				
	Count <DL	0	0	0	0	0	15	12	6	0	0	0	0	0	12	11	0	15	15	15	15	0	15	14				
	Standard Deviation	0.00009	0.00009	0.0167	0.0104	9.2	0	0.00000182	0.005145	0.00018	0.027	0.0118	0.0085	0.0019	0.00000164	0.00000176	24.7	0	0.00000	0.000000	0.000000	27.1	0	0.00256				
	1st Quartile	0.0004	0.00046	0.0143	0.0094	23.9	<0.000010	<0.0000050	<0.00050	0.00038	0.046	0.0246	0.0068	0.0028	<0.0000020	<0.0000020	50.6	<0.0010	<0.0010	<0.00020	<0.00020	30.8	<0.0050	<0.0050				
	Median	0.00049	0.00049	0.0181	0.0154	34.2	<0.000010	<0.0000050	0.00052	0.00053	0.052	0.031	0.009	0.0035	<0.0000020	<0.0000020	74.5	<0.0010	<0.0010	<0.00020	<0.00020	54.6	<0.0050	<0.0050				
	3rd Quartile	0.00054	0.00057	0.0343	0.0246	41.8	<0.000010	<0.0000050	0.00062	0.00065	0.062	0.0387	0.0150	0.0044	<0.0000020	0.00000165	101	<0.0010	<0.0010	<0.00020	<0.00020	81.8	<0.0050	<0.0050				
WB	Average	0.00019	0.0002	0.0450	0.0161	35.3	0.000005	0.0000028	0.00083	0.0006	0.059	0.0262	0.0077	0.0028	0.0000020	0.0000015	36.5	0.00050	0.00050	0.000100	0.000100	29.1	0.00250	0.00250				
E0900504	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	17	15	15				
	Minimum	0.00015	0.00014	0.0134	0.0101	31	<0.000010	<0.0000050	0.00053	0.00047	0.028	0.0214	0.0048	0.0013	<0.0000020	<0.0000020	29.5	<0.0010	<0.0010	<0.00020	<0.00020	20.5	<0.0050	<0.0050				
	Maximum	0.00024	0.00033	0.2870	0.025	41	<0.000010	0.000007	0.00141	0.00084	0.337	0.0318	0.0126	0.006	0.0000075	0.0000031	48.1	<0.0010	<0.0010	<0.00020	<0.00020	38.5	<0.0050	<0.0050				
	Geometric Mean	0.00019	0.000200	0.0278	0.0156	35.2	0.000005	0.00000268	0.0008	0.00059	0.044	0.0260	0.0074	0.0026	0.00000141	0.00000135	36.2	0.00050	0.00050	0.000100	0.000100	28.8	0.00250	0.00250				
	Count <DL	0	0	0	0	0	15	14	0	0	0	0	0	0	12	10	0	15	15	15	15	0	15	15				
	Standard Deviation	0.00003	0.00005	0.0694	0.0039	2.3	0	0.00000116	0.00025	0.0001	0.0770	0.0033	0.0024	0.0012	0.00000207	0.00000077	5	0.00000	0.00000	0.000000	0.000000	4.4	0	0				
	1st Quartile	0.00017	0.00018	0.0173	0.0134	34	<0.000010	<0.0000050	0.00066	0.00052	0.034	0.0246	0.0055	0.002	<0.0000020	<0.0000020	33.8	<0.0010	<0.0010	<0.00020	<0.00020	26.9	<0.0050	<0.0050				
	Median	0.00019	0.000190	0.0195	0.0164	35	<0.000010	<0.0000050	0.00079	0.0006	0.039	0.0256	0.0079	0.0028	<0.0000020	<0.0000020	35.1	<0.0010	<0.0010	<0.00020	<0.00020	27.8	<0.0050	<0.0050				
	3rd Quartile	0.0002	0.000220	0.0394	0.0178	36.3	<0.000010	<0.0000050	0.00095	0.00061	0.044	0.0285	0.0088	0.0031	<0.0000020	0.00000215	38	<0.0010	<0.0010	<0.00020	<0.00020	30.5	<0.0050	<0.0050				
7SSD																												
E292069	Average	0.00377	0.00397	0.1122	0.00906	110.4	0.000005	0.00000341	0.00173	0.00137	0.149	0.022	0.0496	0.0192	0.000001	0.00000117	131.3	0.0005	0.00068	0.0001	0.000136	35.5	0.0025	0.00341	0.0278		0.01	0.0092
	Count	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	2		2	3
	Minimum	<0.00050	0.00098	0.011	<0.0030	51.7	<0.000010	<0.0000050	0.00071	0.00048	0.024	0.0062	0.019	0.0017	<0.0000020	<0.0000020	56.8	<0.0010	<0.0010	<0.00020	<0.00020	10.9	<0.0050	<0.0050	0.0238		<0.020	<0.015
	Maximum	0.0124	0.013	0.954	0.03	151	<0.000010	<0.00025	0.00274	0.00235	0.886	0.0462	0.104	0.0533	<0.0000020	0.0000029	228	<0.0010	<0.0050	<0.00020	<0.0010	115	<0.0050	<0.025	0.0319		<0.020	<0.020
	Geometric Mean	0.002302	0.00275	0.0291	0.00684	106.1	0.00000500	0.00000289	0.00157	0.00123	0.074	0.017	0.0441	0.0131	0.000001	0.0000011	123.7	0.0005	0.00058	0.000100	0.000116	27.3	0.0025	0.00289	0.0276		0.01	0.0091
	Count <DL	1	0	0	1	0	11	11	0	0	0	0	0	0	11	10	0	11	11	11	11	0	11	11	0		2	3
	Standard Deviation	0.003742	0.00383	0.2808	0.00791	30.5	0	0.00000302	0.00075	0.00062	0.252	0.0156	0.026	0.0166	0	0.00000057	46.3	0	0.0006	0	0.000121	30.9	0	0.00302	0.0057		0	0.0014
	1st Quartile	0.0011	0.00125	0.014	0.0044	93	<0.000010	<0.0000050	0.00113	0.00087	0.032	0.0085	0.031	0.0086	<0.0000020	<0.0000020	103.2	<0.0010	<0.0010	<0.00020	<0.00020	14	<0.0050	<0.0050	0.0258		<0.020	0.0088
	Median	0.00315	0.00313	0.0159	0.0067	108	<0.000010	<0.0000050	0.00167	0.00119	0.075	0.016	0.0416	0.012	<0.0000020	<0.0000020	132	<0.0010	<0.0010	<0.00020	<0.00020	27.7	<0.0050	<0.0050	0.0278		<0.020	<0.020
	3rd Quartile	0.0044	0.00435	0.032	0.0099	135.5	<0.000010	<0.0000050	0.00233	0.00181	0.103	0.037	0.0624	0.0264	<0.0000020	<0.0000020	154.5	<0.0010	<0.0010	<0.00020	<0.00020	34.2	<0.0050	<0.0050	0.0299		<0.020	<0.020
7S	Average	0.000075	0.000116	0.0892	0.0262	25.1	0.000005	0.00000356	0.000486	0.00044	0.0558	0.00549	0.00244	0.0005	0.00000114	0.00000196	16.5	0.00050	0.00050	0.000100	0.000100	4.000	0.00250	0.00250				
E292109	Count	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8				
	Minimum	<0.00010	<0.00010	0.0195	0.0159	10.4	<0.000010	<0.0000050	<0.00050	<0.00020	<0.010	<0.0050	<0.0010	<0.0010	<0.0000020	<0.0000020	13.2	<0.0010	<0.0010	<0.00020	<0.00020	3	<0.0050	<0.0050				
	Maximum	0.00013	0.0004	0.514	0.033	93.1	<0.000010	0.000011	0.00137	0.00059	0.411	0.008	0.016	<0.0010	0.0000021	0.0000046	23.5	<0.0010	<0.0010	<0.00020	<0.00020	4.80	<0.0050	<0.0050				
	Geometric Mean	0.000069	0.000087	0.0404	0.0254	18.4	0.000005	0.00000301	0.000389	0.000392	0.0087	0.00504	0.00077	0.0005	0.0000011	0.0000016	16.2	0.00050	0.00050	0.000100	0.000100	3.9	0.00250	0.00250				
	Count <DL	5	4	0	0	0	8	7	5	1	7	2	7	8	7	5	0	8	8	8	8	0	8	8				
	Standard Deviation	0.000035	0.000118	0.1717	0.0065	28	0	0.00000301	0.000401	0.000167	0.1435	0.00215	0.00548	0	0.00000039	0.00000142	3.8	0.00000	0.00000	0.000000	0.000000	0.6	0	0				
	1st Quartile	<0.00010	<0.00010	0.0263	0.0233	11.2	<0.000010	<0.0000050	<0.00050	0.00038	<0.010	0.00438	<0.0010	<0.0010	<0.0000020	<0.0000020	14	<0.0010	<0.0010	<0.00020	<0.00020	3.6	<0.0050	<0.0050				
	Median	<0.00010	0.00008	0.0292	0.0284	14.2	<0.000010	<0.0000050	<0.00050	0.00049	<0.010	0.00565	<0.0010	<0.0010	<0.0000020	<0.0000020	14.8	<0.0010	<0.0010	<0.00020	<0.00020	4	<0.0050	<0.0050				
	3rd Quartile	0.00011	0.00011	0.0348	0.0305	23	<0.000010	<0.0000050	0.000582	0.000562	<0.010	0.007	<0.0010	<0.0010	<0.0000020	0.00000288	17.9	<0.0010	<0.0010	<0.00020	<0.00020	4.3	<0.0050	<0.0050				
QU0813A	Average	0.398			0.0015	180.5		0.0000025		0.000100		0.198		0.0451		0.0000014			0.000500		0.0001000	31.7		0.00250		0.0712		
	Count	4			4	4		4		4		4		4		4			4		4	4		4		4		
	Minimum	0.368			<0.0030	178		<0.0000050		<0.00020		0.171		0.0387		<0.0000020			<0.0010		<0.00020	27.5		<0.0050		0.044		
	Maximum	0.42			<0.0030	182		<0.0000050		<0.00020		0.217		0.0513		0.0000027			<0.0010		<0.00020	37		<0.0050		0.0826		
	Geometric Mean	0.398			0.0015	180.5		0.0000025		0.000100		0.198		0.0448		0.0000013			0.000500		0.0001000	31.5		0.00250		0.0690		
	Count <DL	0			4	0		4		4		0		0		3			4		4	0		4		0		
	Standard Deviation	0.023			0	1.7		0		0.000000		0.020		0.0055		0.0000009			0.000000		0.0000000	4		0.00000		0.0182		
	1st Quartile	0.388			<0.0030	180.2		<0.0000050		<0.00020		0.19		0.0418		<0.0000020			<0.0010		<0.00020	29.4		<0.0050		0.0691		
	Median	0.402			<0.0030	181		<0.0000050		<0.00020		0.203		0.0451		<0.0000020			<0.0010		<0.00020	31.2		<0.0050		0.079		
	3rd Quartile	0.413			<0.0030	181.2		<0.0000050		<0.00020		0.211		0.0484		0.00000142			<0.0010		<0.00020	33.5		<0.0050		0.081		
QU0813B	Average	0.33622			0.0039	123.7		0.0000033		0.000300		0.13383		0.0874		0.0000010			0.000700		0.0001000	58.9		0.00250		0.0763		
	Count	3			3	3		3		3		3		3		3			3		3	3		3		3		
	Minimum	0.00067			0.003	122		<0.0000050		<0.00020		<0.0050		0.0773		<0.0000020			<0.0010		<0.00020	42.3		<0.0050		0.022		
	Maximum	0.509			0.0049	125		0.000005		0.0007		0.272		0.0956		<0.0000020			0.0011		<0.00020	91.9		<0.0050		0.141		
	Geometric Mean	0.05542			0.0039	123.7		0.0000032		0.000191		0.0442		0.0871		0.0000010			0.000650		0.0001000	54.9		0.00250		0.0589		
	Count <DL	0			0	0		2		2		1		0		3			2		3	0		3		0		
	Standard Deviation	0.291			0.0010	1.5		0.0000014		0.000346		0.135		0.0093		0.0000000			0.000350		0.0000000	28.6		0.00000		0.0602		
	1st Quartile	0.24984			0.0034	123		<0.0000050		<0.00020		0.06475		0.0833		<0.0000020			<0.0010		<0.00020	42.4		<0.0050		0.044		
	Median	0.499			0.0039	124		<0.0000050		<0.00020		0.127		0.0894		<0.0000020			<0.0010		<0.00020	42.5		<0.0050		0.066		
	3rd Quartile	0.504			0.0044	124.5		0.00000375		0.0004		0.1995		0.0925		<0.0000020			0.0008		<0.00020	67.2		<0.0050		0.1035		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

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2018 -19 Statistics Stn.Code EMS. ID	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU0821GD	Average	0.184			0.0113	196.8		0.00001		0.0004		0.882		0.1043		0.0000013			0.002		0.0004	0.62		0.01		0.0801		
	Count	4			4	4		4		4		4		4		4			4		4	4		4		4		
	Minimum	0.155			0.0041	186		<0.0000050		<0.00020		0.555		0.0798		<0.0000020			<0.0010		<0.00020	<1.0		<0.0050		0.0374		
	Maximum	0.221			0.026	213		<0.000025		<0.0010		1.4		0.119		0.0000022			<0.0050		<0.0010	1		<0.025		0.163		
	Geometric Mean	0.182			0.0088	196.5		0.00000836		0.000334		0.823		0.1029		0.0000012			0.00167		0.000334	0.59		0.00836		0.066		
	Count <DL	0			2	0		4		4		0		0		3			4		4	3		4		0		
	Standard Deviation	0.028			0.00990	11.6		0.000005		0.0002		0.386		0.0188		0.0000006			0.001		0.0002	0.25		0.00500		0.0591		
	1st Quartile	0.168			0.0066	190.5		0.00001		0.0004		0.604		0.095		<0.0000020			0.002		0.0004	<1.0		0.01		0.0378		
	Median	0.18			<0.015	194		<0.000025		<0.0010		0.786		0.1092		<0.0000020			<0.0050		<0.0010	<1.0		<0.025		0.06		
	3rd Quartile	0.196			0.0121	200.2		<0.000025		<0.0010		1.063		0.119		0.0000013			<0.0050		<0.0010	0.62		<0.025		0.1023		
QU0821GS	Average	0.199			0.0064	205.5		0.0000098		0.0003		1.524		0.1839		0.0000010			0.001500		0.0003000	0.5		0.00750	0.0703	0.1526		
	Count	4			4	4		4		4		4		4		4			4		4	4		4	1	3		
	Minimum	0.137			0.0037	197		<0.0000050		<0.00020		0.423		0.0625		<0.0000020			<0.0010		<0.00020	<1.0		<0.0050	0.0703	0.0958		
	Maximum	0.289			<0.015	213		<0.000025		<0.0010		3.31		0.461		<0.0000020			<0.0050		<0.0010	<1.0		<0.025	0.0703	0.207		
	Geometric Mean	0.191			0.0061	205.4		0.0000082		0.000224		1.163		0.134		0.0000010			0.001120		0.0002240	0.5		0.00559	0.0703	0.1454		
	Count <DL	0			2	0		3		4		0		0		4			4		4	4		4	0	0		
	Standard Deviation	0.068			0.0018	6.6		0.0000049		0.000231		1.267		0.186		0.0000000			0.001150		0.0002310	0		0.00577	0	0.0556		
	1st Quartile	0.154			0.006	203		0.00000948		<0.00020		0.769		0.0885		<0.0000020			<0.0010		<0.00020	<1.0		<0.0050	0.0703	0.1254		
	Median	0.185			0.0071	206		0.00001215		0.0003		1.182		0.1061		<0.0000020			0.0015		0.0003	<1.0		0.00750	0.0703	0.155		
	3rd Quartile	0.23			<0.015	208.5		<0.000025		<0.0010		1.938		0.2015		<0.0000020			<0.0050		<0.0010	<1.0		<0.025	0.0703	0.181		
QU1010D																												
	Average	0.0138			0.1135	89.3		0.000019		0.00075		8.82		0.347		0.0000010			0.00375		0.000750	0.5		0.0188		0.07580		
	Count	2			2	2		2		2		2		2		2			2		2	2		2		2		
	Minimum	0.0135			<0.030	86.3		<0.000025		<0.0010		8.82		0.346		<0.0000020			<0.0050		<0.0010	<1.0		<0.025		0.0521		
	Maximum	0.0142			0.212	92.3		<0.000050		<0.0020		8.82		0.348		<0.0000020			<0.010		<0.0020	<1.0		<0.050		0.0994		
	Geometric Mean	0.0138			0.0564	89.2		0.000018		0.00071		8.82		0.347		0.0000010			0.00354		0.000710	0.5		0.0177		0.07200		
	Count <DL	0			1	0		2		2		0		0		2			2		2	2		2		0		
	Standard Deviation	0.0005			0.1393	4.2		0.000009		0.00035		0.0		0.00		0.0000000			0.00177		0.000350	0.0		0.0088		0.03340		
	1st Quartile	0.0137			0.0642	87.8		0.0000156		0.00062		8.82		0.346		<0.0000020			0.00312		0.00062	<1.0		0.0156		0.0639		
	Median	0.0138			0.1135	89.3		0.0000188		0.00075		8.82		0.347		<0.0000020			0.00375		0.00075	<1.0		0.0188		0.0758		
	3rd Quartile	0.014			0.1628	90.8		0.0000219		0.00088		8.82		0.348		<0.0000020			0.00438		0.00088	<1.0		0.0219		0.0876		
QU1010S	Average	0.107			0.0027	152.0		0.0000025		0.0001		0.192		0.042		0.0000010			0.000500		0.0001000	12.4		0.00250		0.0479		
	Count	2			2	2		2		2		2		2		2			2		2	2		2		2		
	Minimum	0.101			<0.0030	151		<0.0000050		<0.00020		0.175		0.0417		<0.0000020			<0.0010		<0.00020	11.4		<0.0050		0.0475		
	Maximum	0.113			0.0039	153		<0.0000050		<0.00020		0.21		0.0422		<0.0000020			<0.0010		<0.00020	13.5		<0.0050		0.0482		
	Geometric Mean	0.107			0.00242	152.0		0.0000025		0.0001		0.192		0.0419		0.0000010			0.000500		0.0001000	12.4		0.0025		0.0478		
	Count <DL	0			1	0		2		2		0		0		2			2		2	0		2		0		
	Standard Deviation	0.008			0.0017	1.4		0.0000000		0		0.025		0.0004		0.0000000			0.000000		0.0000000	1.5		0		0.0005		
	1st Quartile	0.104			0.0021	151.5		<0.0000050		<0.00020		0.184		0.0418		<0.0000020			<0.0010		<0.00020	11.9		<0.0050		0.0477		
	Median	0.107			0.0027	152		<0.0000050		<0.00020		0.192		0.042		<0.0000020			<0.0010		<0.00020	12.4		<0.0050		0.0479		
	3rd Quartile	0.11			0.0033	152.5		<0.0000050		<0.00020		0.201		0.0421		<0.0000020			<0.0010		<0.00020	13		<0.0050		0.048		
QU1011D	Average	0.00712			0.0075	350		0.0000125		0.0011		3.24		0.36		0.0000061			0.0025		0.0005	0.5		0.0125		0.068		
	Count	1			1	1		1		1		1		1		1			1		1	1		1		1		
	Minimum	0.00712			<0.015	350		<0.000025		0.0011		3.24		0.36		0.0000061			<0.0050		<0.0010	<1.0		<0.025		0.0684		
	Maximum	0.00712			<0.015	350		<0.000025		0.0011		3.24		0.36		0.0000061			<0.0050		<0.0010	<1.0		<0.025		0.0684		
	Geometric Mean	0.00712			0.0075	350		0.0000125		0.0011		3.24		0.36		0.0000061			0.0025		0.0005	0.5		0.0125		0.068		
	Count <DL	0			1	0		1		0		0		0		0			1		1	1		1		0		
	Standard Deviation	0.00000			0.0000	0		0.0000000		0.00000		0.00		0.000		0.0000000			0.00000		0.000000	0.0		0.0000		0.000		
	1st Quartile	0.00712			<0.015	350		<0.000025		0.0011		3.24		0.36		0.0000061			<0.0050		<0.0010	<1.0		<0.025		0.0684		
	Median	0.00712			<0.015	350		<0.000025		0.0011		3.24		0.36		0.0000061			<0.0050		<0.0010	<1.0		<0.025		0.0684		
	3rd Quartile	0.00712			<0.015	350		<0.000025		0.0011		3.24		0.36		0.0000061			<0.0050		<0.0010	<1.0		<0.025		0.0684		
QU1011S	Average	0.00156			0.0035	81.2		0.0000025		0.0001		0.378		0.0521		0.0000028			0.0005		0.0001000	6.5		0.00250		0.0112		
	Count	1			1	1		1		1		1		1		1			1		1	1		1		1		
	Minimum	0.00156			0.0035	81.2		<0.0000050		<0.00020		0.378		0.0521		0.0000028			<0.0010		<0.00020	6.5		<0.0050		0.0112		
	Maximum	0.00156			0.0035	81.2		<0.0000050		<0.00020		0.378		0.0521		0.0000028			<0.0010		<0.00020	6.5		<0.0050		0.0112		
	Geometric Mean	0.00156			0.0035	81.2		0.0000025		0.0001		0.378		0.0521		0.0000028			0.0005		0.0001000	6.5		0.0025		0.0112		
	Count <DL	0			0	0		1		1		0		0		0			1		1	0		1		0		
	Standard Deviation	0			0	0		0.0000000		0		0		0		0.0000000			0		0.0000000	0		0		0		
	1st Quartile	0.00156			0.0035	81.2		<0.0000050		<0.00020		0.378		0.0521		0.0000028			<0.0010		<0.00020	6.5		<0.0050		0.0112		
	Median	0.00156			0.0035	81.2		<0.0000050		<0.00020		0.378		0.0521		0.0000028			<0.0010		<0.00020	6.5		<0.0050		0.0112		
	3rd Quartile	0.00156			0.0035	81.2		<0.0000050		<0.00020		0.378		0.0521		0.0000028			<0.0010		<0.00020	6.5		<0.0050		0.0112		

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

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2018 -19 Statistics Stn.Code EMS. ID	Statistics	As-T	As-D	Al-T	Al-D	Alk-T	Cd-T	Cd-D	Cu-T	Cu-D	Fe-T	Fe-D	Mn-T	Mn-D	Hg-T	Hg-D	Hard-T	Ni-T	Ni-D	Pb-T	Pb-D	SO4-D	Zn-T	Zn-D	P-T	P-D	N-NO23	N-NH3
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QU1105S	Average	0.04295			0.00402	191.3		0.0000050		0.000200		0.6426		0.116		0.0000010			0.001000		0.0002000	118.8		0.00500		0.081		
	Count	4			4	4		4		4		4		4		4			4		4	4		4		4		
	Minimum	0.00609			<0.0030	96.3		<0.0000050		<0.00020		<0.025		0.0795		<0.0000020			<0.0010		<0.00020	56.5		<0.0050		0.011		
	Maximum	0.0606			<0.015	314		<0.000025		<0.0010		1.16		0.183		<0.0000020			<0.0050		<0.0010	214		<0.025		0.259		
	Geometric Mean	0.03177			0.00345	169.6		0.0000037		0.000150		0.2896		0.1102		0.0000010			0.000750		0.0001500	103.9		0.00374		0.037		
	Count <DL	0			2	0		4		4		1		0		4			4		4	0		4		0		
	Standard Deviation	0.0249			0.00251	104.5		0.0000050		0.000200		0.475		0.0458		0.0000000			0.001000		0.0002000	71.0		0.00500		0.119		
	1st Quartile	0.03992			0.00292	108.8		<0.0000050		<0.00020		0.4846		0.0945		<0.0000020			<0.0010		<0.00020	69.4		<0.0050		0.0205		
	Median	0.05255			0.00355	177.5		<0.0000050		<0.00020		0.699		0.1008		<0.0000020			<0.0010		<0.00020	102.4		<0.0050		0.0262		
	3rd Quartile	0.05558			0.00465	260		0.000005		0.0002		0.857		0.1222		<0.0000020			0.001		0.0002	151.8		0.005		0.0863		
QU1109S	Average	0.08961			0.00582	441.8		0.0000081		0.000325		2.7040		0.1053		0.0000033			0.00163		0.000325	423		0.00812		0.056		
	Count	4			4	4		4		4		4		4		4			4		4	4		4		4		
	Minimum	0.00344			<0.0030	427		<0.0000050		<0.00020		0.161		0.0317		<0.0000020			<0.0010		<0.00020	273		<0.0050		0.0058		
	Maximum	0.123			<0.015	462		<0.000025		<0.0010		10		0.309		<0.000020			<0.0050		<0.0010	712		<0.025		0.0834		
	Geometric Mean	0.04885			0.00489	441.6		0.0000067		0.000266		0.6450		0.0631		0.0000018			0.00133		0.000266	395		0.00665		0.038		
	Count <DL	0			3	0		4		4		0		0		4			4		4	0		4		0		
	Standard Deviation	0.058			0.0029	14.7		0.0000052		0.00021		4.8650		0.13590		0.0000045			0.00103		0.000206	196.0		0.0052		0.035		
	1st Quartile	0.08711			0.00547	435.2		0.00000438		0.000175		0.284		0.0376		<0.0000020			0.00088		0.000175	333		0.00438		0.048		
	Median	0.116			0.00715	439		0.00000875		0.00035		0.328		0.0402		<0.0000020			0.00175		0.00035	355		0.00875		0.0674		
	3rd Quartile	0.1185			<0.015	445.5		<0.000025		<0.0010		2.748		0.108		0.00000325			<0.0050		<0.0010	445		<0.025		0.0754		
7SQR	Average	0.00036	0.00039	0.0329	0.0183	34.3	0.000005	0.00000341	0.00073	0.00264	0.09	0.0570	0.0063	0.0049	0.0000018	0.00000139	36.1	0.00050	0.00050	0.000109	0.000100	26.5	0.0025	0.0025	0.00185		0.0215	0.0088
E292113	Count	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	2		2	2
	Minimum	0.00022	0.00025	0.0126	0.0088	26.6	<0.000010	<0.0000050	0.00053	0.00046	0.065	0.035	0.0044	0.0025	<0.0000020	<0.0000020	28.1	<0.0010	<0.0010	<0.00020	<0.00020	14.1	<0.0050	<0.0050	<0.0020		<0.020	<0.015
	Maximum	0.00052	0.00056	0.0603	0.0356	41.8	<0.000010	0.0000093	0.00115	0.0383	0.127	0.0836	0.0097	0.0082	0.0000085	0.0000049	48.8	<0.0010	<0.0010	0.00027	<0.00020	37.3	<0.0050	<0.0050	0.0027		0.033	<0.020
	Geometric Mean	0.00035	0.00038	0.0303	0.0168	34.1	0.000005	0.00000305	0.00071	0.00078	0.088	0.0555	0.0062	0.0047	0.00000131	0.0000012	35.8	0.00050	0.00050	0.000105	0.000100	25.9	0.0025	0.0025	0.00164		0.0182	0.0087
	Count <DL	0	0	0	0	0	20	16	0	0	0	0	0	0	17	17	0	20	20	19	20	0	20	20	1		1	2
	Standard Deviation	0.00008	0.00008	0.0135	0.0079	4.1	0.00000000	0.00000206	0.00017	0.00843	0.018	0.0137	0.0015	0.0013	0.00000214	0.00000106	4.9	0.00000	0.00000	0.000038	0.000000	5.4	0	0	0.0012		0.0163	0.0018
	1st Quartile	0.00032	0.00034	0.0246	0.0122	31.2	<0.000010	<0.0000050	0.00058	0.00052	0.079	0.0484	0.0053	0.004	<0.0000020	<0.0000020	33.4	<0.0010	<0.0010	<0.00020	<0.00020	25	<0.0050	<0.0050	0.00142		0.0158	0.0081
	Median	0.00036	0.00038	0.0284	0.015	34.6	<0.000010	<0.0000050	0.00069	0.00058	0.086	0.0518	0.006	0.0048	<0.0000020	<0.0000020	35.6	<0.0010	<0.0010	<0.00020	<0.00020	27.6	<0.0050	<0.0050	0.00185		0.0215	0.0088
	3rd Quartile	0.00042	0.00043	0.0438	0.0242	37.9	<0.000010	<0.0000050	0.00081	0.00067	0.096	0.0649	0.0075	0.0056	<0.0000020	<0.0000020	38.5	<0.0010	<0.0010	<0.00020	<0.00020	29.30	<0.0050	<0.0050	0.00228		0.0273	0.0094
LQL1	Average	0.00057	0.00063	0.03	0.0216	29.58	0.000005	0.00000387	0.00079	0.00072	0.101	0.0683	0.012	0.00781	0.00000151	0.00000141	33.4	0.0005	0.00050	0.000100	0.000100	18.5	0.00250	0.00250	0.00544	0.0047	0.104	0.01
E292118	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	15	15
	Minimum	0.00047	0.00044	0.0103	0.0079	<1.0	<0.000010	<0.0000050	0.00058	0.0005	0.052	0.0287	0.0046	<0.0010	<0.0000020	<0.0000020	30.1	<0.0010	<0.0010	<0.00020	<0.00020	13.2	<0.0050	<0.0050	<0.0020	<0.0020	<0.020	<0.020
	Maximum	0.00063	0.00071	0.0535	0.0355	38.7	<0.000010	0.0000070	0.00125	0.00108	0.229	0.142	0.0311	0.0264	0.0000058	0.0000047	36.1	<0.0010	<0.0010	<0.00020	<0.00020	24.6	<0.0050	<0.0050	0.0106	0.017	1.42	<0.020
	Geometric Mean	0.00057	0.00062	0.0264	0.0188	23.79	0.000005	0.00000352	0.00077	0.0007	0.089	0.0608	0.0095	0.0036	0.00000123	0.00000121	33.3	0.0005	0.00050	0.000100	0.000100	18	0.00250	0.00250	0.00482	0.0038	0.0139	0.01
	Count <DL	0	0	0	0	1	15	9	0	0	0	0	0	3	13	13	0	15	15	15	15	0	15	15	1	5	14	15
	Standard Deviation	0.00005	0.00008	0.0138	0.0105	9.19	0	0.00000181	0.00017	0.00016	0.055	0.0353	0.0090	0.0088	0.0000014	0.00000111	1.9	0	0.00000	0.000000	0.000000	4.1	0	0	0.00245	0.00386	0.3641	0
	1st Quartile	0.00054	0.00059	0.0175	0.0105	28.05	<0.000010	<0.0000050	0.0007	0.00062	0.056	0.0448	0.0062	0.00145	<0.0000020	<0.0000020	31.8	<0.0010	<0.0010	<0.00020	<0.00020	15.2	<0.0050	<0.0050	0.00407	0.00265	<0.020	<0.020
	Median	0.00059	0.00065	0.0311	0.0203	30.5	<0.000010	<0.0000050	0.000750	0.00073	0.080	0.0542	0.0072	0.00310	<0.0000020	<0.0000020	33.6	<0.0010	<0.0010	<0.00020	<0.00020	17	<0.0050	<0.0050	0.005	0.00405	<0.020	<0.020
	3rd Quartile	0.0006	0.0007	0.0405	0.0305	35.5	<0.000010	0.0000053	0.000860	0.00078	0.134	0.0952	0.018	0.01455	<0.0000020	<0.0000020	34.6	<0.0010	<0.0010	<0.00020	<0.00020	21.9	<0.0050	<0.0050	0.00652	<0.010	<0.020	<0.020
LQLB	Average	0.00073	0.00105	0.0374	0.0232	30.6	0.0000071	0.00000666	0.00089	0.00071	0.485	0.2679	0.1767	0.1636	0.00000122	0.00000163	32	0.00050	0.00050	0.000100	0.000100	15.1	0.0025	0.00250	0.0054	0.00442	0.0387	0.0452
E292118	Count	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	15	15
	Minimum	0.00046	0.00049	0.0225	0.0123	25.9	<0.000010	<0.0000050	0.00063	0.0006	0.102	0.0585	0.0108	0.0075	<0.0000020	<0.0000020	29.6	<0.0010	<0.0010	<0.00020	<0.00020	12.5	<0.0050	<0.0050	0.0027	<0.0020	<0.020	<0.020
	Maximum	0.00127	0.00218	0.0696	0.0326	34.8	0.000015	0.0000110	0.00193	0.00088	1.35	0.746	0.532	0.511	0.0000028	0.0000043	35.4	<0.0010	<0.0010	<0.00020	<0.00020	17.2	<0.0050	<0.0050	0.0086	0.0064	0.124	0.17
	Geometric Mean	0.00069	0.00095	0.0356	0.0226	30.5	0.0000064	0.00000582	0.00085	0.0007	0.35	0.1965	0.0945	0.0786	0.00000114	0.0000014	31.9	0.00050	0.00050	0.000100	0.000100	15	0.0025	0.00250	0.0051	0.00407	0.0274	0.0282
	Count <DL	0	0	0	0	0	11	4	0	0	0	0	0	0	13	10	0	15	15	15	15	0	15	15	0	5	5	6
	Standard Deviation	0.00025	0.00052	0.0125	0.0054	2.9	0.0000036	0.00000317	0.00032	0.00009	0.398	0.2167	0.1701	0.1621	0.00000058	0.00000106	1.7	0.00000	0.00000	0.000000	0.000000	1.3	0	0	0.0018	0.00149	0.0338	0.0462
	1st Quartile	0.00054	0.00066	0.0300	0.0199	28.2	<0.000010	0.0000041	0.00076	0.00063	0.186	0.1065	0.03	0.0241	<0.0000020	<0.0000020	30.9	<0.0010	<0.0010	<0.00020	<0.00020	14.5	<0.0050	<0.0050	0.0037	0.00328	<0.020	<0.020
	Median	0.00062	0.00082	0.0351	0.0238	31.4	<0.000010	0.00000600	0.00079	0.00069	0.234	0.133	0.16	0.1510	<0.0000020	<0.0000020	31.5	<0.0010	<0.0010	<0.00020	<0.00020	14.8	<0.0050	<0.0050	0.0053	<0.010	0.027	0.029
	3rd Quartile	0.00091	0.00129	0.0451	0.026	32.7	0.0000085	0.00000980	0.00090	0.00076	0.694	0.3985	0.272	0.2595	<0.0000020	0.0000021	33.0	<0.0010	<0.0010	<0.00020	<0.00020	16	<0.0050	<0.0050	0.007	<0.010	0.0495	0.07

Notes:
Factor applied to less-than results when calculating statistics: 0.5
Factor applied to greater-than results when calculating statistics: 1.0

Table 73
2018-2019 Annual Report

EMS ID: E217018
Site NAME: NO NAME LAKE (NNL)

NO NAME LAKE DEPTH PROFILING SPRING

Sample Date	3-May						10-May						17-May						23-May						31-May					
Parameter	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP
Sample Depth (m)	Celsius				mg/L		Celsius				mg/L		Celcius				mg/L		Celcius				mg/L		Celcius				mg/L	
1	14.46	7.09	26	100.4	10.29	179.5	16.43	7.15	28	95.5	9.35	234.8	20.58	7.33	51	95.8	8.61	218.5	19.72	7.36	51	98.5	9.00	175.0	17.33	7.66	49	94.7	9.09	130.4
2	11.59	6.99	24	100.1	10.89	182.0	15.31	6.98	28	96.1	9.66	235.6	17.13	7.18	50	98.6	9.55	221.7	19.21	7.27	48	97.8	9.03	180.0	17.31	7.56	48	94.3	9.06	129.7
3	10.01	6.87	22	99.6	11.27	186.4	10.74	6.96	24	96.7	10.81	238.7	12.48	7.10	45	100.5	10.81	223.4	14.29	7.14	41	105.4	10.93	183.5	16.01	7.53	47	96.5	9.51	130.9
4	9.05	6.86	21	97.6	11.31	188.5	8.71	6.86	23	92.1	10.74	242.8	9.83	7.04	44	96.2	10.87	226.2	10.25	7.06	40	101.3	11.31	188.8	10.98	7.37	42	98.8	10.93	138.7
5	7.87	6.78	21	93.1	11.00	192.2	8.18	6.81	23	89.2	10.51	243.7	8.28	6.95	45	89.2	10.49	229.0	8.52	6.92	39	94.2	10.90	196.5	8.68	7.06	42	90.0	10.47	149.2
6	7.25	6.66	21	88.0	10.61	195.5	7.41	6.75	24	85.5	10.26	245.3	7.00	6.78	47	82.2	9.94	233.6	7.55	6.81	42	87.3	10.55	200.1	7.69	6.94	43	83.7	9.97	152.6
7	7.34	6.59	23	82.7	10.20	198.2	6.67	6.65	25	79.1	9.65	248.2	6.34	6.70	48	75.6	9.25	237.0	6.56	6.71	44	78.3	9.58	205.0	6.89	6.85	44	77.3	9.35	156.6
8	5.96	6.51	25	78.2	9.74	200.7	6.08	6.54	26	73.8	9.15	251.0	6.09	6.60	48	71.7	8.88	239.0	6.20	6.63	47	74.4	9.21	207.7	6.54	6.79	44	73.9	9.06	158.9
9	5.85	*6.46*	26	77.1	9.62	202.0	5.93	*6.46*	28	71.3	8.89	253.0	6.00	6.55	48	70.4	8.77	240.3	6.01	6.57	47	72.2	8.97	209.7	6.26	6.75	45	70.6	8.72	161.5
10	5.80	*6.42*	26	76.4	9.55	203.4	5.88	*6.42*	28	70.9	8.85	254.0	5.91	6.51	48	69.3	8.63	241.0	5.99	6.54	45	71.6	8.91	211.5	6.15	6.68	45	68.5	8.48	164.5
11	5.69	*6.40*	27	74.7	9.37	205.8	5.77	*6.40*	29	69.7	8.72	255.4	5.84	6.50	48	68.1	8.48	242.2	5.99	6.51	47	70.9	8.83	213.7	6.09	6.66	45	67.3	8.35	171.6
	5.68	*6.40*	27	74.6	9.36	205.9	5.76	*6.39*	29	69.5	8.71	256.2	5.82	*6.49*	49	67.5	8.44	243.1	5.94	*6.49*	48	47.0	8.67	215.0	6.06	6.64	45	67.0	8.33	174.4
1m from Bottom (BS)	BS=11.5m						BS=11.5m						BS=11.5m						BS=12.0m						BS=12.0 m					

NO NAME LAKE DEPTH PROFILING SUMMER

Sample Date	25-Jul						2-Aug						9-Aug						16-Aug						23-Aug					
Parameter	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP
Sample Depth (m)	Celcius				mg/L		Celcius				mg/L		Celcius				mg/L		Celcius				mg/L		Celcius				mg/L	
1	23.42	7.65	40	101.3	8.62	188.7	24.53	7.55	41	99.7	8.31	240.1	24.79	7.56	40	100.7	8.37	285.8	23.03	6.72	39	95.3	8.17	266.3	21.17	6.93	38	99.6	8.96	254.9
2	23.14	7.51	40	100.7	8.63	191.2	24.52	7.53	40	99.5	8.30	239.90	24.39	7.52	39.7	99.6	8.32	289.5	23.00	6.92	39	94.9	8.14	268.5	21.11	6.99	37	99.4	8.84	258.5
3	21.90	7.44	42	99.6	8.76	193.0	23.22	7.34	41	102.1	8.67	242.10	23.74	7.32	40	96.6	8.15	295.0	22.95	7.11	39	94.7	8.13	269.4	21.10	7.00	37	99.5	8.87	260.6
4	17.57	7.29	40	105.0	10.13	191.8	18.19	7.18	36	111.1	10.51	244.40	19.29	7.21	35	113.5	10.67	299.1	20.57	6.94	35	113.4	10.22	276.5	21.00	7.00	37	101.8	9.08	262.4
5	13.46	7.13	35	101.0	10.58	193.1	13.67	6.99	34	102.1	10.60	249.10	14.18	6.98	33	105.4	10.87	306.7	14.97	6.70	33	103.7	10.49	283.3	15.63	6.60	32	108.1	10.79	269.5
6	10.05	6.91	39	87.5	9.92	196.1	10.12	6.84	36	87.9	9.86	235.70	10.22	6.75	36	86.0	9.62	314.8	11.12	*6.48*	35	87.4	9.58	294.8	11.82	*6.33*	33	91.3	9.94	277.2
7	7.66	6.79	42	78.0	9.08	198.6	8.27	6.71	39	77.8	9.04	257.10	8.22	6.58	38	72.3	8.50	320.1	8.79	*6.22*	37	72.9	8.44	307.0	9.42	*6.18*	36	77.1	8.83	282.9
8	7.02	*6.46*	43	63.0	7.64	205.2	7.14	6.54	41	64.6	7.73	261.40	7.25	6.47	39	63.4	7.43	323.4	7.58	*5.99*	38	61.0	7.28	316.2	7.67	*6.09*	37	63.3	7.53	287.2
9	6.78	*6.44*	43	60.4	7.38	206.3	6.92	6.45	41	60.3	7.31	263.30	6.68	6.38	40	55.2	6.74	326.3	6.88	*5.89*	39	54.3	6.58	320.4	7.26	*6.04*	38	57.0	6.89	288.6
10	6.49	*6.38*	44	56.8	6.98	207.7	6.56	*6.39*	41	55.6	6.82	265.00	6.50	6.34	40	52.6	6.46	328.3	6.68	*5.84*	39	50.9	6.21	322.7	6.77	*6.00*	38	54.0	6.38	290.6
11	6.40	*6.37*	44	56.1	6.91	209.1	6.45	*6.35*	41	54.5	6.70	267.10	6.40	6.31	40	51.9	6.40	330.4	6.55	*5.86*	39	49.1	6.02	322.7	6.59	*5.97*	38	50.0	6.10	291.4
1m from Bottom (BS)	6.40	*6.37*	44	56.1	6.91	209.1	6.45	*6.35*	41	54.5	6.70	267.10	6.40	*6.31*	40	51.9	6.40	330.4	6.55	*5.86*	39	49.1	6.02	322.7	6.59	*5.97*	38	50.0	6.10	291.4
	BS=11.7m						BS=11.5m						BS=11.5m						BS=11.3m						BS=11.6m					

NO NAME LAKE DEPTH PROFILING FALL

Sample Date	15-Oct						23-Oct						31-Oct						8-Nov						15-Nov					
Parameter	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP	TEMP.	pH	COND. µS/cm	% Sat.	D.O.	ORP
Sample Depth (m)	Celcius				mg/L		Celcius				mg/L		Celcius				mg/L		Celcius				mg/L		Celcius				mg/L	
1	10.72	*5.97*	39	90.8	10.06	203.7	9.91	7.88	38	87.0	9.84	252.3	9.17	8.00	39	85.2	9.79	243.9	7.90	*5.22*	33	78.4	9.29	225.00	7.07	7.06	33	79.0	9.55	251.3
2	10.68	*6.26*	39	89.0	9.89	196.5	9.89	7.36	38	84.5	9.57	268.0	9.03	7.59	38	82.9	9.57	233.5	7.86	*5.51*	32	77.6	9.22	222.90	6.95	6.83	33	77.7	9.45	253.1
3	10.66	*6.33*	39	88.8	9.86	194.3	9.83	7.18	38	84.0	9.51	274.6	8.98	7.33	38	82.0	9.48	234.5	7.84	*5.64*	32	77.6	9.22	220.70	6.94	6.73	33	77.4	9.41	253.9
4	10.64	*6.39*	38	88.2	9.80	194.6	9.80	7.04	38	83.4	9.45	280.3	8.97	7.10	38	81.4	9.41	239.6	7.83	*5.76*	32	77.6	9.24	220.20	6.94	6.65	33	77.3	9.39	254.5
5	10.50	*6.40*	38	85.4	9.50	196.6	9.70	6.95	38	81.4	9.26	283.9	8.96	6.95	38	80.9	9.35	243.3	7.83	*5.82*	32	77.6	9.23	220.50	6.93	6.59	33	77.2	9.39	255.5
6	10.28	*6.37*	38	82.3	9.23	198.9	9.59	6.85	38	78.4	8.93	288.7	8.86	6.85	39	78.5	9.09	245.6	7.83	*5.85*	32	77.60	9.23	220.60	6.92	6.53	33	77.6	9.46	255.9
7	9.83	*6.31*	39	77.3	8.76	201.8	9.22	6.73	38	73.8	8.47	292.7	8.80	6.77	39	80.1	9.25	214.4	7.82	*5.88*	32	77.9	9.26	221.00	6.83	*6.49*	32	78.1	9.58	255.8
8	9.01	*6.22*	40	64.9	7.40	204.6	8.52	6.61	40	64.1	7.44	297.5	8.44	6.69	39	73.1	8.53	227.2	7.68	*5.91*	31	78.0	9.31	222.00	6.80	*6.47*	32	78.3	9.54	256.8
9	7.45	*6.07*	42	44.2	5.26	207.8	7.98	*6.42*	41	47.3	5.55	301.7	8.22	6.59	39	73.3	8.64	233.2	7.39	*5.90*	32	73.0	8.75	225.40	6.79	*6.45*	33	77.8	9.49	257.4
10	6.98	*5.97*	43	39.0	4.72	211.9	7.12	*6.28*	42	38.4	4.62	304.8	7.38	6.52	41	40.7	4.88	244.5	7.30	*5.90*	31	74.4	8.96	227.70	6.79	*6.43*	33	77.2	9.42	257.6
11	6.84	*5.92*	43	37.5	4.57	213.9	6.90	*6.22*	42	36.1	4.38	309.4	6.95	*6.17*	42	35.3	4.26	248.6	7.10	*5.90*	31	75.1	9.11	232.10	6.79	*6.42*	32	77.8	9.51	257.6
12	6.80	*5.90*	42	37.3	4.55	214.5	6.52	*6.18*	42	34.2	4.20	314.4	6.83	*6.13*	41	33.3	4.06	251.6	6.98	*5.70*	39	34.7	4.20	237.9	6.65	*6.41*	32	78.0	9.50	260.6
1m from Bottom (BS)	6.80	*5.90*	42	37.3	4.55	214.50	6.45	*6.18*	42	34.2	4.20	314.4	6.76	*6.10*	42	42.2	4.00	254.0	6.98	*5.70*	39	34.7	4.20	237.9	6.65	*6.41*	32	78.0	9.50	260.6
	BS=12.0m						BS=12.1m						BS=12.8m						BS=12.0m						BS=12.0m					

WQG-Max	Max. 6.5 -9.0

Table 74
2018-2019 Annual Report

EMS ID: E206619
Site NAME: LONG LAKE (LLM)

LONG LAKE DEPTH PROFILING SPRING

Sample Date	3-May						10-May						17-May						23-May						31-May					
Parameter	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP
Sample Depth (m)	Celsius		µS/cm		mg/L	mV	Celsius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV
1	13.85	7.38	108	102.4	10.57	221.8	16.30	7.11	136	96.7	9.48	214.7	19.62	7.47	211	95.5	8.78	263.7	19.23	7.49	246	99.3	9.16	218.7	17.00	7 .68	267	94.0	9.06	184.4
2	12.63	7.31	130	101.5	10.88	8.8	15.11	7.05	195	97.4	9.79	222.8	18.08	7.35	289	98.7	9.52	270.0	18.99	7.55	243	98.3	9.12	221.9	16.88	7.72	226	93.8	9.08	183.0
3	10.50	7.28	146	101.7	11.45	231.6	11.62	7.09	181	98.0	10.71	225.2	13.71	7.35	270	99.5	10.55	270.8	14.71	7.50	277	104.2	10.84	266.1	16.79	7.72	266	93.8	9.10	184.0
4	8.26	7.18	203	95.6	11.26	243.2	8.68	7.01	196	94.1	10.95	232.7	9.87	7.25	313	96.6	10.94	276.2	11.12	7.35	211	103.8	11.48	235.7	10.90	7.48	232	98.3	10.90	192.1
5	6.58	7.06	258	83.8	10.28	249.0	6.30	6.90	263	79.1	9.71	240.7	7.39	7.10	417	84.7	10.22	282.6	6.53	7.16	269	82.3	10.09	249.2	7.34	7.31	274	85.4	10.31	199.9
6	5.01	7.01	266	75.7	9.60	251.6	5.25	6.86	265	71.7	9.08	265.1	5.88	7.03	443	77.1	9.53	286.1	5.49	7.11	267	74.5	9.36	255.4	5.85	7.29	271	76.5	9.54	201.7
7	4.28	6.90	266	72.6	9.27	252.3	4.89	6.84	264	68.3	8.73	244.7	5.31	7.00	446	71.2	8.94	288.3	5.21	7.10	269	71.1	9.01	257.4	5.32	7.23	266	70.1	8.84	203.6
8	4.78	6.97	266	70.2	9.00	252.7	4.84	6.83	265	65.7	8.38	245.6	5.17	6.96	444	67.4	8.57	289.8	4.96	7.07	264	67.5	8.62	259.1	5.12	7.19	264	67.3	8.55	204.6
9	4.73	6.94	266	69.1	8.88	253.3	4.79	6.83	266	64.4	8.28	265.7	4.84	6.94	447	65.0	8.32	290.7	4.94	7.06	261	67.2	8.61	260.6	5.01	7.16	264	63.9	8.13	205.6
10	4.67	6.94	266	68.3	8.60	253.6	4.73	6.82	266	64.0	8.24	248.4	4.78	6.91	445	64.0	8.21	291.6	4.80	7.05	263	65.3	8.37	262.2	4.90	7.12	263	62.2	7.96	206.6
11	4.66	6.92	266	67.6	8.70	253.7	4.72	6.82	266	64.7	8.31	249.3	4.73	6.91	444	63.0	8.07	292.2	4.76	7.02	262	64.0	8.21	263.2	4.81	7.11	264	61.7	7.92	207.1
12	4.63	6.91	266	67.3	8.67	253.8	4.68	6.82	265	63.4	8.14	250.0	4.69	6.91	444	62.5	8.04	292.7	4.72	7.01	261	62.1	7.98	264.4	4.75	7.09	261	60.7	7.79	207.6
13	4.59	6.91	266	67.2	8.66	254.0	4.69	6.82	266	63.0	8.10	250.2	4.61	6.90	445	61.3	7.77	293.6	4.72	7.01	261	61.6	7.90	265.4	4.72	7.08	262	59.1	7.59	208.4
14	4.56	6.91	266	66.8	8.61	254.3	4.63	6.82	266	62.6	8.05	251.0	4.59	6.89	447	59.2	7.61	294.4	4.70	7.02	260	61.5	7.91	265.9	4.70	7.08	262	58.6	7.53	208.8
15	4.52	6.91	266	66.8	8.52	254.7	4.60	6.81	265	62.2	8.01	251.7	4.56	6.88	446	57.5	7.37	295.1	4.63	7.01	261	60.8	7.79	267.0	4.70	7.07	261	58.2	7.49	209.3
16	4.51	6.91	266	65.2	8.43	252.7	4.57	6.81	266	61.6	7.92	252.1	4.54	6.87	448	55.9	7.18	295.4	4.58	7.00	262	58.5	7.52	268.7	4.67	7.07	260	57.8	7.44	209.8
17	4.49	6.90	266	64.5	8.33	251.4	4.53	6.80	266	59.3	7.63	252.6	4.52	6.85	450	53.0	6.87	296.4	4.55	7.00	260	58.0	7.47	269.1	4.63	7.07	259	57.2	7.34	210.2
18	4.48	6.90	267	63.8	8.20	251.4	4.51	6.80	266	58..2	7.50	253.1	4.52	6.84	448	51.9	6.70	297.2	4.54	6.99	270	54.5	6.91	270.1	4.62	7.06	259	56.2	7.21	210.5
	4.48	6.89	266	61.2	7.90	251.1	4.50	6.79	266	57.1	7.37	253.5	4.52	6.83	448	47.1	5.84	298.4	4.55	6.98	261	53.0	6.84	270.7	4.58	7.05	260	53.5	6.89	210.9
1m from Bottom (BS)	BS=19.00m						BS=19.20m						BS=19.00m						BS=18.5m						BS=18.5m					

LONG LAKE DEPTH PROFILING SUMMER

Sample Date	25-Jul						02 Aug18						9-Aug						16-Aug						23-Aug					
Parameter	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP
Sample Depth (m)	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV
1	22.58	7.81	313	99.7	8.61	196.6	23.64	7.60	313	98.9	8.37	284.3	24.24	7.87	309	101.0	8.45	299.0	22.61	7.46	307	96.2	8.31	308.3	20.77	7.44	307	100.2	8.97	300.7
2	22.11	7.82	313	99.7	8.68	198.0	23.66	7.74	313	98.9	8.37	281.3	23.83	7.88	309	100.0	8.44	300.3	22.54	7.62	308	96.0	8.30	301.3	20.72	7.56	307	100.0	8.96	299.1
3	21.50	7.76	319	98.2	8.67	199.3	23.61	7.80	314	98.8	8.37	280.7	23.38	7.83	311	98.8	8.41	301.7	22.51	7.68	307	95.7	8.29	298.1	20.67	7.58	307	99.6	8.93	299.1
4	18.28	7.55	366	107.3	10.07	203.4	19.72	7.66	325	109.3	10.10	285.9	21.21	7.64	347	113.3	10.10	307.6	22.06	7.67	313	97.2	8.49	298.9	20.65	7.59	307	99.1	8.89	299.1
5	12.58	7.27	430	106.1	11.13	207.2	15.16	7.48	415	109.6	11.23	292.5	15.55	7.40	405	111.2	11.14	313.4	16.79	7.34	390	114.8	11.21	306.3	17.64	7.33	379	100.8	11.33	306.4
6	10.70	7.20	442	100.9	11.19	209.7	11.00	7.35	439	101.0	11.21	296.7	11.36	7.27	422	100.0	10.99	319.1	11.21	7.22	414	96.6	10.65	310.3	12.16	7.16	406	104.6	11.19	311.9
7	7.88	7.16	450	86.0	10.17	211.3	8.13	7.25	444	86.7	10.08	300.6	8.57	7.16	427	84.1	9.81	323.6	8.67	7.07	418	80.9	9.41	314.3	9.22	7.02	410	90.4	10.34	314.9
8	6.65	7.09	452	75.0	9.16	213.3	7.21	7.16	446	71.8	8.71	304.0	7.03	7.10	429	74.0	8.92	326.4	7.36	7.00	422	72.1	8.67	316.9	7.54	6.91	410	75.0	8.95	317.9
9	6.20	7.02	454	67.6	8.40	217.9	6.44	7.08	448	67.5	8.34	305.6	6.37	7.05	430	69.3	8.54	328.8	6.41	6.95	419	65.9	8.09	319.7	6.56	6.82	409	67.7	8.30	321.0
10	5.71	7.00	454	62.2	7.80	220.4	5.91	7.04	449	62.8	7.78	306.7	5.97	7.02	431	65.1	8.07	330.3	6.02	6.89	420	61.8	7.54	321.4	6.11	6.76	409	63.0	7.76	323.2
11	5.50	6.95	455	58.4	7.35	222.1	5.72	7.00	449	59.1	7.38	307.1	5.71	6.97	431	57.7	7.22	332.7	5.75	6.83	420	53.7	6.71	324.0	5.81	6.72	409	57.8	7.21	324.9
12	5.46	6.94	456	56.7	7.14	222.9	5.48	6.97	449	56.2	7.07	308.7	5.57	6.94	432	55.4	6.94	333.9	5.53	6.80	420	51.4	6.48	327.0	5.61	6.70	409	54.8	6.87	325.9
13	5.20	6.92	456	54.6	6.92	223.9	5.31	6.95	449	53.4	6.72	309.7	5.35	6.92	432	51.6	6.51	336.1	5.28	6.77	420	48.1	6.08	328.9	5.36	6.67	409	50.7	6.40	327.6
14	5.01	6.91	456	51.1	6.50	225.3	5.15	6.92	449	51.0	6.48	310.5	5.23	6.90	432	49.7	6.30	337.4	5.03	6.75	420	41.4	5.23	330.2	5.20	6.66	410	47.6	6.06	328.6
15	4.99	6.89	456	45.3	5.73	227.2	5.05	6.91	449	48.3	6.12	311.3	5.16	6.89	432	47.8	6.05	338.4	4.94	6.73	421	36.2	4.60	331.3	5.12	6.64	410	44.2	5.54	329.7
16	4.88	6.88	455	43.7	5.58	228.2	4.94	6.89	450	43.5	5.42	312.1	5.05	6.88	433	46.1	5.85	339.6	4.91	6.72	421	33.8	4.30	332.1	5.05	6.63	410	40.1	5.08	330.7
17	4.83	6.87	455	41.6	5.28	229.1	4.87	6.87	450	38.2	4.86	313.1	4.94	6.86	433	39.9	5.07	341.1	4.89	6.71	421	31.9	4.07	333.2	5.00	6.61	410	37.6	4.78	331.6
18							4.87	6.87	450	36.5	4.32	313.3	4.89	6.84	433	37.3	4.75	342.0	4.89	6.71	421	30.8	3.95	335.1	4.94	6.60	411	35.0	4.47	332.3
	4.83	6.87	455	41.6	5.28	229.1	4.87	6.87	450	36.5	4.32	313.3	4.86	6.83	434	34.7	4.32	343.9	4.89	6.70	421	30.8	3.93	335.9	4.94	6.60	411	33.9	4.33	333.0
1m from Bottom (BS)	BS=17.8m						BS=18.0m						BS=19.0m						BS=18.9m						BS=18.5m					

LONG LAKE DEPTH PROFILING FALL

Sample Date	15-Oct						23-Oct						1-Nov						8-Nov						15-Nov					
Parameter	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP
Sample Depth (m)	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV
1	11.12	6.80	221	93.6	10.27	237.0	9.89	6.75	211	87.0	9.84	379.7	9.20	8.68	194	89.9	10.30	202.3	8.20	6.52	143.8	87.0	10.21	281.8	7.101	6.81	120	88.4	10.69	279.4
2	11.10	6.96	221	93.0	10.22	230.9	9.86	6.85	211	86.4	9.77	377.8	9.25	8.36	203	87.8	10.08	208.8	8.14	6.64	143.7	85.5	10.08	284.3	7.15	6.78	134	87.8	10.61	280.6
3	11.11	7.05	221	92.7	10.19	228.5	9.84	6.90	211	86.1	9.75	377.9	9.26	8.24	206	87.4	10.03	214.5	8.12	6.71	143	85.2	10.05	286.4	7.15	6.78	135	87.7	10.60	280.6
4	11.07	7.11	221	92.6	10.18	228.8	9.80	6.95	211	85.8	9.73	378.7	9.26	8.15	209	87.3	10.02	218.9	8.13	6.76	144.5	85.0	10.02	288.3	7.16	6.77	139	87.5	10.57	281.0
5	11.10	7.15	222	92.5	10.17	229.3	9.79	6.98	211	85.7	9.72	379.1	9.25	8.10	210	87.0	9.99	222.2	8.13	6.80	146.2	84.8	10.01	289.6	7.18	6.75	146	87.1	10.50	282.0
6	11.09	7.18	221	92.4	10.16	229.9	9.79	7.00	211	85.7	9.71	379.9	9.23	8.02	213	86.3	9.91	226.9	8.21	6.80	154.5	84.6	9.95	292.0	7.40	6.73	178	85.6	10.28	283.5
7	10.98	7.17	244	91.0	9.98	233.3	9.78	7.01	211	85.6	9.71	380.5	9.21	7.96	222	85.7	9.85	229.9	8.54	6.77	218.2	83.5	9.78	295.9	7.41	6.72	196	84.3	10.13	284.1
8	9.81	7.02	441	72.6	8.25	240.2	9.28	6.81	420	68.2	7.79	390.8	9.03	7.79	333	75.8	8.66	240.5	8.11	6.81	210.1	83.3	9.83	296.2	7.33	6.70	215	84.5	10.16	286.9
9	8.02	7.00	448	67.2	7.97	241.2	7.84	6.78	436	60.5	7.19	391.9	8.10	7.61	433	61.3	7.21	246.7	8.23	6.67	382.6	56.9	6.70	304.1	7.62	6.58	356	62.2	7.21	291.0
10	6.75	6.98	446	60.5	7.35	243.3	6.59	6.75	434	52.1	6.36	393.2	7.10	7.52	435	54.1	6.43	251.2	7.17	6.69	390.7	51.6	6.24	304.8	7.49	6.58	398	54.1	6.45	290.9
11	6.36	6.95	444	53.7	6.58	245.2	6.24	6.72	433	49.0	6.04	394.6	6.43	7.40	433	47.5	5.82	255.7	6.52	6.69	390	46.8	5.75	305.8	6.61	6.57	398	49.1	5.98	291.2
12	6.03	6.92	444	49.8	6.17	246.7	5.97	6.70	433	45.7	5.68	396.1	6.19	7.35	433	44.8	5.53	258.1	6.22	6.68	389.6	46.3	5.73	306.7	6.23	6.55	398	45.8	5.54	292.3
13	5.78	6.90	443	47.0	5.84	247.8	5.68	6.68	432	41.7	5.21	397.1	5.83	7.30	433	41.1	5.10	260.7	5.97	6.68	389.5	42.3	5.24	307.7	6.05	6.54	398	41.2	5.11	292.6
14	5.62	6.89	443	43.6	5.44	248.6	5.53	6.66	432	38.8	4.83	398.1	5.58	7.26	433	36.5	4.57	263.3	5.69	6.67	389.1	36.4	4.50	308.9	5.74	6.52	398	37.2	4.64	292.9
15	5.34	6.87	444	36.5	4.58	249.7	5.41	6.65	432	35.8	4.45	398.8	5.43	7.20	432	32.2	4.05	265.8	5.49	6.66	388.8	32.4	4.06	309.7	5.61	6.51	398	34.3	4.29	293.2
16	5.15	6.84	443	28.2	3.54	251.1	5.28	6.63	433	29.8	3.74	399.7	5.28	7.14	433	26.9	3.39	268.1	5.32	6.64	388.8	25.5	3.22	310.5	5.39	6.50	398	29.5	3.62	293.6
17	5.09	6.81	443	21.1	2.66	252.0	5.20	6.62	433	26.1	3.29	400.4	5.22	7.11	432	23.3	2.91	269.5	5.22	6.62	388.5	20.9	2.58	311.3	5.27	*6.47*	397	24.9	2.86	294.1
18	5.07	6.78	443	16.3	2.06	252.8	5.13	6.59	432	20.3	2.56	401.4	5.17	7.08	432	19.3	2.36	270.9	5.18	6.61	388.7	17.8	2.22	311.8	5.21	*6.46*	397	19.2	2.42	294.4
1m from Bottom (BS)	5.07	6.77	443	14.2	1.73	253.4	5.10	6.57	432	16.7	2.03	402.8	5.17	7.08	432	19.3	2.36	270.9	5.18	6.61	388.7	17.8	2.22	311.8	5.21	*6.46*	397	19.2	2.42	294.4
	BS=18.9m						BS=18m						BS=18m						BS=18.m						BS=18.m					

WQG-Max pH Max. 6.5 -9.0 Hypolimnetic DO minimum 3 mg/L June -August

Table 75
2018-2019 Annual Report

EMS ID E206618

Site NAME: MIDDLE QUINSAM LAKE (MQL)

MIDDLE QUINSAM LAKE DEPTH PROFILING SPRING

Sample Date	3-May						10-May						17-May						23-May						31-May					
Parameter	TEMP.	pH		% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP
Sample Depth (m)	Celsius		µS/cm		mg/L	mV	Celsius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV
1	14.89	7.53	129	103.1	10.42	222.8	16.84	7.41	173	97.8	9.47	271.4	20.51	7.74	243	99.1	8.92	259.9	19.82	7.92	206	99.7	9.09	155.5	17.77	7.96	187	97.2	9.25	184.2
2	13.04	7.50	132	102.0	10.75	225.4	16.67	7.51	172	98.3	9.58	27.2.3	18.95	7.72	243	98.6	9.11	259.8	19.76	7.90	214	99.7	9.11	156.5	17.63	7.97	192	97.0	9.25	184.3
3	12.09	7.50	128	100.6	10.80	226.9	14.02	7.52	166	98.5	9.86	273.7	17.16	7.60	245	98.7	9.51	261.0	18.80	7.81	207	100.6	9.37	160.3	17.54	7.98	186	97.3	9.29	184.4
4	11.33	7.53	112	103.4	11.34	224.9	12.68	7.55	133	100.1	10.61	274.4	13.73	7.62	177	103.5	10.73	259.9	16.43	7.79	200	109.4	10.74	174.4	17.44	7.98	185	97.0	9.28	184.9
5	10.02	7.55	106	104.3	11.72	225.8	11.20	7.58	113	101.6	11.17	271.4	12.12	7.66	158	105.3	11.29	260.0	13.47	7.85	202	112.8	11.87	182.9	14.74	8.02	162	109.5	11.16	185.0
6	9.60	7.56	106	103.1	11.04	226.7	10.35	7.58	107	101.0	11.34	272.7	10.38	7.66	162	102.5	11.47	263.3	12.08	7.85	203	109.7	11.78	197.1	12.30	7.93	150	108.3	11.62	190.1
7	8.80	7.54	107	100.5	11.68	228.5	9.19	7.58	110	99.1	11.43	275.4	9.52	7.64	166	99.9	11.37	265.3	10.32	7.81	205	106.5	11.96	203.0	10.78	7.92	154	105.6	11.73	194.0
8	8.20	7.51	114	100.3	11.81	230.6	8.45	7.55	119	97.5	11.40	280.1	8.85	7.59	173	98.3	11.42	267.7	9.23	7.75	205	102.4	11.84	210.5	8.97	7.82	178	101.9	11.80	198.1
9	7.67	7.47	121	99.0	11.80	232.5	7.64	7.50	127	95.3	11.38	281.7	7.53	7.53	202	95.6	11.42	272.3	8.14	7.72	207	101.1	11.92	214.3	8.12	7.78	190	98.3	11.61	200.8
10	6.60	7.39	135	93.5	11.42	235.9	7.19	7.43	138	91.6	11.09	286.1	7.02	7.35	214	89.9	10.90	275.5	7.43	7.62	209	96.2	11.54	222.6	7.75	7.63	198	95.9	11.39	202.1
11	6.60	7.34	136	92.5	11.33	236.9	6.66	7.36	142	86.4	10.48	287.2	6.76	7.31	221	86.7	10.58	276.3	7.01	7.50	217	89.1	10.80	228.9	7.33	7.58	205	90.7	10.88	204.2
12	6.30	7.28	141	88.6	10.92	238.0	6.44	7.27	147	82.1	10.10	288.0	6.59	7.26	226	82.5	10.10	277.8	6.94	7.44	220	87.4	10.61	235.7	7.09	7.49	211	86.1	10.41	205.9
13	6.19	7.24	142	86.0	10.64	238.3	6.37	7.23	147	81.4	10.03	289.2	6.54	7.20	224	80.4	9.81	279.3	6.80	7.41	222	84.4	10.28	239.2	7.06	7.47	209	85.0	10.29	206.4
	6.11	7.20	144	83.3	10.32	239.0	6.35	7.21	148	80.9	9.97	289.9	6.54	7.18	226	79.6	9.78	280.2	6.73	7.33	222	79.3	9.77	243.8	7.07	7.45	210	84.6	10.25	206.7
1m from Bottom (BS)	BS=13.40m						BS=13.40m						BS=13.5m						BS=13.5m						BS=13.5m					

MIDDLE QUINSAM LAKE DEPTH PROFILING SUMMER

Sample Date	25-Jul						02 Aug18						9-Aug						16-Aug						23-Aug					
Parameter	TEMP.	pH		% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP
Sample Depth (m)	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV
1	23.77	8.25	165	108.0	9.12	198.5	24.49	8.07	154	105.3	8.78	281.7	25.42	8.17	133	107.1	8.79	294.5	23.69	7.84	111	100.9	8.54	287.7	21.76	7.76	101	104.6	9.19	290.6
2	23.71	8.27	165	108.4	9.18	203.7	24.52	8.12	155	105.4	8.79	277.8	24.92	8.18	134	106.2	8.79	295.3	23.60	7.90	112	100.7	8.53	289.6	21.69	7.81	101	104.5	9.19	286.1
3	23.00	8.26	168	109.0	9.37	208.2	24.52	8.15	155	105.4	8.78	276.1	24.54	8.14	137	105.3	8.78	297.0	23.50	7.93	112	100.0	8.50	291.4	21.64	7.83	101	104.6	9.21	285.9
4	22.34	8.21	165	107.9	9.37	212.0	24.04	8.17	155	110.6	9.42	276.2	24.32	8.11	133	105.6	8.83	297.5	23.39	7.94	113	99.5	8.49	293.8	21.54	7.83	101	103.8	9.16	286.6
5	21.10	8.22	167	111.9	10.03	214.7	21.80	8.23	158	117.8	10.36	276.4	23.14	8.07	145	115.1	9.91	299.8	22.98	7.91	116	104.2	8.94	295.4	21.48	7.84	101	104.0	9.18	286.0
6	18.90	8.27	172	114.5	10.69	217.7	18.94	8.40	162	120.3	11.17	278.4	20.09	8.23	158	121.3	11.12	301.7	20.62	7.98	153	118.9	10.82	299.5	21.24	7.82	104	105.3	9.50	288.9
7	15.83	8.20	170	114.7	11.63	222.4	15.89	8.41	162	122.2	12.16	280.6	16.56	8.24	156	125.0	12.22	305.9	16.63	8.04	153	122.9	12.00	304.5	17.33	7.70	152	121.7	11.79	294.4
8	13.17	8.11	181	118.6	12.60	226.6	12.94	8.23	176	121.3	12.87	285.9	13.42	8.17	169	122.5	12.81	310.0	13.74	7.94	165	121.2	12.57	311.1	14.34	7.72	161	124.9	12.79	299.3
9	10.57	7.95	201	109.9	12.23	236.0	10.95	8.10	195	113.1	12.42	290.9	11.37	8.05	185	115.6	12.48	314.9	11.37	7.81	185	107.6	11.75	318.1	11.48	7.48	181	108.8	11.85	307.0
10	9.61	7.75	214	101.2	11.54	242.4	10.09	7.93	207	101.8	11.46	294.5	9.72	7.76	201	98.6	11.19	320.6	10.07	7.50	194	96.4	10.83	321.2	10.17	7.35	190	98.8	11.08	310.2
11	8.85	7.63	220	94.9	10.99	245.0	9.22	7.72	212	93.8	10.83	296.7	8.98	7.54	205	88.8	10.25	323.7	9.33	7.34	199	85.7	9.75	324.5	9.61	7.20	194	87.6	9.94	313.8
12	8.62	7.54	222	91.0	10.60	248.3	8.79	7.62	214	89.8	10.38	298.3	8.83	7.41	207	83.1	9.63	325.9	9.10	7.23	201	80.9	9.30	326.4	9.10	7.07	197	79.4	9.11	316.7
13	8.52	7.44	221	8.5	10.10	251.5	8.63	7.49	215	82.9	9.61	299.8	8.73	7.34	208	77.9	9.04	327.5	8.91	7.13	203	74.4	8.58	328.1	8.93	6.95	199	69.6	7.93	318.9
1m from Bottom (BS)	8.52	7.44	221	8.5	10.10	251.5	8.62	7.49	215	81.0	9.00	297.4	8.72	7.34	209	76.9	8.92	325.9	9.02	7.10	204	72.7	7.50	327.3	8.98	6.94	203	54.6	6.53	316.0
	BS=13.0m						BS=13.5m						BS=13.5m						BS=13.5m						BS=13.5m					

MIDDLE QUINSAM LAKE DEPTH PROFILING FALL

Sample Date	15-Oct						23-Oct						1-Nov						8-Nov						15-Nov					
Parameter	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP
Sample Depth (m)	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV
1	12.24	7.42	133	95.9	10.28	242.9	11.37	7.29	132	91.7	10.00	391.8	10.25	7.25	138	90.2	10.10	284.0	9.60	7.18	127	88.4	10.06	297.8	8.45	7.23	142	88.3	10.34	249.7
2	12.16	7.44	133	95.6	10.26	244.3	11.39	7.27	132	90.6	9.89	391.9	10.26	7.31	138	89.0	9.98	284.5	9.53	7.20	127	87.6	10.00	298.5	8.43	7.19	142	87.8	10.30	249.7
3	12.12	7.45	133	95.5	10.26	245.2	11.40	7.27	132	90.4	9.87	392.7	10.26	7.32	138	88.8	9.96	285.1	9.50	7.21	127	87.3	9.97	299.3	8.40	7.17	142	87.7	10.28	249.7
4	12.08	7.47	133	95.3	10.25	246.2	11.39	7.27	132	90.2	9.85	393.7	10.26	7.33	138	88.7	9.95	285.6	9.47	7.22	127	87.1	9.95	300.1	8.39	7.15	142	87.5	10.27	249.7
5	12.06	7.47	133	95.3	10.25	247.0	11.38	7.27	132	90.0	9.83	394.3	10.26	7.34	138	88.6	9.94	286.3	9.46	7.23	127	87.0	9.95	301.0	8.38	7.13	142	87.6	10.28	249.8
6	12.04	7.47	132	95.2	10.25	247.8	11.36	7.26	132	89.8	9.81	394.9	10.26	7.34	138	88.6	9.94	286.9	9.42	7.24	127	86.9	9.94	301.6	8.37	7.13	141	87.6	10.28	249.9
7	12.02	7.47	133	95.1	10.24	248.6	11.35	7.26	132	89.4	9.77	395.3	10.26	7.34	138	88.6	9.93	287.3	9.42	7.24	128	86.7	9.92	302.3	8.39	7.10	146	87.3	10.23	250.3
8	12.02	7.48	133	95.1	10.24	249.2	11.34	7.26	132	89.5	9.80	395.6	10.25	7.34	138	88.4	9.92	287.8	9.43	7.23	129	86.4	9.88	303.0	8.38	7.09	151	86.7	10.17	250.7
9	11.99	7.48	133	95.0	10.24	250.0	11.31	7.27	132	89.7	9.83	395.9	10.25	7.34	138	88.5	9.93	288.2	9.39	7.23	129	86.3	9.88	303.7	8.36	7.08	153	86.1	10.10	251.3
10	11.95	7.48	132	94.9	10.23	250.8	11.29	7.27	132	89.8	9.83	396.3	10.24	7.34	138	88.6	9.94	288.6	.9.326	7.24	128	86.2	9.89	304.3	8.34	7.06	159	86.1	10.11	251.9
11	11.77	7.47	138	92.3	9.88	253.0	11.15	7.26	138	86.8	9.51	397.8	10.24	7.34	138	88.6	9.94	288.9	9.29	7.24	127	86.2	9.89	305.2	8.34	7.06	158	86.1	10.11	252.4
12	10.13	7.30	217	60.1	6.68	260.4	10.10	7.08	209	50.4	5.56	406.0	10.23	7.33	139	87.8	9.85	289.4	9.27	7.23	128	86.1	9.88	305.9	8.34	7.05	160	85.6	10.05	253.1
13	9.31	7.10	229	31.6	3.59	264.3	9.29	6.91	228	28.6	3.11	409.5	10.21	7.32	139	86.1	9.77	289.9	9.26	7.24	128	85.9	9.87	306.5	8.34	7.04	162	85.6	10.05	253.5
14	9.11	7.04	240	26.5	2.38	265.5	9.15	6.85	244	18.3	2.47	410.0	10.00	7.31	140	85.7	9.53	290.5	9.25	7.23	132	85.2	9.78	307.7	8.39	6.90	259	78.5	9.15	261.8
	9.10	7.03	242	17.5	1.99	265.9	9.07	6.82	243	10.8	1.54	411.2	10.03	7.30	142	83.0	9.03	291.0	9.29	7.23	134	84.9	9.05	306.0	8.39	6.90	259	78.5	9.15	261.8
1m from Bottom (BS)	BS=14.3m						BS=14.5m						BS=14.5m						BS=14.5m						BS=14m					

WQG-Max pH Max. 6.5 -9.0 Hypolimnetic DO minimum 3 mg/L June -August

Table 76
2018-2019 Annual Report

EMS ID E292118

Site NAME: LOWER QUINSAM LAKE (LQL)

LOWER QUINSAM LAKE DEPTH PROFILING SPRING

Sample Date	3-May						10-May						17-May						23-May						31-May					
Parameter	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP
Sample Depth (m)	Celsius		µS/cm		mg/L	mV	Celsius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV
1	6.72	6.97	87	97.3	11.89	214.8	7.01	7.38	105	97.0	11.54	217.2	9.63	7.53	100	98.0	11.16	197.8	9.85	7.11	107	97.6	11.06	180.5	11.75	7.44	104	98.8	10.69	181.9
2	6.68	6.96	88	97.1	11.88	224.8	7.75	7.33	105	96.9	11.54	217.9	9.54	7.47	100	97.7	11.15	199.0	9.58	7.06	109	97.0	11.05	182.9	10.47	7.35	104	96.9	10.80	184.2
3	6.47	6.94	90	97.1	11.94	234.2	7.72	7.30	104	96.9	11.55	218.8	9.49	7.46	100	97.8	11.17	198.6	9.39	7.03	108	96.2	11.01	187.4	9.90	7.31	104	95.7	10.82	184.9
4	6.39	6.94	90	97.3	11.99	241.0	7.71	7.28	104	96.5	11.52	219.1	8.94	7.40	102	95.5	11.12	200.7	9.30	7.01	107	96.1	11.02	195.3	9.70	7.29	104	95.0	10.80	185.4
5	6.33	6.94	90	96.8	11.95	246.3	7.68	7.27	104	97.1	11.59	219.2	8.64	7.37	102	95.5	11.13	201.0	9.20	7.00	108	95.5	11.01	198.3	9.48	7.28	102	95.0	10.86	185.3
6	6.29	6.94	91	97.3	12.02	251.1	7.65	7.26	104	96.5	11.52	219.3	8.60	7.34	102	95.2	11.11	201.6	9.01	6.98	109	94.8	10.96	200.6	9.31	7.26	103	94.1	10.80	185.6
7	6.29	6.93	91	97.2	12.01	254.6	7.59	7.24	104	96.2	11.51	219.7	8.57	7.33	102	95.3	11.14	202.8	8.93	7.00	108	95.5	11.05	201.9	9.25	7.25	103	93.5	10.74	185.9
8	6.29	6.94	91	97.2	12.01	257.5	7.51	7.23	104	96.1	11.52	220.2	8.48	7.30	102	95.3	11.15	203.5	8.80	7.00	107	95.0	11.01	203.8	8.94	7.24	102	93.4	10.80	186.6
9	6.28	6.92	91	97.3	12.03	259.7	7.41	7.21	104	95.9	11.52	220.5	8.33	7.30	101	95.1	11.17	203.3	8.79	6.98	107	94.6	10.99	205.3	8.86	7.22	101	91.9	10.66	187.4
10	6.23	6.92	90	97.2	12.03	261.9	7.38	7.20	104	95.9	11.53	220.7	8.17	7.28	101	94.9	11.18	204.0	8.74	6.98	107	94.4	10.98	206.7	8.74	7.20	101	92.4	10.74	187.6
11	6.13	6.93	87	97.2	12.05	264.4	7.35	7.19	105	95.8	11.52	221.0	8.11	7.26	99	94.9	11.21	204.7	8.65	6.97	107	94.1	10.97	207.5	8.65	7.20	101	91.5	10.69	188.5
12	6.12	6.93	88	97.1	12.05	266.6	7.35	7.19	105	95.8	11.52	221.2	8.08	7.23	98	95.0	11.23	205.5	8.55	6.97	107	94.0	10.96	208.0	8.37	7.18	100	90.4	10.61	188.9
13	6.11	6.92	89	97.1	12.05	268.2	7.08	7.18	105	95.0	11.49	221.9	7.95	7.23	98	94.6	11.22	206.0	8.32	6.96	104	92.5	10.91	210.4	8.17	7.16	100	88.8	10.46	190.1
14	6.07	6.91	89	96.8	12.03	270.2	7.06	7.17	105	94.7	11.48	222.3	7.62	7.22	97	94.0	11.23	206.5	8.13	6.95	103	92.1	10.85	211.0	8.05	7.13	100	87.2	10.31	190.6
15	6.03	6.92	88	96.6	12.02	271.2	7.02	7.15	104	94.5	11.49	222.5	7.50	7.21	97	93.8	11.24	207.4	8.02	6.95	103	91.7	10.81	211.6	8.01	7.09	100	86.0	10.18	192.2
1m from Bottom (BS)	5.99	6.92	88	96.4	12.01	273.1	6.90	7.15	104	94.5	11.49	222.9	7.48	7.19	96	93.7	11.23	207.7	7.99	6.95	103	91.7	10.80	212.0	7.89	7.07	100	84.5	10.04	192.7
	BS=16.10m						BS=16.10m						BS=16.2m						BS=16.0m						BS=16.0m					

LOWER QUINSAM LAKE DEPTH PROFILING SUMMER

Sample Date	25-Jul						02 Aug18						9-Aug						16-Aug						23-Aug					
Parameter	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP
Sample Depth (m)	Celcius		µS/cm		mg/L	mV	Celcius.		µS/cm	101.1	8.64	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV
1	22.60	8.12	141	105.3	9.02	188.9	23.63	8.00	142	105.3	9.01	201.9	24.31	7.50	142	105.4	8.81	272.4	21.72	7.95	135	98.7	8.68	266.4	20.55	7.83	130	99.0	8.90	217.8
2	21.99	8.05	149	104.0	9.09	195.3	23.21	7.77	143	105.9	9.08	204.9	24.00	7.69	142	105.6	8.91	273.4	21.71	7.96	135	98.7	8.68	274.2	20.56	7.81	134	98.8	8.88	224.0
3	21.60	8.01	151	103.0	9.06	199.7	22.10	7.64	145	106.7	9.06	205.9	23.59	7.85	141	107.2	9.09	275.3	21.70	7.98	135	98.6	8.67	278.6	20.57	7.79	134	98.7	8.87	235.2
4	21.05	7.99	148	103.5	9.22	202.3	20.99	7.99	148	104.1	9.29	202.3	22.33	7.88	139	107.6	9.36	279.6	21.64	7.96	135	98.7	8.69	282.4	20.56	7.79	134	98.4	8.85	238.2
5	19.65	7.95	144	100.8	9.21	204.2	19.48	7.98	145	101.8	9.24	203.1	20.87	7.84	134	106.6	9.52	284.1	21.30	7.87	133	97.1	8.60	287.1	20.56	7.79	133	98.3	8.84	242.1
6	17.97	7.77	138	98.8	9.34	206.7	18.24	7.67	139	98.0	9.32	206.8	18.55	7.71	127	100.1	9.37	289.9	20.51	7.69	129	96.4	8.68	294.6	19.47	7.51	127	94.2	8.65	251.3
7	14.82	7.64	125	91.2	9.21	208.7	15.15	7.59	124	90.8	9.21	211.7	15.51	7.49	115	91.6	9.13	295.9	16.96	7.53	116	92.4	8.93	302.6	17.57	7.27	117	93.6	8.93	259.5
8	12.56	7.48	119	83.0	8.81	212.3	12.79	7.44	116	83.9	8.89	213.9	13.24	7.27	109	83.9	8.78	301.1	14.33	7.30	109	84.1	8.58	309.2	13.68	7.00	107	80.9	8.38	270.8
9	11.60	7.30	115	79.1	8.59	213.8	12.01	7.27	115	79.2	8.59	214.5	11.88	7.17	106	78.3	8.45	304.6	12.30	7.14	104	76.4	8.17	314.5	12.23	6.92	104	75.3	8.07	275.9
10	10.50	7.22	114	73.3	8.13	215.8	10.78	7.18	115	75.9	8.14	216.7	10.72	7.06	104	70.5	7.81	308.1	10.81	6.96	102	66.7	7.28	319.6	11.07	6.84	102	69.6	*7.59*	279.8
11	9.99	7.13	112	68.4	7.72	218.0	9.99	7.13	112	67.7	7.70	219.7	9.78	6.96	103	62.4	7.07	311.2	9.95	6.89	100	60.6	6.84	324.4	10.29	6.80	102	59.0	*6.62*	283.1
12	9.07	7.05	112	57.7	6.65	220.8	9.09	7.12	112	57.4	6.75	220.1	9.14	6.85	102	52.0	5.96	315.5	9.26	6.82	100	48.9	5.58	328.9	9.38	6.67	99	50.0	*5.72*	286.4
13	8.53	6.94	113	47.9	5.39	223.6	8.58	6.91	113	47.5	5.25	224.8	8.80	6.77	103	42.5	4.87	318.7	8.82	6.69	101	32.2	3.78	334.1	9.12	6.65	100	37.1	*4.13*	289.8
14	8.33	6.86	113	38.1	4.40	226.0	8.33	6.91	111	38.2	4.37	225.7	8.48	6.71	104	33.7	3.91	321.2	8.50	6.65	101	28.6	3.33	337.3	8.52	6.55	101	25.1	***2.93***	292.8
15	8.30	6.67	108	27.3	3.18	323.3	8.19	6.79	108	27.9	3.08	323.5	8.25	6.65	105	25.1	***2.91***	323.9	8.36	6.61	102	22.7	*2.52*	340.6	8.26	***6.45***	103	14.4	***1.45***	296.5
16																			8.15	6.58	104	13.7	*1.58*	345.0	8.09	***6.43***	105	7.3	***0.86***	298.8
1m from Bottom (BS)	8.30	6.67	108	27.3	3.18	323.3	8.19	6.79	108	27.9	3.08	323.5	8.25	6.65	105	25.1	***2.91***	323.9	8.15	6.58	104	13.7	*1.58*	345.0	8.09	***6.43***	105	7.3	***0.86***	298.8
	BS=15.4m						BS=15.5m						BS=15.0m						BS=16.00m						BS=16.6m					

LOWER QUINSAM LAKE DEPTH PROFILING FALL

Sample Date	15-Oct						22-Oct						30-Oct						7-Nov						15-Nov					
Parameter	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP	TEMP.	pH	COND.	% Sat.	D.O.	ORP
Sample Depth (m)	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV	Celcius		µS/cm		mg/L	mV
1	22.60	8.12	141	105.3	9.02	188.9	23.63	8.00	142	105.3	9.01	201.9	24.306	7.50	142	105.4	8.81	272.4	21.72	7.95	135	98.7	8.68	266.4	20.55	7.83	130	99.0	8.90	217.8
2	21.99	8.05	149	104.0	9.09	195.3	23.21	7.77	143	105.9	9.08	204.9	24.002	7.69	142	105.6	8.91	273.4	21.71	7.96	135	98.7	8.68	274.2	20.56	7.81	134	98.8	8.88	224.0
3	21.60	8.01	151	103.0	9.06	199.7	22.10	7.64	145	106.7	9.06	205.9	23.591	7.85	141	107.2	9.09	275.3	21.70	7.98	135	98.6	8.67	278.6	20.57	7.79	134	98.7	8.87	235.2
4	21.05	7.99	148	103.5	9.22	202.3	20.99	7.99	148	104.1	9.29	202.3	22.334	7.88	139	107.6	9.36	279.6	21.64	7.96	135	98.7	8.69	282.4	20.56	7.79	134	98.4	8.85	238.2
5	19.65	7.95	144	100.8	9.21	204.2	19.48	7.98	145	101.8	9.24	203.1	20.867	7.84	134	106.6	9.52	284.1	21.30	7.87	133	97.1	8.60	287.1	20.56	7.79	133	98.3	8.84	242.1
6	17.97	7.77	138	98.8	9.34	206.7	18.24	7.67	139	98.0	9.32	206.8	18.554	7.71	127	100.1	9.37	289.9	20.51	7.69	129	96.4	8.68	294.6	19.47	7.51	127	94.2	8.65	251.3
7	14.82	7.64	125	91.2	9.21	208.7	15.15	7.59	124	90.8	9.21	211.7	15.512	7.49	115	91.6	9.13	295.9	16.96	7.53	116	92.4	8.93	302.6	17.57	7.27	117	93.6	8.93	259.5
8	12.56	7.48	119	83.0	8.81	212.3	12.79	7.44	116	83.9	8.89	213.9	13.239	7.27	109	83.9	8.78	301.1	14.33	7.30	109	84.1	8.58	309.2	13.68	7.00	107	80.9	8.38	270.8
9	11.60	7.30	115	79.1	8.59	213.8	12.01	7.27	115	79.2	8.59	214.5	11.881	7.17	106	78.3	8.45	304.6	12.30	7.14	104	76.4	8.17	314.5	12.23	6.92	104	75.3	8.07	275.9
10	10.50	7.22	114	73.3	8.13	215.8	10.78	7.18	115	75.9	8.14	216.7	10.718	7.06	104	70.5	7.81	308.1	10.81	6.96	102	66.7	7.28	319.6	11.07	6.84	102	69.6	7.59	279.8
11	9.99	7.13	112	68.4	7.72	218.0	9.99	7.13	112	67.7	7.70	219.7	9.775	6.96	103	62.4	7.07	311.2	9.95	6.89	100	60.6	6.84	324.4	10.29	6.80	102	59.0	6.62	283.1
12	9.07	7.05	112	57.7	6.65	220.8	9.09	7.12	112	57.4	6.75	220.1	9.139	6.85	102	52.0	5.96	315.5	9.26	6.82	100	48.9	5.58	328.9	9.38	6.67	99	50.0	5.72	286.4
13	8.53	6.94	113	47.9	5.39	223.6	8.58	6.91	113	47.5	5.25	224.8	8.804	6.77	103	42.5	4.87	318.7	8.82	6.69	101	32.2	3.78	334.1	9.12	6.65	100	37.1	4.13	289.8
14	8.33	6.86	113	38.1	4.40	226.0	8.33	6.91	111	38.2	4.37	225.7	8.478	6.71	104	33.7	3.91	321.2	8.50	6.65	101	28.6	3.33	337.3	8.52	6.55	101	25.1	2.93	292.8
15	8.30	6.67	108	27.3	3.18	323.3	8.19	6.79	108	27.9	3.08	323.5	8.249	6.65	105	25.1	2.91	323.9	8.36	6.61	102	22.7	2.52	340.6	8.26	***6.45***	103	14.4	1.45	296.5
16																			8.15	6.58	104	13.7	1.58	345.0	8.09	***6.43***	105	7.3	0.86	298.8
1m from Bottom (BS)	8.30	6.67	108	27.3	3.18	323.3	8.19	6.79	108	27.9	3.08	323.5	8.249	6.65	105	25.1	2.91	323.9	8.15	6.58	104	13.7	1.58	345.0	8.09	***6.43***	105	7.3	0.86	298.8
	BS= 15.4						BS= 15.5						BS= 15.0						BS= 16.0						BS= 16.6					

WQG-Max pH Max. 6.5 -9.0

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Nutrients in Lakes (mg/L)

Water Quality Guidelines											WQO
Average			1.87	0.02	3						0.007
Max			12.9	0.06	32.8						
Stn.Code	Sample No.	Date	N-NH3	N-NO2	N-NO3	N-NO23	N-T	N-TKN	P-D	PO4-D	P-T
LLEZ2	LLEZ2-31May18-M	31-May-18	<0.020			<0.020	0.147	0.147	<0.010		0.0114
LLEZ2	LLEZ2-23May18-M	23-May-18	<0.020			<0.020	0.122	0.122	<0.010		<0.0020
LLEZ2	LLEZ2-2May18-M	2-May-18	<0.020			<0.020	0.225	0.225	<0.010		0.0047
LLEZ2	LLEZ2-10May18-M	10-May-18	<0.020			<0.020	0.194	0.194	<0.010		0.0068
LLEZ2	LLEZ2-17May18-M	17-May-18	<0.020			<0.020	0.131	0.131	<0.010		0.0046
LLEZ2	LLEZ2-25Jul18-M	25-Jul-18	<0.020	<0.0050	<0.020	<0.020	0.113	0.113	<0.0020	<0.0050	<0.0020
LLEZ2	LLEZ2-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.131	0.131	0.0030	<0.0050	0.0049
LLEZ2	LLEZ2-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.214	0.214	0.0051	<0.0050	0.0172
LLEZ2	LLEZ2-15Oct18-M	15-Oct-18	0.029	<0.0050	<0.020	<0.020	0.183	0.183	0.0042	<0.0050	0.0088
LLEZ2	LLEZ2-23Oct18-M	23-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.169	0.169	0.0036	<0.0050	0.0063
LLEZ2	LLEZ2-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.168	0.168	0.0038	<0.0050	0.0053
LLEZ2	LLEZ2-15Nov18-M	15-Nov-18	<0.020	<0.0050	5.04	5.04	1.16	<0.20	0.0028	<0.0050	0.004
LLEZ2	LLEZ2-01Nov18-M	1-Nov-18	<0.020	<0.0050	<0.020	<0.020			0.0095	<0.0050	
LLM1	LLM1-31May18-M	31-May-18	<0.020			<0.020	0.128	0.128	<0.010		0.0049
LLM1	LLM1-23May18-M	23-May-18	<0.020			<0.020	0.128	0.128	<0.010		0.0025
LLM1	LLM1-2May18-M	2-May-18	<0.020			<0.020	0.139	0.139	<0.050		0.0024
LLM1	LLM1-10May18-M	10-May-18	<0.020			<0.020	0.139	0.139	<0.010		0.0026
LLM1	LLM1-17May18-M	17-May-18	<0.020			<0.020	0.152	0.152	<0.010		0.0027
LLM1	LLM1-25Jul18-M	25-Jul-18	<0.020	<0.0050	<0.020	<0.020	0.141	0.141	<0.0020	<0.0050	<0.0020
LLM1	LLM1-2Aug18-M	2-Aug-18	0.056	<0.0050	<0.020	<0.020	0.111	0.111	<0.0020	<0.0050	0.0066
LLM1	LLM1-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.151	0.151	0.0042	<0.0050	0.0064
LLM1	LLM1-9Aug18-Rep	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.160	0.160	0.0030	<0.0050	0.0048
LLM1	LLM1-16Aug18-M	16-Aug-18	0.048	<0.0050	<0.020	<0.020	0.084	0.084	0.0045	<0.0050	0.0023
LLM1	LLM1-23Aug18-M	23-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.151	0.151	0.0026	<0.0050	0.0025
LLM1	LLM1-15Oct18-M	15-Oct-18	0.032	<0.0050	<0.020	<0.020	0.217	0.217	0.0032	<0.0050	0.0044
LLM1	LLM1-23Oct18-M	23-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.161	0.161	0.0022	<0.0050	0.0067
LLM1	LLM1-23Oct18-Rep	23-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.169	0.169	0.003	<0.0050	0.0048
LLM1	LLM1-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.159	0.159	0.0033	<0.0050	0.0043
LLM1	LLM1-15Nov18-M	15-Nov-18	<0.020	<0.0050	0.029	0.029	0.211	0.181	0.0033	<0.0050	0.0045
LLM1	LLM1-01Nov18-M	1-Nov-18	0.020	<0.0050	<0.020	<0.020			0.0034	<0.0050	
LLM4	LLM4-31May18-M	31-May-18	<0.020			<0.020	0.117	0.117	<0.010		0.0045
LLM4	LLM4-23May18-M	23-May-18	<0.020			<0.020	0.108	0.108	<0.010		0.0039
LLM4	LLM4-2May18-M	2-May-18	<0.020			<0.020	0.158	0.158	<0.010		0.0057
LLM4	LLM4-10May18-M	10-May-18	<0.020			<0.020	0.164	0.164	<0.010		0.0032
LLM4	LLM4-17May18-M	17-May-18	<0.020			<0.020	0.129	0.129	<0.010		0.0033
LLM4	LLM4-25Jul18-M	25-Jul-18	<0.020	<0.0050	<0.020	<0.020	0.129	0.129	<0.0020	<0.0050	<0.0020
LLM4	LLM4-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.122	0.122	0.0214	<0.0050	0.0038
LLM4	LLM4-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.153	0.153	0.0033	0.0125	0.0046
LLM4	LLM4-16Aug18-M	16-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.191	0.191	0.0023	<0.0050	<0.0020
LLM4	LLM4-23Aug18-M	23-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.138	0.138	0.0034	<0.0050	0.0029
LLM4	LLM4-15Oct18-M	15-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.183	0.183	0.0029	<0.0050	0.004
LLM4	LLM4-23Oct18-M	23-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.162	0.162	0.0042	<0.0050	0.0051
LLM4	LLM4-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.218	0.218	0.0029	<0.0050	0.0057
LLM4	LLM4-15Nov18-M	15-Nov-18	0.023	<0.0050	0.074	0.074	0.228	0.154	0.0037	<0.0050	0.0035
LLM4	LLM4-01Nov18-M	1-Nov-18	<0.020	<0.0050	<0.020	<0.020			0.0029	<0.0050	
LLM9	LLM9-31May18-M	31-May-18	<0.020			0.040	0.130	0.090	<0.010		0.0050
LLM9	LLM9-23May18-M	23-May-18	<0.020			0.035	0.136	0.101	<0.010		0.0026
LLM9	LLM9-2May18-M	2-May-18	<0.020			0.048	0.170	0.122	<0.010		0.0038
LLM9	LLM9-10May18-M	10-May-18	<0.020			0.048	0.217	0.169	<0.010		0.0040
LLM9	LLM9-17May18-M	17-May-18	<0.020			0.029	0.116	0.088	<0.010		0.0026
LLM9	LLM9-25Jul18-M	25-Jul-18	0.043	<0.0050	0.022	0.022	0.109	0.088	<0.0020	<0.0050	<0.0020
LLM9	LLM9-2Aug18-M	2-Aug-18	<0.020	<0.0050	0.031	0.031	0.280	0.249	0.0022	<0.0050	0.0048
LLM9	LLM9-9Aug18-M	9-Aug-18	<0.020	<0.0050	0.033	0.033	0.149	0.116	0.0026	<0.0050	0.0040
LLM9	LLM9-16Aug18-M	16-Aug-18	<0.020	0.0079	<0.020	<0.020	0.177	0.177	<0.0020	<0.0050	<0.0020
LLM9	LLM9-23Aug18-M	23-Aug-18	<0.020	<0.0050	0.020	0.020	0.202	0.182	0.0028	<0.0050	0.0045
LLM9	LLM9-15Oct18-M	15-Oct-18	0.024	<0.0050	<0.020	<0.020	0.119	0.119	0.003	<0.0050	0.0125
LLM9	LLM9-23Oct18-M	23-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.105	0.105	0.0027	<0.0050	0.0038
LLM9	LLM9-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.15	0.15	0.0031	<0.0050	0.0038
LLM9	LLM9-15Nov18-M	15-Nov-18	<0.020	<0.0050	0.022	0.022	0.234	0.212	0.0045	<0.0050	0.0047
LLM9	LLM9-01Nov18-M	1-Nov-18	<0.020	<0.0050	<0.020	<0.020			0.0044	<0.0050	
LLMB	LLMB-31May18-M	31-May-18	<0.020			0.057	0.164	0.107	<0.010		0.0062
LLMB	LLMB-23May18-M	23-May-18	<0.020			0.049	0.151	0.102	<0.010		0.0023
LLMB	LLMB-2May18-M	2-May-18	<0.020			0.060	0.170	0.110	<0.010		0.0034
LLMB	LLMB-10May18-M	10-May-18	<0.020			0.055	0.272	0.217	<0.010		0.0038
LLMB	LLMB-17May18-M	17-May-18	<0.020			0.049	0.174	0.125	<0.010		0.0052
LLMB	LLMB-25Jul18-M	25-Jul-18	<0.020	<0.0050	0.072	0.072	0.160	0.088	<0.0020	<0.0050	<0.0020
LLMB	LLMB-2Aug18-M	2-Aug-18	<0.020	<0.0050	0.083	0.083	0.125	0.041	<0.0020	0.0053	0.0052
LLMB	LLMB-9Aug18-M	9-Aug-18	<0.020	<0.0050	0.075	0.075	0.324	0.248	0.0042	<0.0050	0.0085
LLMB	LLMB-16Aug18-M	16-Aug-18	<0.020	<0.0050	0.084	0.084	0.217	0.134	0.0028	<0.0050	<0.0020
LLMB	LLMB-23Aug18-M	23-Aug-18	0.039	<0.0050	0.094	0.094	0.200	0.106	0.0027	<0.0050	0.0035
LLMB	LLMB-15Oct18-M	15-Oct-18	0.026	<0.0050	0.109	0.109	0.229	0.12	0.0025	<0.0050	0.0041
LLMB	LLMB-23Oct18-M	23-Oct-18	<0.020	<0.0050	0.105	0.105	0.171	0.067	0.003	<0.0050	0.004
LLMB	LLMB-08Nov18-M	8-Nov-18	<0.020	<0.0050	0.108	0.108	0.177	0.069	0.0029	<0.0050	0.0032
LLMB	LLMB-15Nov18-M	15-Nov-18	<0.020	<0.0050	0.121	0.121	0.188	0.067	0.0028	0.0051	0.0024
LLMB	LLMB-01Nov18-M	1-Nov-18	0.035	<0.0050	0.110	0.110			0.0021	<0.0050	
LQL1	LQL1-25May18-M	25-May-18	<0.020			<0.020	0.096	0.096	<0.010		0.0071
LQL1	LQL1-17May18-M	17-May-18	<0.020			<0.020	0.118	0.118	<0.010		0.0052
LQL1	LQL1-3May18-M	3-May-18	<0.020			<0.020	0.127	0.127	<0.010		0.0039
LQL1	LQL1-10May18-M	10-May-18	<0.020			<0.020	0.133	0.133	<0.010		0.0106
LQL1	LQL1-30May18-M	30-May-18	<0.020			<0.020	0.091	0.091			0.0035
LQL1	LQL1-26Jul18-M	26-Jul-18	<0.020	<0.0050		<0.020	0.121	0.121	0.0022	<0.0050	0.0089
LQL1	LQL1-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.166	0.166	<0.0020	<0.0050	<0.0020
LQL1	LQL1-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.099	0.099	0.0026	<0.0050	0.0048
LQL1	LQL1-17Aug18-M	17-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.130	0.130	0.017	<0.0050	0.0066
LQL1	LQL1-22Aug18-M	22-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.134	0.134	0.0025	<0.0050	0.0029
LQL1	LQL1-15Oct18-M	15-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.158	0.158	0.0043	<0.0050	0.0046
LQL1	LQL1-22Oct18-M	22-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.0028	<0.0050	
LQL1	LQL1-07Nov18-M	7-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.178	0.178	0.0028	<0.0050	0.0063
LQL1	LQL1-14Nov18-M	14-Nov-18	<0.020	<0.0050	1.42	1.42	2.11	0.694	0.0068	<0.0050	0.0047
LQL1	LQL1-14Nov18-Rep	14-Nov-18	<0.020	<0.0050	0.69	0.69	0.262	<0.020	0.0038	<0.0050	0.0047

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Nutrients in Lakes (mg/L)

Water Quality Guidelines											WQO
Average			1.87	0.02	3						0.007
Max			12.9	0.06	32.8						
Stn.Code	Sample No.	Date	N-NH3	N-NO2	N-NO3	N-NO23	N-T	N-TKN	P-D	PO4-D	P-T
LQL1	LQL1-30Oct18-M	30-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.255	0.255	0.0038	<0.0050	0.0061
LQL4	LQL4-25May18-M	25-May-18	<0.020			<0.020	0.100	0.100	<0.010		0.0051
LQL4	LQL4-17May18-M	17-May-18	<0.020			<0.020	0.120	0.120	<0.010		0.0057
LQL4	LQL4-3May18-M	3-May-18	<0.020			<0.020	0.103	0.103	<0.010		0.0040
LQL4	LQL4-10May18-M	10-May-18	<0.020			<0.020	0.165	0.165	<0.010		0.0052
LQL4	LQL4-30May18-M	30-May-18	0.033			<0.020	0.106	0.106			0.0037
LQL4	LQL4-26Jul18-M	26-Jul-18	<0.020	<0.0050		<0.020	0.145	0.145	<0.0020	<0.0050	<0.0020
LQL4	LQL4-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.172	0.172	<0.0020	<0.0050	0.0048
LQL4	LQL4-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.099	0.099	0.0033	<0.0050	0.0051
LQL4	LQL4-17Aug18-M	17-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.141	0.141	0.0035	<0.0050	0.0031
LQL4	LQL4-22Aug18-M	22-Aug-18	0.077	<0.0050	<0.020	<0.020	0.164	0.164	0.0029	<0.0050	0.0031
LQL4	LQL4-15Oct18-M	15-Oct-18	<0.020	<0.0050	0.022	0.022	0.088	0.066	0.004	<0.0050	0.0087
LQL4	LQL4-22Oct18-M	22-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.0025	<0.0050	
LQL4	LQL4-07Nov18-M	7-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.165	0.165	0.0038	<0.0050	0.0058
LQL4	LQL4-14Nov18-M	14-Nov-18	<0.020	<0.0050	0.038	0.038	0.216	0.178	0.0057	<0.0050	0.0036
LQL4	LQL4-30Oct18-M	30-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.202	0.202	0.0042	<0.0050	0.0044
LQL9	LQL9-25May18-M	25-May-18	<0.020			<0.020	0.075	0.075	<0.010		0.0040
LQL9	LQL9-17May18-M	17-May-18	<0.020			<0.020	0.117	0.117	<0.010		0.0034
LQL9	LQL9-3May18-M	3-May-18	<0.020			<0.020	0.122	0.122	<0.010		0.0045
LQL9	LQL9-10May18-M	10-May-18	<0.020			0.024	0.112	0.088	<0.010		0.0032
LQL9	LQL9-30May18-M	30-May-18	<0.020			<0.020	0.098	0.098			0.0025
LQL9	LQL9-26Jul18-M	26-Jul-18	<0.020	<0.0050		<0.020	0.168	0.168	<0.0020	<0.0050	0.0048
LQL9	LQL9-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.225	0.225	<0.0020	<0.0050	0.0051
LQL9	LQL9-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.110	0.110	0.0034	<0.0050	0.0043
LQL9	LQL9-17Aug18-M	17-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.225	0.225	0.0020	<0.0050	0.0028
LQL9	LQL9-17Aug18-Rep	17-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.206	0.206	0.0044	<0.0050	0.0029
LQL9	LQL9-22Aug18-M	22-Aug-18	0.096	<0.0050	<0.020	<0.020	0.146	0.146	0.0025	0.0084	0.0031
LQL9	LQL9-15Oct18-M	15-Oct-18	<0.020	<0.0050	0.023	0.023	0.087	0.064	0.0045	<0.0050	0.0065
LQL9	LQL9-22Oct18-M	22-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.003	<0.0050	
LQL9	LQL9-07Nov18-M	7-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.168	0.168	0.0063	<0.0050	0.0051
LQL9	LQL9-14Nov18-M	14-Nov-18	<0.020	<0.0050	0.102	0.102	0.271	0.169	0.0054	<0.0050	0.0034
LQL9	LQL9-30Oct18-M	30-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.224	0.224	0.0029	<0.0050	0.0057
LQLB	LQLB-25May18-M	25-May-18	0.029			<0.020	0.123	0.123	<0.010		0.0049
LQLB	LQLB-17May18-M	17-May-18	<0.020			<0.020	0.123	0.123	<0.010		0.0034
LQLB	LQLB-3May18-M	3-May-18	<0.020			0.022	0.113	0.091	<0.010		0.0034
LQLB	LQLB-10May18-M	10-May-18	<0.020			0.021	0.122	0.101	<0.010		0.0027
LQLB	LQLB-30May18-M	30-May-18	0.029			<0.020	0.143	0.143			0.0034
LQLB	LQLB-26Jul18-M	26-Jul-18	0.058	<0.0050		0.027	0.338	0.338	<0.0020	<0.0050	0.0086
LQLB	LQLB-2Aug18-M	2-Aug-18	0.095	<0.0050	0.046	0.046	0.245	0.199	0.0050	<0.0050	0.0072
LQLB	LQLB-9Aug18-M	9-Aug-18	0.082	<0.0050	0.051	0.051	0.200	0.149	0.0063	<0.0050	0.0069
LQLB	LQLB-17Aug18-M	17-Aug-18	0.087	<0.0050	0.092	0.092	0.355	0.264	0.0030	0.0057	0.0058
LQLB	LQLB-22Aug18-M	22-Aug-18	0.17	<0.0050	0.124	0.124	0.358	0.234	0.0048	<0.0050	0.0071
LQLB	LQLB-15Oct18-M	15-Oct-18	<0.020	<0.0050	0.066	0.066	0.137	0.071	0.0064	<0.0050	0.0075
LQLB	LQLB-22Oct18-M	22-Oct-18	0.022	<0.0050	0.034	0.034			0.0031	<0.0050	
LQLB	LQLB-07Nov18-M	7-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.187	0.187	0.0029	<0.0050	0.0057
LQLB	LQLB-14Nov18-M	14-Nov-18	<0.020	<0.0050	0.048	0.048	0.194	0.147	0.0056	<0.0050	0.0047
LQLB	LQLB-30Oct18-M	30-Oct-18	0.046	<0.0050	<0.020	<0.020	0.259	0.259	0.0038	<0.0050	0.0047
MQL1	MQL1-31May18-M	31-May-18	<0.020			<0.020	0.101	0.101			0.0036
MQL1	MQL1-31May18-Rep	31-May-18	0.042			<0.020	0.109	0.109			0.0023
MQL1	MQL1-17May18-M	17-May-18	<0.020			<0.020	0.095	0.095	<0.010		<0.0020
MQL1	MQL1-03May18-M	3-May-18	<0.020			<0.020	0.109	0.109	<0.010		0.0025
MQL1	MQL1-25May18-M	25-May-18	<0.020			<0.020	0.107	0.107	<0.010		0.0025
MQL1	MQL1-10May18-M	10-May-18	<0.020			<0.020	0.082	0.082	<0.010		0.0029
MQL1	MQL1-26Jul18-M	26-Jul-18	<0.020	<0.0050	<0.020	<0.020	0.205	0.205	<0.0020	<0.0050	0.0032
MQL1	MQL1-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.117	0.117	<0.0020	<0.0050	<0.0020
MQL1	MQL1-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.123	0.123	0.0072	<0.0050	0.0036
MQL1	MQL1-16Aug18-M	16-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.166	0.166	0.0021	<0.0050	0.0042
MQL1	MQL1-23Aug18-M	23-Aug-18	0.18	<0.0050	<0.020	<0.020	0.148	0.148	0.0033	<0.0050	0.0029
MQL1	MQL1-23Oct18-M	23-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.0021	<0.0050	
MQL1	MQL1-23Oct18-Rep	23-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.0032	<0.0050	
MQL1	MQL1-08Nov18-M	8-Nov-18	<0.020	0.0054	<0.020	<0.020	0.124	0.124	0.0038	<0.0050	0.0035
MQL1	MQL1-14Nov18-M	14-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.149	0.149	0.0052	<0.0050	0.0079
MQL1	MQL1-15Oct18-M	15-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.117	0.117	0.0031	<0.0050	0.0045
MQL1	MQL1-01Nov18-M	1-Nov-18	<0.020	<0.0050	<0.020	<0.020			0.0039	<0.0050	
MQL4	MQL4-31May18-M	31-May-18	<0.020			<0.020	0.096	0.096			0.0058
MQL4	MQL4-17May18-M	17-May-18	<0.020			<0.020	0.062	0.062	<0.010		0.0025
MQL4	MQL4-17May18-Rep	17-May-18	<0.020			<0.020	0.106	0.106	<0.010		0.0036
MQL4	MQL4-03May18-M	3-May-18	<0.020			<0.020	0.121	0.121	<0.010		0.0026
MQL4	MQL4-25May18-M	25-May-18	<0.020			<0.020	0.104	0.104	<0.010		0.0031
MQL4	MQL4-10May18-M	10-May-18	<0.020			<0.020	0.105	0.105	<0.010		0.0022
MQL4	MQL4-26Jul18-M	26-Jul-18	<0.020	<0.0050	<0.020	<0.020	0.120	0.120	0.0033	<0.0050	0.0048
MQL4	MQL4-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.160	0.160	0.0043	<0.0050	0.0080
MQL4	MQL4-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.118	0.118	0.0037	<0.0050	0.0025
MQL4	MQL4-16Aug18-M	16-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.103	0.103	0.0044	<0.0050	0.0026
MQL4	MQL4-23Aug18-M	23-Aug-18	0.039	<0.0050	<0.020	<0.020	0.136	0.136	0.0024	<0.0050	0.0045
MQL4	MQL4-23Oct18-M	23-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.002	<0.0050	
MQL4	MQL4-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.182	0.182	0.0031	<0.0050	0.0045
MQL4	MQL4-14Nov18-M	14-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.167	0.167	0.0025	<0.0050	0.003
MQL4	MQL4-15Oct18-M	15-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.096	0.096	0.0041	<0.0050	0.0023
MQL4	MQL4-01Nov18-M	1-Nov-18	<0.020	<0.0050	<0.020	<0.020			0.0021	<0.0050	
MQL4	MQL4-01Nov18-Rep	1-Nov-18	<0.020	<0.0050	<0.020	<0.020			0.0110	<0.0050	
MQL9	MQL9-31May18-M	31-May-18	<0.020			<0.020	0.092	0.092			0.0031
MQL9	MQL9-17May18-M	17-May-18	<0.020			<0.020	0.107	0.107	<0.010		0.0032
MQL9	MQL9-03May18-M	3-May-18	<0.020			<0.020	0.091	0.091	<0.010		0.0029
MQL9	MQL9-03May18-Rep	3-May-18	<0.020			<0.020	0.115	0.115	<0.010		0.0037
MQL9	MQL9-25May18-M	25-May-18	<0.020			<0.020	0.083	0.083	<0.010		0.0024
MQL9	MQL9-10May18-M	10-May-18	<0.020			<0.020	0.083	0.083	<0.010		0.0025
MQL9	MQL9-26Jul18-M	26-Jul-18	<0.020	<0.0050	<0.020	<0.020	0.096	0.096	<0.0020	<0.0050	0.0044
MQL9	MQL9-2Aug18-M	2-Aug-18	0.023	<0.0050	<0.020	<0.020	0.102	0.102	0.0035	<0.0050	0.0034
MQL9	MQL9-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.149	0.149	0.0031	<0.0050	0.0043

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Nutrients in Lakes (mg/L)

Water Quality Guidelines											WQO
Average			1.87	0.02	3						0.007
Max			12.9	0.06	32.8						
Stn.Code	Sample No.	Date	N-NH3	N-NO2	N-NO3	N-NO23	N-T	N-TKN	P-D	PO4-D	P-T
MQL9	MQL9-16Aug18-M	16-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.178	0.178	0.0021	<0.0050	0.0030
MQL9	MQL9-23Aug18-M	23-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.144	0.144	0.0071	<0.0050	0.0041
MQL9	MQL9-23Oct18-M	23-Oct-18	<0.020	<0.0050	<0.020	<0.020			<0.0020	<0.0050	
MQL9	MQL9-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.13	0.13	0.003	<0.0050	0.0035
MQL9	MQL9-14Nov18-M	14-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.126	0.126	0.0036	<0.0050	0.0026
MQL9	MQL9-15Oct18-M	15-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.106	0.106	0.0048	<0.0050	0.0026
MQL9	MQL9-01Nov18-M	1-Nov-18	<0.020	<0.0050	<0.020	<0.020			<0.0020	<0.0050	
MQLB	MQLB-31May18-M	31-May-18	<0.020			<0.020	0.097	0.097			0.0096
MQLB	MQLB-17May18-M	17-May-18	<0.020			<0.020	0.112	0.112	<0.010		0.0039
MQLB	MQLB-03May18-M	3-May-18	<0.020			<0.020	0.118	0.118	<0.010		0.0032
MQLB	MQLB-25May18-M	25-May-18	<0.020			<0.020	0.107	0.107	<0.010		0.0034
MQLB	MQLB-10May18-M	10-May-18	<0.020			<0.020	0.087	0.087	<0.010		0.0031
MQLB	MQLB-26Jul18-M	26-Jul-18	<0.020	<0.0050	<0.020	<0.020	0.163	0.163	<0.0020	<0.0050	0.0063
MQLB	MQLB-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.113	0.113	0.0022	<0.0050	0.0034
MQLB	MQLB-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.065	0.065	0.0030	<0.0050	0.0045
MQLB	MQLB-16Aug18-M	16-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.147	0.147	0.0050	<0.0050	0.0025
MQLB	MQLB-23Aug18-M	23-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.147	0.147	<0.0020	<0.0050	0.0042
MQLB	MQLB-23Oct18-M	23-Oct-18	0.11	<0.0050	<0.020	<0.020			0.0024	0.0096	
MQLB	MQLB-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.135	0.135	0.0024	<0.0050	0.0051
MQLB	MQLB-14Nov18-M	14-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.149	0.149	0.0033	<0.0050	0.0036
MQLB	MQLB-15Oct18-M	15-Oct-18	0.13	<0.0050	<0.020	<0.020	0.261	0.261	0.0042	<0.0050	0.0046
MQLB	MQLB-01Nov18-M	1-Nov-18	<0.020	<0.0050	<0.020	<0.020			0.0022	<0.0050	
NNL1	NNL1-31May18-M	31-May-18	<0.020			<0.020	0.176	0.176	<0.010		0.0069
NNL1	NNL1-23May18-M	23-May-18	<0.020			<0.020	0.137	0.137	<0.010		0.0043
NNL1	NNL1-17May18-M	17-May-18	<0.020			<0.020	0.115	0.115	<0.010		0.0025
NNL1	NNL1-3May18-M	3-May-18	<0.020			<0.020	0.163	0.163	<0.010		0.0056
NNL1	NNL1-3May18-Rep	3-May-18	<0.020			<0.020	0.146	0.146	<0.010		0.0041
NNL1	NNL1-10May18-M	10-May-18	<0.020			<0.020	0.161	0.161	<0.010		0.0036
NNL1	NNL1-25Jul18-M	25-Jul-18	<0.020	<0.0050	<0.020	<0.020	0.177	0.177	<0.0020	<0.0050	<0.0020
NNL1	NNL1-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.159	0.159	0.0054	<0.0050	0.0041
NNL1	NNL1-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.162	0.162	0.0037	<0.0050	0.0045
NNL1	NNL1-16Aug18-M	16-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.189	0.189	0.0037	<0.0050	0.0028
NNL1	NNL1-23Aug18-M	23-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.182	0.182	0.0025	<0.0050	0.0030
NNL1	NNL1-23Oct18-M	23-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.0036	<0.0050	
NNL1	NNL1-31Oct18-M	31-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.0125	<0.0050	
NNL1	NNL1-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.18	0.18	0.003	<0.0050	0.006
NNL1	NNL1-15Nov18-M	15-Nov-18	<0.020	<0.0050	1.13	1.13	1.46	0.331	0.004	<0.0050	0.0046
NNL1	NNL1-15Oct18-M	15-Oct-18	<0.020	<0.0050	<0.020	<0.020	0.222	0.222	0.0055	<0.0050	0.0054
NNL4	NNL4-31May18-M	31-May-18	<0.020			<0.020	0.119	0.119	<0.010		0.0039
NNL4	NNL4-23May18-M	23-May-18	<0.020			<0.020	0.142	0.142	<0.010		0.0045
NNL4	NNL4-17May18-M	17-May-18	<0.020			<0.020	0.141	0.141	<0.010		0.0034
NNL4	NNL4-3May18-M	3-May-18	<0.020			<0.020	0.140	0.140	<0.010		0.0037
NNL4	NNL4-10May18-M	10-May-18	<0.020			<0.020	0.128	0.128	0.015		0.0025
NNL4	NNL4-25Jul18-M	25-Jul-18	<0.020	<0.0050	<0.020	<0.020	0.155	0.155	<0.0020	<0.0050	0.0161
NNL4	NNL4-2Aug18-M	2-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.168	0.168	0.0044	<0.0050	0.0046
NNL4	NNL4-9Aug18-M	9-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.138	0.138	0.0037	<0.0050	0.0068
NNL4	NNL4-16Aug18-M	16-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.200	0.200	<0.0020	<0.0050	0.0044
NNL4	NNL4-23Aug18-M	23-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.169	0.169	0.0029	<0.0050	0.0025
NNL4	NNL4-23Oct18-M	23-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.0049	0.0089	
NNL4	NNL4-31Oct18-M	31-Oct-18	<0.020	<0.0050	<0.020	<0.020			0.0037	<0.0050	
NNL4	NNL4-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.201	0.201	0.0035	<0.0050	0.0062
NNL4	NNL4-15Nov18-M	15-Nov-18	<0.020	<0.0050	0.109	0.109	0.239	0.13	0.0046	<0.0050	0.0048
NNL4	NNL4-15Oct18-M	15-Oct-18	0.020	<0.0050	<0.020	<0.020	1190	1190	0.0039	<0.0050	0.0029
NNL9	NNL9-31May18-M	31-May-18	<0.020			0.035	0.144	0.109	<0.010		0.0035
NNL9	NNL9-23May18-M	23-May-18	<0.020			0.033	0.192	0.160	<0.010		0.0040
NNL9	NNL9-23May18-Rep	23-May-18	<0.020			0.030	0.191	0.161	<0.010		0.0055
NNL9	NNL9-17May18-M	17-May-18	<0.020			0.041	0.132	0.091	<0.010		0.0080
NNL9	NNL9-3May18-M	3-May-18	<0.020			0.039	0.208	0.169	<0.010		0.0057
NNL9	NNL9-10May18-M	10-May-18	<0.020			0.042	0.165	0.123	<0.010		0.0033
NNL9	NNL9-25Jul18-M	25-Jul-18	<0.020	<0.0050	0.043	0.043	0.142	0.100	<0.0020	<0.0050	0.0025
NNL9	NNL9-25Jul18-Rep	25-Jul-18	<0.020	<0.0050	0.037	0.037	0.159	0.122	0.0054	<0.0050	0.0033
NNL9	NNL9-2Aug18-M	2-Aug-18	<0.020	<0.0050	0.028	0.028	0.146	0.119	0.0026	<0.0050	0.0050
NNL9	NNL9-9Aug18-M	9-Aug-18	<0.020	<0.0050	0.022	0.022	0.168	0.146	0.0038	<0.0050	0.0048
NNL9	NNL9-16Aug18-M	16-Aug-18	<0.020	<0.0050	<0.020	<0.020	0.166	0.166	0.0030	<0.0050	0.0045
NNL9	NNL9-23Aug18-M	23-Aug-18	<0.020	<0.0050	0.034	0.034	0.129	0.095	0.0037	<0.0050	0.0034
NNL9	NNL9-23Oct18-M	23-Oct-18	<0.020	<0.0050	0.024	0.024			0.0045	<0.0050	
NNL9	NNL9-31Oct18-M	31-Oct-18	0.023	<0.0050	<0.020	<0.020			0.0049	<0.0050	
NNL9	NNL9-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.191	0.191	0.0024	<0.0050	0.0059
NNL9	NNL9-15Nov18-M	15-Nov-18	<0.020	<0.0050	0.049	0.049	0.18	0.131	0.0044	<0.0050	0.0045
NNL9	NNL9-15Oct18-M	15-Oct-18	0.029	<0.0050	<0.020	<0.020	0.159	0.159	0.0039	<0.0050	0.0057
NNLB	NNLB-31May18-M	31-May-18	<0.020			0.043	0.162	0.119	<0.010		0.0034
NNLB	NNLB-23May18-M	23-May-18	<0.020			0.035	0.171	0.137	<0.010		0.0051
NNLB	NNLB-17May18-M	17-May-18	<0.020			0.031	0.177	0.145	<0.010		0.0047
NNLB	NNLB-3May18-M	3-May-18	<0.020			0.043	0.166	0.123	<0.010		0.0036
NNLB	NNLB-10May18-M	10-May-18	<0.020			0.047	0.147	0.100	<0.010		0.0038
NNLB	NNLB-25Jul18-M	25-Jul-18	<0.020	<0.0050	0.050	0.050	0.177	0.128	0.0026	<0.0050	0.0038
NNLB	NNLB-2Aug18-M	2-Aug-18	<0.020	<0.0050	0.049	0.049	0.169	0.119	0.0042	<0.0050	0.0061
NNLB	NNLB-9Aug18-M	9-Aug-18	<0.020	<0.0050	0.045	0.045	0.125	0.079	0.0045	<0.0050	0.0046
NNLB	NNLB-16Aug18-M	16-Aug-18	0.090	<0.0050	0.039	0.039	0.198	0.159	0.0032	<0.0050	0.0050
NNLB	NNLB-23Aug18-M	23-Aug-18	0.031	<0.0050	0.051	0.051	0.193	0.142	0.0029	<0.0050	0.0051
NNLB	NNLB-23Oct18-M	23-Oct-18	<0.020	<0.0050	0.048	0.048			0.0041	<0.0050	
NNLB	NNLB-31Oct18-M	31-Oct-18	<0.020	<0.0050	0.049	0.049			0.0065	<0.0050	
NNLB	NNLB-08Nov18-M	8-Nov-18	<0.020	<0.0050	<0.020	<0.020	0.18	0.18	0.0035	<0.0050	0.005
NNLB	NNLB-08Nov18-Rep	8-Nov-18	0.023	<0.0050	0.027	0.027	0.203	0.177	0.0035	<0.0050	0.0058
NNLB	NNLB-15Nov18-M	15-Nov-18	<0.020	<0.0050	0.029	0.029	0.198	0.17	0.0038	<0.0050	0.0052
NNLB	NNLB-15Oct18-M	15-Oct-18	0.032	<0.0050	0.045	0.045	0.254	0.209	0.0042	<0.0050	0.0066

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EMS ID	E217018								
		No Name Lake 1 Metre Depth							
Site Name	NNL1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	23-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	2.1	2.1	2.0	1.9	1.7	2.0	**128**	-
Chlr-a	ug/L					0.80	0.80	-	-
Turb	NTU	0.40	0.51	0.33	0.54	1.11	0.58	-	-
Alk-T	mg/L	12.1	10.4	10.1	12.8	11.6	11.4	-	-
P-T	mg/L	0.0056	0.0036	0.0025	0.0043	0.0069	0.0046	-	-
Al-T	mg/L	0.0453	0.0349	0.0309	0.0319	0.0273	0.0341	-	-
As-T	mg/L	0.00025	0.00027	0.00029	0.00033	0.00033	0.00029	-	**0.005**
Ba-T	mg/L	0.0012	0.0011	0.0012	0.0011	0.0012	0.0012	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	4.03	4.12	4.05	4.13	4.19	4.10	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00069	0.00066	0.00055	0.00060	0.00055	0.00061	**0.002**	**0.007**
Hard-T	mg/L	13.3	14.0	13.7	13.9	14.0	13.8	-	-
Fe-T	mg/L	0.051	0.059	0.071	0.070	0.071	0.064	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	0.780	0.907	0.878	0.883	0.867	0.863	-	-
Mn-T	mg/L	0.0061	0.0058	0.0056	0.0036	0.0028	0.0048	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.088	0.089	0.081	0.073	0.074	0.081	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	1.08	1.19	1.18	1.11	1.20	1.15	-	-
Sr-T	mg/L	0.0122	0.0121	0.0126	0.0134	0.0141	0.0129	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0327	0.0337	0.0288	0.0285	0.0250	0.0297	**0.05**	**0.1**
As-D	mg/L	0.00024	0.00026	0.00024	0.00030	0.00032	0.00027	-	-
Ba-D	mg/L	0.0012	0.0012	0.0012	0.0012	0.0011	0.0012	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.00017**
Ca-D	mg/L	3.57	3.86	4.28	3.99	4.30	4.00	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00115	0.00055	0.00060	0.00058	0.00054	0.00068	-	-
Hard-D	mg/L	12.1	13.1	14.4	13.6	14.4	13.5	-	-
Fe-D	mg/L	0.0425	0.0475	0.0575	0.0609	0.0563	0.0529	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	0.769	0.828	0.896	0.872	0.896	0.852	-	-
Mn-D	mg/L	0.0058	0.0057	0.0038	0.0016	0.0012	0.0036	-	-
Hg-D	mg/L	0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000022	0.00000144	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.079	0.082	0.082	0.081	0.073	0.079	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	1.03	1.16	1.20	1.14	1.24	1.15	-	-
Sr-D	mg/L	0.0117	0.0128	0.0127	0.0123	0.0131	0.0125	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

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EMS ID	E217018	No Name Lake 1 Metre Depth							
Site Name	NNL1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		25-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	1.7	2.0	2.5	1.6	3.5	2.3	**128**	-
Chloro-a	ug/L					<0.50	0.250	-	-
Turb	NTU	0.31	0.38	0.25	0.27	0.27	0.30	-	-
Alk-T	mg/L	13.4	14.8	13.9	13.0	16.2	14.3	-	-
P-T	mg/L	<0.0020	0.0041	0.0045	0.0028	0.0030	0.00308	-	-
Al-T	mg/L	0.0159	0.0151	0.0130	0.0131	0.0127	0.0140	-	-
As-T	mg/L	0.00037	0.00039	0.00041	0.00043	0.00042	0.00040	-	**0.005**
Ba-T	mg/L	0.0012	0.0011	0.0011	0.0012	0.0011	0.0011	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	4.44	4.40	4.90	4.28	4.58	4.52	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00063	0.00068	0.00069	0.00058	<0.00050	0.000566	**0.002**	**0.007**
Hard-T	mg/L	15.1	15.2	16.4	14.6	15.4	15.3	-	-
Fe-T	mg/L	0.049	0.049	0.053	0.057	0.057	0.053	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	0.974	1.01	1.00	0.938	0.967	0.978	-	-
Mn-T	mg/L	0.0038	0.0049	0.0053	0.0052	0.0054	0.0049	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.084	0.078	0.080	0.077	0.073	0.078	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	1.32	1.29	1.33	1.25	1.25	1.29	-	-
Sr-T	mg/L	0.0144	0.0153	0.0151	0.0156	0.0152	0.0151	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0152	0.0134	0.0118	0.0126	0.0186	0.0143	**0.05**	**0.1**
As-D	mg/L	0.00034	0.00039	0.00037	0.00043	0.00037	0.00038	-	-
Ba-D	mg/L	0.0012	0.0010	0.0011	0.0010	0.0012	0.0011	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.00017**
Ca-D	mg/L	4.49	4.51	4.48	4.61	4.61	4.54	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00045	0.00064	0.00040	0.00046	0.00039	0.00047	-	-
Hard-D	mg/L	15.1	15.2	15.1	15.6	15.5	15.3	-	-
Fe-D	mg/L	0.0365	0.0372	0.0385	0.0426	0.0396	0.0389	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	0.948	0.968	0.956	0.999	0.967	0.968	-	-
Mn-D	mg/L	0.0027	0.0035	0.0038	0.0038	0.0028	0.0033	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.093	0.080	0.066	0.079	0.070	0.078	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	1.27	1.32	1.23	1.29	1.27	1.28	-	-
Sr-D	mg/L	0.0146	0.0145	0.0143	0.0152	0.0151	0.0147	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

Table 82
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EMS ID	E217018	No Name Lake 1 Metre Depth							
Site Name	NNL1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	31-Oct-18	8-Nov-18	15-Nov-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	1.80	1.20	1.30	1.3	<1.0	1.22	**128**	-
Chloro-a	ug/L				1.39		1.390	-	-
Turb	NTU	0.46	0.51	0.41	0.45	0.5	0.47	-	-
Alk-T	mg/L	12.1	<1.0	5.1	13.5	9	8.04	-	-
P-T	mg/L	0.0054			0.006	0.0046	0.0053	-	-
Al-T	mg/L	0.0424	0.0394	0.0432	0.0645	0.0535	0.0486	-	-
As-T	mg/L	0.00034	0.00035	0.00036	0.00029	0.00031	0.00033	-	**0.005**
Ba-T	mg/L	0.0014	0.0014	0.0015	0.0015	0.0016	0.0015	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	4.59	4.36	4.95	4.25	4.51	4.53	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.0012	0.00073	0.00120	0.0008	0.0006	0.00091	**0.002**	**0.007**
Hard-T	mg/L	15.5	14.9	16.7	14.3	15.1	15.3	-	-
Fe-T	mg/L	0.077	0.081	0.095	0.098	0.11	0.092	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	0.967	0.967	1.04	0.901	0.921	0.959	-	-
Mn-T	mg/L	0.0048	0.0056	0.0098	0.0119	0.0146	0.0093	**0.7**	**0.8**
Hg-T	mg/L	0.0000059	0.0000023	<0.0000020	<0.0000020	<0.0000020	0.00000224	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.096	0.089	0.096	0.123	0.125	0.106	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	1.29	1.250	1.32	1.15	1.2	1.24	-	-
Sr-T	mg/L	0.0149	0.0146	0.0147	0.014	0.0142	0.0145	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0365	0.0349	0.0365	0.0536	0.0443	0.0412	**0.05**	**0.1**
As-D	mg/L	0.00031	0.00032	0.00031	0.00027	0.00027	0.0003	-	-
Ba-D	mg/L	0.0013	0.0015	0.0015	0.0015	0.0015	0.0015	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.00017**
Ca-D	mg/L	4.33	4.6	4.89	4.21	4.09	4.42	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00061	0.00056	0.00054	0.00065	0.00066	0.0006	-	-
Hard-D	mg/L	14.6	15.4	16.4	14.2	14.2	15	-	-
Fe-D	mg/L	0.051	0.0454	0.0626	0.0716	0.0775	0.0616	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	0.908	0.96	1	0.891	0.962	0.944	-	-
Mn-D	mg/L	0.0030	0.0039	0.0076	0.01	0.0138	0.0077	-	-
Hg-D	mg/L	0.0000023	<0.0000020	0.0000053	<0.0000020	<0.0000020	0.00000212	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.099	0.093	0.084	0.126	0.112	0.103	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	1.14	1.22	1.26	1.15	1.25	1.2	-	-
Sr-D	mg/L	0.0135	0.0152	0.0143	0.0145	0.0136	0.0142	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

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EMS ID	E217018								
		No Name Lake 4 Metre Depth							
Site Name	NNL4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	23-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	2	1.5	1.9	2.3	1.7	1.9	**128**	-
Turb	NTU	0.31	0.33	0.36	0.36	0.52	0.38	-	-
Alk-T	mg/L	12.3	11.2	9.9	9.4	11	10.8	-	-
P-T	mg/L	0.0037	0.0025	0.0034	0.0045	0.0039	0.0036	-	-
Al-T	mg/L	0.0410	0.0451	0.0386	0.0433	0.0324	0.0401	-	-
As-T	mg/L	0.00025	0.00022	0.00020	0.00024	0.00023	0.00023	-	**0.005**
Ba-T	mg/L	0.0012	0.0011	0.0011	0.0011	0.0011	0.0011	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	4.08	3.78	3.85	3.83	3.62	3.83	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00073	0.00080	0.00055	0.00074	0.00062	0.00069	**0.002**	**0.007**
Hard-T	mg/L	13.6	12.7	13.0	12.7	12.2	12.8	-	-
Fe-T	mg/L	0.053	0.040	0.039	0.037	0.038	0.041	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	0.833	0.782	0.817	0.752	0.761	0.789	-	-
Mn-T	mg/L	0.0062	0.0041	0.0036	0.0031	0.0026	0.0039	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	0.00068	-	**0.025**
K-T	mg/L	0.086	0.075	0.073	0.073	0.070	0.075	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	1.11	1.05	1.10	1.04	1.04	1.07	-	-
Sr-T	mg/L	0.0120	0.0111	0.0117	0.0120	0.0122	0.0118	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0321	0.0349	0.0312	0.0318	0.0295	0.0319	**0.05**	**0.1**
As-D	mg/L	0.00025	0.00024	0.00022	0.00024	0.00023	0.00024	-	-
Ba-D	mg/L	0.0011	0.0013	0.0011	0.0011	0.0011	0.0011	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.000170**
Ca-D	mg/L	3.61	3.81	3.61	3.56	3.89	3.70	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L		0.00061	0.00056	0.00056	0.00046	0.00055	-	-
Hard-D	mg/L	12.3	12.7	12.1	12.2	13.0	12.5	-	-
Fe-D	mg/L	0.0346	0.0285	0.0263	0.0269	0.0259	0.0284	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	0.802	0.782	0.755	0.801	0.787	0.785	-	-
Mn-D	mg/L	0.0049	0.0035	0.0018	0.0011	<0.0010	0.00236	-	-
Hg-D	mg/L	0.0000021	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000122	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.076	0.083	0.073	0.075	0.071	0.076	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	1.07	1.11	1.09	1.08	1.12	1.09	-	-
Sr-D	mg/L	0.0112	0.0124	0.0115	0.0108	0.0113	0.0114	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

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EMS ID	E217018								
		No Name Lake 4 Metre Depth							
Site Name	NNL4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		25-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	<1.0	2.00	1	1.30	3.9	2	**128**	-
Turb	NTU	0.42	0.41	0.31	0.24	0.28	0.33	-	-
Alk-T	mg/L	15.1	14.6	16.9	16.3	16	15.8	-	-
P-T	mg/L	0.0161	0.0046	0.0068	0.0044	0.0025	0.0069	-	-
Al-T	mg/L	0.0234	0.0176	0.0483	0.0129	0.0128	0.023	-	-
As-T	mg/L	0.0005	0.00045	0.00045	0.00047	0.00041	0.00046	-	**0.005**
Ba-T	mg/L	0.0014	0.0012	0.0014	0.0011	0.0011	0.0012	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	4.8	4.68	5.02	4.62	4.53	4.73	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00064	0.00298	0.00078	0.0006	<0.00050	0.00105	**0.002**	**0.007**
Hard-T	mg/L	16.3	16	16.7	15.7	15.4	16.000	-	-
Fe-T	mg/L	0.106	0.072	0.072	0.06	0.057	0.073	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.05	1.05	1.01	1.01	1.00	1.024	-	-
Mn-T	mg/L	0.0052	0.005	0.0057	0.0049	0.0051	0.005	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.091	0.088	0.079	0.079	0.071	0.082	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	1.33	1.29	1.29	1.25	1.28	1.29	-	-
Sr-T	mg/L	0.0157	0.0154	0.0155	0.0154	0.0152	0.0154	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.018	0.0146	0.0146	0.0122	0.0131	0.0145	**0.05**	**0.1**
As-D	mg/L	0.00042	0.00045	0.00041	0.00046	0.00038	0.00042	-	-
Ba-D	mg/L	0.0013	0.0012	0.0013	0.0011	0.0011	0.0012	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	4.68	4.57	4.52	4.56	4.7	4.61	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.0006	0.00037	0.0005	0.00076	0.00047	0.00054	-	-
Hard-D	mg/L	15.7	15.5	15.3	15.4	15.8	15.5	-	-
Fe-D	mg/L	0.0711	0.0496	0.0454	0.043	0.04	0.0498	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	0.983	0.995	0.965	0.978	0.987	0.982	-	-
Mn-D	mg/L	0.0027	0.003	0.0033	0.0039	0.0027	0.0031	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000033	0.0000015	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.075	0.085	0.065	0.078	0.074	0.075	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	1.19	1.32	1.19	1.27	1.29	1.25	-	-
Sr-D	mg/L	0.0147	0.0149	0.0144	0.0149	0.0154	0.0149	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E217018	No Name Lake 4 Metre Depth							
Site Name	NNL4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	31-Oct-18	8-Nov-18	15-Nov-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	2	1	1.90	1.6	<1.0	1	**128**	-
Turb	NTU	0.44	0.45	0.46	0.54	0.53	0.48	-	-
Alk-T	mg/L	13.8	17.1	14.5	13.4	12	14.2	-	-
P-T	mg/L	0.0029			0.0062	0.0048	0.0046	-	-
Al-T	mg/L	0.0424	0.0428	0.0424	0.0639	0.0513	0.0486	-	-
As-T	mg/L	0.00035	0.00037	0.00035	0.00031	0.00031	0.00034	-	**0.005**
Ba-T	mg/L	0.0014	0.0015	0.0014	0.0014	0.0015	0.0014	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	4.46	4.57	4.77	4.18	4.69	4.53	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00073	0.00074	0.00107	0.00079	0.00154	0.00097	**0.002**	**0.007**
Hard-T	mg/L	15.1	15.4	15.9	14.2	15.6	15.200	-	-
Fe-T	mg/L	0.077	0.086	0.099	0.101	0.116	0.096	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	0.954	0.974	0.974	0.903	0.94	0.949	-	-
Mn-T	mg/L	0.0049	0.0055	0.0096	0.0123	0.0148	0.009	**0.7**	**0.8**
Hg-T	mg/L	0.0000046	0.0000023	<0.0000020	<0.0000020	<0.0000020	0.0000020	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.092	0.09	0.094	0.126	0.123	0.105	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	1.27	1.26	1.33	1.17	1.26	1.26	-	-
Sr-T	mg/L	0.0147	0.0144	0.0145	0.014	0.0145	0.0144	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0450	0.0394	0.0395	0.0486	0.0447	0.0434	**0.05**	**0.1**
As-D	mg/L	<0.00050	0.00031	0.00029	0.0003	0.00025	0.00028	-	-
Ba-D	mg/L	<0.0050	0.0015	0.0015	0.0015	0.0015	0.0017	-	-
B-D	mg/L	<0.25	<0.050	<0.050	<0.050	<0.050	0.045	-	-
Cd-D	mg/L	<0.000025	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	9.45	4.55	4.83	4.17	4.21	5.44	-	-
Cr-D	mg/L	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	0.0009	-	-
Co-D	mg/L	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	0.00018	-	-
Cu-D	mg/L	<0.0010	0.00069	0.00067	0.00069	0.00059	0.00063	-	-
Hard-D	mg/L	29.1	15.3	16.1	14.1	14.4	17.8	-	-
Fe-D	mg/L	0.081	0.0588	0.066	0.0716	0.079	0.0713	-	**0.35**
Pb-D	mg/L	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	0.00018	-	-
Mg-D	mg/L	1.34	0.947	0.993	0.884	0.938	1.02	-	-
Mn-D	mg/L	0.0071	0.0042	0.0079	0.0101	0.0138	0.0086	-	-
Hg-D	mg/L	0.0000039	0.0000063	0.0000056	<0.0000020	<0.0000020	0.0000036	-	-
Mo-D	mg/L	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	0.0009	-	-
Ni-D	mg/L	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	0.0009	-	-
K-D	mg/L	0.43	0.1	0.086	0.127	0.107	0.17	-	-
S-D	mg/L	-	<3.0	<3.0	<3.0	<3.0	369.2	-	-
Se-D	mg/L	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	0.00009	-	-
Na-D	mg/L	1.4	1.2	1.29	1.17	1.22	1.26	-	-
Sr-D	mg/L	0.0217	0.015	0.0147	0.0141	0.0137	0.0158	-	-
Zn-D	mg/L	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	0.0045	-	-

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EMS ID	E217018								
		No Name Lake 9 Metre Depth							
Site Name	NNL9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	23-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	4.3	4.1	4.1	4.5	4.7	4.3	**128**	-
Turb	NTU	0.45	0.53	0.35	0.39	0.34	0.41	-	-
Alk-T	mg/L	10.6	9.8	9.1	11.7	12.7	10.8	-	-
P-T	mg/L	0.0057	0.0033	0.0080	0.0040	0.0035	0.0049	-	-
Al-T	mg/L	0.0441	0.0425	0.0396	0.0383	0.135	0.0599	-	-
As-T	mg/L	0.00023	0.00021	0.00020	0.00021	0.00021	0.00021	-	**0.005**
Ba-T	mg/L	0.0014	0.0013	0.0014	0.0014	0.0014	0.0014	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	4.61	4.65	4.67	4.50	4.50	4.59	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00119	0.00060	0.00052	0.00104	0.00089	0.00085	**0.002**	**0.007**
Hard-T	mg/L	14.9	15.4	15.1	14.7	14.7	15.0	-	-
Fe-T	mg/L	0.099	0.100	0.086	0.084	0.084	0.091	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	0.813	0.915	0.845	0.847	0.847	0.853	-	-
Mn-T	mg/L	0.0152	0.0151	0.0145	0.0161	0.0146	0.0151	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.084	0.098	0.086	0.080	0.079	0.085	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	1.01	1.13	1.09	1.07	1.11	1.08	-	-
Sr-T	mg/L	0.0146	0.0148	0.0154	0.0154	0.0164	0.0153	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0377	0.0424	0.0351	0.0355	0.0347	0.0371	**0.05**	**0.1**
As-D	mg/L	0.00020	0.00023	0.00017	0.00020	0.00020	0.00020	-	-
Ba-D	mg/L	0.0013	0.0015	0.0016	0.0014	0.0013	0.0014	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	<0.0000050	0.0000053	<0.0000050	<0.0000050	<0.0000050	0.00000306	**0.000088**	**0.000170**
Ca-D	mg/L	4.09	4.54	4.40	4.29	4.62	4.39	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L		0.00057	0.00051	0.00048	0.00050	0.00052	-	-
Hard-D	mg/L	13.8	15.0	14.7	14.2	15.2	14.6	-	-
Fe-D	mg/L	0.0532	0.0837	0.0580	0.0662	0.0602	0.0643	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	0.867	0.894	0.908	0.851	0.880	0.880	-	-
Mn-D	mg/L	0.0139	0.0152	0.0130	0.0131	0.0126	0.0136	-	-
Hg-D	mg/L	0.0000021	0.0000023	<0.0000020	<0.0000020	0.0000024	0.00000176	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.078	0.093	0.095	0.083	0.077	0.085	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	1.07	1.14	1.14	1.08	1.15	1.12	-	-
Sr-D	mg/L	0.0148	0.0166	0.0154	0.0146	0.0152	0.0153	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

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EMS ID	E217018								
		No Name Lake 9 Metre Depth							
Site Name	NNL9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		25-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	4.5	4.3	4.7	1.3	5.9	4	**128**	-
Turb	NTU	0.41	0.46	0.3	0.22	0.43	0.36	-	-
Alk-T	mg/L	11	11.8	11.4	14.6	13.7	12.5	-	-
P-T	mg/L	0.0025	0.005	0.0048	0.0045	0.0034	0.004	-	-
Al-T	mg/L	0.036	0.0346	0.0524	0.0129	0.0326	0.0337	-	-
As-T	mg/L	0.00023	0.00022	0.00021	0.00046	0.00019	0.00026	-	**0.005**
Ba-T	mg/L	0.0017	0.0015	0.0014	0.0012	0.0015	0.0015	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	4.67	4.59	4.65	4.64	4.61	4.63	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00052	0.00057	0.00123	0.0007	<0.00050	0.00065	**0.002**	**0.007**
Hard-T	mg/L	15.4	15.2	15.2	15.7	15.1	15.300	-	-
Fe-T	mg/L	0.115	0.089	0.081	0.06	0.107	0.090	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	0.912	0.915	0.866	0.993	0.877	0.913	-	-
Mn-T	mg/L	0.0153	0.0123	0.0118	0.0049	0.0147	0.012	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000038	0.0000016	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.101	0.088	0.081	0.079	0.083	0.086	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	1.15	1.14	1.09	1.270	1.09	1.15	-	-
Sr-T	mg/L	0.0177	0.0169	0.0159	0.0155	0.0173	0.0167	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0301	0.0325	0.0292	0.0116	0.0304	0.0268	**0.05**	**0.1**
As-D	mg/L	0.00017	0.00019	0.0002	0.00042	0.00018	0.00023	-	-
Ba-D	mg/L	0.0015	0.0014	0.0015	0.0011	0.0015	0.0014	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	4.65	4.51	4.43	4.56	4.61	4.55	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00041	0.00045	0.00042	0.0004	0.00048	0.00043	-	-
Hard-D	mg/L	15.2	14.8	14.6	15.4	15.1	15	-	-
Fe-D	mg/L	0.0666	0.0595	0.0612	0.0424	0.0684	0.0596	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	0.879	0.87	0.861	0.983	0.881	0.895	-	-
Mn-D	mg/L	0.0127	0.01	0.011	0.0038	0.0127	0.01	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000034	0.0000015	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.088	0.085	0.075	0.077	0.083	0.082	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	1.13	1.17	1.080	1.25	1.11	1.15	-	-
Sr-D	mg/L	0.0171	0.0162	0.0163	0.0153	0.0174	0.0165	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E217018	No Name Lake 9 Metre Depth							
Site Name	NNL9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	31-Oct-18	8-Nov-18	15-Nov-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	3.4	3.7	2.60	<1.0	<1.0	2	**128**	-
Turb	NTU	0.46	0.4	0.45	0.5	0.41	0.44	-	-
Alk-T	mg/L	12.3	14	17.8	12.3	12.7	13.8	-	-
P-T	mg/L	0.0057			0.0059	0.0045	0.0054	-	-
Al-T	mg/L	0.0397	0.0334	0.0435	0.051	0.0583	0.0452	-	-
As-T	mg/L	0.00028	0.00025	0.00035	0.00026	0.00033	0.00029	-	**0.005**
Ba-T	mg/L	0.0017	0.0016	0.0015	0.0015	0.0015	0.0016	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	4.61	4.45	4.77	4.05	4.76	4.53	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00126	0.0006	0.0009	0.00075	**0.0342**	**0.00754**	**0.002**	**0.007**
Hard-T	mg/L	15.3	14.8	16.2	13.6	16.0	15.200	-	-
Fe-T	mg/L	0.116	0.119	0.132	0.099	0.123	0.118	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	0.914	0.884	1.04	0.853	0.991	0.936	-	-
Mn-T	mg/L	0.0335	0.0443	0.0214	0.0138	0.0156	0.026	**0.7**	**0.8**
Hg-T	mg/L	0.0000023	0.0000031	<0.0000020	<0.0000020	<0.0000020	0.0000017	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.09	0.089	0.109	0.112	0.126	0.105	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	1.21	1.11	1.32	1.12	1.3	1.21	-	-
Sr-T	mg/L	0.0167	0.0166	0.0149	0.0134	0.0144	0.0152	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0343	0.0336	0.0395	0.0456	0.0466	0.0399	**0.05**	**0.1**
As-D	mg/L	0.00026	0.00021	0.00032	0.00024	0.00025	0.00026	-	-
Ba-D	mg/L	0.0016	0.0018	0.0014	0.0015	0.0015	0.0016	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	4.34	4.79	5.02	3.97	4.11	4.45	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00057	0.00054	0.00070	0.00075	0.00064	0.00064	-	-
Hard-D	mg/L	14.5	15.8	16.6	13.5	14.2	14.9	-	-
Fe-D	mg/L	0.0665	0.0759	0.0864	0.0716	0.0877	0.0776	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	0.882	0.922	0.986	0.867	0.948	0.921	-	-
Mn-D	mg/L	0.0258	0.0411	0.0178	0.012	0.0146	0.0223	-	-
Hg-D	mg/L	0.0000024	0.0000054	<0.0000020	<0.0000020	<0.0000020	0.0000022	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.099	0.096	0.096	0.116	0.107	0.103	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	1.11	1.12	1.23	1.13	1.24	1.17	-	-
Sr-D	mg/L	0.0153	0.0178	0.0149	0.0138	0.0133	0.0150	-	-
Zn-D	mg/L	<0.0050	<0.0050	0.0063	<0.0050	<0.0050	0.0033	-	-

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EMS ID	E217018	No Name Lake 1 Metre From Bottom Depth							
Site Name	NNLB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	23-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	5.1	4.8	4.9	5.4	4.4	4.9	**128**	-
Turb	NTU	0.50	0.58	0.47	0.49	0.49	0.51	-	-
Alk-T	mg/L	11.2	9.4	9.6	9.5	11.5	10.2	-	-
P-T	mg/L	0.0036	0.0038	0.0047	0.0051	0.0034	0.0041	-	-
Al-T	mg/L	0.0463	0.0478	0.0415	0.0418	0.0416	0.0438	-	-
As-T	mg/L	0.00027	0.00022	0.00025	0.00025	0.00025	0.00025	-	**0.005**
Ba-T	mg/L	0.0014	0.0014	0.0016	0.0014	0.0016	0.0015	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	4.68	4.98	4.65	4.63	4.81	4.75	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.050**
Cu-T	mg/L	0.00068	0.00060	0.00056	0.00054	0.00093	0.00066	**0.0020**	**0.0070**
Hard-T	mg/L	15.6	16.3	15.3	15.1	15.8	15.6	-	-
Fe-T	mg/L	0.124	0.135	0.118	0.114	0.123	0.123	-	**1.0**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	0.951	0.938	0.904	0.863	0.909	0.913	-	-
Mn-T	mg/L	0.0198	0.0186	0.0189	0.0191	0.0190	0.0191	**0.70**	**0.80**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.094	0.096	0.094	0.083	0.086	0.091	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	1.13	1.15	1.14	1.05	1.19	1.13	-	-
Sr-T	mg/L	0.0161	0.0165	0.0171	0.0171	0.0183	0.0170	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0356	0.0420	0.0382	0.0343	0.0349	0.0370	**0.05**	**0.1**
As-D	mg/L	0.00021	0.00022	0.00019	0.00020	0.00020	0.00020	-	-
Ba-D	mg/L	0.0014	0.0015	0.0015	0.0013	0.0013	0.0014	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.000170**
Ca-D	mg/L	4.43	4.93	4.74	4.46	4.74	4.66	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L		0.00059	0.00049	0.00092	0.00043	0.00061	-	-
Hard-D	mg/L	14.6	16.1	15.4	14.9	15.6	15.3	-	-
Fe-D	mg/L	0.0668	0.0809	0.0717	0.0762	0.0764	0.0744	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	0.867	0.927	0.853	0.900	0.902	0.890	-	-
Mn-D	mg/L	0.0164	0.0176	0.0162	0.0158	0.0152	0.0162	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000025	0.00000130	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.082	0.094	0.091	0.083	0.078	0.086	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.50	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	1.11	1.18	1.15	1.11	1.18	1.15	-	-
Sr-D	mg/L	0.0160	0.0182	0.0170	0.0156	0.0161	0.0166	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

Table 90
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EMS ID	E217018								
		No Name Lake 1 Metre From Bottom Depth							
Site Name	NNLB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		25-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	4.7	5.30	5.2	4.40	5.9	5	**128**	-
Turb	NTU	0.54	0.53	0.41	0.36	0.45	0.46	-	-
Alk-T	mg/L	10.8	10.4	11.3	10.7	12.5	11.1	-	-
P-T	mg/L	0.0038	0.0061	0.0046	0.005	0.0051	0.0049	-	-
Al-T	mg/L	0.0369	0.037	0.0335	0.0333	0.0342	0.035	-	-
As-T	mg/L	0.00025	0.00024	0.00023	0.00022	0.00023	0.00023	-	**0.005**
Ba-T	mg/L	0.0017	0.0016	0.0016	0.0017	0.0016	0.0016	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	4.62	4.82	4.88	4.75	4.47	4.71	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.050**
Cu-T	mg/L	0.00054	0.00051	0.00079	0.00056	0.00052	0.00058	**0.0020**	**0.0070**
Hard-T	mg/L	15.2	15.9	15.8	15.7	14.8	15.500	-	-
Fe-T	mg/L	0.156	0.138	0.137	0.119	0.136	0.137	-	**1.0**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	0.898	0.933	0.869	0.926	0.892	0.904	-	-
Mn-T	mg/L	0.0172	0.0167	0.0164	0.0156	0.0171	0.017	**0.70**	**0.80**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000064	0.0000021	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.094	0.097	0.086	0.092	0.088	0.091	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	1.12	1.19	1.10	1.13	1.09	1.13	-	-
Sr-T	mg/L	0.0179	0.0181	0.017	0.0183	0.0178	0.0178	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0313	0.033	0.0296	0.0293	0.0308	0.0308	**0.05**	**0.1**
As-D	mg/L	0.00018	0.00020	0.00018	0.00021	0.00017	0.00019	-	-
Ba-D	mg/L	0.0016	0.0015	0.0015	0.0015	0.0016	0.0015	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	4.86	4.68	4.68	4.55	4.67	4.69	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00043	0.00042	0.00060	0.00068	0.00048	0.00052	-	-
Hard-D	mg/L	15.9	15.5	15.3	15.1	15.3	15.4	-	-
Fe-D	mg/L	0.0899	0.0865	0.0896	0.0784	0.0833	0.0855	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	0.90	0.929	0.886	0.899	0.885	0.9	-	-
Mn-D	mg/L	0.0137	0.0135	0.0141	0.0134	0.0141	0.0138	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000046	0.0000017	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.094	0.09	0.078	0.093	0.098	0.091	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	1.14	1.17	1.07	1.11	1.11	1.12	-	-
Sr-D	mg/L	0.0179	0.0183	0.0175	0.0176	0.018	0.0179	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E217018								
		No Name Lake 1 Metre From Bottom Depth							
Site Name	NNLB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	31-Oct-18	8-Nov-18	15-Nov-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	4.80	4.30	5.10	1.00	1.30	3	**128**	-
Turb	NTU	0.61	0.59	0.56	0.65	0.49	0.58	-	-
Alk-T	mg/L	13.2	13.200	13.6	11.4	11.2	12.5	-	-
P-T	mg/L	0.0066			0.005	0.0052	0.0056	-	-
Al-T	mg/L	0.0337	0.0327	0.0359	0.0517	0.0566	0.0421	-	-
As-T	mg/L	0.00023	0.0002	0.00027	0.0003	0.00033	0.00027	-	**0.005**
Ba-T	mg/L	0.002	0.002	0.002	0.002	0.002	0.0017	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	5.0	4.7	5.1	4.1	4.6	4.68	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.050**
Cu-T	mg/L	0.00101	0.00052	0.00103	0.00081	0.00086	0.00085	**0.0020**	**0.0070**
Hard-T	mg/L	16	16	17	14	15	15.500	-	-
Fe-T	mg/L	0.20	0.19	0.22	0.13	0.13	0.172	-	**1.0**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	0.93	0.92	1.00	0.88	0.95	0.936	-	-
Mn-T	mg/L	0.0774	0.0730	0.0762	0.0232	0.0150	0.053	**0.70**	**0.80**
Hg-T	mg/L	0.0000068	<0.0000020	0.0000	<0.0000020	<0.0000020	0.0000031	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.093	0.091	0.095	0.107	0.121	0.101	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	1.16	1.11	1.23	1.12	1.25	1.17	-	-
Sr-T	mg/L	0.0193	0.0178	0.0178	0.0134	0.0139	0.0164	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0256	0.0289	0.0306	0.0453	0.0470	0.0355	**0.05**	**0.1**
As-D	mg/L	0.00018	0.0002	0.00022	0.00028	0.00027	0.00023	-	-
Ba-D	mg/L	0.002	0.002	0.002	0.001	0.002	0.0016	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	4.7	4.9	5.1	4.1	4.1	4.57	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.0004	0.0004	0.0005	0.0006	0.0007	0.00051	-	-
Hard-D	mg/L	15.30	15.90	16.70	13.70	14.10	15.1	-	-
Fe-D	mg/L	0.100	0.097	0.112	0.091	0.082	0.0963	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	0.863	0.918	0.953	0.853	0.945	0.906	-	-
Mn-D	mg/L	0.065	0.070	0.069	0.020	0.013	0.0476	-	-
Hg-D	mg/L	<0.0000020	0.0000	0.0000	<0.0000020	<0.0000020	0.0000025	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.099	0.096	0.088	0.111	0.108	0.1	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	1.5	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	1.04	1.10	1.16	1.11	1.22	1.13	-	-
Sr-D	mg/L	0.0175	0.0188	0.0179	0.0140	0.0137	0.0164	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206619								
		Long Lake Middle 1 Metre Depth							
Site Name	LLM1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		2-May-18	10-May-18	17-May-18	23-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	33.6	41.7	52.3	67.1	67.6	52.5	**128**	-
Chloro-a	ug/L					<0.50	0.250	-	-
Turb	NTU	0.40	0.45	0.33	0.47	0.34	0.40	-	-
Alk-T	mg/L	22.9	23.0	28.6	34.2	36.3	29.0	-	-
P-T	mg/L	0.0024	0.0026	0.0027	0.0025	0.0049	0.0030	-	-
Al-T	mg/L	0.0340	0.0279	0.0222	0.0208	0.0167	0.0243	-	-
As-T	mg/L	0.00039	0.00040	0.00046	0.00050	0.00050	0.00045	-	**0.005**
Ba-T	mg/L	0.0038	0.0042	0.0051	0.0053	0.0062	0.0049	-	-
B-T	mg/L	<0.050	<0.050	0.061	0.070	0.083	0.0528	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	15.2	20.2	23.6	26.8	30.4	23.2	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00084	0.00122	0.00057	<0.00050	<0.00050	0.000626	**0.002**	**0.007**
Hard-T	mg/L	46.5	60.8	70.1	79.3	90.0	69.3	-	-
Fe-T	mg/L	0.058	0.053	0.047	0.044	0.036	0.048	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	2.05	2.52	2.74	3.01	3.41	2.75	-	-
Mn-T	mg/L	0.0078	0.0080	0.0116	0.0139	0.0150	0.0113	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.216	0.281	0.320	0.326	0.373	0.303	-	-
S-T	mg/L	11.3	15.7	21.7	21.3	25.2	19.0	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	5.36	6.99	8.71	10.2	12.2	8.69	-	-
Sr-T	mg/L	0.101	0.116	0.151	0.200	0.232	0.160	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.037	0.0213	0.0199	0.0176	0.0150	0.0222	**0.05**	**0.1**
As-D	mg/L	<0.00050	0.00042	0.00040	0.00043	0.00046	0.000392	-	-
Ba-D	mg/L	<0.0050	0.0043	0.0049	0.0054	0.0058	0.00458	-	-
B-D	mg/L	<0.25	0.052	0.056	0.067	0.082	0.0764	-	-
Cd-D	mg/L	<0.000025	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000450	**0.000088**	**0.000170**
Ca-D	mg/L	16.1	19.0	22.6	26.2	31.2	23.0	-	-
Cr-D	mg/L	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	0.00090	-	-
Co-D	mg/L	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	0.000180	-	-
Cu-D	mg/L	<0.0010	0.00088	0.00052	0.00042	0.00048	0.000560	-	-
Hard-D	mg/L	49.3	57.3	67.7	77.2	92.9	68.9	-	-
Fe-D	mg/L	0.063	0.0306	0.0354	0.0311	0.0266	0.0373	-	**0.35**
Pb-D	mg/L	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	0.000180	-	-
Mg-D	mg/L	2.20	2.40	2.76	2.89	3.65	2.78	-	-
Mn-D	mg/L	0.0082	0.0055	0.0095	0.0119	0.0127	0.0096	-	-
Hg-D	mg/L	0.0000022	<0.0000020	<0.0000020	<0.0000020	0.0000021	0.00000146	-	-
Mo-D	mg/L	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	0.00090	-	-
Ni-D	mg/L	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	0.00090	-	-
K-D	mg/L	0.228	0.255	0.330	0.319	0.364	0.299	-	-
S-D	mg/L	11.2	14.7	18.0	20.8	25.6	18.1	-	-
Se-D	mg/L	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	0.000090	-	-
Na-D	mg/L	5.68	6.92	9.16	10.1	12.7	8.91	-	-
Sr-D	mg/L	0.0964	0.130	0.146	0.191	0.222	0.1571	-	-
Zn-D	mg/L	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	0.00450	-	-

Table 93
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EMS ID	E206619	Long Lake Middle 1 Metre Depth							
Site Name	LLM1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		25-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	93.5	98.2	90.9	99.7	97.9	96	**128**	-
Chloro-a	ug/L					0.5	0.5	-	-
Turb	NTU	0.23	0.3	0.26	0.19	0.23	0.24	-	-
Alk-T	mg/L	42.7	42.4	41.6	43.9	44	42.9	-	-
P-T	mg/L	<0.0020	0.0066	0.0064	0.0023	0.0025	0.0038	**0.007**	-
Al-T	mg/L	0.0146	0.0102	0.0142	0.0094	0.0083	0.0113	-	-
As-T	mg/L	0.00059	0.00057	0.00063	0.00066	0.00059	0.00061	-	**0.005**
Ba-T	mg/L	0.0072	0.0071	0.0073	0.0075	0.0067	0.0072	-	-
B-T	mg/L	0.089	0.1	0.091	0.097	0.106	0.097	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	34.8	35.5	38.3	35.4	35.1	35.8	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000	-	**0.05**
Cu-T	mg/L	0.00053	<0.00050	0.0006	<0.00050	0.00056	0.00044	**0.002**	**0.007**
Hard-T	mg/L	104	106	112	107	105	106.800	-	-
Fe-T	mg/L	0.025	0.021	0.017	0.012	0.012	0.017	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	4.15	4.15	4.1	4.39	4.29	4.220	-	-
Mn-T	mg/L	0.0069	0.0058	0.0045	0.0036	0.0046	0.005	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000048	0.0000018	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.429	0.42	0.424	0.448	0.438	0.432	-	-
S-T	mg/L	30.8	29.3	30.8	31.4	32.5	31.0	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	14.1	14.1	14.1	14.6	15	14.4	-	-
Sr-T	mg/L	0.265	0.264	0.27	0.271	0.287	0.271	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0089	0.0095	0.0097	0.0081	0.0101	0.0093	**0.05**	**0.1**
As-D	mg/L	0.00052	0.00058	0.00057	0.00064	0.00064	0.00059	-	-
Ba-D	mg/L	0.007	0.007	0.007	0.0075	0.0077	0.0072	-	-
B-D	mg/L	0.085	0.093	0.090	0.086	0.092	0.089	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	35	36.9	35.7	36.1	36.7	36.1	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00031	0.00027	0.00076	0.00036	0.00035	0.00041	-	-
Hard-D	mg/L	103	109	106	107	109	106.8	-	-
Fe-D	mg/L	0.0213	0.0121	0.0119	0.0118	0.0122	0.0139	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	3.74	3.97	4.17	4.19	4.21	4.06	-	-
Mn-D	mg/L	0.0012	<0.0010	<0.0010	0.0015	0.0012	0.00098	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.411	0.448	0.418	0.444	0.47	0.438	-	-
S-D	mg/L	27.6	31.7	30.8	30.5	33.6	30.8	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	12.5	12.8	14.3	14.3	14	13.60	-	-
Sr-D	mg/L	0.253	0.259	0.267	0.276	0.274	0.2660	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206619								
		Long Lake Middle 1 Metre Depth							
Site Name	LLM1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	1-Nov-18	8-Nov-18	15-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	56.40	55.70	41.50	40.20	25.80	44	**128**	-
Chloro-a	ug/L				1.22		1.22	-	-
Turb	NTU	0.5	0.4	0.4	0.5	0.6	0.45	-	-
Alk-T	mg/L	31.6	32.2	34.1000	25.4	20.7	28.8	-	-
P-T	mg/L	0.0044	0.0067		0.0043	0.0045	0.0050	-	-
Al-T	mg/L	0.0188	0.0180	0.0226	0.0324	0.0449	0.0273	-	-
As-T	mg/L	0.00059	0.00054	0.00049	0.00049	0.00049	0.00052	-	**0.005**
Ba-T	mg/L	0.0063	0.0056	0.0052	0.0048	0.0037	0.0051	-	-
B-T	mg/L	0.059	0.057	0.059	<0.050	<0.050	0.045	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	26.10	23.90	22.90	18.10	13.40	20.9	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000	-	**0.05**
Cu-T	mg/L	0.00053	0.00056	0.00106	0.00076	0.00164	0.00091	**0.002**	**0.007**
Hard-T	mg/L	76.9	71.8	69.2	55.2	41.7	63.000	-	-
Fe-T	mg/L	0.062	0.057	0.119	0.088	0.092	0.084	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	2.84	2.91	2.94	2.41	1.96	2.610	-	-
Mn-T	mg/L	0.0125	0.0117	0.0103	0.0088	0.0085	0.010	**0.7**	**0.8**
Hg-T	mg/L	0.0000021	0.0000	0.0000	<0.0000020	<0.0000020	0.0000025	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.35	0.31	0.31	0.26	0.24	0.292	-	-
S-T	mg/L	21.2	19.0	18.5	13.6	8.6	16.2	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	8.4	8.4	8.1	5.8	4.2	7	-	-
Sr-T	mg/L	0.17	0.17	0.14	0.12	0.07	0.1341	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0136	0.0155	0.0155	0.0255	0.0353	0.0211	**0.05**	**0.1**
As-D	mg/L	0.0005	0.0005	0.0004	0.0005	0.0004	0.00046	-	-
Ba-D	mg/L	0.00530	0.00590	0.00510	0.00480	0.00390	0.005	-	-
B-D	mg/L	0.06	0.059	0.057	<0.050	<0.050	0.045	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	23.7	24.7	23.5	17.9	12.8	20.5	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00045	0.00059	0.00046	0.00059	0.00063	0.00054	-	-
Hard-D	mg/L	72	74	71	55	40	62.1	-	-
Fe-D	mg/L	0.031	0.031	0.035	0.053	0.070	0.0441	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	3.00	3.05	2.87	2.37	1.89	2.64	-	-
Mn-D	mg/L	0.004	0.0037	0.0031	0.0054	0.0069	0.0046	-	-
Hg-D	mg/L	0.000004	0.0000	0.000005	<0.0000020	<0.0000020	0.0000030	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.320	0.325	0.290	0.266	0.219	0.284	-	-
S-D	mg/L	18.7	20.0	18.5	13.7	8.8	15.9	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	8.75	8.64	7.83	5.67	4.14	7.01	-	-
Sr-D	mg/L	0.159	0.170	0.140	0.115	0.074	0.1316	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206619								
		Long Lake Middle 4 Metre Depth							
Site Name	LLM4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		2-May-18	10-May-18	17-May-18	23-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	63.7	81.0	76.5	84.7	77.1	76.6	**128**	-
Turb	NTU	0.44	0.65	0.36	0.36	0.39	0.44	-	-
Alk-T	mg/L	<1.0	35.0	35.8	39.3	36.3	29.38	-	-
P-T	mg/L	0.0057	0.0032	0.0033	0.0039	0.0045	0.0041	-	-
Al-T	mg/L	0.0340	0.0291	0.0243	0.0213	0.0201	0.0258	-	-
As-T	mg/L	0.00036	0.00035	0.00038	0.00037	0.00039	0.00037	-	**0.005**
Ba-T	mg/L	0.0049	0.0058	0.0061	0.0059	0.0061	0.0058	-	-
B-T	mg/L	0.072	0.074	0.082	0.085	0.083	0.079	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	24.9	34.8	31.5	33.2	30.6	31.0	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00073	0.00078	0.00067	<0.00050	<0.00050	0.000536	**0.002**	**0.007**
Hard-T	mg/L	74.2	103	93.2	97.7	90.8	91.8	-	-
Fe-T	mg/L	0.053	0.060	0.046	0.028	0.030	0.043	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	2.90	3.90	3.49	3.59	3.50	3.48	-	-
Mn-T	mg/L	0.0095	0.0086	0.0078	0.0035	0.0083	0.0075	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.334	0.470	0.416	0.411	0.389	0.404	-	-
S-T	mg/L	20.7	31.1	27.5	27.8	26.7	26.8	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	10.1	14.1	13.4	12.9	12.6	12.6	-	-
Sr-T	mg/L	0.197	0.231	0.225	0.251	0.239	0.229	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0219	0.0184	0.0179	0.0184	0.0159	0.0185	**0.05**	**0.1**
As-D	mg/L	0.00034	0.00033	0.00037	0.00034	0.00037	0.00035	-	-
Ba-D	mg/L	0.0053	0.0061	0.0058	0.0058	0.0057	0.0057	-	-
B-D	mg/L	0.065	0.090	0.074	0.076	0.087	0.078	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.000170**
Ca-D	mg/L	27.3	33.8	31.3	30.5	33.4	31.3	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00045	0.00054	0.00041	0.00044	0.00043	0.00045	-	-
Hard-D	mg/L	80.5	100	92.1	90.3	98.9	92.4	-	-
Fe-D	mg/L	0.0245	0.0206	0.0236	0.0192	0.0216	0.0219	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	2.97	3.83	3.40	3.44	3.78	3.48	-	-
Mn-D	mg/L	0.0014	0.0010	0.0041	0.0014	0.0062	0.0028	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	0.0000023	<0.0000020	0.0000023	0.00000152	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.386	0.436	0.417	0.387	0.394	0.404	-	-
S-D	mg/L	23.1	29.0	28.4	25.7	27.0	26.6	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	10.5	14.1	12.4	12.8	13.6	12.7	-	-
Sr-D	mg/L	0.190	0.265	0.231	0.234	0.237	0.231	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

Table 96
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EMS ID	E206619								
		Long Lake Middle 4 Metre Depth							
Site Name	LLM4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		25-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	95.8	103	101	101	94.6	99.1	**128**	-
Turb	NTU	0.26	0.4	0.26	0.24	0.32	0.30	-	-
Alk-T	mg/L	41.5	40.6	43	41.6	44	42.1	-	-
P-T	mg/L	<0.0020	0.0038	0.0046	<0.0020	0.0029	0.00266	**0.007**	-
Al-T	mg/L	0.0099	0.0094	0.0118	0.0083	0.0097	0.0098	-	-
As-T	mg/L	0.00054	0.00056	0.00051	0.00063	0.00056	0.00056	-	**0.005**
Ba-T	mg/L	0.0072	0.0072	0.0075	0.0075	0.0069	0.0073	-	-
B-T	mg/L	0.094	0.099	0.098	0.1	0.11	0.100	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	35.8	36.7	40.8	36.3	34.6	36.8	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	<0.00050	0.00103	0.00061	<0.00050	<0.00050	0.00048	**0.002**	**0.007**
Hard-T	mg/L	107	109	120	108	104	109.600	-	-
Fe-T	mg/L	0.027	0.026	0.02	0.016	0.013	0.020	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	4.3	4.28	4.43	4.29	4.23	4.310	-	-
Mn-T	mg/L	0.0076	0.0066	0.0057	0.0033	0.0048	0.006	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000056	0.0000019	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.434	0.425	0.456	0.448	0.425	0.438	-	-
S-T	mg/L	31.7	31.5	33.9	31	31.4	31.9	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	14.4	14.6	15.6	14.6	14.5	14.7	-	-
Sr-T	mg/L	0.275	0.267	0.289	0.277	0.273	0.276	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.008	0.0085	0.0068	0.0097	0.0082	0.0082	**0.05**	**0.1**
As-D	mg/L	0.00048	0.00054	0.0005	0.00058	0.00065	0.00055	-	-
Ba-D	mg/L	0.0072	0.0072	0.0074	0.0074	0.0075	0.0073	-	-
B-D	mg/L	0.084	0.099	0.097	0.093	0.096	0.094	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	36.4	39.0	38.4	35.7	37.1	37.3	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00034	0.00063	0.00048	0.00038	0.00037	0.00044	-	-
Hard-D	mg/L	107	114	114	106	110	110.2	-	-
Fe-D	mg/L	0.019	0.0137	0.0137	0.0106	0.0107	0.0135	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	3.86	4.06	4.5	4.01	4.29	4.14	-	-
Mn-D	mg/L	0.0013	<0.0010	<0.0010	0.0015	<0.0010	0.00086	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000061	0.0000020	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.424	0.44	0.441	0.435	0.466	0.441	-	-
S-D	mg/L	31.6	33.7	34.1	30	33.0	32.5	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	12.9	13.6	15.7	13.7	14.9	14.20	-	-
Sr-D	mg/L	0.269	0.265	0.295	0.278	0.272	0.2760	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0362	0.0092	-	-

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EMS ID	E206619								
		Long Lake Middle 4 Metre Depth							
Site Name	LLM4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	1-Nov-18	8-Nov-18	15-Nov-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	59.1	55.7	56.8	40.0	37.0	49.7	**128**	-
Turb	NTU	0.55	0.53	0.27	0.46	0.46	0.45	-	-
Alk-T	mg/L	32.1	31.9	32.5	23.4	18.8	27.7	-	-
P-T	mg/L	0.004	0.005		0.0057	0.0035	0.0046	-	-
Al-T	mg/L	0.0182	0.0208	0.0396	0.0376	0.0381	0.0309	-	-
As-T	mg/L	0.00059	0.00055	0.00051	0.00052	0.00047	0.00053	-	**0.005**
Ba-T	mg/L	0.0063	0.0057	0.0057	0.0055	0.0045	0.0055	-	-
B-T	mg/L	0.056	0.058	0.065	0.052	<0.050	0.051	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	25.8	24.5	24.1	18.7	17.6	22.1	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	<0.00050	0.00056	<0.00050	0.00075	0.00071	0.00050	**0.002**	**0.007**
Hard-T	mg/L	76	74	73	57	53	66.500	-	-
Fe-T	mg/L	0.064	0.059	0.123	0.082	0.089	0.083	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	2.75	3.05	3.14	2.48	2.25	2.730	-	-
Mn-T	mg/L	0.012	0.012	0.011	0.009	0.009	0.011	**0.7**	**0.8**
Hg-T	mg/L	0.0000079	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000024	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.34	0.32	0.341	0.272	0.259	0.306	-	-
S-T	mg/L	19.8	19.6	19.0	14.2	12.5	17.0	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	8.0	8.5	8.8	6.1	5.2	7.32	-	-
Sr-T	mg/L	0.166	0.169	0.153	0.1210	0.1	0.142	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0136	0.0176	0.0169	0.0253	0.0325	0.0212	**0.05**	**0.1**
As-D	mg/L	0.00051	0.0005	0.00048	0.00043	0.00042	0.00047	-	-
Ba-D	mg/L	0.0054	0.0059	0.0054	0.0049	0.0047	0.0053	-	-
B-D	mg/L	0.063	0.059	0.061	<0.050	<0.050	0.047	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	23.8	24.40	26	17.90	15.9	21.6	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00045	0.00042	0.00078	0.00053	0.00058	0.00055	-	-
Hard-D	mg/L	72	73	78	55	49	65.5	-	-
Fe-D	mg/L	0.032	0.032	0.033	0.053	0.068	0.0434	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	3.07	3.05	3.13	2.41	2.33	2.8	-	-
Mn-D	mg/L	0.0042	0.0038	0.0028	0.0055	0.0071	0.0047	-	-
Hg-D	mg/L	0.0000044	<0.0000020	0.0000035	<0.0000020	<0.0000020	0.0000022	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	0.0007	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.32	0.326	0.321	0.266	0.246	0.296	-	-
S-D	mg/L	19.10	20.30	20.10	14.00	12.00	17.1	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	8.8	8.6	8.8	5.8	5.2	7.44	-	-
Sr-D	mg/L	0.161	0.173	0.153	0.117	0.099	0.1405	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206619								
		Long Lake Middle 9 Metre Depth							
Site Name	LLM9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		2-May-18	10-May-18	17-May-18	23-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	139	135	128	146	128	135.2	**128**	-
Turb	NTU	0.66	0.47	0.43	0.26	0.40	0.44	-	-
Alk-T	mg/L	57.0	51.8	48.4	55.1	54.9	53.4	-	-
P-T	mg/L	0.0038	0.0040	0.0026	0.0026	0.0050	0.0036	-	-
Al-T	mg/L	0.120	0.0185	0.0216	0.0244	0.0880	0.0545	-	-
As-T	mg/L	0.00021	0.00022	0.00023	0.00022	0.00021	0.00022	-	**0.005**
Ba-T	mg/L	0.0076	0.0077	0.0078	0.0083	0.0083	0.0079	-	-
B-T	mg/L	0.134	0.133	0.123	0.136	0.134	0.132	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	46.4	56.0	49.3	52.5	49.7	50.8	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00073	0.00066	<0.00050	0.00065	0.00068	0.000594	**0.002**	**0.007**
Hard-T	mg/L	137	165	144	153	146	149.0	-	-
Fe-T	mg/L	0.037	0.047	0.034	0.026	0.029	0.035	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	5.09	6.17	5.05	5.37	5.39	5.41	-	-
Mn-T	mg/L	0.0550	0.0556	0.0336	0.0440	0.0386	0.0454	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.617	0.759	0.663	0.651	0.655	0.669	-	-
S-T	mg/L	43.0	52.5	47.8	47.9	47.1	47.7	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	21.9	25.7	20.8	23.1	23.0	22.9	-	-
Sr-T	mg/L	0.400	0.374	0.358	0.418	0.423	0.395	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0146	0.0140	0.0143	0.0125	0.0121	0.0135	**0.05**	**0.1**
As-D	mg/L	0.00020	0.00021	0.00024	0.00019	0.00019	0.00021	-	-
Ba-D	mg/L	0.0083	0.0080	0.0078	0.0078	0.0077	0.0079	-	-
B-D	mg/L	0.139	0.135	0.116	0.123	0.140	0.131	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.000170**
Ca-D	mg/L	52.8	49.3	47.5	49.9	51.5	50.2	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00044	0.00053	0.00053	0.00039	0.00045	0.00047	-	-
Hard-D	mg/L	154	146	140	147	152	147.8	-	-
Fe-D	mg/L	0.0232	0.0408	0.0187	0.0155	0.0141	0.0225	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	5.33	5.46	5.12	5.33	5.60	5.37	-	-
Mn-D	mg/L	0.0441	0.0433	0.0224	0.0333	0.0249	0.0336	-	-
Hg-D	mg/L	0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000021	0.00000142	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.700	0.650	0.625	0.619	0.636	0.646	-	-
S-D	mg/L	45.5	46.3	44.5	44.6	45.6	45.3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	22.5	23.6	21.0	22.7	23.8	22.7	-	-
Sr-D	mg/L	0.387	0.418	0.345	0.402	0.394	0.389	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

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EMS ID	E206619								
		Long Lake Middle 9 Metre Depth							
Site Name	LLM9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		25-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	142	145	138	146	140	142.2	**128**	-
Turb	NTU	0.18	0.33	0.26	0.17	0.31	0.25	-	-
Alk-T	mg/L	55.1	56.7	54.1	54.5	56.2	55.3	-	-
P-T	mg/L	<0.0020	0.0048	0.004	<0.0020	0.0045	0.00306	**0.007**	-
Al-T	mg/L	0.0128	0.0127	0.0122	0.0112	0.0117	0.0121	-	-
As-T	mg/L	0.00022	0.00023	0.0002	0.00022	0.00022	0.00022	-	**0.005**
Ba-T	mg/L	0.0085	0.0081	0.0081	0.0085	0.0078	0.0082	-	-
B-T	mg/L	0.135	0.133	0.127	0.137	0.152	0.137	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	50.8	49.7	52.7	49.5	48.6	50.3	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	<0.00050	0.00060	0.00052	<0.00050	<0.00050	0.00037	**0.002**	**0.007**
Hard-T	mg/L	150	147	153	146	145	148.20	-	-
Fe-T	mg/L	0.021	0.022	0.018	0.014	0.019	0.019	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	5.68	5.53	5.22	5.55	5.69	5.530	-	-
Mn-T	mg/L	0.0373	0.0422	0.0451	0.0391	0.0451	0.042	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000042	0.0000016	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.692	0.668	0.632	0.692	0.665	0.67	-	-
S-T	mg/L	49.2	48	45.2	46.7	48.1	47.4	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	24.3	23.7	22.5	23.8	23.9	23.6	-	-
Sr-T	mg/L	0.425	0.387	0.395	0.432	0.42	0.412	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0108	0.0110	0.0110	0.0111	0.0138	0.0115	**0.05**	**0.1**
As-D	mg/L	0.00019	0.00024	0.00019	0.00018	0.00024	0.00021	-	-
Ba-D	mg/L	0.0082	0.008	0.0077	0.0081	0.0082	0.008	-	-
B-D	mg/L	0.121	0.13	0.122	0.124	0.133	0.126	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	49.6	53.0	49.3	49.2	47.9	49.8	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00037	0.00042	0.00049	0.00043	0.00039	0.00042	-	-
Hard-D	mg/L	145	154	145	144	141	145.8	-	-
Fe-D	mg/L	0.0178	0.0136	0.0148	0.0127	0.0352	0.0188	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	5.04	5.25	5.34	5	5.21	5.17	-	-
Mn-D	mg/L	0.0339	0.0366	0.0401	0.0376	0.039	0.0375	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.668	0.673	0.628	0.652	0.669	0.658	-	-
S-D	mg/L	46.7	48.5	45.1	44.4	45.9	46.1	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	21.3	21.6	22.6	21.8	21.8	21.80	-	-
Sr-D	mg/L	0.403	0.391	0.402	0.41	0.385	0.3980	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206619								
		Long Lake Middle 9 Metre Depth							
Site Name	LLM9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	1-Nov-18	8-Nov-18	15-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	116	131	108	101	66	104.3	**128**	-
Turb	NTU	0.45	0.45	0.42	0.51	0.54	0.47	-	-
Alk-T	mg/L	49.9	56.9	50.5	45.2	28.7	46.2	-	-
P-T	mg/L	0.0125	0.004		0.0038	0.0047	0.0062	-	-
Al-T	mg/L	0.0103	0.0096	0.0153	0.0231	0.0377	0.0192	-	-
As-T	mg/L	0.00032	0.00025	0.00034	0.0004	0.00049	0.00036	-	**0.005**
Ba-T	mg/L	0.0083	0.0080	0.0078	0.0077	0.0066	0.0077	-	-
B-T	mg/L	0.116	0.124	0.110	0.098	0.062	0.102	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	45.1	49	45.2	37.8	28.7	41.2	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00077	0.00035	**0.002**	**0.007**
Hard-T	mg/L	130	143	135	112	87	121.40	-	-
Fe-T	mg/L	0.034	0.027	0.049	0.065	0.113	0.058	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	4.21	5.10	5.35	4.32	3.76	4.550	-	-
Mn-T	mg/L	0.033	0.045	0.029	0.017	0.015	0.028	**0.7**	**0.8**
Hg-T	mg/L	0.0000025	<0.0000020	0.0000050	<0.0000020	<0.0000020	0.0000021	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.603	0.642	0.624	0.507	0.383	0.552	-	-
S-T	mg/L	40.8	44.5	43	33.2	23.5	37.0	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	17.3	21.5	20.0	14.7	9.0	16.5	-	-
Sr-T	mg/L	0.342	0.403	0.320	0.287	0.176	0.306	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0083	0.0074	0.0095	0.0154	0.0314	0.0144	**0.05**	**0.1**
As-D	mg/L	0.00031	0.00021	0.00031	0.00034	0.00044	0.00032	-	-
Ba-D	mg/L	0.0073	0.0083	0.0075	0.0076	0.0067	0.0075	-	-
B-D	mg/L	0.114	0.118	0.106	0.093	0.065	0.099	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	42.0	49.2	44.8	37.8	26.2	40	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00037	0.00037	0.00038	0.00048	0.0005	0.00042	-	-
Hard-D	mg/L	124	145	131	112	79.6	118.3	-	-
Fe-D	mg/L	0.0145	0.010	0.021	0.039	0.083	0.0334	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	4.76	5.26	4.66	4.27	3.47	4.48	-	-
Mn-D	mg/L	0.0151	0.0194	0.0107	0.0102	0.0126	0.0136	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	0.0000052	<0.0000020	<0.0000020	0.0000018	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.5580	0.6500	0.5460	0.5050	0.3700	0.526	-	-
S-D	mg/L	37.40	45.70	38.30	33.60	21.70	35.3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	18.70	21.50	17.80	14.60	8.65	16.25	-	-
Sr-D	mg/L	0.3500	0.4080	0.3020	0.2930	0.1730	0.3050	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206619								
		Long Lake Middle 1 Metre From Bottom Depth							
Site Name	LLMB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		2-May-18	10-May-18	17-May-18	23-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	140	140	141	147	134	140.4	**128**	-
Turb	NTU	0.55	0.60	0.45	0.92	0.55	0.61	-	-
Alk-T	mg/L	56.8	54.0	55.3	58.5	54.8	55.9	-	-
P-T	mg/L	0.0034	0.0038	0.0052	0.0023	0.0062	0.0042	-	-
Al-T	mg/L	0.0245	0.0195	0.0178	0.0174	0.0291	0.0217	-	-
As-T	mg/L	0.00024	0.00023	0.00023	0.00026	0.00024	0.00024	-	**0.005**
Ba-T	mg/L	0.0081	0.0085	0.0106	0.0090	0.0086	0.0090	-	-
B-T	mg/L	0.135	0.127	0.137	0.136	0.134	0.134	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	46.9	56.7	51.4	53.6	50.0	51.7	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	<0.00050	0.00057	<0.00050	<0.00050	<0.00050	0.000314	**0.002**	**0.007**
Hard-T	mg/L	138	166	152	156	147	151.8	-	-
Fe-T	mg/L	0.045	0.053	0.048	0.042	0.037	0.045	-	**1.0**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	5.14	5.88	5.64	5.47	5.41	5.51	-	-
Mn-T	mg/L	0.0795	0.0910	0.120	0.0921	0.0883	0.0942	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000021	0.00000122	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.629	0.739	0.703	0.667	0.649	0.677	-	-
S-T	mg/L	43.6	49.9	49.7	48.3	46.5	47.6	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	22.0	24.7	23.3	23.5	23.0	23.3	-	-
Sr-T	mg/L	0.413	0.365	0.400	0.427	0.431	0.407	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0141	0.0144	0.0126	0.0121	0.0121	0.0131	**0.05**	**0.1**
As-D	mg/L	0.00023	0.00021	0.00020	0.00020	0.00019	0.00021	-	-
Ba-D	mg/L	0.0087	0.0088	0.0098	0.0088	0.0080	0.0088	-	-
B-D	mg/L	0.134	0.138	0.130	0.130	0.140	0.134	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.000170**
Ca-D	mg/L	52.8	50.3	53.9	48.4	51.9	51.5	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00042	0.00049	0.00066	0.00049	0.00040	0.00049	-	-
Hard-D	mg/L	154	148	159	143	153	151.4	-	-
Fe-D	mg/L	0.0214	0.0189	0.0168	0.0140	0.0136	0.0169	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	5.36	5.57	5.89	5.30	5.60	5.54	-	-
Mn-D	mg/L	0.0601	0.0673	0.0933	0.0673	0.0660	0.0708	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000023	0.00000126	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.707	0.653	0.737	0.634	0.643	0.675	-	-
S-D	mg/L	45.8	47.2	53.3	45.0	46.4	47.5	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	22.7	23.6	24.1	23.3	24.1	23.6	-	-
Sr-D	mg/L	0.380	0.424	0.407	0.396	0.402	0.402	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

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EMS ID	E206619								
		Long Lake Middle 1 Metre From Bottom Depth							
Site Name	LLMB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		25-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Unit						-		
SO4-D	mg/L	143	143	136	147	146	143.0	**128**	-
Turb	NTU	0.41	0.51	0.4	0.45	0.57	0.47	-	-
Alk-T	mg/L	57.5	58	58	58	55.8	57.5	-	-
P-T	mg/L	<0.0020	0.0052	0.0085	<0.0020	0.0035	0.00384	**0.007**	-
Al-T	mg/L	0.014	0.0112	0.0122	0.0121	0.0099	0.0119	-	-
As-T	mg/L	0.00027	0.00022	0.00026	0.0003	0.00024	0.00026	-	**0.005**
Ba-T	mg/L	0.0116	0.0115	0.012	0.0134	0.0111	0.0119	-	-
B-T	mg/L	0.139	0.143	0.129	0.134	0.137	0.136	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	50	50.1	53.4	47.5	48.3	49.9	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00062	0.00055	0.00051	<0.00050	<0.00050	0.00044	**0.002**	**0.007**
Hard-T	mg/L	148	148	156	141	143	147.200	-	-
Fe-T	mg/L	0.037	0.043	0.033	0.039	0.037	0.038	-	**1.0**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	5.66	5.5	5.53	5.43	5.31	5.490	-	-
Mn-T	mg/L	0.241	0.241	0.304	0.391	0.326	0.301	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.694	0.685	0.67	0.678	0.663	0.678	-	-
S-T	mg/L	47.7	46.8	46.8	45.4	47.1	46.8	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	24.3	24	23.9	23.2	22.9	23.7	-	-
Sr-T	mg/L	0.427	0.419	0.415	0.409	0.422	0.418	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0095	0.0093	0.0088	0.0078	0.0098	0.0090	**0.05**	**0.1**
As-D	mg/L	0.00019	0.00021	0.00020	0.00023	0.00022	0.00021	-	-
Ba-D	mg/L	0.0109	0.0109	0.011	0.013	0.0118	0.0115	-	-
B-D	mg/L	0.124	0.134	0.122	0.119	0.126	0.125	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	49.7	53	48.6	48.7	48.3	49.7	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00136	0.00032	0.00036	0.00045	0.00038	0.00057	-	-
Hard-D	mg/L	145	154	143	143	142	145.4	-	-
Fe-D	mg/L	0.0114	0.0132	0.0125	0.0126	0.0207	0.0141	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	5.12	5.24	5.21	5.13	5.29	5.2	-	-
Mn-D	mg/L	0.201	0.213	0.267	0.391	0.272	0.269	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000058	0.0000020	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.673	0.707	0.629	0.674	0.693	0.675	-	-
S-D	mg/L	48.5	50	43.7	44.1	46.5	46.6	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	21.7	22	22.7	22.1	22.0	22.10	-	-
Sr-D	mg/L	0.406	0.403	0.4	0.402	0.396	0.4010	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206619								
		Long Lake Middle 1 Metre From Bottom Depth							
Site Name	LLMB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	1-Nov-18	8-Nov-18	15-Nov-18	5x30 Average	Average	Max
Parameter	Unit						-		
SO4-D	mg/L	129	134	132	136	138	133.8	128	-
Turb	NTU	2.80	1.44	1.32	1.14	0.54	1.45	-	-
Alk-T	mg/L	57.1	58.20	58.7	56.2	54.5	56.9	-	-
P-T	mg/L	0.0041	0.004		0.0032	0.0024	0.0034	-	-
Al-T	mg/L	0.0065	0.008	0.0076	0.0064	0.0071	0.0071	-	-
As-T	mg/L	0.00026	0.00024	0.00023	0.0002	0.00022	0.00023	-	0.005
Ba-T	mg/L	0.0105	0.0098	0.0091	0.0088	0.0085	0.0093	-	-
B-T	mg/L	0.123	0.124	0.149	0.130	0.140	0.133	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	50.8	49.7	52.2	49.2	50.7	50.5	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	0.05
Cu-T	mg/L	<0.00050	<0.00050	0.00103	0.00055	<0.00050	0.00047	0.002	0.007
Hard-T	mg/L	146	146	153	144	149	147.6	-	-
Fe-T	mg/L	0.036	0.044	0.027	0.022	0.012	0.028	-	1.0
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	0.003	0.005
Mg-T	mg/L	4.53	5.21	5.58	5.18	5.33	5.170	-	-
Mn-T	mg/L	0.243	0.129	0.155	0.117	0.0387	0.137	0.7	0.8
Hg-T	mg/L	0.000005	0.0000045	0.0000059	<0.0000020	<0.0000020	0.0000035	-	0.00010
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	0.025
K-T	mg/L	0.71	0.673	0.719	0.665	0.696	0.693	-	-
S-T	mg/L	47.7	45.6	49.8	45.1	45.1	46.7	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	0.0001
Na-T	mg/L	20.40	22.50	24.20	22.20	23.10	22.5	-	-
Sr-T	mg/L	0.392	0.418	0.396	0.4090	0.401	0.403	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	0.0075	0.03
Al-D	mg/L	0.0048	0.0091	0.0055	0.0051	0.0055	0.0060	0.05	0.1
As-D	mg/L	0.0002	0.00019	0.0002	0.00016	0.00019	0.00019	-	-
Ba-D	mg/L	0.0085	0.0094	0.0082	0.0083	0.0089	0.0087	-	-
B-D	mg/L	0.131	0.122	0.137	0.130	0.132	0.130	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	0.000088	0.00017
Ca-D	mg/L	47.2	49.7	52.0	48.1	49.2	49.2	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00035	0.00034	0.00034	0.00040	0.00033	0.00035	-	-
Hard-D	mg/L	139	145	152	141	145	144.4	-	-
Fe-D	mg/L	0.0052	0.0051	<0.0050	<0.0050	<0.0050	0.00356	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	5.15	5.15	5.32	5.16	5.40	5.24	-	-
Mn-D	mg/L	0.0094	<0.0010	<0.0010	<0.0010	0.0018	0.00254	-	-
Hg-D	mg/L	<0.0000020	0.0000060	<0.0000020	<0.0000020	<0.0000020	0.0000020	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.646	0.673	0.674	0.661	0.679	0.667	-	-
S-D	mg/L	43.50	46.60	48.20	45.00	45.90	45.8	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	22.2	21.8	22.7	21.6	23.0	22.30	-	-
Sr-D	mg/L	0.405	0.422	0.379	0.409	0.402	0.4030	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 104
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EMS ID	E206618								
Site Description		Middle Quinsam Lake 1 Metre Depth							
Site Name	MQL1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	25-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	30.6	42.9	49.1	43.7	36.4	40.5	**128**	-
Chloro-a	ug/L					<0.50	0.250	-	-
Turb	NTU	0.20	0.24	0.22	0.20	0.21	0.21	-	-
Alk-T	mg/L	36.2	38.4	39.6	41.3	36.3	38.4	-	-
P-T	mg/L	0.0025	0.0029	<0.0020	0.0025	0.0036	0.00250	-	-
Al-T	mg/L	0.0209	0.0293	0.0170	0.0160	0.0213	0.0209	-	-
As-T	mg/L	0.00015	0.00015	0.00017	0.00016	0.00015	0.00016	-	**0.005**
Ba-T	mg/L	0.0022	0.0025	0.0028	0.0024	0.0025	0.0025	-	-
B-T	mg/L	0.050	0.061	0.076	0.063	0.067	0.063	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	13.0	17.1	17.4	13.5	14.8	15.2	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00079	0.00077	0.00061	0.00066	0.00071	0.00071	**0.002**	**0.007**
Hard-T	mg/L	38.9	51.2	51.3	41.5	44.4	45.5	-	-
Fe-T	mg/L	0.030	0.032	0.043	0.023	0.025	0.031	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	1.59	2.08	1.91	1.91	1.78	1.85	-	-
Mn-T	mg/L	0.0054	0.0075	0.0091	0.0090	0.0089	0.0080	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.272	0.357	0.358	0.306	0.281	0.315	-	-
S-T	mg/L	11.4	16.4	17.5	15.2	14.4	15.0	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	14.4	21.4	22.1	20.1	19.1	19.4	-	-
Sr-T	mg/L	0.0650	0.0868	0.0962	0.0864	0.0866	0.0842	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0156	0.0167	0.0158	0.0147	0.0143	0.0154	**0.05**	**0.1**
As-D	mg/L	0.00013	0.00015	0.00012	0.00016	0.00016	0.00014	-	-
Ba-D	mg/L	0.0020	0.0025	0.0028	0.0024	0.0022	0.0024	-	-
B-D	mg/L	<0.050	0.069	0.075	0.065	0.064	0.0596	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.000170**
Ca-D	mg/L	12.4	15.2	17.1	14.7	14.3	14.7	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00071	0.00065	0.00054	0.00053	0.00063	0.00061	-	-
Hard-D	mg/L	37.1	45.8	51.2	44.2	43.0	44.3	-	-
Fe-D	mg/L	0.0192	0.0231	0.0263	0.0185	0.0152	0.0205	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	1.49	1.94	2.08	1.80	1.74	1.81	-	-
Mn-D	mg/L	0.0039	0.0064	0.0084	0.0082	0.0071	0.0068	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000025	0.00000130	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.246	0.306	0.352	0.285	0.263	0.290	-	-
S-D	mg/L	10.2	15.4	18.6	13.9	13.0	14.2	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	14.1	20.3	22.6	18.3	18.8	18.8	-	-
Sr-D	mg/L	0.0622	0.0941	0.0988	0.0859	0.0769	0.0836	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

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EMS ID	E206618								
Site Description		Middle Quinsam Lake 1 Metre Depth							
Site Name	MQL1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		26-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	27.5	27.2	23.4	17.8	15.6	22	**128**	-
Chloro-a	ug/L					<0.50	0.25	-	-
Turb	NTU	0.37	0.35	0.32	0.25	0.24	0.31	-	-
Alk-T	mg/L	36.4	39.1	34.7	31.4	29.7	34.3	-	-
P-T	mg/L	0.0032	<0.0020	0.0036	0.0042	0.0029	0.0030	**0.006**	-
Al-T	mg/L	0.0204	0.0187	0.0192	0.0175	0.0161	0.0184	-	-
As-T	mg/L	0.0002	0.0002	0.00023	0.0002	0.0002	0.00021	-	**0.005**
Ba-T	mg/L	0.0018	0.0017	0.0016	0.0014	0.0012	0.0015	-	-
B-T	mg/L	<0.050	0.057	<0.050	<0.050	<0.050	0.031	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	10.9	11.6	10.7	8.72	9.06	10.2	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000	-	**0.05**
Cu-T	mg/L	0.00062	0.00060	0.00153	0.0006	0.00056	0.00078	**0.002**	**0.007**
Hard-T	mg/L	33.1	34.6	32	26.1	27.2	30.600	-	-
Fe-T	mg/L	0.035	0.04	0.035	0.034	0.031	0.035	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.42	1.41	1.27	1.06	1.11	1.250	-	-
Mn-T	mg/L	0.0066	0.0075	0.0071	0.0047	0.0045	0.006	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.239	0.244	0.205	0.170	0.163	0.204	-	-
S-T	mg/L	8.9	9	7.3	5.4	5.2	7.2	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	15.3	15.6	12.4	9.1	8.7	12.22	-	-
Sr-T	mg/L	0.0558	0.0604	0.0499	0.0434	0.0377	0.0494	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0159	0.017	0.0206	0.0161	0.0158	0.0171	**0.05**	**0.1**
As-D	mg/L	0.00019	0.0002	0.00018	0.00018	0.00019	0.00019	-	-
Ba-D	mg/L	0.0020	0.0016	0.0015	0.0013	0.0013	0.0015	-	-
B-D	mg/L	<0.050	0.054	<0.050	<0.050	<0.050	0.031	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	10.8	11.6	10.5	10.2	9.44	10.51	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00059	0.00052	0.0006	0.00053	0.00053	0.00055	-	-
Hard-D	mg/L	32.2	34.5	31.4	30.3	28.1	31.3	-	-
Fe-D	mg/L	0.0253	0.0227	0.0302	0.0225	0.0234	0.0248	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.28	1.33	1.23	1.18	1.1	1.22	-	-
Mn-D	mg/L	<0.0010	<0.0010	0.0017	<0.0010	<0.0010	0.00074	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000035	0.0000015	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.219	0.258	0.209	0.177	0.171	0.207	-	-
S-D	mg/L	8.7	9.8	7	6.1	5.1	7.3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	14.6	14.6	11.8	10	8.62	11.92	-	-
Sr-D	mg/L	0.0584	0.0586	0.0502	0.043	0.0398	0.0500	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 106
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EMS ID	E206618								
Site Description		Middle Quinsam Lake 1 Metre Depth							
Site Name	MQL1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	1-Nov-18	8-Nov-18	14-Nov-18	5x30 Average	Average	Max
Parameter	Units								
SO4-D	mg/L	23.10	23.50	24.70	26.40	29.60	25.5	**128**	-
Chloro-a	ug/L				1.81		1.81	-	-
Turb	NTU	0.35	0.34	0.37	0.42	0.37	0.37	-	-
Alk-T	mg/L	31.2	30.3	33.5	32.8	34.1	32.4	-	-
P-T	mg/L	0.0045			0.0035	0.0079	0.0053	-	-
Al-T	mg/L	0.0130	0.0126	0.0142	0.0127	0.0165	0.0138	-	-
As-T	mg/L	0.00017	0.00018	0.00019	0.00014	0.00017	0.00017	-	**0.005**
Ba-T	mg/L	0.0022	0.0021	0.0022	0.0023	0.0026	0.0023	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	11.1	10.2	12	11.7	13.4	11.7	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000	-	**0.05**
Cu-T	mg/L	0.00076	0.00057	<0.00050	0.00063	0.00073	0.00059	**0.002**	**0.007**
Hard-T	mg/L	32.7	30.8	36.1	35.3	40.3	35.000	-	-
Fe-T	mg/L	0.043	0.049	0.05	0.044	0.048	0.047	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.18	1.26	1.47	1.46	1.63	1.400	-	-
Mn-T	mg/L	0.0063	0.0061	0.0099	0.0069	0.0069	0.007	**0.7**	**0.8**
Hg-T	mg/L	0.000004	<0.0000020	0.0000036	<0.0000020	<0.0000020	0.0000021	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.229	0.207	0.241	0.240	0.279	0.239	-	-
S-T	mg/L	8.3	7.3	9.5	9.0	11.8	9.2	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	10.1	11.00	13.1	12.6	13.5	12.1	-	-
Sr-T	mg/L	0.0533	0.0551	0.0563	0.0626	0.065	0.0585	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.012	0.012	0.009	0.010	0.012	0.0110	**0.05**	**0.1**
As-D	mg/L	0.00018	0.00017	0.00014	0.00013	0.00014	0.00015	-	-
Ba-D	mg/L	0.0021	0.0022	0.0021	0.0023	0.0025	0.0022	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	10.4	11.0	12.0	11.3	11.8	11.3	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00052	0.00051	0.00047	0.00053	0.00128	0.00066	-	-
Hard-D	mg/L	31	33	36	34	36	33.9	-	-
Fe-D	mg/L	0.0265	0.0274	0.0271	0.0237	0.0252	0.026	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.26	1.34	1.39	1.42	1.54	1.39	-	-
Mn-D	mg/L	0.0012	0.0013	<0.0010	<0.0010	<0.0010	0.0008	-	-
Hg-D	mg/L	0.0000035	0.0000023	0.0000031	<0.0000020	<0.0000020	0.0000022	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.228	0.227	0.229	0.237	0.251	0.234	-	-
S-D	mg/L	7.4	7.8	8.8	9.0	9.7	8.5	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	11.3	11.4	12.3	12.0	13.3	12.10	-	-
Sr-D	mg/L	0.0498	0.0567	0.0553	0.0603	0.0654	0.0575	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 107
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EMS ID	E206618								
Site Description		Middle Quinsam Lake 4 Metre Depth							
Site Name	MQL4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	25-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	31.8	42.9	41.6	41.7	35.1	38.6	**128**	-
Turb	NTU	0.33	0.28	0.39	0.23	0.27	0.30	-	-
Alk-T	mg/L	37.2	36.4	36.4	41.8	36.2	37.6	-	-
P-T	mg/L	0.0026	0.0022	0.0025	0.0031	0.0058	0.0032	-	-
Al-T	mg/L	0.0251	0.0495	0.0156	0.0144	0.0165	0.0242	-	-
As-T	mg/L	0.00014	0.00015	0.00010	0.00013	0.00015	0.00013	-	**0.005**
Ba-T	mg/L	0.0022	0.0025	0.0025	0.0024	0.0024	0.0024	-	-
B-T	mg/L	<0.050	0.056	0.062	0.059	0.063	0.0530	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	13.1	15.9	15.8	14.0	13.7	14.5	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00071	0.00077	0.00059	0.00058	0.00071	0.00067	**0.002**	**0.007**
Hard-T	mg/L	39.0	47.8	47.0	42.1	41.2	43.4	-	-
Fe-T	mg/L	0.033	0.031	0.028	0.022	0.021	0.027	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	1.52	1.98	1.85	1.73	1.70	1.76	-	-
Mn-T	mg/L	0.0052	0.0070	0.0037	0.0049	0.0077	0.0057	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.266	0.349	0.313	0.274	0.263	0.293	-	-
S-T	mg/L	10.7	16.0	15.8	13.7	13.7	14.0	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	15.0	20.4	19.6	17.9	18.0	18.2	-	-
Sr-T	mg/L	0.0682	0.0826	0.0868	0.0798	0.0818	0.0798	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0159	0.0175	0.0146	0.0129	0.0144	0.0151	**0.05**	**0.1**
As-D	mg/L	0.00011	0.00014	0.00013	0.00015	0.00016	0.00014	-	-
Ba-D	mg/L	0.0021	0.0025	0.0025	0.0024	0.0023	0.0024	-	-
B-D	mg/L	<0.050	0.066	0.065	0.063	0.063	0.0564	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.000170**
Ca-D	mg/L	12.4	15.3	15.2	14.9	14.5	14.5	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00070	0.00071	0.00056	0.00048	0.00060	0.00061	-	-
Hard-D	mg/L	37.3	46.5	45.6	44.6	43.4	43.5	-	-
Fe-D	mg/L	0.0187	0.0232	0.0159	0.0150	0.0154	0.0176	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	1.51	1.99	1.85	1.82	1.72	1.78	-	-
Mn-D	mg/L	0.0027	0.0061	0.0011	0.0026	0.0068	0.0039	-	-
Hg-D	mg/L	<0.0000020	<0.000020	<0.0000020	<0.0000020	0.0000023	0.00000306	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.247	0.305	0.315	0.282	0.262	0.282	-	-
S-D	mg/L	11.4	15.7	17.0	14.1	12.9	14.2	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	14.4	20.4	19.8	18.3	18.7	18.3	-	-
Sr-D	mg/L	0.0660	0.0934	0.0846	0.0832	0.0767	0.0808	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

Table 108
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EMS ID	E206618								
Site Description		Middle Quinsam Lake 4 Metre Depth							
Site Name	MQL4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		26-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	29.9	27.2	25.3	18.0	15.3	23	**128**	-
Turb	NTU	0.37	0.4	0.3	0.28	0.24	0.32	-	-
Alk-T	mg/L	37.5	36.7	35.8	33.2	31.3	34.9	-	-
P-T	mg/L	0.0048	0.008	0.0025	0.0026	0.0045	0.0045	**0.006**	-
Al-T	mg/L	0.019	0.0193	0.0262	0.0151	0.017	0.0193	-	-
As-T	mg/L	0.00018	0.00019	0.00023	0.0002	0.0002	0.0002	-	**0.005**
Ba-T	mg/L	0.0018	0.0018	0.0016	0.0014	0.0012	0.0016	-	-
B-T	mg/L	<0.050	0.060	<0.050	<0.050	<0.050	0.032	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	11.0	11.2	11.1	9.05	9.13	10.3	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00058	0.00063	0.00114	0.00057	0.00403	0.00139	**0.002**	**0.007**
Hard-T	mg/L	33.4	33.7	33	27.0	27.5	30.900	-	-
Fe-T	mg/L	0.038	0.04	0.035	0.033	0.031	0.035	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.46	1.41	1.3	1.06	1.13	1.270	-	-
Mn-T	mg/L	0.0067	0.0077	0.007	0.0047	0.0045	0.006	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.241	0.243	0.209	0.171	0.161	0.205	-	-
S-T	mg/L	9	8.8	7.9	5.4	5.2	7.3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	15.3	15.5	13.3	9.22	8.77	12.42	-	-
Sr-T	mg/L	0.0562	0.0611	0.0523	0.0433	0.0391	0.0504	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0149	0.0163	0.0163	0.0165	0.0182	0.0164	**0.05**	**0.1**
As-D	mg/L	0.00019	0.00016	0.00018	0.00017	0.00019	0.00018	-	-
Ba-D	mg/L	0.0018	0.0016	0.0015	0.0013	0.0013	0.0015	-	-
B-D	mg/L	0.052	0.052	<0.050	<0.050	<0.050	0.036	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	11.7	11.6	10.2	10.1	9.67	10.65	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00057	0.00071	0.00053	0.00054	0.00051	0.00057	-	-
Hard-D	mg/L	34.7	34.3	30.7	30.3	28.8	31.8	-	-
Fe-D	mg/L	0.0229	0.0235	0.0228	0.0228	0.022	0.0228	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.34	1.28	1.26	1.2	1.13	1.24	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000036	0.0000015	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.228	0.239	0.221	0.177	0.172	0.207	-	-
S-D	mg/L	9.2	9.3	7.4	6.8	5.6	7.7	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	15	14.2	12.6	9.98	8.3	12.02	-	-
Sr-D	mg/L	0.0608	0.0580	0.0522	0.0429	0.0395	0.0507	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 109
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EMS ID	E206618								
Site Description		Middle Quinsam Lake 4 Metre Depth							
Site Name	MQL4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	1-Nov-18	8-Nov-18	14-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	23.60	23.10	30.80	26.30	29.60	26.7	**128**	-
Turb	NTU	0.350	0.350	0.380	0.310	0.480	0.37	-	-
Alk-T	mg/L	34.9	35.1	34.3	14.5	34.8	30.7	-	-
P-T	mg/L	0.0023			0.0045	0.003	0.0033	-	-
Al-T	mg/L	0.0145	0.0129	0.0126	0.0133	0.0199	0.0146	-	-
As-T	mg/L	0.0002	0.00018	0.00016	0.00014	0.00018	0.00017	-	**0.005**
Ba-T	mg/L	0.0022	0.0023	0.0022	0.0027	0.0026	0.0024	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	11.5	10.9	11.7	11.7	13.3	11.8	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00057	0.00057	0.0013	0.00081	0.00053	0.00076	**0.002**	**0.007**
Hard-T	mg/L	33.6	32.9	35.5	35.3	39.8	35.400	-	-
Fe-T	mg/L	0.046	0.044	0.047	0.041	0.048	0.045	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.2	1.37	1.5	1.47	1.61	1.430	-	-
Mn-T	mg/L	0.007	0.006	0.011	0.007	0.008	0.008	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	0.0000021	<0.0000020	<0.0000020	0.0000012	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.233	0.224	0.236	0.240	0.266	0.24	-	-
S-T	mg/L	8.0	7.7	9.8	9.0	11.4	9.2	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	10.4	11.5	12.8	12.5	14.2	12.3	-	-
Sr-T	mg/L	0.0524	0.0578	0.0554	0.0609	0.0677	0.0588	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0108	0.0121	0.0103	0.0117	0.0116	0.0113	**0.05**	**0.1**
As-D	mg/L	0.00016	0.00017	0.00013	0.00016	0.00015	0.00015	-	-
Ba-D	mg/L	0.002	0.0022	0.0021	0.0028	0.0025	0.0023	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	0.051	0.030	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	10.2	10.9	11.3	11.3	12.3	11.2	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00052	0.00054	0.00054	0.00048	0.00052	0.00052	-	-
Hard-D	mg/L	30.5	32.5	33.9	34.2	37.5	33.7	-	-
Fe-D	mg/L	0.0256	0.0278	0.0281	0.0243	0.0272	0.0266	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.23	1.32	1.36	1.42	1.67	1.4	-	-
Mn-D	mg/L	0.001	0.0011	0.001	<0.0010	<0.0010	0.00082	-	-
Hg-D	mg/L	<0.0000020	0.0000041	<0.0000020	<0.0000020	<0.0000020	0.0000016	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.221	0.223	0.217	0.238	0.257	0.231	-	-
S-D	mg/L	7.2	8.2	19.4	9.1	10.3	10.8	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	11.2	11.4	12.6	12.1	14.1	12.30	-	-
Sr-D	mg/L	0.048	0.056	0.055	0.062	0.066	0.0574	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 110
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EMS ID	E206618								
Site Description		Middle Quinsam Lake 9 Metre Depth							
Site Name	MQL9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	25-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	33.5	32.6	32.0	35.5	34.9	33.7	**128**	-
Turb	NTU	0.27	0.23	0.22	0.20	0.16	0.22	-	-
Alk-T	mg/L	37.9	34.5	34.8	37.3	36.5	36.2	-	-
P-T	mg/L	0.0029	0.0025	0.0032	0.0024	0.0031	0.0028	-	-
Al-T	mg/L	0.0203	0.0160	0.0158	0.0163	0.0143	0.0165	-	-
As-T	mg/L	0.00013	0.00012	0.00011	0.00012	0.00012	0.00012	-	**0.005**
Ba-T	mg/L	0.0021	0.0020	0.0020	0.0020	0.0022	0.0021	-	-
B-T	mg/L	0.056	<0.050	0.052	0.054	0.061	0.0496	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	11.9	13.5	13.1	12.5	13.6	12.9	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00069	0.00069	0.00053	0.00051	0.00068	0.00062	**0.002**	**0.007**
Hard-T	mg/L	36.0	40.5	39.0	37.7	41.0	38.8	-	-
Fe-T	mg/L	0.020	0.018	0.018	0.014	0.013	0.017	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	1.53	1.66	1.54	1.60	1.75	1.62	-	-
Mn-T	mg/L	0.0029	0.0023	0.0023	0.0021	0.0018	0.0023	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.232	0.276	0.248	0.245	0.262	0.253	-	-
S-T	mg/L	10.3	11.3	11.7	11.8	13.4	11.7	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	15.1	16.5	15.8	16.3	18.2	16.4	-	-
Sr-T	mg/L	0.0645	0.0615	0.0662	0.0640	0.0743	0.0661	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0143	0.0150	0.0139	0.0126	0.0117	0.0135	**0.05**	**0.1**
As-D	mg/L	0.00014	0.00014	0.00013	0.00012	0.00012	0.00013	-	-
Ba-D	mg/L	0.0021	0.0021	0.0020	0.0020	0.0019	0.0020	-	-
B-D	mg/L	0.051	0.059	0.052	0.057	0.059	0.056	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.000170**
Ca-D	mg/L	12.1	13.0	13.5	13.1	13.8	13.1	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00064	0.00066	0.00054	0.00093	0.00054	0.00066	-	-
Hard-D	mg/L	36.5	39.6	40.1	39.6	41.4	39.4	-	-
Fe-D	mg/L	0.0109	0.0110	0.0105	0.0088	0.0092	0.0101	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	1.55	1.73	1.53	1.66	1.68	1.63	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000026	0.00000132	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.254	0.257	0.254	0.246	0.238	0.250	-	-
S-D	mg/L	11.9	12.4	12.3	11.6	12.3	12.1	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	16.2	17.2	15.6	16.2	17.9	16.6	-	-
Sr-D	mg/L	0.0636	0.0701	0.0650	0.0674	0.0666	0.0665	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

Table 111
2018-2019 Annual Report

EMS ID	E206618								
Site Description		Middle Quinsam Lake 9 Metre Depth							
Site Name	MQL9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		26-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	33.8	32.3	35.1	37.4	32.5	34	**128**	-
Turb	NTU	0.31	0.42	0.4	0.35	0.49	0.39	-	-
Alk-T	mg/L	37.4	36.8	38.8	39.6	39.7	38.5	-	-
P-T	mg/L	0.0044	0.0034	0.0043	0.003	0.0041	0.0038	**0.006**	-
Al-T	mg/L	0.0114	0.0142	0.0104	0.0095	0.0108	0.0113	-	-
As-T	mg/L	0.00015	0.00016	0.00016	0.00015	0.00015	0.00015	-	**0.005**
Ba-T	mg/L	0.0021	0.002	0.0021	0.0022	0.0020	0.0021	-	-
B-T	mg/L	<0.050	0.061	0.057	0.058	0.067	0.054	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	12.8	12.4	13.9	12.2	12.9	12.8	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00078	0.00072	0.00092	0.00069	0.0006	0.00074	**0.002**	**0.007**
Hard-T	mg/L	39.4	37.8	41.8	37.4	39.5	39.200	-	-
Fe-T	mg/L	0.02	0.026	0.02	0.031	0.026	0.025	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.77	1.63	1.74	1.66	1.76	1.710	-	-
Mn-T	mg/L	0.0051	0.0054	0.0052	0.0074	0.0088	0.006	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.245	0.252	0.231	0.233	0.235	0.239	-	-
S-T	mg/L	11.7	11.4	12.5	12.7	12.3	12.1	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	17.6	17.1	17.5	16.6	17.3	17.2	-	-
Sr-T	mg/L	0.0668	0.0681	0.07	0.074	0.0696	0.0697	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0093	0.011	0.0087	0.0076	0.0084	0.0090	**0.05**	**0.1**
As-D	mg/L	0.00015	0.00016	0.00014	0.00013	0.00015	0.00015	-	-
Ba-D	mg/L	0.0020	0.0018	0.0020	0.002	0.0021	0.002	-	-
B-D	mg/L	0.056	0.056	0.052	0.056	0.054	0.055	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	13.1	12.8	13.5	13.5	13.5	13.3	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00084	0.00047	0.00053	0.00052	0.00062	0.0006	-	-
Hard-D	mg/L	39.6	38.1	41	41.1	40.6	40.1	-	-
Fe-D	mg/L	0.0141	0.0123	0.0121	0.0073	0.0066	0.0105	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.64	1.50	1.74	1.78	1.68	1.67	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000035	0.0000015	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.228	0.242	0.247	0.233	0.246	0.239	-	-
S-D	mg/L	11.8	11.8	13	13	12.4	12.4	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	16.7	15.6	17	17.7	16.8	16.80	-	-
Sr-D	mg/L	0.0708	0.0644	0.0698	0.0724	0.0691	0.0693	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206618								
Site Description		Middle Quinsam Lake 9 Metre Depth							
Site Name	MQL9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	1-Nov-18	8-Nov-18	14-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	23.60	23.00	27.40	27.10	30.70	26	**128**	-
Turb	NTU	0.210	0.400	0.350	0.400	0.330	0.34	-	-
Alk-T	mg/L	34.7	33	33.9	25.6	35.4	32.5	-	-
P-T	mg/L	0.0026			0.0035	0.0026	0.0029	-	-
Al-T	mg/L	0.013	0.0133	0.0122	0.0156	0.0168	0.0142	-	-
As-T	mg/L	0.00019	0.00017	0.00018	0.00014	0.00017	0.00017	-	**0.005**
Ba-T	mg/L	0.0022	0.0022	0.0022	0.0025	0.0027	0.0024	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	0.050	0.030	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	10.8	11.1	11.8	11.7	13.4	11.8	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00076	0.00073	<0.00050	0.00067	0.00082	0.00065	**0.002**	**0.007**
Hard-T	mg/L	31.6	33.2	35.8	35.1	40.3	35.20	-	-
Fe-T	mg/L	0.042	0.045	0.046	0.046	0.045	0.045	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.14	1.33	1.51	1.46	1.66	1.420	-	-
Mn-T	mg/L	0.0063	0.0065	0.0100	0.0067	0.0063	0.007	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	0.0000020	0.0000066	<0.0000020	<0.0000020	0.0000023	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.228	0.219	0.249	0.241	0.274	0.242	-	-
S-T	mg/L	7.9	7.7	9.5	9.2	11.6	9.2	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	10.1	11.3	13.4	12.6	14.7	12.4	-	-
Sr-T	mg/L	0.0523	0.0556	0.0564	0.0625	0.0696	0.0593	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0145	0.0116	0.0098	0.0112	0.0119	0.0118	**0.05**	**0.1**
As-D	mg/L	0.00016	0.00018	0.00016	0.00015	0.00013	0.00016	-	-
Ba-D	mg/L	0.0028	0.0022	0.0022	0.0025	0.0026	0.0025	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	0.052	0.030	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	10.20	11.00	12.70	11.40	12.50	11.6	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00068	0.0007	0.00053	0.00052	0.00052	0.00059	-	-
Hard-D	mg/L	30.6	33.2	37.8	34.6	38.3	34.9	-	-
Fe-D	mg/L	0.0282	0.028	0.030	0.025	0.029	0.0279	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.25	1.36	1.45	1.45	1.69	1.44	-	-
Mn-D	mg/L	0.0012	0.0013	<0.0010	0.0010	<0.0010	0.0009	-	-
Hg-D	mg/L	0.0000042	0.0000041	0.0000051	<0.0000020	<0.0000020	0.0000031	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.226	0.229	0.223	0.242	0.262	0.236	-	-
S-D	mg/L	7.20	8.30	9.50	9.60	10.90	9.1	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	11.2	11.7	12.8	12.3	14.6	12.50	-	-
Sr-D	mg/L	0.049	0.057	0.056	0.063	0.070	0.0588	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206618								
Site Description		Middle Quinsam Lake 1 Metre from Bottom Depth							
Site Name	MQLB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	25-May-18	31-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	49.0	46.8	49.3	47.7	45.9	47.7	**128**	-
Turb	NTU	0.27	0.28	0.54	0.18	0.24	0.30	-	-
Alk-T	mg/L	<1.0	37.5	39.0	41.0	39.7	31.54	-	-
P-T	mg/L	0.0032	0.0031	0.0039	0.0034	0.0096	0.0046	-	-
Al-T	mg/L	0.0308	0.0144	0.0123	0.0170	0.0109	0.0171	-	-
As-T	mg/L	0.00014	0.00011	<0.00010	0.00011	<0.00010	0.000092	-	**0.005**
Ba-T	mg/L	0.0031	0.0026	0.0029	0.0028	0.0029	0.0029	-	-
B-T	mg/L	0.066	0.059	0.068	0.063	0.067	0.065	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	17.3	16.6	17.4	16.0	15.8	16.6	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00068	0.00067	0.00067	0.00072	0.00056	0.00066	**0.002**	**0.007**
Hard-T	mg/L	52.8	51.4	53.1	48.7	48.2	50.8	-	-
Fe-T	mg/L	0.027	0.020	0.021	0.025	0.018	0.022	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	2.34	2.43	2.34	2.14	2.15	2.28	-	-
Mn-T	mg/L	0.0105	0.0063	0.0047	0.0028	0.0037	0.0056	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000022	0.00000124	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.303	0.315	0.335	0.282	0.276	0.302	-	-
S-T	mg/L	17.4	17.2	19.9	16.0	16.3	17.4	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	21.2	21.5	21.7	19.9	20.6	21.0	-	-
Sr-T	mg/L	0.0873	0.0788	0.0882	0.0780	0.0852	0.0835	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0118	0.0110	0.0098	0.0092	0.0104	0.0104	**0.05**	**0.1**
As-D	mg/L	<0.00010	0.00012	<0.00010	0.00012	0.00011	0.000090	-	-
Ba-D	mg/L	0.0028	0.0027	0.0028	0.0026	0.0026	0.0027	-	-
B-D	mg/L	0.061	0.068	0.062	0.065	0.067	0.065	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00000250	**0.000088**	**0.000170**
Ca-D	mg/L	16.1	16.4	16.2	16.0	16.6	16.3	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00061	0.00054	0.00048	0.00049	0.00055	0.00053	-	-
Hard-D	mg/L	49.6	50.6	49.7	48.7	50.7	49.9	-	-
Fe-D	mg/L	0.0121	0.0102	0.0093	0.0106	0.0111	0.0107	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	2.30	2.32	2.25	2.15	2.24	2.25	-	-
Mn-D	mg/L	0.0030	<0.0010	<0.0010	0.0011	0.0020	0.00142	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000024	0.00000128	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.289	0.288	0.318	0.278	0.276	0.290	-	-
S-D	mg/L	17.6	17.3	18.5	15.9	16.5	17.2	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	20.7	21.3	20.7	19.6	21.5	20.8	-	-
Sr-D	mg/L	0.0851	0.0883	0.0849	0.0819	0.0801	0.0841	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

Table 114
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EMS ID	E206618								
Site Description		Middle Quinsam Lake 1 Metre from Bottom Depth							
Site Name	MQLB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		26-Jul-18	2-Aug-18	9-Aug-18	16-Aug-18	23-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	46	47.7	45	45	42.8	45	**128**	-
Turb	NTU	0.29	0.43	0.29	0.34	0.40	0.35	-	-
Alk-T	mg/L	42.4	43.6	41.6	42.7	42.5	42.6	-	-
P-T	mg/L	0.0063	0.0034	0.0045	0.0025	0.0042	0.0042	**0.006**	-
Al-T	mg/L	0.0083	0.0093	0.0076	0.0072	0.0072	0.0079	-	-
As-T	mg/L	0.00012	0.00012	0.00013	0.00013	0.00011	0.00012	-	**0.005**
Ba-T	mg/L	0.0028	0.0027	0.0029	0.0031	0.003	0.0029	-	-
B-T	mg/L	0.059	0.069	0.065	0.068	0.075	0.067	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	15.4	15.2	16.2	14.3	15	15.2	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00057	0.0007	0.00080	0.00058	0.00057	0.00064	**0.002**	**0.007**
Hard-T	mg/L	47.7	46.9	49.3	44.3	46.9	47.000	-	-
Fe-T	mg/L	0.025	0.025	0.027	0.025	0.031	0.027	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	2.25	2.18	2.17	2.1	2.28	2.200	-	-
Mn-T	mg/L	0.0086	0.0088	0.0089	0.0092	0.0109	0.009	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000053	0.0000019	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.281	0.307	0.267	0.277	0.273	0.281	-	-
S-T	mg/L	15.4	15.4	15.4	15.4	15.6	15.4	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	21.1	20.4	20.5	19.6	20.7	20.5	-	-
Sr-T	mg/L	0.0788	0.0803	0.0821	0.0866	0.0802	0.0816	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0066	0.0075	0.0063	0.0065	0.0107	0.0075	**0.05**	**0.1**
As-D	mg/L	0.00013	0.00011	0.00011	<0.00010	0.00014	0.000108	-	-
Ba-D	mg/L	0.0028	0.0026	0.0027	0.0028	0.0031	0.0028	-	-
B-D	mg/L	0.063	0.066	0.061	0.063	0.062	0.063	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	15.5	16.3	14.9	15.6	15.9	15.6	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.0005	0.00088	0.00057	0.00055	0.0005	0.0006	-	-
Hard-D	mg/L	47.7	49.2	45.7	48.3	48.7	47.9	-	-
Fe-D	mg/L	0.0176	0.0158	0.0224	0.0132	0.0161	0.017	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	2.17	2.06	2.07	2.23	2.18	2.14	-	-
Mn-D	mg/L	0.0065	0.0065	0.0059	0.0049	0.0043	0.0056	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000003	0.0000014	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.261	0.28	0.264	0.27	0.285	0.272	-	-
S-D	mg/L	15.8	15.4	15.7	16	15.4	15.7	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	20.4	19.9	18.9	20.8	19.7	19.90	-	-
Sr-D	mg/L	0.0833	0.0826	0.0807	0.0818	0.0818	0.0820	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E206618								
Site Description		Middle Quinsam Lake 1 Metre from Bottom Depth							
Site Name	MQLB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	23-Oct-18	1-Nov-18	8-Nov-18	14-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	33.50	37.40	27.90	26.70	32.30	32	**128**	-
Turb	NTU	1.06	0.90	0.40	0.41	0.42	0.64	-	-
Alk-T	mg/L	52.2	51	35.2	32.2	35.5	41.2	-	-
P-T	mg/L	0.0046			0.0051	0.0036	0.0044	-	-
Al-T	mg/L	0.0054	0.0069	0.0146	0.0142	0.0186	0.0119	-	-
As-T	mg/L	0.00016	0.00013	0.00016	0.00014	0.00016	0.00015	-	**0.005**
Ba-T	mg/L	0.0042	0.0040	0.0021	0.0024	0.0027	0.0031	-	-
B-T	mg/L	0.057	0.058	<0.050	<0.050	0.051	0.043	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	17.7	16.9	11.9	11.8	13.9	14.4	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	0.00021	<0.00020	<0.00020	<0.00020	0.00012	-	**0.05**
Cu-T	mg/L	0.00056	0.00076	0.00062	0.0007	0.00085	0.00070	**0.002**	**0.007**
Hard-T	mg/L	53	51	36	36	42	43.600	-	-
Fe-T	mg/L	0.124	0.103	0.069	0.042	0.053	0.078	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	2.03	2.20	1.56	1.48	1.89	1.830	-	-
Mn-T	mg/L	0.553	0.634	0.011	0.007	0.009	0.243	**0.7**	**0.8**
Hg-T	mg/L	0.0000032	<0.0000020	0.0000022	<0.0000020	<0.0000020	0.0000017	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.321	0.311	0.255	0.237	0.307	0.286	-	-
S-T	mg/L	14.7	12.9	9.4	9	13.1	11.8	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	18.2	19.7	13.2	12.4	16.5	16	-	-
Sr-T	mg/L	0.09	0.0853	0.0568	0.0615	0.0746	0.0736	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0041	0.0064	0.0101	0.0101	0.0121	0.0086	**0.05**	**0.1**
As-D	mg/L	0.00011	0.00012	0.00013	0.00013	0.00014	0.00013	-	-
Ba-D	mg/L	0.0035	0.004	0.0022	0.0025	0.0027	0.003	-	-
B-D	mg/L	0.065	0.060	<0.050	<0.050	0.053	0.046	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	16.7	16.9	11.9	11.5	12.9	14	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00056	0.00067	0.00050	0.00049	0.00054	0.00055	-	-
Hard-D	mg/L	51	52	36	35	39	42.5	-	-
Fe-D	mg/L	0.031	0.036	0.031	0.024	0.030	0.0302	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	2.21	2.23	1.49	1.46	1.71	1.82	-	-
Mn-D	mg/L	0.572	0.630	0.001	<0.0010	0.002	0.24106	-	-
Hg-D	mg/L	0.0000057	0.0000024	<0.0000020	<0.0000020	<0.0000020	0.0000022	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.31	0.317	0.225	0.235	0.267	0.271	-	-
S-D	mg/L	13.5	14.4	8.9	9.0	11.3	11.4	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	20.4	19.9	12.8	12.0	15.0	16.00	-	-
Sr-D	mg/L	0.0836	0.0878	0.0568	0.0613	0.0714	0.0722	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 116
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 1 Metre Depth							
Site Name	LQL1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	25-May-18	30-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	14.8	15.0	17.0	19.9	20.1	17.4	**128**	-
Chloro-a	ug/L					1.20	1.20	-	-
Turb	NTU	0.41	0.45	0.58	0.38	0.41	0.45	-	-
Alk-T	mg/L	27.5	26.1	<1.0	29.9	30.8	22.96	-	-
P-T	mg/L	0.0039	0.0106	0.0052	0.0071	0.0035	0.0061	-	-
Al-T	mg/L	0.0415	0.0440	0.0438	0.0350	0.0311	0.0391	-	-
As-T	mg/L	0.00044	0.00050	0.00056	0.00058	0.00060	0.00054	-	**0.0050**
Ba-T	mg/L	0.0031	0.0030	0.0036	0.0035	0.0035	0.0033	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	10.3	10.9	10.8	10.9	11.6	10.9	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00074	0.00082	0.00089	0.00070	0.00091	0.00081	**0.002**	**0.007**
Hard-T	mg/L	30.3	31.8	31.6	32.6	33.9	32.0	-	-
Fe-T	mg/L	0.069	0.082	0.080	0.085	0.078	0.079	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	1.11	1.12	1.12	1.32	1.23	1.18	-	-
Mn-T	mg/L	0.0046	0.0048	0.0053	0.0072	0.0070	0.0058	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.211	0.229	0.238	0.229	0.236	0.229	-	-
S-T	mg/L	4.7	5.0	6.3	6.9	7.5	6.1	-	-
Se-T	mg/L	0.00010	<0.00010	0.00010	<0.00010	<0.00010	0.000070	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	6.44	6.66	7.53	9.07	8.75	7.69	-	-
Sr-T	mg/L	0.0433	0.0438	0.0515	0.0515	0.0565	0.0493	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0322	0.0354	0.0355	0.0283	0.0280	0.0319	**0.05**	**0.1**
As-D	mg/L	0.00047	0.00052	0.00047	0.00054	0.00055	0.00051	-	-
Ba-D	mg/L	0.0030	0.0033	0.0032	0.0033	0.0035	0.0033	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	0.0000070	0.0000069	0.0000054	<0.0000050	<0.0000050	0.00000486	**0.000088**	**0.000170**
Ca-D	mg/L	9.69	10.1	9.22	10.9	11.6	10.30	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00073	0.00086	0.00075	0.00076	0.00088	0.00080	-	-
Hard-D	mg/L	28.7	29.8	27.7	32.4	34.4	30.6	-	-
Fe-D	mg/L	0.0467	0.0542	0.0465	0.0647	0.0503	0.0525	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	1.10	1.11	1.13	1.29	1.29	1.18	-	-
Mn-D	mg/L	0.0030	0.0031	0.0023	0.0050	0.0042	0.0035	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.200	0.211	0.224	0.226	0.244	0.221	-	-
S-D	mg/L	4.3	5.2	7.2	6.6	7.4	6.1	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	6.30	6.70	7.97	8.92	9.36	7.85	-	-
Sr-D	mg/L	0.0428	0.0475	0.0480	0.0503	0.0562	0.0490	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

Table 117
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 1 Metre Depth							
Site Name	LQL1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		26-Jul-18	2-Aug-18	9-Aug-18	17-Aug-18	22-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	22.9	24.1	24.1	24.6	20.9	23	**128.0**	-
Chloro-a	ug/L					0.94	0.94	-	-
Turb	NTU	0.35	0.58	0.33	0.34	0.35	0.39	-	-
Alk-T	mg/L	35.5	38.7	38.4	35.5	36	36.8	-	-
P-T	mg/L	0.0089	<0.0020	0.0048	0.0066	0.0029	0.0048	**0.006**	-
Al-T	mg/L	0.013	0.0124	0.0366	0.0109	0.0103	0.0166	-	-
As-T	mg/L	0.00065	0.00063	0.00069	0.00071	0.00070	0.00068	-	**0.0050**
Ba-T	mg/L	0.0036	0.0035	0.0035	0.0037	0.0036	0.0036	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	12	11.9	11.9	10.6	11.6	11.6	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00075	0.00062	0.00072	0.00059	0.00058	0.00065	**0.002**	**0.007**
Hard-T	mg/L	36.1	35.7	35.9	31.9	34.6	34.800	-	-
Fe-T	mg/L	0.055	0.056	0.057	0.052	0.055	0.055	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.51	1.43	1.49	1.33	1.38	1.430	-	-
Mn-T	mg/L	0.0063	0.0066	0.0061	0.0074	0.0072	0.007	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.246	0.244	0.248	0.241	0.252	0.246	-	-
S-T	mg/L	7.5	7.8	7.9	7.5	7.4	7.6	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	11.7	11.9	12.6	11.2	11.2	11.7	-	-
Sr-T	mg/L	0.0575	0.0612	0.0593	0.0604	0.0598	0.0596	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0079	0.0103	0.0095	0.0107	0.0089	0.0095	**0.05**	**0.1**
As-D	mg/L	0.00059	0.00057	0.00063	0.00062	0.00063	0.00061	-	-
Ba-D	mg/L	0.0032	0.0033	0.0034	0.0033	0.0033	0.0033	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	10.9	11.8	12.1	11.8	11.7	11.7	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00108	0.00050	0.00053	0.00062	0.00051	0.00065	-	-
Hard-D	mg/L	32.5	35.3	36.3	35.3	35	34.9	-	-
Fe-D	mg/L	0.0553	0.0403	0.0432	0.0318	0.0287	0.0399	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.27	1.4	1.49	1.41	1.41	1.4	-	-
Mn-D	mg/L	0.0019	<0.0010	0.0010	<0.0010	<0.0010	0.00088	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.222	0.262	0.228	0.233	0.238	0.237	-	-
S-D	mg/L	6.2	9.7	7.6	7.6	7.7	7.8	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	10.6	11.3	12.5	11.6	11.3	11.50	-	-
Sr-D	mg/L	0.0532	0.061	0.0597	0.0582	0.058	0.0580	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 118
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 1 Metre Depth							
Site Name	LQL1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	22-Oct-18	30-Oct-18	7-Nov-18	14-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	15.50	15.50	15.90	13.20	13.40	15	**128.0**	-
Chloro-a	ug/L					1.53	1.53	-	-
Turb	NTU	0.49	0.61	0.67	0.80	0.79	0.67	-	-
Alk-T	mg/L	28.6	30.500	32.200	30.000	23.500	29	-	-
P-T	mg/L	0.0046		0.0061	0.0063	0.0047	0.0054	-	-
Al-T	mg/L	0.0251	0.0220	0.0308	0.0535	0.0395	0.0342	-	-
As-T	mg/L	0.0007	0.0007	0.0007	0.0007	0.0006	0.00068	-	**0.0050**
Ba-T	mg/L	0.004	0.0038	0.004	0.004	0.004	0.004	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	11.9	11.3	11.5	10.1	11.3	11.2	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.0007	0.00077	0.00125	0.00101	0.0008	0.00091	**0.002**	**0.007**
Hard-T	mg/L	34.3	33.6	34.5	30.1	33.5	33.200	-	-
Fe-T	mg/L	0.135	0.133	0.163	0.229	0.181	0.168	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.12	1.33	1.37	1.19	1.29	1.260	-	-
Mn-T	mg/L	0.0208	0.0249	0.0311	0.0249	0.0153	0.023	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	0.0000058	0.0000039	<0.0000020	<0.0000020	0.0000025	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.228	0.223	0.231	0.243	0.24	0.233	-	-
S-T	mg/L	4.8	5.4	6.0	5.0	5.3	5.3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	5.7	6.8	7.1	5.3	5.6	6.12	-	-
Sr-T	mg/L	0.0504	0.0512	0.0512	0.0458	0.0458	0.0489	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0203	0.0189	0.0155	0.0332	0.0288	0.0233	**0.05**	**0.1**
As-D	mg/L	0.0006	0.0006	0.0006	0.0006	0.00055	0.00059	-	-
Ba-D	mg/L	0.0035	0.0038	0.0034	0.0039	0.004	0.0037	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	0.0000051	<0.0000050	<0.0000050	0.0000060	0.0000051	0.000004	**0.000088**	**0.00017**
Ca-D	mg/L	10.4	10.9	11.0	10.1	10.2	10.5	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00071	0.00063	0.00063	0.00080	0.00075	0.0007	-	-
Hard-D	mg/L	31.0	32.5	32.6	30.4	31.0	31.5	-	-
Fe-D	mg/L	0.0957	0.095	0.104	0.142	0.126	0.1125	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.23	1.31	1.25	1.23	1.35	1.27	-	-
Mn-D	mg/L	0.0178	0.0206	0.0264	0.0190	0.0113	0.019	-	-
Hg-D	mg/L	0.0000035	0.0000047	<0.0000020	<0.0000020	<0.0000020	0.0000022	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.221	0.228	0.200	0.217	0.219	0.217	-	-
S-D	mg/L	4.80	5.40	5.00	4.90	4.60	4.9	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	6.5	6.8	6.4	5.7	5.8	6.23	-	-
Sr-D	mg/L	0.0471	0.0525	0.0480	0.0457	0.0463	0.0479	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 119
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 4 Metre Depth							
Site Name	LQL4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	25-May-18	30-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	14.3	14.9	16.8	20.2	19.3	17.1	**128**	-
Turb	NTU	0.40	0.48	0.41	0.39	0.44	0.42	-	-
Alk-T	mg/L	<1.0	26.0	25.7	29.9	31.6	22.74	-	-
P-T	mg/L	0.0040	0.0052	0.0057	0.0051	0.0037	0.0047	-	-
Al-T	mg/L	0.0459	0.0467	0.0455	0.0334	0.0303	0.0404	-	-
As-T	mg/L	0.00050	0.00049	0.00050	0.00054	0.00061	0.00053	-	**0.005**
Ba-T	mg/L	0.0030	0.0030	0.0033	0.0034	0.0036	0.0033	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	10.2	11.0	10.6	10.7	11.6	10.8	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00105	0.00083	0.00077	0.00075	0.00073	0.00083	**0.002**	**0.007**
Hard-T	mg/L	30.0	32.3	31.2	31.8	34.3	31.9	-	-
Fe-T	mg/L	0.074	0.074	0.077	0.073	0.083	0.076	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	1.08	1.19	1.12	1.24	1.26	1.18	-	-
Mn-T	mg/L	0.0049	0.0047	0.0050	0.0054	0.0066	0.0053	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.206	0.228	0.234	0.222	0.238	0.226	-	-
S-T	mg/L	4.9	5.4	5.7	6.6	7.4	6.0	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	6.23	6.87	7.09	8.90	8.99	7.62	-	-
Sr-T	mg/L	0.0436	0.0429	0.0501	0.0500	0.0578	0.0489	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0329	0.0398	0.0386	0.0284	0.0260	0.0331	**0.05**	**0.1**
As-D	mg/L	0.00044	0.00051	0.00047	0.00051	0.00054	0.00049	-	-
Ba-D	mg/L	0.0029	0.0032	0.0031	0.0034	0.0033	0.0032	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	0.0000070	0.0000074	0.0000065	<0.0000050	<0.0000050	0.00000518	**0.000088**	**0.000170**
Ca-D	mg/L	9.61	10.3	10.4	10.7	12.0	10.60	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00081	0.00087	0.00089	0.00064	0.00068	0.00078	-	-
Hard-D	mg/L	28.5	30.5	30.7	31.9	35.1	31.3	-	-
Fe-D	mg/L	0.0463	0.0526	0.0481	0.0494	0.0520	0.0497	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	1.10	1.13	1.11	1.26	1.27	1.17	-	-
Mn-D	mg/L	0.0028	0.0029	0.0015	0.0018	0.0035	0.0025	-	-
Hg-D	mg/L	0.0000020	0.0000021	<0.0000020	<0.0000020	<0.0000020	0.00000142	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.200	0.211	0.224	0.225	0.239	0.220	-	-
S-D	mg/L	4.8	5.2	6.3	6.7	7.7	6.1	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	6.38	6.77	7.46	9.06	9.15	7.76	-	-
Sr-D	mg/L	0.0416	0.0473	0.0478	0.0510	0.0559	0.0487	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

Table 120
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 4 Metre Depth							
Site Name	LQL4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		26-Jul-18	2-Aug-18	9-Aug-18	17-Aug-18	22-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	23.5	23.7	24.4	24.6	22.4	23.7	**128**	-
Turb	NTU	0.38	0.49	0.33	0.36	0.36	0.38	-	-
Alk-T	mg/L	36.2	39.7	38.5	36.7	37.6	37.7	-	-
P-T	mg/L	<0.0020	0.0048	0.0051	0.0031	0.0031	0.00342	-	-
Al-T	mg/L	0.0133	0.0122	0.0805	0.0132	0.0104	0.0259	-	-
As-T	mg/L	0.00067	0.00065	0.00068	0.00075	0.00069	0.00069	-	**0.005**
Ba-T	mg/L	0.0037	0.0036	0.0035	0.0037	0.0035	0.0036	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	12.1	12.3	12.1	11.3	11.8	11.9	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00059	0.00203	0.00084	0.00073	0.00067	0.00097	**0.002**	**0.007**
Hard-T	mg/L	36.4	36.8	36.4	33.7	35.2	35.700	-	-
Fe-T	mg/L	0.063	0.063	0.051	0.056	0.052	0.057	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.52	1.45	1.47	1.35	1.38	1.430	-	-
Mn-T	mg/L	0.0064	0.0073	0.0055	0.008	0.006	0.007	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.252	0.255	0.248	0.245	0.248	0.25	-	-
S-T	mg/L	7.8	7.9	7.9	7.7	7.3	7.7	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	12.1	12.2	12.5	11.4	10.7	11.8	-	-
Sr-T	mg/L	0.0586	0.0624	0.0597	0.0626	0.06	0.0607	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.01	0.0095	0.0094	0.0114	0.0093	0.0099	**0.05**	**0.1**
As-D	mg/L	0.0006	0.00057	0.00062	0.00061	0.00066	0.00061	-	-
Ba-D	mg/L	0.0036	0.0034	0.0033	0.0038	0.0032	0.0035	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000260	0.000007	**0.000088**	**0.00017**
Ca-D	mg/L	12.3	12.9	11.7	12.2	12.0	12.2	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00057	0.0006	0.00051	0.00053	0.00057	0.00056	-	-
Hard-D	mg/L	36.8	37.6	35	36.6	35.7	36.3	-	-
Fe-D	mg/L	0.0453	0.0391	0.038	0.0324	0.0312	0.0372	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.47	1.32	1.42	1.46	1.42	1.42	-	-
Mn-D	mg/L	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	0.00066	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.256	0.266	0.226	0.243	0.246	0.247	-	-
S-D	mg/L	7.5	8.2	7.4	8.3	8.4	8.0	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	12.2	11.1	12	12.1	11.4	11.80	-	-
Sr-D	mg/L	0.0626	0.0596	0.0582	0.0583	0.0572	0.0592	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 121
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 4 Metre Depth							
Site Name	LQL4	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	22-Oct-18	30-Oct-18	7-Nov-18	14-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	15.80	15.30	16.00	13.00	13.50	14.7	**128**	-
Turb	NTU	0.51	0.61	0.68	0.85	0.66	0.66	-	-
Alk-T	mg/L	32	31	32.100	28.8	25.800	29.9	-	-
P-T	mg/L	0.0087		0.0044	0.0058	0.004	0.0056	-	-
Al-T	mg/L	0.0251	0.0213	0.0357	0.0494	0.0411	0.0345	-	-
As-T	mg/L	0.00065	0.00065	0.00067	0.00073	0.00068	0.00068	-	**0.005**
Ba-T	mg/L	0.004	0.0037	0.0038	0.0039	0.0041	0.0039	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	11.3	10.8	9.87	10.5	11.4	10.77	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00078	0.00074	0.00105	0.00111	0.00123	0.00098	**0.002**	**0.007**
Hard-T	mg/L	32.8	32.3	30.1	31.4	34.4	32.200	-	-
Fe-T	mg/L	0.126	0.127	0.147	0.223	0.193	0.163	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.13	1.28	1.34	1.28	1.40	1.290	-	-
Mn-T	mg/L	0.0232	0.0242	0.0295	0.0254	0.0162	0.024	**0.7**	**0.8**
Hg-T	mg/L	0.0000032	<0.0000020	0.0000041	<0.0000020	<0.0000020	0.0000021	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.225	0.214	0.222	0.231	0.253	0.229	-	-
S-T	mg/L	5.1	5.7	5.5	5.3	5.7	5.5	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	5.87	6.63	7.06	5.25	5.93	6.15	-	-
Sr-T	mg/L	0.0506	0.0497	0.0514	0.0452	0.048	0.049	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0201	0.0191	0.015	0.0333	0.0291	0.0233	**0.05**	**0.1**
As-D	mg/L	0.00056	0.00058	0.00054	0.00062	0.00057	0.00057	-	-
Ba-D	mg/L	0.0035	0.0038	0.0035	0.004	0.0039	0.0037	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000058	<0.0000050	0.000003	**0.000088**	**0.00017**
Ca-D	mg/L	10.3	11.00	10.9	10.10	10.3	10.5	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00069	0.00065	0.00077	0.00073	0.00078	0.00072	-	-
Hard-D	mg/L	30.7	32.9	32.5	30.3	31.4	31.6	-	-
Fe-D	mg/L	0.093	0.096	0.106	0.143	0.125	0.1126	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.2	1.31	1.31	1.24	1.36	1.28	-	-
Mn-D	mg/L	0.0187	0.0197	0.0239	0.0183	0.011	0.0183	-	-
Hg-D	mg/L	0.0000033	0.0000043	0.0000023	<0.0000020	0.0000025	0.0000027	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.215	0.223	0.224	0.218	0.218	0.22	-	-
S-D	mg/L	4.80	5.50	5.50	5.60	4.70	5.2	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	6.4	6.7	6.5	5.7	5.9	6.24	-	-
Sr-D	mg/L	0.0457	0.0513	0.0478	0.0463	0.0472	0.0477	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 122
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 9 Metre Depth							
Site Name	LQL9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	25-May-18	30-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	14.7	15.3	16.3	15.4	14.6	15.3	**128**	-
Turb	NTU	0.45	0.36	0.33	0.41	0.47	0.40	-	-
Alk-T	mg/L	<1.0	25.7	25.4	26.8	28.4	21.36	-	-
P-T	mg/L	0.0045	0.0032	0.0034	0.0040	0.0025	0.0035	-	-
Al-T	mg/L	0.0882	0.0403	0.0403	0.0362	0.0463	0.0503	-	-
As-T	mg/L	0.00048	0.00047	0.00046	0.00047	0.00056	0.00049	-	**0.005**
Ba-T	mg/L	0.0033	0.0030	0.0033	0.0032	0.0035	0.0033	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	10.6	10.9	10.1	9.97	11.0	10.51	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00118	0.00102	0.00077	0.00068	0.00070	0.00087	**0.002**	**0.007**
Hard-T	mg/L	30.9	32.2	30.0	29.6	32.3	31.0	-	-
Fe-T	mg/L	0.078	0.067	0.070	0.069	0.093	0.075	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	1.09	1.22	1.17	1.14	1.18	1.16	-	-
Mn-T	mg/L	0.0050	0.0047	0.0064	0.0066	0.0113	0.0068	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.210	0.221	0.214	0.197	0.237	0.216	-	-
S-T	mg/L	4.5	4.9	6.9	5.0	5.4	5.3	-	-
Se-T	mg/L	0.00011	<0.00010	0.00010	<0.00010	<0.00010	0.000072	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	6.30	7.03	7.32	6.61	7.17	6.89	-	-
Sr-T	mg/L	0.0451	0.0434	0.0493	0.0434	0.0522	0.0467	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0373	0.0314	0.0305	0.0283	0.0274	0.0310	**0.05**	**0.1**
As-D	mg/L	0.00045	0.00046	0.00040	0.00045	0.00048	0.00045	-	-
Ba-D	mg/L	0.0030	0.0031	0.0032	0.0031	0.0032	0.0031	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	0.0000070	0.0000051	0.0000054	<0.0000050	<0.0000050	0.00000450	**0.000088**	**0.000170**
Ca-D	mg/L	9.75	9.91	9.72	10.1	10.9	10.08	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00083	0.00071	0.00064	0.00064	0.00063	0.00069	-	-
Hard-D	mg/L	28.9	29.4	29.1	30.0	31.8	29.8	-	-
Fe-D	mg/L	0.0434	0.0436	0.0445	0.0473	0.0515	0.0461	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	1.10	1.13	1.16	1.18	1.14	1.14	-	-
Mn-D	mg/L	0.0026	0.0025	0.0025	0.0015	0.0030	0.0024	-	-
Hg-D	mg/L	0.0000023	<0.0000020	<0.0000020	<0.0000020	0.0000025	0.00000156	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.199	0.200	0.217	0.201	0.211	0.206	-	-
S-D	mg/L	4.5	5.1	5.7	5.2	5.6	5.2	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	6.32	6.84	6.95	6.87	6.97	6.79	-	-
Sr-D	mg/L	0.0429	0.0470	0.0463	0.0438	0.0487	0.0457	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

Table 123
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 9 Metre Depth							
Site Name	LQL9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		26-Jul-18	2-Aug-18	9-Aug-18	17-Aug-18	22-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	21.5	17.2	18.1	18.1	17.9	18.6	**128**	-
Turb	NTU	0.34	0.56	0.31	0.39	0.4	0.4	-	-
Alk-T	mg/L	36.9	33	32	29.5	30.3	32.3	-	-
P-T	mg/L	0.0048	0.0051	0.0043	0.0029	0.0031	0.0040	-	-
Al-T	mg/L	0.0147	0.0198	0.051	0.0179	0.0151	0.0237	-	-
As-T	mg/L	0.00063	0.00055	0.00055	0.00059	0.00059	0.0006	-	**0.005**
Ba-T	mg/L	0.0035	0.0035	0.0041	0.0037	0.0036	0.0037	-	-
B-T	mg/L	0.050	0.050	0.050	0.050	0.050	0.050	-	-
Cd-T	mg/L	0.000010	0.000010	0.000010	0.000010	0.000010	0.000010	-	-
Ca-T	mg/L	11.7	10.7	10.7	9.83	10.9	10.8	-	-
Cr-T	mg/L	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	-	-
Co-T	mg/L	0.00020	0.00024	0.00020	0.00020	0.00020	0.00021	-	**0.05**
Cu-T	mg/L	0.00061	0.00067	0.00082	0.00068	0.00061	0.00068	**0.002**	**0.007**
Hard-T	mg/L	35.1	31.7	31.9	29.3	32.2	32.0	-	-
Fe-T	mg/L	0.066	0.09	0.071	0.081	0.07	0.1	-	**1**
Pb-T	mg/L	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	1.45	1.22	1.27	1.15	1.22	1.26	-	-
Mn-T	mg/L	0.0073	0.0095	0.0074	0.0102	0.0078	0.0084	**0.7**	**0.8**
Hg-T	mg/L	0.0000020	0.0000020	0.0000020	0.0000020	0.000002	0.0000020	-	**0.00010**
Mo-T	mg/L	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	-	-
Ni-T	mg/L	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	-	**0.025**
K-T	mg/L	0.242	0.22	0.221	0.218	0.237	0.228	-	-
S-T	mg/L	7.1	5.7	5.9	5.7	5.8	6.0	-	-
Se-T	mg/L	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	-	-
Ag-T	mg/L	0.000020	0.000020	0.000020	0.000020	0.000020	0.000020	-	**0.0001**
Na-T	mg/L	10.7	7.9	8.49	7.47	7.83	8.47	-	-
Sr-T	mg/L	0.0546	0.0517	0.0502	0.0521	0.0515	0.0520	-	-
Zn-T	mg/L	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.011	0.0161	0.0149	0.02	0.0136	0.0151	**0.05**	**0.1**
As-D	mg/L	0.0006	0.00046	0.00054	0.00052	0.00059	0.00054	-	-
Ba-D	mg/L	0.0035	0.0033	0.0033	0.0035	0.0032	0.0034	-	-
B-D	mg/L	0.050	0.050	0.050	0.050	0.05	0.050	-	-
Cd-D	mg/L	0.0000050	0.0000050	0.0000050	0.0000055	0.000005	0.0000051	**0.000088**	**0.00017**
Ca-D	mg/L	11.6	11.2	10.8	11.1	10.6	11.1	-	-
Cr-D	mg/L	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	-	-
Co-D	mg/L	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	-	-
Cu-D	mg/L	0.00086	0.00047	0.00064	0.00083	0.00054	0.00067	-	-
Hard-D	mg/L	34.4	32.7	32.1	32.7	31.4	32.66	-	-
Fe-D	mg/L	0.0457	0.0698	0.0598	0.0624	0.0558	0.05870	-	**0.35**
Pb-D	mg/L	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	-	-
Mg-D	mg/L	1.33	1.14	1.25	1.23	1.19	1.23	-	-
Mn-D	mg/L	0.0021	0.0037	0.0045	0.0048	0.0016	0.0033	-	-
Hg-D	mg/L	0.0000020	0.0000020	0.0000020	0.0000020	0.000002	0.000002	-	-
Mo-D	mg/L	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	-	-
Ni-D	mg/L	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	-	-
K-D	mg/L	0.227	0.243	0.211	0.22	0.217	0.224	-	-
S-D	mg/L	7	5.5	5.8	6.1	5.5	5.98	-	-
Se-D	mg/L	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	-	-
Na-D	mg/L	10.3	7.16	8.69	7.86	8.12	8.43	-	-
Sr-D	mg/L	0.0585	0.0507	0.0511	0.0507	0.0519	0.0526	-	-
Zn-D	mg/L	0.0142	0.0050	0.0050	0.0050	0.0050	0.0068	-	-

Table 124
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 9 Metre Depth							
Site Name	LQL9	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	22-Oct-18	30-Oct-18	7-Nov-18	14-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	15.7	17.7	16	13.3	13.6	15.3	**128**	-
Turb	NTU	0.54	0.67	0.72	0.87	0.68	0.7	-	-
Alk-T	mg/L	30.7	31.6	33.3	30	28.7	30.9	-	-
P-T	mg/L	0.0065		0.0057	0.0051	0.0034	0.0052	-	-
Al-T	mg/L	0.0248	0.0215	0.0232	0.0504	0.0427	0.0325	-	-
As-T	mg/L	0.00071	0.00065	0.00069	0.00071	0.0007	0.0007	-	**0.005**
Ba-T	mg/L	0.0042	0.0036	0.0039	0.004	0.0042	0.0040	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	11.4	11	11.6	10.5	11.6	11.2	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	**0.05**
Cu-T	mg/L	0.00106	0.00074	0.00123	0.00085	0.00081	0.00094	**0.002**	**0.007**
Hard-T	mg/L	33.6	32.9	34.6	31.4	34.6	33.4	-	-
Fe-T	mg/L	0.145	0.141	0.192	0.221	0.193	0.18	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.21	1.34	1.35	1.27	1.33	1.30	-	-
Mn-T	mg/L	0.0312	0.0213	0.0322	0.0256	0.0152	0.0251	**0.7**	**0.8**
Hg-T	mg/L	0.0000024	0.0000051	<0.0000020	<0.0000020	<0.0000020	0.0000021	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.231	0.217	0.227	0.242	0.23	0.229	-	-
S-T	mg/L	5.6	5.5	5.6	4.5	6.2	5.5	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	0.00010	0.00012	0.00007	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	6.18	7.1	6.93	5.33	5.89	6.28	-	-
Sr-T	mg/L	0.0507	0.051	0.0511	0.0471	0.0471	0.0494	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.0197	0.0172	0.0149	0.0335	0.029	0.0229	**0.05**	**0.1**
As-D	mg/L	0.00058	0.00059	0.0006	0.00062	0.00057	0.00059	-	-
Ba-D	mg/L	0.0037	0.0038	0.0037	0.0039	0.0039	0.0038	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000055	<0.0000050	0.0000031	**0.000088**	**0.00017**
Ca-D	mg/L	10.5	11.1	11.3	10.1	10.4	10.7	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Cu-D	mg/L	0.00068	0.00064	0.00061	0.00079	0.00072	0.00069	-	-
Hard-D	mg/L	31.3	33.3	33.4	30.5	31.6	32.00	-	-
Fe-D	mg/L	0.102	0.0965	0.12	0.138	0.128	0.117	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.26	1.33	1.26	1.26	1.38	1.30	-	-
Mn-D	mg/L	0.026	0.0172	0.0298	0.0176	0.0113	0.0204	-	-
Hg-D	mg/L	0.0000021	0.0000041	0.0000025	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.223	0.226	0.216	0.218	0.22	0.221	-	-
S-D	mg/L	4.9	5.7	5.9	4.8	4.8	5.20	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	6.55	7.07	6.65	5.61	5.95	6.37	-	-
Sr-D	mg/L	0.0468	0.0529	0.0487	0.0458	0.0473	0.0483	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

Table 125
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EMS ID	E292118								
Site Description		Lower Quinsam Lake 1 Metre from Bottom							
Site Name	LQLB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		3-May-18	10-May-18	17-May-18	25-May-18	30-May-18	5x30 Average	Average	Max
Parameters	Units								
SO4-D	mg/L	16.7	16.3	16.7	15.7	14.9	16.1	**128**	-
Turb	NTU	0.46	0.54	0.64	0.97	1.08	0.74	-	-
Alk-T	mg/L	27.7	25.9	26.9	28.3	29.0	27.6	-	-
P-T	mg/L	0.0034	0.0027	0.0034	0.0049	0.0034	0.0036	-	-
Al-T	mg/L	0.0471	0.0696	0.0379	0.0351	0.0401	0.0460	-	-
As-T	mg/L	0.00049	0.00051	0.00062	0.00065	0.00073	0.00060	-	**0.005**
Ba-T	mg/L	0.0034	0.0033	0.0038	0.0038	0.0041	0.0037	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	-	-
Ca-T	mg/L	10.6	10.4	10.4	9.87	10.5	10.35	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	**0.05**
Cu-T	mg/L	0.00071	0.00079	0.00063	0.00076	0.00079	0.00074	**0.002**	**0.007**
Hard-T	mg/L	31.2	31.1	30.8	29.6	31.0	30.7	-	-
Fe-T	mg/L	0.102	0.127	0.160	0.204	0.234	0.165	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	**0.003**	**0.005**
Mg-T	mg/L	1.14	1.26	1.18	1.20	1.15	1.19	-	-
Mn-T	mg/L	0.0108	0.0226	0.0359	0.0561	0.0631	0.0377	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.00000100	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	**0.025**
K-T	mg/L	0.202	0.226	0.220	0.207	0.220	0.215	-	-
S-T	mg/L	4.8	5.1	5.4	5.3	5.7	5.3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	-	**0.0001**
Na-T	mg/L	6.79	7.11	7.23	7.07	6.91	7.02	-	-
Sr-T	mg/L	0.0483	0.0438	0.0471	0.0455	0.0511	0.0472	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	**0.0075**	**0.03**
Al-D	mg/L	0.0296	0.0298	0.0267	0.0253	0.0243	0.0271	**0.05**	**0.1**
As-D	mg/L	0.00046	0.00050	0.00048	0.00054	0.00056	0.00051	-	-
Ba-D	mg/L	0.0031	0.0034	0.0037	0.0037	0.0038	0.0035	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.0250	-	-
Cd-D	mg/L	0.0000060	0.0000063	0.0000057	<0.0000050	0.0000060	0.00000530	**0.000088**	**0.000170**
Ca-D	mg/L	9.84	10.0	10.7	10.2	10.8	10.31	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Cu-D	mg/L	0.00072	0.00065	0.00068	0.00085	0.00071	0.00072	-	-
Hard-D	mg/L	29.4	29.9	31.7	30.5	31.6	30.6	-	-
Fe-D	mg/L	0.0585	0.0796	0.0927	0.110	0.111	0.0904	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	-	-
Mg-D	mg/L	1.18	1.17	1.24	1.22	1.16	1.19	-	-
Mn-D	mg/L	0.0081	0.0201	0.0281	0.0460	0.0492	0.0303	-	-
Hg-D	mg/L	0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000024	0.00000148	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	-	-
K-D	mg/L	0.212	0.203	0.234	0.209	0.217	0.215	-	-
S-D	mg/L	5.3	5.6	7.2	5.4	6.1	5.9	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	-	-
Na-D	mg/L	7.04	7.14	7.47	7.09	7.03	7.15	-	-
Sr-D	mg/L	0.0451	0.0487	0.0474	0.0462	0.0487	0.0472	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	-	-

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EMS ID	E292118								
Site Description		Lower Quinsam Lake 1 Metre from Bottom							
Site Name	LQLB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		26-Jul-18	2-Aug-18	9-Aug-18	17-Aug-18	22-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	17.2	14.8	14.8	14.4	13.8	15	**128**	-
Turb	NTU	2.84	3.91	2.94	5.12	6.39	4.24	-	-
Alk-T	mg/L	32.6	33.9	32.4	32.8	33.9	33.1	-	-
P-T	mg/L	0.0086	0.0072	0.0069	0.0058	0.0071	0.0071	-	-
Al-T	mg/L	0.0297	0.0333	0.0472	0.0303	0.0321	0.0345	-	-
As-T	mg/L	0.00124	0.00149	0.00134	0.00196	0.00218	0.00164	-	**0.005**
Ba-T	mg/L	0.0052	0.006	0.0058	0.0077	0.0086	0.0067	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	0.000012	<0.000010	0.000012	0.000015	0.000012	0.000011	-	-
Ca-T	mg/L	10.3	10.6	10.6	10.0	11.2	10.54	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	0.00029	0.00025	0.00051	0.00059	0.00035	-	**0.05**
Cu-T	mg/L	0.00075	0.00082	0.00092	0.00088	0.00193	0.00106	**0.002**	**0.007**
Hard-T	mg/L	30.8	31.6	31.5	29.7	33	31.30	-	-
Fe-T	mg/L	0.582	0.826	0.69	**1.17**	**1.35**	0.924	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.22	1.22	1.23	1.15	1.23	1.210	-	-
Mn-T	mg/L	0.179	0.272	0.272	0.481	0.532	0.347	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.227	0.226	0.229	0.231	0.242	0.231	-	-
S-T	mg/L	4.9	4.9	4.8	4.9	4.9	4.9	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.00006	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	7.18	7.03	7.26	6.63	6.78	6.98	-	-
Sr-T	mg/L	0.0478	0.0509	0.0495	0.0531	0.0545	0.0512	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.019	0.0219	0.0208	0.0238	0.0226	0.0216	**0.05**	**0.1**
As-D	mg/L	0.00075	0.00095	0.00091	0.00111	0.00127	0.001	-	-
Ba-D	mg/L	0.005	0.0055	0.0057	0.0068	0.0078	0.0062	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	0.0000089	0.0000100	0.0000102	0.0000102	0.000011	0.0000101	**0.000088**	**0.00017**
Ca-D	mg/L	10.5	10.9	10.8	10.7	10.6	10.7	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	0.00024	0.00040	0.00051	0.00027	-	-
Cu-D	mg/L	0.00062	0.00081	0.00088	0.00065	0.00076	0.00074	-	-
Hard-D	mg/L	31.1	32	31.9	31.6	31.4	31.6	-	-
Fe-D	mg/L	0.291	**0.442**	**0.442**	**0.632**	**0.746**	0.511	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.16	1.15	1.21	1.2	1.19	1.18	-	-
Mn-D	mg/L	0.161	0.247	0.295	0.433	0.511	0.329	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000010	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.217	0.238	0.212	0.219	0.233	0.224	-	-
S-D	mg/L	4.8	5.1	4.2	5.1	5.6	5.0	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	-	-
Na-D	mg/L	7.1	6.55	7.11	6.71	6.82	6.86	-	-
Sr-D	mg/L	0.0505	0.0501	0.0498	0.0488	0.0529	0.0504	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E292118								
Site Description		Lower Quinsam Lake 1 Metre from Bottom							
Site Name	LQLB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		15-Oct-18	22-Oct-18	30-Oct-18	7-Nov-18	14-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	14.70	14.60	15.00	12.50	14.00	14	**128**	-
Turb	NTU	0.8	2.7	2.8	0.8	0.9	1.59	-	-
Alk-T	mg/L	31.4	32.2	34.8	28.2	29.2	31.2	-	-
P-T	mg/L	0.0075		0.0047	0.0057	0.0047	0.0056	-	-
Al-T	mg/L	0.0227	0.0225	0.0225	0.0472	0.0431	0.0316	-	-
As-T	mg/L	0.00082	0.00119	0.00121	0.00067	0.0007	0.00092	-	**0.005**
Ba-T	mg/L	0.0045	0.0053	0.0054	0.0039	0.0041	0.0046	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	-	-
Ca-T	mg/L	11.7	11.1	12.0	10.8	11.5	11.4	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-T	mg/L	<0.00020	<0.00020	0.00031	<0.00020	<0.00020	0.00014	-	**0.05**
Cu-T	mg/L	0.00068	0.00076	0.00115	0.00097	0.00078	0.00087	**0.002**	**0.007**
Hard-T	mg/L	33.8	33.1	35.4	32.4	34.6	33.90	-	-
Fe-T	mg/L	0.18	0.56	0.70	0.21	0.19	0.367	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	**0.003**	**0.005**
Mg-T	mg/L	1.15	1.30	1.34	1.30	1.44	1.310	-	-
Mn-T	mg/L	0.315	0.160	0.211	0.024	0.016	0.145	**0.7**	**0.8**
Hg-T	mg/L	0.0000025	0.0000028	<0.0000020	<0.0000020	<0.0000020	0.0000017	-	**0.00010**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	**0.025**
K-T	mg/L	0.243	0.226	0.233	0.244	0.247	0.239	-	-
S-T	mg/L	5.4	5.1	5.4	5.3	6.4	5.5	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00006	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000010	-	**0.0001**
Na-T	mg/L	6.19	6.89	6.89	5.39	6.36	6.34	-	-
Sr-T	mg/L	0.0528	0.0522	0.0526	0.0460	0.052	0.0511	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	**0.0075**	**0.03**
Al-D	mg/L	0.017	0.018	0.0123	0.0326	0.0249	0.0210	**0.05**	**0.1**
As-D	mg/L	0.00062	0.00091	0.00075	0.0006	0.00055	0.00069	-	-
Ba-D	mg/L	0.0039	0.0055	0.005	0.0038	0.0038	0.0044	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.025	-	-
Cd-D	mg/L	0.0000096	<0.0000050	0.0000060	<0.0000050	<0.0000050	0.0000046	**0.000088**	**0.00017**
Ca-D	mg/L	10.5	11.10	11.3	9.92	10.3	10.62	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
Co-D	mg/L	<0.00020	<0.00020	0.00027	<0.00020	<0.00020	0.00013	-	-
Cu-D	mg/L	0.00062	0.00061	0.0006	0.00075	0.00069	0.00065	-	-
Hard-D	mg/L	31.1	32.9	33.3	29.9	31.1	31.7	-	-
Fe-D	mg/L	0.121	0.355	0.302	0.133	0.103	0.203	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	-	-
Mg-D	mg/L	1.17	1.27	1.25	1.23	1.32	1.25	-	-
Mn-D	mg/L	0.2720	0.1510	0.2100	0.0156	0.0075	0.1312	-	-
Hg-D	mg/L	0.0000035	0.0000043	0.0000022	<0.0000020	<0.0000020	0.0000024	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0018	0.0008	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	-	-
K-D	mg/L	0.222	0.226	0.234	0.207	0.220	0.222	-	-
S-D	mg/L	4.5	4.9	5.8	4.4	4.8	4.9	-	-
Se-D	mg/L	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	0.00006	-	-
Na-D	mg/L	6.60	6.72	6.55	5.46	5.95	6.26	-	-
Sr-D	mg/L	0.0481	0.0531	0.0501	0.0451	0.0476	0.0488	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	-	-

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EMS ID	E0126402								
Site Description		Middle Quinsam Lake Inlet							
Site Name	WA	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		11-Apr-18	18-Apr-18	25-Apr-18	1-May-18	8-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	<1.0	1.20	1.3	1.5	1.2	1.2	**128**	-
Alk-T	mg/L	17.2	15.6	21.8	20	22.8	19.5	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0317	0.0267	0.0248	0.0291	0.0235	0.0272	-	-
As-T	mg/L	0.0001	<0.00010	0.00011	0.00011	<0.00010	0.0001	-	**0.005**
Ba-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	6.33	6.31	6.78	6.87	7.26	6.71	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00069	0.00158	0.0007	0.00079	0.00059	0.00087	**0.002**	**0.007**
Hard-T	mg/L	18.5	18.6	20	20.2	21	19.7	-	-
Fe-T	mg/L	0.016	0.013	0.011	0.012	0.013	0.013	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	0.659	0.698	0.735	0.741	0.705	0.708	-	-
Mn-T	mg/L	0.0011	<0.0010	<0.0010	0.0012	0.0011	0.001	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.072	0.089	0.103	0.133	0.065	0.092	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	0.677	0.655	0.689	0.701	0.639	0.672	-	-
Sr-T	mg/L	0.0105	0.0107	0.012	0.0109	0.0114	0.0111	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0255	0.0233	0.0286	0.0176	0.0198	0.0230	**0.05**	**0.1**
As-D	mg/L	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ba-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.000170**
Ca-D	mg/L	6.35	6.61	6.97	6.50	7.35	6.76	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00075	0.00077	0.00077	0.0006	0.00081	0.00074	-	-
Hard-D	mg/L	18.6	19.2	20.3	19.2	21.5	19.8	-	-
Fe-D	mg/L	0.0105	0.0128	0.0117	0.0069	0.0083	0.01	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	0.673	0.655	0.705	0.711	0.775	0.704	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Hg-D	mg/L	0.0000027	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000021	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.074	0.1	0.09	0.068	0.076	0.082	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	0.672	0.679	0.622	0.631	0.687	0.7	-	-
Sr-D	mg/L	0.0106	0.0111	0.0116	0.011	0.0107	0.011	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

Table 129
2018-2019 Annual Report

EMS ID	E0126402								
Site Description		Middle Quinsam Lake Inlet							
Site Name	WA	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	1.1	1.3	1.1	1.5	1.1	1	**128**	-
Alk-T	mg/L	20.3	20.4	21	21.4	22.1	21	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0236	0.0272	0.0215	0.0218	0.0218	0.0232	-	-
As-T	mg/L	0.00012	0.00011	0.00012	0.00014	0.00012	0.00012	-	**0.005**
Ba-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	6.9	6.87	6.89	6.58	6.7	6.79	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00136	0.00094	0.00063	0.0007	0.00059	0.00084	**0.002**	**0.007**
Hard-T	mg/L	20.4	20.3	20.1	19.4	19.7	20	-	-
Fe-T	mg/L	0.025	0.028	0.023	0.021	0.016	0.023	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	0.764	0.76	0.71	0.723	0.711	0.734	-	-
Mn-T	mg/L	0.002	0.002	0.0015	0.0012	0.0012	0.002	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.062	0.083	0.071	<0.050	0.058	0.065	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	0.674	0.63	0.594	0.581	0.567	0.609	-	-
Sr-T	mg/L	0.0114	0.0115	0.0109	0.0107	0.0109	0.0111	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0207	0.0189	0.0212	0.0176	0.0189	0.0195	**0.05**	**0.1**
As-D	mg/L	0.00012	0.00012	0.00016	0.00014	0.00011	0.00013	-	-
Ba-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000196	<0.0000050	0.000008	**0.000088**	**0.00017**
Ca-D	mg/L	7.12	6.89	6.9	7.04	7.27	7.04	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00058	0.0006	0.00058	0.00076	0.00065	0.00063	-	-
Hard-D	mg/L	20.8	20.1	20.3	20.6	21.3	20.6	-	-
Fe-D	mg/L	0.0169	0.0152	0.0287	0.0155	0.0141	0.0181	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	0.723	0.703	0.75	0.741	0.768	0.737	-	-
Mn-D	mg/L	<0.0010	<0.0010	0.0014	0.0010	<0.0010	0.0011	-	-
Hg-D	mg/L	<0.0000020	0.0000021	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.067	0.071	0.073	0.085	0.059	0.071	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	0.61	0.587	0.648	0.607	0.633	0.6	-	-
Sr-D	mg/L	0.0112	0.0117	0.0116	0.0111	0.0119	0.0115	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

Table 130
2018-2019 Annual Report

EMS ID	E0126402								
Site Description		Middle Quinsam Lake Inlet							
Site Name	WA	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		11-Oct-18	16-Oct-18	24-Oct-18	29-Oct-18	6-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	<1.0	1.9	1.9	<1.0	<1.0	1	**128**	-
Alk-T	mg/L	17.6	21.1	21.5	23	17.3	20.1	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<5.2	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0276	0.0211	0.0154	0.0288	0.026	0.0238	-	-
As-T	mg/L	0.00014	0.00013	0.00011	0.00013	0.00013	0.00013	-	**0.005**
Ba-T	mg/L	0.0014	<0.0010	<0.0010	<0.0010	0.0013	0.0011	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	6.04	6.43	6.53	6.95	6.15	6.42	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00089	0.00074	0.0007	0.0016	0.00084	0.00095	**0.002**	**0.007**
Hard-T	mg/L	17.8	19	19.2	20.5	18.4	19	-	-
Fe-T	mg/L	0.021	0.016	0.014	0.024	0.017	0.018	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	0.666	0.706	0.711	0.766	0.730	0.716	-	-
Mn-T	mg/L	0.0014	0.0013	0.0011	0.0017	0.0012	0.001	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.076	0.065	0.062	0.114	0.083	0.08	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	0.737	0.679	0.631	0.725	0.73	0.7	-	-
Sr-T	mg/L	0.011	0.0114	0.0113	0.0115	0.011	0.0112	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0256	0.0204	0.0152	0.0166	0.0217	0.0199	**0.05**	**0.1**
As-D	mg/L	0.00015	0.00011	0.00012	0.00016	0.00014	0.00014	-	-
Ba-D	mg/L	0.0015	0.0011	<0.0010	<0.0010	0.0012	0.00116	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	6.04	6.27	6.69	6.64	6.35	6.4	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00085	0.00061	0.00063	0.00083	0.00068	0.00072	-	-
Hard-D	mg/L	17.9	18.7	19.8	19.6	18.8	19	-	-
Fe-D	mg/L	0.0171	0.0139	0.01	0.0149	0.0119	0.0136	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	0.692	0.729	0.748	0.733	0.707	0.722	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Hg-D	mg/L	0.0000031	0.000003	<0.0000020	0.0000023	<0.0000020	0.00000248	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.076	0.067	0.075	0.083	0.075	0.075	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	0.757	0.667	0.692	0.65	0.723	0.7	-	-
Sr-D	mg/L	0.0117	0.0112	0.0115	0.011	0.0118	0.0114	-	-
Zn-D	mg/L	<0.0050	0.0108	<0.0050	<0.0050	<0.0050	0.00616	-	-

Table 131
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EMS ID	E0900504								
Site Description		Middle Quinsam Lake Outlet						Water Quality Guidelines	
Site Name	WB	5 in 30 Weekly Samples							
Date		11-Apr-18	18-Apr-18	25-Apr-18	1-May-18	8-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	37.7	26.9	27.5	26.9	38.5	32	**128**	-
Alk-T	mg/L	36.8	34.5	31	34.5	41	35.6	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.2870	0.0672	0.0342	0.0672	0.0213	0.0954	-	-
As-T	mg/L	0.00033	0.00014	0.00019	0.00014	0.00019	0.0002	-	**0.005**
Ba-T	mg/L	0.0042	0.0021	0.0026	0.0021	0.0028	0.0028	-	-
B-T	mg/L	0.055	<0.050	<0.050	<0.050	0.057	0.052	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	16	11.7	11.6	11.7	14.7	13.10	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00141	0.00079	0.00068	0.00079	0.00093	0.00092	**0.002**	**0.007**
Hard-T	mg/L	48.1	35.1	35	35.1	44.6	39.6	-	-
Fe-T	mg/L	0.337	0.028	0.044	0.028	0.039	0.095	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	1.99	1.44	1.47	1.44	1.9	1.65	-	-
Mn-T	mg/L	0.0117	0.0048	0.0048	0.0048	0.0084	0.007	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.294	0.229	0.268	0.229	0.296	0.263	-	-
S-T	mg/L	12.5	9.8	10.5	9.8	14.5	11.4	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	14	12.2	10.6	12.2	17.7	13.3	-	-
Sr-T	mg/L	0.0942	0.0572	0.0677	0.0572	0.0904	0.0733	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0205	0.0164	0.025	0.0164	0.0168	0.0190	**0.05**	**0.1**
As-D	mg/L	0.0002	0.00015	0.00018	0.00015	0.00016	0.00017	-	-
Ba-D	mg/L	0.0031	0.002	0.0026	0.002	0.0024	0.0024	-	-
B-D	mg/L	0.052	<0.050	<0.050	<0.050	0.054	0.051	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.000170**
Ca-D	mg/L	14.4	10.9	12.3	10.9	15.4	12.8	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00061	0.00061	0.00057	0.00061	0.0006	0.0006	-	-
Hard-D	mg/L	43.8	32.8	36.8	32.8	46.2	38.5	-	-
Fe-D	mg/L	0.0262	0.0214	0.0247	0.0214	0.0253	0.0238	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	1.87	1.38	1.46	1.38	1.87	1.59	-	-
Mn-D	mg/L	0.0035	0.0031	0.0031	0.0031	0.0060	0.0038	-	-
Hg-D	mg/L	0.0000021	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.285	0.2	0.255	0.2	0.298	0.248	-	-
S-D	mg/L	13.9	8	10.9	8	13.9	10.9	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	13.6	11.5	11.2	11.5	18.3	13.2	-	-
Sr-D	mg/L	0.0902	0.0559	0.0669	0.0559	0.0793	0.0696	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

Table 132
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EMS ID	E0900504								
Site Description		Middle Quinsam Lake Outlet							
Site Name	WB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	29.3	27.8	27.7	25.2	20.5	26	**128**	-
Alk-T	mg/L	37.5	36.4	36.2	35.4	33.8	35.9	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0167	0.0178	0.0195	0.0193	0.0184	0.0183	-	-
As-T	mg/L	0.00018	0.00018	0.00019	0.00021	0.0002	0.00019	-	**0.005**
Ba-T	mg/L	0.0016	0.0018	0.0017	0.0015	0.0014	0.0016	-	-
B-T	mg/L	0.052	0.058	0.054	<0.050	<0.050	0.053	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	11.7	11.2	11.4	10.4	9.83	10.91	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00123	0.00097	0.00053	0.00064	0.00055	0.00078	**0.002**	**0.007**
Hard-T	mg/L	35.3	33.8	33.7	31.4	29.5	32.7	-	-
Fe-T	mg/L	0.041	0.034	0.033	0.039	0.034	0.036	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	1.49	1.4	1.3	1.28	1.2	1.33	-	-
Mn-T	mg/L	0.0088	0.0074	0.0092	0.0088	0.0085	0.009	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.23	0.237	0.239	0.199	0.191	0.219	-	-
S-T	mg/L	9.5	9.4	9.5	9.1	6.9	8.9	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	15.3	15.1	14.2	14.1	11.3	14	-	-
Sr-T	mg/L	0.0611	0.0601	0.0587	0.0519	0.0475	0.0559	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0168	0.0154	0.0183	0.0176	0.0179	0.0172	**0.05**	**0.1**
As-D	mg/L	0.00019	0.00015	0.00019	0.00021	0.0002	0.00019	-	-
Ba-D	mg/L	0.0018	0.0017	0.0016	0.0017	0.0016	0.0017	-	-
B-D	mg/L	0.055	<0.050	0.051	<0.050	<0.050	0.051	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000070	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	11.1	11.3	11	10.9	10.8	11	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00076	0.00047	0.00052	0.00071	0.00084	0.00066	-	-
Hard-D	mg/L	33.6	33.6	33.2	32.4	32.2	33	-	-
Fe-D	mg/L	0.0309	0.0221	0.0256	0.0255	0.0244	0.0257	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	1.40	1.29	1.37	1.25	1.25	1.31	-	-
Mn-D	mg/L	0.0016	0.0022	0.0023	0.0031	0.0018	0.0022	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.228	0.243	0.239	0.249	0.195	0.231	-	-
S-D	mg/L	9.5	9.7	8.5	8.7	7.1	8.7	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	14.3	13.9	14.3	12.9	12	13.5	-	-
Sr-D	mg/L	0.0625	0.0623	0.0597	0.0535	0.0507	0.0577	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E0900504								
Site Description		Middle Quinsam Lake Outlet							
Site Name	WB	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		11-Oct-18	16-Oct-18	24-Oct-18	29-Oct-18	6-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	33.4	29.4	25.8	29.5	27.2	29	**128**	-
Alk-T	mg/L	35.0	34.2	33.9	35.9	33	34.4	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.4	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0134	0.014	0.0135	0.0447	0.0203	0.0212	-	-
As-T	mg/L	0.00026	0.00022	0.00015	0.00021	0.00022	0.00021	-	**0.005**
Ba-T	mg/L	0.0027	0.0026	0.0022	0.0029	0.0027	0.0026	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	13.9	12.9	11	11.2	12.2	12.20	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00066	0.00105	0.00065	0.00074	0.00090	0.00080	**0.002**	**0.007**
Hard-T	mg/L	41.9	38.7	33.0	34.4	37.2	37	-	-
Fe-T	mg/L	0.044	0.043	0.039	0.045	0.052	0.045	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	1.73	1.58	1.33	1.59	1.63	1.57	-	-
Mn-T	mg/L	0.0068	0.0062	0.0049	0.0126	0.0079	0.008	**0.7**	**0.8**
Hg-T	mg/L	0.0000054	0.0000075	<0.0000020	0.0000045	<0.0000020	0.00000428	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.265	0.23	0.214	0.263	0.237	0.242	-	-
S-T	mg/L	10.8	9.9	7.4	9.7	9.1	9.4	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	10.7	11.5	10.7	11.2	10.4	10.9	-	-
Sr-T	mg/L	0.0737	0.0702	0.0554	0.0687	0.0623	0.0661	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0136	0.0133	0.0104	0.0101	0.0123	0.0119	**0.05**	**0.1**
As-D	mg/L	0.00024	0.00021	0.00018	0.00019	0.00022	0.00021	-	-
Ba-D	mg/L	0.0030	0.0026	0.0021	0.0025	0.0027	0.0026	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	14.2	13.1	11.1	12.5	12.1	12.6	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00052	0.0005	0.00053	0.00061	0.00056	0.00054	-	-
Hard-D	mg/L	42.4	39.1	33.8	37.5	36.6	37.9	-	-
Fe-D	mg/L	0.0289	0.0318	0.0266	0.0281	0.03	0.0291	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	1.71	1.55	1.45	1.56	1.54	1.56	-	-
Mn-D	mg/L	0.0028	0.0024	0.0015	0.0045	0.0013	0.0025	-	-
Hg-D	mg/L	0.0000031	0.0000029	0.0000022	0.0000022	<0.0000020	0.00000248	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.241	0.227	0.223	0.233	0.219	0.229	-	-
S-D	mg/L	10.4	9.6	8.2	12	9.3	9.9	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	10.4	10.6	11.9	10.7	10.60	10.8	-	-
Sr-D	mg/L	0.0801	0.0684	0.0569	0.066	0.0651	0.0673	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E219412								
Site Description		Long Lake Outlet						Water Quality Guidelines	
Site Name	LLO	5 in 30 Weekly Samples							
Date		12-Apr-18	18-Apr-18	25-Apr-18	1-May-18	8-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	48.1	28.6	32.1	31.6	39.5	36	**128**	-
Alk-T	mg/L	27.6	15.9	23.2	22.5	24.6	22.8	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0469	0.0384	0.0705	0.0344	0.0311	0.0443	-	-
As-T	mg/L	0.00051	0.00035	0.00047	0.00038	0.00043	0.00043	-	**0.005**
Ba-T	mg/L	0.0051	0.0034	0.0041	0.0035	0.0046	0.0041	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	21.2	12.8	14.3	14.6	18.8	16.30	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00067	<0.00050	0.00057	<0.00050	<0.00050	0.00055	**0.002**	**0.007**
Hard-T	mg/L	64	39.1	43.3	44.5	56.7	49.5	-	-
Fe-T	mg/L	0.071	0.055	0.132	0.049	0.065	0.074	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	2.72	1.71	1.88	1.97	2.35	2.13	-	-
Mn-T	mg/L	0.0134	0.0073	0.035	0.0079	0.0138	0.016	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.334	0.2	0.237	0.215	0.254	0.248	-	-
S-T	mg/L	16.2	9.2	12.6	10.9	14.7	12.7	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	7.5	4.24	4.85	4.9	6.48	5.59	-	-
Sr-T	mg/L	0.134	0.0796	0.098	0.0878	0.124	0.1047	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0309	0.0304	0.0403	0.0207	0.0193	0.0283	**0.05**	**0.1**
As-D	mg/L	0.00041	0.00039	0.00038	0.00036	0.0004	0.00039	-	-
Ba-D	mg/L	0.005	0.0033	0.0129	0.0035	0.0039	0.0057	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000080	0.000006	**0.000088**	**0.000170**
Ca-D	mg/L	19.4	13.2	15.7	14.8	19.7	16.6	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00078	0.00048	0.00053	0.00036	0.00094	0.00062	-	-
Hard-D	mg/L	58.8	39.7	47.1	44.8	58.7	49.8	-	-
Fe-D	mg/L	0.0431	0.0354	0.0395	0.0282	0.0378	0.0368	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	2.49	1.63	1.94	1.89	2.29	2.05	-	-
Mn-D	mg/L	0.007	0.0042	0.0046	0.0034	0.0063	0.0051	-	-
Hg-D	mg/L	0.0000023	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000021	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.297	0.198	0.241	0.201	0.264	0.24	-	-
S-D	mg/L	14.8	9.9	12.6	10.1	14.3	12.3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	6.94	4.3	4.85	4.94	6.85	5.6	-	-
Sr-D	mg/L	0.132	0.0802	0.099	0.0879	0.115	0.1028	-	-
Zn-D	mg/L	<0.0050	<0.0050	0.0124	<0.0050	<0.0050	0.0065	-	-

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EMS ID	E219412								
Site Description		Long Lake Outlet							
Site Name	LLO	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	89.8	89.1	93.1	91.5	93.1	91	**128**	-
Alk-T	mg/L	43.9	42.8	41.5	42.1	43.1	42.7	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0128	0.0151	0.0109	0.0138	0.0124	0.013	-	-
As-T	mg/L	0.00049	0.00059	0.00047	0.00066	0.00066	0.00057	-	**0.005**
Ba-T	mg/L	0.0066	0.0078	0.0078	0.0079	0.0079	0.0076	-	-
B-T	mg/L	0.092	0.091	0.09	0.091	0.096	0.092	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	34.2	34.3	34.9	33.6	35.1	34.40	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00052	0.00055	<0.00050	0.02040	<0.00050	0.00449	**0.002**	**0.007**
Hard-T	mg/L	102	102	103	100	105	102.4	-	-
Fe-T	mg/L	0.028	0.046	0.012	0.045	0.035	0.033	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	4.02	4.03	3.87	3.99	4.16	4.01	-	-
Mn-T	mg/L	0.0063	0.0162	0.0048	0.0213	0.0238	0.015	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.42	0.446	0.466	0.407	0.455	0.439	-	-
S-T	mg/L	28.4	29.2	29	27.8	31.1	29.1	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	13.5	13.7	13.1	14.1	14	13.7	-	-
Sr-T	mg/L	0.261	0.261	0.242	0.238	0.266	0.254	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0078	0.0054	0.0082	0.0105	0.0067	0.0077	**0.05**	**0.1**
As-D	mg/L	0.0005	0.0005	0.00048	0.00064	0.00063	0.00055	-	-
Ba-D	mg/L	0.0071	0.0077	0.0075	0.0082	0.0082	0.0077	-	-
B-D	mg/L	0.084	0.08	0.087	0.092	0.092	0.087	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000070	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	34.1	34.3	34.8	36.3	37.2	35.3	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00033	0.00033	0.0004	0.00067	0.00034	0.00041	-	-
Hard-D	mg/L	101	101	104	106	110.0	104.4	-	-
Fe-D	mg/L	0.0165	0.0226	0.007	0.0266	0.016	0.0176	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	3.98	3.72	4.06	3.83	4.23	3.96	-	-
Mn-D	mg/L	0.0015	0.0033	0.0024	0.0085	0.0021	0.0036	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.419	0.444	0.456	0.457	0.455	0.446	-	-
S-D	mg/L	28.3	28.3	29.8	31.3	32	29.9	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	13.3	12.6	13.1	13.7	14.6	13.5	-	-
Sr-D	mg/L	0.238	0.256	0.244	0.249	0.288	0.255	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E219412								
Site Description		Long Lake Outlet							
Site Name	LLO	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		11-Oct-18	16-Oct-18	24-Oct-18	29-Oct-18	6-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	66.5	60	59	59	29.6	59	**128**	-
Alk-T	mg/L	35.9	34.7	32.2	34.2	23.1	32	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.7	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0161	0.0181	0.0148	0.0202	0.0342	0.0207	-	-
As-T	mg/L	0.0006	0.00055	0.00048	0.00052	0.00046	0.00052	-	**0.005**
Ba-T	mg/L	0.006	0.0057	0.0057	0.0056	0.0041	0.0054	-	-
B-T	mg/L	0.070	0.064	0.058	0.062	<0.050	0.061	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	27.4	24.9	23.4	24.7	13.8	22.80	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	<0.00050	0.00057	0.00052	0.00134	0.00087	0.00076	**0.002**	**0.007**
Hard-T	mg/L	81.9	75.1	70.8	74.5	42.9	69	-	-
Fe-T	mg/L	0.052	0.053	0.047	0.058	0.075	0.057	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	3.26	3.17	3.01	3.1	2.04	2.92	-	-
Mn-T	mg/L	0.0109	0.0083	0.0054	0.009	0.0058	0.008	**0.7**	**0.8**
Hg-T	mg/L	0.0000030	0.0000067	<0.0000020	0.0000040	<0.0000020	0.00000354	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.349	0.315	0.302	0.326	0.24	0.306	-	-
S-T	mg/L	22.7	20.9	18.6	21.2	9.6	18.6	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	9.56	9.17	8.41	8.49	4.55	8.04	-	-
Sr-T	mg/L	0.181	0.17	0.161	0.158	0.0806	0.1501	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0154	0.017	0.0138	0.0132	0.0284	0.0176	**0.05**	**0.1**
As-D	mg/L	0.00054	0.00054	0.00049	0.00055	0.00044	0.00051	-	-
Ba-D	mg/L	0.0061	0.0055	0.0055	0.0054	0.0041	0.0053	-	-
B-D	mg/L	0.069	0.064	0.065	0.059	<0.050	0.0614	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	26.5	24.6	24	24	14.1	22.6	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00062	0.00063	0.00052	0.0007	0.00056	0.00061	-	-
Hard-D	mg/L	79.8	74.2	73	72	43.2	68.4	-	-
Fe-D	mg/L	0.0337	0.0404	0.0310	0.0306	0.0523	0.0376	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	3.32	3.1	3.18	2.95	1.96	2.9	-	-
Mn-D	mg/L	0.0038	0.0038	0.0029	0.0028	0.0035	0.0034	-	-
Hg-D	mg/L	0.0000027	0.0000030	<0.0000020	0.0000076	<0.0000020	0.00000346	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.346	0.338	0.321	0.329	0.219	0.311	-	-
S-D	mg/L	21.4	19.0	19.7	21.0	9.8	18.2	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	9.63	8.64	9.03	8.17	4.66	8.0	-	-
Sr-D	mg/L	0.19	0.162	0.173	0.153	0.0846	0.1525	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E217017								
Site Description		No Name Lake Outlet						Water Quality Guidelines	
Site Name	NNO	5 in 30 Weekly Samples							
Date		12-Apr-18	19-Apr-18	25-Apr-18	2-May-18	9-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	1.7	2.4	2.9	2.3	1.9	2	**128**	-
Alk-T	mg/L	11.3	8.6	8.9	11.9	11.4	10.4	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0452	0.0551	0.0397	0.0387	0.0363	0.043	-	-
As-T	mg/L	0.00021	0.00021	0.00024	0.00025	0.00027	0.00024	-	**0.005**
Ba-T	mg/L	0.0012	0.0011	0.0011	0.0011	0.0012	0.0011	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	3.63	3.68	3.56	3.88	4.13	3.78	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00065	<0.00050	0.00057	0.00053	0.00051	0.00055	**0.002**	**0.007**
Hard-T	mg/L	12.3	12.2	12.0	13.1	13.7	12.7	-	-
Fe-T	mg/L	0.066	0.048	0.051	0.052	0.065	0.056	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	0.783	0.731	0.75	0.836	0.823	0.785	-	-
Mn-T	mg/L	0.0083	0.0058	0.0056	0.0063	0.0068	0.007	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.078	0.073	0.072	0.074	0.066	0.073	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	1.05	0.97	0.93	1.19	1.12	1.05	-	-
Sr-T	mg/L	0.0118	0.0117	0.0119	0.0121	0.0127	0.012	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0386	0.0394	0.0387	0.0306	0.031	0.0357	**0.05**	**0.1**
As-D	mg/L	0.00019	0.00021	0.00025	0.00024	0.00025	0.00023	-	-
Ba-D	mg/L	0.0012	0.0011	0.0012	0.0011	0.001	0.0011	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.000170**
Ca-D	mg/L	3.64	3.66	3.74	3.61	4.27	3.78	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.0007	0.00066	0.00067	0.00055	0.00056	0.00063	-	-
Hard-D	mg/L	12.2	12.2	12.7	12.4	14.6	12.8	-	-
Fe-D	mg/L	0.0403	0.0394	0.0396	0.0393	0.0521	0.0421	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	0.748	0.75	0.801	0.835	0.945	0.816	-	-
Mn-D	mg/L	0.0067	0.0053	0.0056	0.0055	0.0063	0.0059	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.076	0.082	0.077	0.072	0.099	0.081	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	1.03	1.01	1.04	1.1	1.28	1.1	-	-
Sr-D	mg/L	0.0117	0.012	0.0123	0.0115	0.012	0.0119	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E217017								
Site Description		No Name Lake Outlet							
Site Name	NNO	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	2	2.2	2.2	2.2	2	2	**128**	-
Alk-T	mg/L	14.5	14.5	14.9	15.9	22	16.4	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	5.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0551	0.0162	0.0188	0.0116	0.0112	0.0226	-	-
As-T	mg/L	0.00039	0.00037	0.00041	0.00037	0.00042	0.00039	-	**0.005**
Ba-T	mg/L	0.0012	0.0011	0.0011	0.0014	0.0011	0.0012	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	4.44	4.5	4.49	5.05	5.64	4.82	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00125	0.0007	0.0005	<0.00050	<0.00050	0.00069	**0.002**	**0.007**
Hard-T	mg/L	15	15.3	14.9	17.1	19.2	16.3	-	-
Fe-T	mg/L	0.161	0.053	0.079	0.063	0.06	0.083	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	0.95	0.982	0.9	1.1	1.23	1.032	-	-
Mn-T	mg/L	0.0209	0.004	0.0136	0.0408	0.0309	0.022	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.112	0.093	0.078	0.107	0.122	0.102	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	1.29	1.35	1.23	1.38	1.48	1.35	-	-
Sr-T	mg/L	0.014	0.0148	0.0142	0.0178	0.0187	0.0159	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0152	0.0136	0.0173	0.0081	0.0095	0.0127	**0.05**	**0.1**
As-D	mg/L	0.00035	0.00035	0.00041	0.00032	0.00041	0.00037	-	-
Ba-D	mg/L	0.001	0.0011	0.001	0.0014	0.0016	0.0012	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	0.000006	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	4.51	4.43	4.4	5.32	6.68	5.07	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00041	0.00041	0.00051	0.00027	0.00032	0.00038	-	-
Hard-D	mg/L	15	14.8	14.9	17.8	22.5	17	-	-
Fe-D	mg/L	0.0441	0.0463	0.0714	0.0445	0.0591	0.0531	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	0.914	0.911	0.948	1.1	1.41	1.057	-	-
Mn-D	mg/L	0.0032	0.0029	0.0156	0.0388	0.086	0.0293	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.083	0.087	0.101	0.111	0.125	0.101	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	1.27	1.2	1.27	1.29	1.65	1.3	-	-
Sr-D	mg/L	0.0143	0.0148	0.0149	0.0175	0.0219	0.0167	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

Table 139
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EMS ID	E217017								
Site Description		No Name Lake Outlet							
Site Name	NNO	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		11-Oct-18	16-Oct-18	24-Oct-18	29-Oct-18	6-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	<1.0	1.6	2.1	2	1.1	2	**128**	-
Alk-T	mg/L	15	14	14.5	15.4	12.8	14.3	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<5.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0375	0.0403	0.04	0.0423	0.051	0.0422	-	-
As-T	mg/L	0.00037	0.00033	0.00034	0.00034	0.00031	0.00034	-	**0.005**
Ba-T	mg/L	0.0013	0.0014	0.0015	0.0015	0.0015	0.0014	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	4.53	4.63	4.32	4.63	4.23	4.47	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00065	0.00107	0.00141	0.00097	0.00091	0.00100	**0.002**	**0.007**
Hard-T	mg/L	15.3	15.6	14.7	15.6	14.6	15.2	-	-
Fe-T	mg/L	0.073	0.077	0.079	0.091	0.104	0.085	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	0.973	0.984	0.944	0.98	0.966	0.969	-	-
Mn-T	mg/L	0.0047	0.0045	0.0055	0.0091	0.0093	0.007	**0.7**	**0.8**
Hg-T	mg/L	0.0000029	0.0000074	0.0000035	0.0000064	<0.0000020	0.00000444	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.106	0.123	0.256	0.112	0.129	0.145	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	1.21	1.29	1.25	1.27	1.250	1.25	-	-
Sr-T	mg/L	0.0143	0.0149	0.0143	0.0147	0.0135	0.0143	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0328	0.0408	0.0383	0.0341	0.044	0.0380	**0.05**	**0.1**
As-D	mg/L	0.00032	0.00034	0.00032	0.00034	0.00030	0.00032	-	-
Ba-D	mg/L	0.0015	0.0014	0.0015	0.0015	0.0016	0.0015	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	<0.0000050	0.0000070	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	4.54	4.66	4.55	4.46	4.43	4.53	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00063	0.00103	0.00073	0.00079	0.00073	0.00078	-	-
Hard-D	mg/L	15.1	15.6	15.4	15	14.8	15.2	-	-
Fe-D	mg/L	0.0497	0.0592	0.0603	0.0623	0.075	0.0613	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	0.923	0.954	0.989	0.945	0.917	0.946	-	-
Mn-D	mg/L	0.0031	0.0033	0.0046	0.0074	0.0077	0.0052	-	-
Hg-D	mg/L	0.0000024	0.0000034	0.0000062	0.0000073	<0.0000020	0.00000426	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.095	0.121	0.126	0.112	0.124	0.116	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	1.21	1.24	1.29	1.16	1.26	1.2	-	-
Sr-D	mg/L	0.0145	0.0147	0.0143	0.0139	0.0143	0.0143	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E286930								
Site Description		Quinsam River Upstream of 7 South Mining Operation							
Site Name	QRDS1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		11-Apr-18	19-Apr-18	25-Apr-18	1-May-18	8-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	34.7	29.5	25.8	27.4	37.9	31	**128**	-
Alk-T	mg/L	36.6	30.6	31.2	33.8	41.1	34.7	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0372	0.0262	0.0265	0.0219	0.0336	0.0291	-	-
As-T	mg/L	0.00033	0.00028	0.00026	0.00024	0.00032	0.00029	-	**0.005**
Ba-T	mg/L	0.003	0.0025	0.0025	0.0022	0.0032	0.0027	-	-
B-T	mg/L	0.055	0.051	<0.050	<0.050	0.058	0.053	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	14.1	11.7	11.2	11.4	16.4	13.00	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00064	0.00058	0.00054	0.00072	0.00057	0.00061	**0.002**	**0.007**
Hard-T	mg/L	42.7	35.6	34	34.5	48.8	39.1	-	-
Fe-T	mg/L	0.05	0.035	0.034	0.028	0.062	0.042	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	1.82	1.54	1.46	1.45	1.89	1.63	-	-
Mn-T	mg/L	0.0047	0.0035	0.0031	0.0029	0.0053	0.004	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.284	0.244	0.258	0.218	0.307	0.262	-	-
S-T	mg/L	12.3	10.4	10.5	9.2	14.3	11.3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	14.4	12.9	13.1	11.9	16.6	13.8	-	-
Sr-T	mg/L	0.0834	0.0661	0.0617	0.0594	0.0877	0.0717	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0204	0.0208	0.0204	0.0151	0.0157	0.0185	**0.05**	**0.1**
As-D	mg/L	0.0003	0.00028	0.00026	0.00023	0.00029	0.00027	-	-
Ba-D	mg/L	0.003	0.0025	0.0025	0.0023	0.0027	0.0026	-	-
B-D	mg/L	0.053	<0.050	<0.050	<0.050	0.055	0.052	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.000170**
Ca-D	mg/L	14	11.6	11.6	11.7	16.5	13.1	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00073	0.00069	0.00057	0.00052	0.00074	0.00065	-	-
Hard-D	mg/L	42.3	34.8	34.8	35.3	49.2	39.3	-	-
Fe-D	mg/L	0.0258	0.0269	0.0237	0.0203	0.0238	0.0241	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	1.81	1.45	1.44	1.47	1.94	1.62	-	-
Mn-D	mg/L	0.0022	0.0018	0.0023	0.002	0.0026	0.0022	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.298	0.266	0.278	0.215	0.31	0.273	-	-
S-D	mg/L	12	10.2	11.6	8.4	14.1	11.3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	14.3	12	12.8	12	17.6	13.7	-	-
Sr-D	mg/L	0.08	0.0630	0.0637	0.0579	0.0827	0.0695	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E286930								
Site Description		Quinsam River Upstream of 7 South Mining Operation							
Site Name	QRDS1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	28.4	28.9	28	25.9	21.9	27	**128**	-
Alk-T	mg/L	38.4	37.8	38	37	36.7	37.6	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	1.10	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	4	**5**	**25**
Al-T	mg/L	0.0586	0.0323	0.0248	0.0242	0.0226	0.0325	-	-
As-T	mg/L	0.00035	0.00035	0.00036	0.00039	0.00036	0.00036	-	**0.005**
Ba-T	mg/L	0.0027	0.0024	0.0022	0.0022	0.002	0.0023	-	-
B-T	mg/L	0.054	0.052	0.055	0.053	0.050	0.053	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	11.7	11.3	12.1	11.1	10	11.20	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00090	0.00067	0.0006	0.00062	0.00055	0.00067	**0.002**	**0.007**
Hard-T	mg/L	35.6	34	35.8	33.5	30.2	33.8	-	-
Fe-T	mg/L	0.099	0.065	0.058	0.056	0.05	0.066	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	1.54	1.41	1.36	1.42	1.24	1.39	-	-
Mn-T	mg/L	0.0121	0.0108	0.0102	0.0097	0.0083	0.010	**0.7**	**0.8**
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.244	0.245	0.253	0.232	0.204	0.236	-	-
S-T	mg/L	9.5	9.3	9.3	8.9	7.1	8.8	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	15.7	15	14.4	15	11.9	14.4	-	-
Sr-T	mg/L	0.0637	0.0627	0.0599	0.0569	0.0503	0.0587	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.0127	0.0131	0.0131	0.0123	0.0144	0.0131	**0.05**	**0.1**
As-D	mg/L	0.00033	0.00031	0.00033	0.0003	0.00032	0.00032	-	-
Ba-D	mg/L	0.0023	0.0024	0.0021	0.0021	0.002	0.0022	-	-
B-D	mg/L	0.055	<0.050	0.054	0.051	<0.050	0.052	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000050	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	11.8	11.5	11.1	11	10.7	11.2	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00056	0.00047	0.00095	0.00051	0.00051	0.0006	-	-
Hard-D	mg/L	35.8	34.1	33.4	32.7	32	33.6	-	-
Fe-D	mg/L	0.0212	0.0232	0.0297	0.0241	0.0286	0.0254	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	1.51	1.31	1.39	1.28	1.28	1.35	-	-
Mn-D	mg/L	0.0025	0.0027	0.0031	0.0032	0.0034	0.003	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.258	0.256	0.252	0.228	0.207	0.24	-	-
S-D	mg/L	9.5	9	9.4	8.4	7.6	8.8	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	15.8	14.5	14.4	13.3	12.2	14.0	-	-
Sr-D	mg/L	0.0626	0.0657	0.0599	0.0554	0.0529	0.0593	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E286930								
Site Description		Quinsam River Upstream of 7 South Mining Operation							
Site Name	QRDS1	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		11-Oct-18	16-Oct-18	24-Oct-18	31-Oct-18	6-Nov-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	32.4	27.9	27.1	33.7	29	30	**128**	-
Alk-T	mg/L	33.6	35.2	34.1	35.6	30.2	33.7	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	3.10	1.42	-	-
TSS	mg/L	<4.0	<5.2	<4.0	<4.8	<4.0	4	**5**	**25**
Al-T	mg/L	0.0164	0.016	0.0086	0.0209	0.0281	0.018	-	-
As-T	mg/L	0.00035	0.00030	0.00030	0.00033	0.00039	0.00033	-	**0.005**
Ba-T	mg/L	0.0031	0.0026	0.0026	0.0029	0.0034	0.0029	-	-
B-T	mg/L	0.050	<0.050	<0.050	0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	13.9	12.3	11.8	13.5	12.40	12.80	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	**0.05**
Cu-T	mg/L	0.00078	0.00062	0.00102	0.00114	0.00074	0.00086	**0.002**	**0.007**
Hard-T	mg/L	41.6	37.1	35.1	41	38.2	38.6	-	-
Fe-T	mg/L	0.047	0.047	0.039	0.068	0.10	0.06	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	1.67	1.52	1.39	1.75	1.76	1.62	-	-
Mn-T	mg/L	0.0054	0.0051	0.0041	0.0087	0.0084	0.006	**0.7**	**0.8**
Hg-T	mg/L	0.0000045	<0.0000020	0.0000038	0.0000048	<0.0000020	0.00000342	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.257	0.224	0.218	0.254	0.243	0.239	-	-
S-T	mg/L	11.2	9.4	8.2	10.4	9.2	9.7	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00002	-	**0.0001**
Na-T	mg/L	10.2	11.6	10.7	12.3	9.04	10.77	-	-
Sr-T	mg/L	0.0746	0.0647	0.0611	0.0656	0.0693	0.0671	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	**0.0075**	**0.03**
Al-D	mg/L	0.012	0.0095	0.0119	0.0138	0.0192	0.0133	**0.05**	**0.1**
As-D	mg/L	0.00033	0.00029	0.00029	0.00028	0.00036	0.00031	-	-
Ba-D	mg/L	0.0032	0.0026	0.0026	0.0027	0.0034	0.0029	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	**0.000088**	**0.00017**
Ca-D	mg/L	14.0	12.60	11.6	13.8	12.7	12.9	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Cu-D	mg/L	0.00076	0.00049	0.00067	0.00054	0.00088	0.00067	-	-
Hard-D	mg/L	42.2	38.1	35.5	41.3	38.9	39.2	-	-
Fe-D	mg/L	0.0304	0.0306	0.0281	0.0343	0.0363	0.0319	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	1.77	1.62	1.56	1.64	1.74	1.67	-	-
Mn-D	mg/L	0.0027	0.0029	0.0027	0.0024	0.0017	0.0025	-	-
Hg-D	mg/L	0.0000039	0.0000022	<0.0000020	0.0000042	<0.0000020	0.00000286	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.26	0.231	0.235	0.25	0.243	0.244	-	-
S-D	mg/L	10.4	9.2	8.7	10.6	9.6	9.7	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	10.8	12	12.1	11.8	9.48	11.2	-	-
Sr-D	mg/L	0.0789	0.0641	0.0605	0.0654	0.073	0.0684	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E292112								
Site Description		Lower Wetland Outlet at the Confluence of the Quinsam River							
Site Name	LWO	5 in 30 Weekly Samples						Water Quality Guidelines	
Date		12-Apr-18	19-Apr-18	25-Apr-18	1-May-18	9-May-18	5x30 Average	Average	Max
Parameter	Unit								
SO4-D	mg/L	1.60	<1.0	<1.0	<1.0	<1.0	1	**128**	-
Alk-T	mg/L	15	14.8	17.5	24.5	28.9	20.1	-	-
Acidity 8.3	mg/L	<1.0	1.3	8	<1.0	<1.0	2.50	-	-
TSS	mg/L	<4.0	<4.0	<16	8	5.8	**8**	**5**	**25**
Al-T	mg/L	0.0904	0.166	0.178	0.267	0.343	0.2089	-	-
As-T	mg/L	0.00023	0.0004	0.00055	0.00096	0.00161	0.00075	-	**0.005**
Ba-T	mg/L	0.0015	0.002	0.0022	0.003	0.0038	0.0025	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	0.000014	0.000012	0.000011	-	-
Ca-T	mg/L	4.86	5.43	5.56	7.05	8.17	6.21	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0010	-	-
Co-T	mg/L	<0.00020	0.00021	0.00033	0.00055	0.00083	0.00042	-	**0.05**
Cu-T	mg/L	0.00109	0.00173	0.00212	0.00283	0.00336	**0.00223**	**0.002**	**0.007**
Hard-T	mg/L	15.4	17.6	18.2	22.5	25.9	19.9	-	-
Fe-T	mg/L	0.137	0.403	0.881	**1.58**	**2.59**	1.118	-	**1**
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	**0.003**	**0.005**
Mg-T	mg/L	0.799	0.985	1.04	1.18	1.34	1.069	-	-
Mn-T	mg/L	0.0085	0.0286	0.0381	0.0640	0.0825	0.044	**0.7**	**0.8**
Hg-T	mg/L	0.0000024	0.0000028	0.0000022	0.0000028	0.0000030	0.0000026	-	**0.0001**
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	**0.025**
K-T	mg/L	0.051	0.072	0.124	0.080	0.079	0.081	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.0001	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	0.000032	0.000022	-	**0.0001**
Na-T	mg/L	1.62	1.88	1.91	2.04	2.31	1.95	-	-
Sr-T	mg/L	0.0189	0.0216	0.0243	0.0269	0.0332	0.025	-	-
Zn-T	mg/L	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	0.0051	**0.0075**	**0.03**
Al-D	mg/L	0.0743	**0.117**	**0.166**	**0.184**	**0.220**	**0.1523**	**0.05**	**0.1**
As-D	mg/L	0.00021	0.00036	0.0006	0.00089	0.00129	0.00067	-	-
Ba-D	mg/L	0.0015	0.0019	0.0022	0.0025	0.0031	0.0022	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	-	-
Cd-D	mg/L	<0.0000050	0.0000070	0.0000050	0.0000050	0.0000130	0.000007	**0.000088**	**0.000170**
Ca-D	mg/L	4.82	5.41	6.39	6.71	8.78	6.42	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Co-D	mg/L	<0.00020	<0.00020	0.00035	0.00051	0.00072	0.0004	-	-
Cu-D	mg/L	0.00113	0.00165	0.00189	0.00227	0.00309	0.00201	-	-
Hard-D	mg/L	15.5	17.4	20.3	21.7	27.7	20.5	-	-
Fe-D	mg/L	0.112	0.296	**0.777**	**1.09**	**1.99**	0.853	-	**0.35**
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	-
Mg-D	mg/L	0.837	0.948	1.05	1.21	1.39	1.087	-	-
Mn-D	mg/L	0.0084	0.0274	0.0386	0.0503	0.0715	0.0392	-	-
Hg-D	mg/L	0.0000034	0.0000029	0.0000027	0.0000045	0.0000057	0.0000038	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	-
K-D	mg/L	0.068	0.071	0.067	0.069	0.106	0.076	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	-	-
Na-D	mg/L	1.73	1.82	1.91	2.11	2.33	2.0	-	-
Sr-D	mg/L	0.0193	0.0215	0.0247	0.025	0.0301	0.0241	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	-	-

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EMS ID	E292112	Lower Wetland Outlet at the Confluence of the Quinsam River			
Site Description		5 in 30 Weekly Samples			
Site Name	LWO			Water Quality Guidelines	
Date			5x30 Average	Average	Max
Parameter	Unit				
SO4-D	mg/L			128	-
Alk-T	mg/L			-	-
Acidity 8.3	mg/L			-	-
TSS	mg/L			5	25
Al-T	mg/L			-	-
As-T	mg/L			-	0.005
Ba-T	mg/L			-	-
B-T	mg/L			-	-
Cd-T	mg/L			-	-
Ca-T	mg/L			-	-
Cr-T	mg/L			-	-
Co-T	mg/L			-	0.05
Cu-T	mg/L			0.002	0.007
Hard-T	mg/L			-	-
Fe-T	mg/L			-	1
Pb-T	mg/L			0.003	0.005
Mg-T	mg/L			-	-
Mn-T	mg/L			0.7	0.8
Hg-T	mg/L			-	0.0001
Mo-T	mg/L			-	-
Ni-T	mg/L			-	0.025
K-T	mg/L			-	-
S-T	mg/L			-	-
Se-T	mg/L			-	-
Ag-T	mg/L			-	0.0001
Na-T	mg/L	Dry No Flow		-	-
Sr-T	mg/L			-	-
Zn-T	mg/L			0.0075	0.03
Al-D	mg/L			0.05	0.1
As-D	mg/L			-	-
Ba-D	mg/L			-	-
B-D	mg/L			-	-
Cd-D	mg/L			0.000088	0.00017
Ca-D	mg/L			-	-
Cr-D	mg/L			-	-
Co-D	mg/L			-	-
Cu-D	mg/L			-	-
Hard-D	mg/L			-	-
Fe-D	mg/L			-	0.35
Pb-D	mg/L			-	-
Mg-D	mg/L			-	-
Mn-D	mg/L			-	-
Hg-D	mg/L			-	-
Mo-D	mg/L			-	-
Ni-D	mg/L			-	-
K-D	mg/L			-	-
S-D	mg/L			-	-
Se-D	mg/L			-	-
Na-D	mg/L			-	-
Sr-D	mg/L			-	-
Zn-D	mg/L			-	-

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EMS ID	E292112					
Site Description		Lower Wetland Outlet at the Confluence of the Quinsam River				
Site Name	LWO	5 in 30 Weekly Samples				
Date		11-Oct-18		5x30 Average	Water Quality Guidelines	
Parameter	Unit				Average	Max
SO4-D	mg/L	<1.0			128	-
Alk-T	mg/L	15.2			-	-
Acidity 8.3	mg/L	3.70			-	-
TSS	mg/L	<4.0			5	25
Al-T	mg/L	0.248			-	-
As-T	mg/L	0.00054			-	0.005
Ba-T	mg/L	0.0023			-	-
B-T	mg/L	<0.050			-	-
Cd-T	mg/L	0.000013			-	-
Ca-T	mg/L	5.86			-	-
Cr-T	mg/L	<0.0010			-	-
Co-T	mg/L	0.00024			-	0.05
Cu-T	mg/L	0.00321			0.002	0.007
Hard-T	mg/L	18.8			-	-
Fe-T	mg/L	0.329			-	1
Pb-T	mg/L	<0.00020			0.003	0.005
Mg-T	mg/L	0.999			-	-
Mn-T	mg/L	0.0355			0.7	0.8
Hg-T	mg/L	0.0000043			-	0.0001
Mo-T	mg/L	<0.0010			-	-
Ni-T	mg/L	<0.0010			-	0.025
K-T	mg/L	0.12			-	-
S-T	mg/L	<3.0			-	-
Se-T	mg/L	0.00010			-	-
Ag-T	mg/L	<0.000020	Authorization was recieved from ENV to temporarily suspend monitoring from this site for Q3 due to no discharge from 7SSD.		-	0.0001
Na-T	mg/L	1.93			-	-
Sr-T	mg/L	0.0224			-	-
Zn-T	mg/L	<0.0050			0.0075	0.03
Al-D	mg/L	0.209			0.05	0.1
As-D	mg/L	0.00047			-	-
Ba-D	mg/L	0.0021			-	-
B-D	mg/L	<0.050			-	-
Cd-D	mg/L	0.0000107			0.000088	0.00017
Ca-D	mg/L	5.67			-	-
Cr-D	mg/L	<0.0010			-	-
Co-D	mg/L	<0.00020			-	-
Cu-D	mg/L	0.00288			-	-
Hard-D	mg/L	18.2			-	-
Fe-D	mg/L	0.268			-	0.35
Pb-D	mg/L	<0.00020			-	-
Mg-D	mg/L	0.987			-	-
Mn-D	mg/L	0.0195			-	-
Hg-D	mg/L	0.0000082			-	-
Mo-D	mg/L	<0.0010			-	-
Ni-D	mg/L	<0.0010			-	-
K-D	mg/L	0.078			-	-
S-D	mg/L	<3.0			-	-
Se-D	mg/L	<0.00010			-	-
Na-D	mg/L	1.96			-	-
Sr-D	mg/L	0.0217			-	-
Zn-D	mg/L	<0.0050			-	-

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EMS ID	E292113	Quinsam River Downstream of 7 South Mine Operation								
Site Description		5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Site Name	7SQR									
Date		12-Apr-18	19-Apr-18	25-Apr-18	1-May-18	9-May-18	19-Jun-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	29.2	27.6	26.5	25.8	37.3	37.3	29.3	128	-
Alk-T	mg/L	31.4	28.9	30.4	34.1	35.4	35.4	32	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	5	25
Al-T	mg/L	0.0497	0.0295	0.0265	0.0264	0.0293	0.0293	0.0323	-	-
As-T	mg/L	0.00037	0.00029	0.00030	0.00033	0.0004	0.0004	0.00034	-	0.005
Ba-T	mg/L	0.0029	0.0025	0.003	0.0024	0.0037	0.0037	0.0029	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	0.057	0.057	0.051	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	12.7	11.4	11.7	12	16.4	16.4	12.80	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	0.05
Cu-T	mg/L	0.00075	0.00056	0.00057	0.00062	0.00085	0.00085	0.0007	0.002	0.007
Hard-T	mg/L	38.2	34	34.9	36.3	48.8	48.8	38	-	-
Fe-T	mg/L	0.092	0.069	0.073	0.079	0.113	0.113	0.085	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	0.003	0.005
Mg-T	mg/L	1.59	1.36	1.4	1.55	1.87	1.87	1.55	-	-
Mn-T	mg/L	0.0056	0.0046	0.0049	0.0053	0.0076	0.0076	0.0056	0.7	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.244	0.232	0.235	0.24	0.34	0.34	0.258	-	-
S-T	mg/L	10.1	9.3	9.9	9	14.5	14.5	10.6	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	-	0.0001
Na-T	mg/L	11.6	11.3	11	12	17.5	17.5	12.7	-	-
Sr-T	mg/L	0.0698	0.0605	0.0620	0.0601	0.0858	0.0858	0.0676	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.0075	0.033
Al-D	mg/L	0.0251	0.0216	0.0239	0.0152	0.0142	0.0142	0.0200	0.05	0.1
As-D	mg/L	0.00028	0.00028	0.00032	0.00030	0.00035	0.00035	0.00031	-	-
Ba-D	mg/L	0.0029	0.0027	0.0026	0.0024	0.003	0.003	0.0027	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	0.054	0.054	0.051	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	0.000005	0.000005	0.000088	0.00017
Ca-D	mg/L	11.9	11.7	12.1	11.1	15.9	15.9	12.5	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00066	0.00063	0.00072	0.00394	0.00069	0.00069	0.00133	-	-
Hard-D	mg/L	36.2	34.9	36.1	33.9	47.3	47.3	37.7	-	-
Fe-D	mg/L	0.0482	0.0474	0.0502	0.0807	0.0618	0.0618	0.0577	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	1.56	1.4	1.45	1.49	1.85	1.85	1.55	-	-
Mn-D	mg/L	0.0037	0.0038	0.0043	0.0045	0.006	0.0060	0.0045	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.249	0.24	0.252	0.211	0.303	0.303	0.251	-	-
S-D	mg/L	8.3	9.7	9.8	8.1	12.6	12.6	9.7	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	-	-
Na-D	mg/L	11.4	11.4	11.3	11.7	17.6	17.6	12.70	-	-
Sr-D	mg/L	0.0685	0.0604	0.0631	0.0564	0.0762	0.0762	0.0649	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	-	-

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EMS ID	E292113									
Site Description		Quinsam River Downstream of 7 South Mine Operation								
Site Name	7SQR	5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	12-Sep-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	29.4	28.6	26.9	24.3	21.1	16.1	26.1	128	-
Alk-T	mg/L	39	38.8	39.1	38.9	37.6	29.3	38.7	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	5	25
Al-T	mg/L	0.0245	0.0392	0.0237	0.0603	0.0247	0.0129	0.0345	-	-
As-T	mg/L	0.00042	0.00048	0.00051	0.00045	0.00049	0.00035	0.00047	-	0.005
Ba-T	mg/L	0.0023	0.0027	0.0025	0.0023	0.0021	0.0017	0.0024	-	-
B-T	mg/L	0.051	0.057	0.055	<0.050	0.050	<0.050	0.053	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	11.5	11.8	11.8	10.3	10.5	9.45	11.20	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	0.05
Cu-T	mg/L	0.00099	0.00064	0.00053	0.00075	0.00058	0.00057	0.0007	0.002	0.007
Hard-T	mg/L	34.7	35.5	35.3	31.6	31.4	28.4	34	-	-
Fe-T	mg/L	0.085	0.122	0.087	0.084	0.086	0.065	0.093	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	0.003	0.005
Mg-T	mg/L	1.46	1.47	1.41	1.43	1.27	1.16	1.41	-	-
Mn-T	mg/L	0.008	0.0097	0.0082	0.0078	0.0067	0.0044	0.0081	0.7	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.23	0.256	0.266	0.205	0.214	0.193	0.234	-	-
S-T	mg/L	9	9.5	9.3	9.3	7.1	5	8.8	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	-	0.0001
Na-T	mg/L	14.4	15.3	14.5	13.6	11.9	8.46	13.9	-	-
Sr-T	mg/L	0.0603	0.0641	0.0606	0.0538	0.0511	0.0409	0.0580	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.0075	0.033
Al-D	mg/L	0.0124	0.0114	0.0116	0.0133	0.0148	0.0088	0.0127	0.05	0.1
As-D	mg/L	0.00043	0.00044	0.00044	0.00041	0.00045	0.00036	0.00043	-	-
Ba-D	mg/L	0.0026	0.0026	0.0024	0.0024	0.0024	0.0018	0.0025	-	-
B-D	mg/L	0.053	<0.050	0.054	0.053	<0.050	<0.050	0.052	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000093	<0.0000050	<0.0000050	0.000006	0.000088	0.00017
Ca-D	mg/L	12.4	11.6	11.1	11.2	11.2	9.67	11.5	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00046	0.00047	0.00052	0.00046	0.00064	0.0005	0.00051	-	-
Hard-D	mg/L	36.9	34.5	33.4	33	33.6	29	34.3	-	-
Fe-D	mg/L	0.0507	0.0509	0.0487	0.0535	0.0558	0.0451	0.0519	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	1.46	1.34	1.4	1.23	1.35	1.16	1.36	-	-
Mn-D	mg/L	0.0050	0.0059	0.0082	0.0053	0.0052	0.004	0.0059	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.236	0.258	0.246	0.227	0.215	0.181	0.236	-	-
S-D	mg/L	9.1	9.5	7.9	7.3	7.5	5.8	8.3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	-	-
Na-D	mg/L	14.7	13.9	13.8	13.1	12.6	8.6	13.600	-	-
Sr-D	mg/L	0.0604	0.0635	0.0593	0.0576	0.0538	0.0403	0.0589	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	-	-

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EMS ID	E292113	Quinsam River Downstream of 7 South Mine Operation								
Site Description		5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Site Name	7SQR									
Date		11-Oct-18	16-Oct-18	24-Oct-18	31-Oct-18	7-Nov-18	12-Dec-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	29.5	29	25.8	28.4	14.1	31.8	25.4	128	-
Alk-T	mg/L	32.4	34.8	35.7	34.4	30.2	33.1	33.5	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.52	5	25
Al-T	mg/L	0.0276	0.0223	0.0126	0.0312	0.053	0.0442	0.0293	-	-
As-T	mg/L	0.00042	0.00041	0.00035	0.0004	0.00056	0.00037	0.00043	-	0.005
Ba-T	mg/L	0.0031	0.0029	0.0026	0.0029	0.0038	0.0033	0.0031	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.052	0.0500	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000100	-	-
Ca-T	mg/L	12.7	12.8	11.9	13.2	10.5	12.9	12.2	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	0.05
Cu-T	mg/L	0.00059	0.00075	0.00063	0.00090	0.00115	0.00099	0.00080	0.002	0.007
Hard-T	mg/L	38.5	38.6	35.8	40.2	31.7	39.7	37.0	-	-
Fe-T	mg/L	0.094	0.095	0.089	0.127	0.101	0.113	0.101	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	0.00027	<0.00020	<0.00020	0.000214	0.003	0.005
Mg-T	mg/L	1.64	1.64	1.45	1.77	1.34	1.82	1.57	-	-
Mn-T	mg/L	0.0062	0.0071	0.0058	0.0075	0.0053	0.0065	0.0064	0.7	0.8
Hg-T	mg/L	<0.0000020	0.0000071	0.0000085	0.0000035	<0.0000020	<0.0000020	0.00000462	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	0.025
K-T	mg/L	0.251	0.235	0.229	0.277	0.214	0.274	0.241	-	-
S-T	mg/L	10	10.4	7.5	10	4.9	11.3	8.6	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000100	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000200	-	0.0001
Na-T	mg/L	9.36	11.7	11.1	11.5	5.54	14.3	9.84	-	-
Sr-T	mg/L	0.0706	0.0668	0.0597	0.0655	0.0472	0.0739	0.0620	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00500	0.0075	0.033
Al-D	mg/L	0.0264	0.0145	0.0105	0.018	0.0356	0.0313	0.0210	0.05	0.1
As-D	mg/L	0.00037	0.00038	0.00039	0.00035	0.00052	0.00035	0.00040	-	-
Ba-D	mg/L	0.0032	0.0029	0.0026	0.0029	0.0036	0.0031	0.0030	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.051	0.0500	-	-
Cd-D	mg/L	0.0000086	<0.0000050	<0.0000050	<0.0000050	0.0000052	<0.0000050	0.00000576	0.000088	0.00017
Ca-D	mg/L	13	12.9	11.6	13	10.2	12.6	12.1	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	-
Cu-D	mg/L	0.0383	0.00056	0.00052	0.00053	0.00083	0.00065	0.00815	-	-
Hard-D	mg/L	39.3	38.8	35.4	39.3	30.6	39.5	36.7	-	-
Fe-D	mg/L	0.0683	0.071	0.0638	0.0813	0.0526	0.0836	0.0674	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	-
Mg-D	mg/L	1.66	1.6	1.54	1.63	1.25	1.93	1.54	-	-
Mn-D	mg/L	0.0054	0.0061	0.0056	0.0058	0.0033	0.0047	0.0052	-	-
Hg-D	mg/L	<0.0000020	0.0000038	0.0000049	0.0000021	<0.0000020	<0.0000020	0.00000296	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
K-D	mg/L	0.259	0.24	0.238	0.239	0.197	0.281	0.235	-	-
S-D	mg/L	9.2	9.1	8.7	9.4	5	12.3	8.3	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000100	-	-
Na-D	mg/L	9.66	11	11.9	10.5	5.46	15.1	9.70	-	-
Sr-D	mg/L	0.0726	0.0644	0.0592	0.0635	0.0485	0.0707	0.0616	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00500	-	-

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EMS ID	E292113	Quinsam River Downstream of 7 South Mine Operation			Water Quality Guidelines
Site Description		Monthly Samples			
Site Name	7SQR				
Date		23-Jan-19	20-Feb-19	20-Mar-19	Max
Parameter	Unit				
SO4-D	mg/L	21.6		49	-
Alk-T	mg/L	26.6		41.8	-
Acidity 8.3	mg/L	<1.0		<1.0	-
TSS	mg/L	<4.0		<4.0	25
Al-T	mg/L	0.0522		0.025	-
As-T	mg/L	0.00028		0.00025	0.005
Ba-T	mg/L	0.0023		0.0028	-
B-T	mg/L	<0.050		0.066	-
Cd-T	mg/L	<0.000010		<0.000010	-
Ca-T	mg/L	9.26		14.2	-
Cr-T	mg/L	<0.0010		<0.0010	-
Co-T	mg/L	<0.00020		<0.00020	0.05
Cu-T	mg/L	0.00074		0.00058	0.007
Hard-T	mg/L	28.1		42.8	-
Fe-T	mg/L	0.081		0.066	1
Pb-T	mg/L	<0.00020		<0.00020	0.005
Mg-T	mg/L	1.21		1.78	-
Mn-T	mg/L	0.0054		0.0045	0.8
Hg-T	mg/L	<0.0000020		<0.0000020	0.0001
Mo-T	mg/L	<0.0010		<0.0010	-
Ni-T	mg/L	<0.0010		<0.0010	0.025
K-T	mg/L	0.18		0.326	-
S-T	mg/L	7		15.8	-
Se-T	mg/L	<0.00010		<0.00010	-
Ag-T	mg/L	<0.000020		<0.000020	0.0001
Na-T	mg/L	8.74	Dangerous conditions, no samples were collected	20.5	-
Sr-T	mg/L	0.0464		0.0954	-
Zn-T	mg/L	<0.0050		<0.0050	0.033
Al-D	mg/L	0.0298		0.0165	0.1
As-D	mg/L	0.00024		0.00022	-
Ba-D	mg/L	0.0021		0.0026	-
B-D	mg/L	<0.050		0.060	-
Cd-D	mg/L	<0.0000050		<0.0000050	0.00017
Ca-D	mg/L	9.58		13.7	-
Cr-D	mg/L	<0.0010		<0.0010	-
Co-D	mg/L	<0.00020		<0.00020	-
Cu-D	mg/L	0.0006		0.00052	-
Hard-D	mg/L	28.8		41.6	-
Fe-D	mg/L	0.035		0.0428	0.35
Pb-D	mg/L	<0.00020		<0.00020	-
Mg-D	mg/L	1.19		1.79	-
Mn-D	mg/L	0.0025		0.0035	-
Hg-D	mg/L	<0.0000020		<0.0000020	-
Mo-D	mg/L	<0.0010		<0.0010	-
Ni-D	mg/L	<0.0010		<0.0010	-
K-D	mg/L	0.187		0.324	-
S-D	mg/L	7.5		15.7	-
Se-D	mg/L	<0.00010		<0.00010	-
Na-D	mg/L	8.9		18.6	-
Sr-D	mg/L	0.0491		0.0893	-
Zn-D	mg/L	<0.0050		<0.0050	-

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EMS ID	E297230	Iron River Upstream of Mining Operations								
Site Description		5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Site Name	IR1									
Date		12-Apr-18	19-Apr-18	25-Apr-18	1-May-18	9-May-18	19-Jun-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	3.00	2.80	2.50	2.5	<1.0	3.8	2.40	128	-
Alk-T	mg/L	26.5	29.7	28.3	27	20.5	36.5	26.4	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	1.10	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	5	25
Al-T	mg/L	0.0757	0.0494	0.0568	0.0737	0.107	0.04	0.0725	-	-
As-T	mg/L	0.00029	0.0004	0.0004	0.00028	0.00018	0.00052	0.00031	-	0.005
Ba-T	mg/L	0.0021	0.0023	0.0022	0.0019	0.0014	0.003	0.0020	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	0.000017	0.000026	0.000023	0.000028	0.000027	0.000019	0.000024	-	-
Ca-T	mg/L	9.37	12.2	11.6	9.65	7.27	14.5	10.02	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.004	0.11
Cu-T	mg/L	0.00063	0.00052	0.00071	0.00071	0.00089	0.00088	0.0007	0.002	0.0070
Hard-T	mg/L	25.6	32.8	31.1	26.4	20.1	39.5	27	-	-
Fe-T	mg/L	0.035	0.017	0.017	0.022	0.054	<0.010	0.029	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	0.005
Mg-T	mg/L	0.534	0.591	0.549	0.557	0.46	0.822	0.538	-	-
Mn-T	mg/L	0.0011	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	0.0011	0.7	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000025	<0.0000020	0.0000021	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.147	0.16	0.153	0.161	0.139	0.234	0.152	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	-	-
Se-T	mg/L	0.00023	0.00027	0.00023	0.00017	0.00011	0.00029	0.00020	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	0.00005	0.0001
Na-T	mg/L	0.74	0.792	0.69	0.679	0.527	1.05	0.686	-	-
Sr-T	mg/L	0.0318	0.0408	0.0397	0.03	0.0215	0.0472	0.0328	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.008	0.03
Al-D	mg/L	0.0654	0.0447	0.0551	0.061	0.0809	0.0347	**0.061**	0.05	0.1
As-D	mg/L	0.00028	0.00038	0.0004	0.0003	0.00018	0.00047	0.00031	-	-
Ba-D	mg/L	0.0021	0.0023	0.0023	0.0018	0.0012	0.003	0.0019	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-D	mg/L	0.0000200	0.000018	0.0000260	0.0000257	0.0000270	0.000019	0.000023	0.00008	0.00017
Ca-D	mg/L	9.36	12.2	12.5	9.57	7.71	14.7	10.27	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00076	0.00047	0.00063	0.00067	0.00092	0.0007	0.00069	-	-
Hard-D	mg/L	25.6	32.9	33.6	26.1	21.3	40.3	27.9	-	-
Fe-D	mg/L	0.0184	0.0099	0.0131	0.0204	0.0214	0.0068	0.0166	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	0.528	0.586	0.588	0.545	0.489	0.885	0.547	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Hg-D	mg/L	0.0000023	<0.0000020	<0.0000020	0.0000021	0.0000026	<0.0000020	0.0000022	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.158	0.161	0.169	0.149	0.156	0.21	0.159	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	-	-
Se-D	mg/L	0.00016	0.00027	0.00023	0.00017	<0.00010	0.00025	0.00019	-	-
Na-D	mg/L	0.744	0.782	0.716	0.664	0.56	1.08	0.693	-	-
Sr-D	mg/L	0.0327	0.0414	0.0419	0.0288	0.0189	0.0472	0.0327	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	-	-

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EMS ID	E297230									
Site Description		Quinsam River Downstream of 7 South Mine Operation								
Site Name	IR1	5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	12-Sep-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	5.5	6.9	9.8	10.2	11.2	9.5	8.7	128	-
Alk-T	mg/L	52.5	61.6	70.2	71.7	76.1	59.8	66.4	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	5	25
Al-T	mg/L	0.0246	0.0251	0.0262	0.0256	0.0209	0.0213	0.0245	-	-
As-T	mg/L	0.0006	0.00069	0.00068	0.00068	0.00063	0.00074	0.00066	-	0.005
Ba-T	mg/L	0.0035	0.0046	0.0052	0.0051	0.0054	0.004	0.0048	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	0.000020	0.000017	0.000017	0.000015	0.000016	0.000016	0.000017	-	-
Ca-T	mg/L	20.6	24.1	28.7	28.5	29.5	24.9	26.30	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.004	0.11
Cu-T	mg/L	0.00095	0.00055	0.00062	0.00058	<0.00050	0.0008	0.0006	0.002	0.007
Hard-T	mg/L	55.7	64.8	76.8	76.6	79.2	66.7	71	-	-
Fe-T	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	0.003	0.005
Mg-T	mg/L	1.01	1.15	1.26	1.32	1.36	1.11	1.22	-	-
Mn-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	0.7	0.8
Hg-T	mg/L	<0.0000020	0.0000030	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000022	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.192	0.221	0.264	0.236	0.25	0.238	0.233	-	-
S-T	mg/L	<3.0	<3.0	<3.0	3.8	3.7	3.1	3.3	-	-
Se-T	mg/L	0.00037	0.00046	0.00041	0.00038	0.00042	0.00083	0.00041	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	0.00005	0.0001
Na-T	mg/L	1.18	1.32	1.49	1.62	1.66	1.35	1.45	-	-
Sr-T	mg/L	0.0657	0.0809	0.0912	0.091	0.0973	0.0817	0.0852	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.0075	0.03
Al-D	mg/L	0.0255	0.0244	0.0248	0.0229	0.0201	0.0227	0.0235	0.05	0.1
As-D	mg/L	0.00064	0.00063	0.00069	0.00059	0.00064	0.0007	0.00064	-	-
Ba-D	mg/L	0.0039	0.0049	0.0051	0.0054	0.0058	0.0043	0.0050	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-D	mg/L	0.000019	0.0000180	0.0000160	0.0000210	0.0000173	0.0000170	0.000018	0.00008	0.00017
Ca-D	mg/L	21.2	25.6	27	29.8	32.3	25.2	27.2	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00053	0.0005	0.00046	0.00051	0.00059	0.00083	0.00052	-	-
Hard-D	mg/L	57.1	68.5	72.9	80	86.6	67.3	73	-	-
Fe-D	mg/L	0.0056	0.0075	<0.0050	0.0062	<0.0050	0.0073	0.0059	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	1.01	1.11	1.32	1.33	1.43	1.06	1.24	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000024	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.21	0.23	0.272	0.288	0.245	0.216	0.249	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	3.2	3.3	3.0	-	-
Se-D	mg/L	0.00035	0.00047	0.00046	0.00033	0.00039	0.00081	0.00040	-	-
Na-D	mg/L	1.19	1.24	1.52	1.6	1.74	1.25	1.460	-	-
Sr-D	mg/L	0.0662	0.0842	0.0913	0.0937	0.101	0.0786	0.0873	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	-	-

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EMS ID	E297230	Iron River Upstream of Mining Operations								
Site Description		5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Site Name	IR1									
Date		11-Oct-18	16-Oct-18	24-Oct-18	31-Oct-18	8-Nov-18	12-Dec-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	3.7	5.3	7.2	5.3	3.9	2.5	5.1	128	-
Alk-T	mg/L	34.3	42	51.4	37	33.6	22.2	39.7	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.6	<4.0	<4.9	<4.0	<4.0	4.30	5	25
Al-T	mg/L	0.0333	0.0253	0.017	0.0371	0.0461	0.0816	0.0318	-	-
As-T	mg/L	0.00042	0.00049	0.00052	0.00051	0.00037	0.00058	0.00046	-	0.005
Ba-T	mg/L	0.0025	0.0027	0.0033	0.0025	0.0024	0.0035	0.0027	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.0500	-	-
Cd-T	mg/L	0.000017	0.000015	0.000016	0.000016	0.000018	0.000012	0.000016	-	-
Ca-T	mg/L	12.6	15.5	17.5	14.1	12.5	8.09	14.4	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	0.004	0.11
Cu-T	mg/L	0.00079	0.00053	0.0006	0.00164	0.00089	0.00106	0.00089	0.002	0.007
Hard-T	mg/L	34.4	42.2	47.6	38.7	34.2	22.9	39.4	-	-
Fe-T	mg/L	0.012	0.011	<0.010	0.017	0.019	0.043	0.0138	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	0.003	0.005
Mg-T	mg/L	0.716	0.842	0.958	0.837	0.714	0.651	0.813	-	-
Mn-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.00100	0.7	0.8
Hg-T	mg/L	0.0000065	0.0000076	0.0000028	0.0000046	<0.0000020	<0.0000020	0.00000470	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	0.025
K-T	mg/L	0.179	0.141	0.149	0.167	0.147	0.148	0.157	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.00	-	-
Se-T	mg/L	0.00024	0.00038	0.00044	0.00032	0.00031	0.00013	0.00034	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000200	0.00005	0.0001
Na-T	mg/L	0.933	1.07	1.13	1.06	0.911	0.986	1.021	-	-
Sr-T	mg/L	0.0417	0.0515	0.0622	0.0443	0.042	0.0283	0.0483	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00500	0.0075	0.033
Al-D	mg/L	0.0382	0.0288	0.021	0.0336	0.0465	0.0619	0.0336	0.05	0.1
As-D	mg/L	0.00043	0.00048	0.00052	0.00045	0.00038	0.00034	0.00045	-	-
Ba-D	mg/L	0.0026	0.0028	0.0033	0.0026	0.0025	0.0023	0.0028	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.0500	-	-
Cd-D	mg/L	0.0000176	0.000015	0.0000159	0.000017	0.0000181	0.0000170	0.0000167	0.00008	0.00017
Ca-D	mg/L	12.8	16.9	20.1	14.8	12.4	9.59	15.4	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	-
Cu-D	mg/L	0.0006	0.00058	0.0005	0.00051	0.00057	0.00089	0.00055	-	-
Hard-D	mg/L	35.2	45.9	54.6	40.3	33.9	26.5	42.0	-	-
Fe-D	mg/L	0.0109	0.0104	0.007	0.0111	0.016	0.021	0.0111	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	-
Mg-D	mg/L	0.769	0.89	1.04	0.792	0.718	0.631	0.842	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Hg-D	mg/L	<0.0000020	0.0000021	0.0000037	0.0000047	<0.0000020	<0.0000020	0.00000290	-	-
Mo-D	mg/L	<0.0010	<0.0010	0.002	<0.0010	<0.0010	<0.0010	0.00120	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
K-D	mg/L	0.147	0.148	0.163	0.144	0.148	0.148	0.150	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.00	-	-
Se-D	mg/L	0.00026	0.0004	0.00048	0.00026	0.00027	0.00017	0.00033	-	-
Na-D	mg/L	0.967	1.09	1.26	1.01	0.915	0.886	1.048	-	-
Sr-D	mg/L	0.0414	0.0522	0.0627	0.0439	0.043	0.0313	0.0486	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00500	-	-

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EMS ID	E297230	Iron River Upstream of Mining Operations			Water Quality Guidelines
Site Description		Monthly Samples			
Site Name	IR1				
Date		23-Jan-19	20-Feb-19	20-Mar-19	Max
Parameter	Unit				
SO4-D	mg/L	2.9		4.5	-
Alk-T	mg/L	23.9		29.0	-
Acidity 8.3	mg/L	<1.0		<1.0	-
TSS	mg/L	<4.0		<4.0	25
Al-T	mg/L	0.0486		0.058	-
As-T	mg/L	0.00029		0.00041	0.005
Ba-T	mg/L	0.0019		0.0019	5
B-T	mg/L	<0.050		<0.050	-
Cd-T	mg/L	0.000011		0.000014	-
Ca-T	mg/L	8.78		9.16	-
Cr-T	mg/L	<0.0010		<0.0010	-
Co-T	mg/L	<0.00020		<0.00020	0.11
Cu-T	mg/L	<0.00050		0.00058	0.007
Hard-T	mg/L	24.1		25.2	-
Fe-T	mg/L	0.018		0.045	1
Pb-T	mg/L	<0.00020		<0.00020	0.004
Mg-T	mg/L	0.533		0.563	-
Mn-T	mg/L	<0.0010		0.0014	0.8
Hg-T	mg/L	<0.0000020		<0.0000020	0.00001
Mo-T	mg/L	<0.0010		<0.0010	2
Ni-T	mg/L	<0.0010		<0.0010	0.025
K-T	mg/L	0.115		0.115	-
S-T	mg/L	<3.0		<3.0	-
Se-T	mg/L	0.00018		0.0002	-
Ag-T	mg/L	<0.000020		<0.000020	0.0001
Na-T	mg/L	0.773	Dangerous conditions, no samples were collected	0.817	-
Sr-T	mg/L	0.0306		0.0339	-
Zn-T	mg/L	<0.0050		<0.0050	0.033
Al-D	mg/L	0.0469		0.0385	0.1
As-D	mg/L	0.00029		0.00039	-
Ba-D	mg/L	0.0019		0.0018	-
B-D	mg/L	<0.050		<0.050	-
Cd-D	mg/L	0.0000135		0.0000133	0.00017
Ca-D	mg/L	9.4		9.3	-
Cr-D	mg/L	<0.0010		<0.0010	-
Co-D	mg/L	<0.00020		<0.00020	-
Cu-D	mg/L	0.00048		0.00047	-
Hard-D	mg/L	25.6		25.7	-
Fe-D	mg/L	0.0106		0.0101	0.35
Pb-D	mg/L	<0.00020		<0.00020	-
Mg-D	mg/L	0.523		0.596	-
Mn-D	mg/L	<0.0010		<0.0010	-
Hg-D	mg/L	<0.0000020		<0.0000020	-
Mo-D	mg/L	<0.0010		<0.0010	-
Ni-D	mg/L	<0.0010		<0.0010	-
K-D	mg/L	0.123		0.128	-
S-D	mg/L	<3.0		<3.0	-
Se-D	mg/L	0.0002		0.00021	-
Na-D	mg/L	0.768		0.861	-
Sr-D	mg/L	0.0328		0.0318	-
Zn-D	mg/L	<0.0050		<0.0050	-

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EMS ID	E297231	Iron River Upstream of 7SA5 & Upstream of Reclaimed 242 Mine								
Site Description		5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Site Name	IR6									
Date		12-Apr-18	19-Apr-18	25-Apr-18	1-May-18	9-May-18	19-Jun-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	1.50	2.20	1.9	1.10	<1.0	4.5	1.50	128	-
Alk-T	mg/L	21.4	22.7	29.2	23.9	15.4	36.9	22.5	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	5	25
Al-T	mg/L	0.123	0.0626	0.0724	0.0791	0.237	0.0517	0.1148	-	-
As-T	mg/L	0.00046	0.00061	0.00052	0.00063	0.00034	0.00143	0.00051	-	0.005
Ba-T	mg/L	0.0033	0.0034	0.0033	0.0027	0.0023	0.0048	0.0030	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	0.000013	0.000011	0.000015	0.000019	0.000019	0.000012	0.000015	-	-
Ca-T	mg/L	7.17	9.57	10.3	8.44	6.9	11.8	8.48	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.004	0.11
Cu-T	mg/L	0.00077	0.0005	0.00073	0.00104	0.00143	0.00164	0.0009	0.002	0.0070
Hard-T	mg/L	20.4	26.6	28.2	23.5	19.3	33.1	24	-	-
Fe-T	mg/L	0.065	0.025	0.031	0.031	0.064	0.01	0.043	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	0.005
Mg-T	mg/L	0.617	0.645	0.633	0.591	0.492	0.919	0.596	-	-
Mn-T	mg/L	0.0017	<0.0010	<0.0010	<0.0010	0.0016	<0.0010	0.0013	0.7	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000022	0.0000025	<0.0000020	0.0000021	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.164	0.167	0.175	0.154	0.154	0.38	0.163	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	-	-
Se-T	mg/L	0.00015	0.00019	0.0002	0.00011	<0.00010	0.00024	0.00015	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	0.00005	0.0001
Na-T	mg/L	0.863	0.866	0.753	0.723	0.576	1.38	0.756	-	-
Sr-T	mg/L	0.0266	0.0338	0.0357	0.0261	0.0192	0.0409	0.0283	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.0075	0.03
Al-D	mg/L	0.0857	0.0565	0.0699	0.0657	0.0947	0.0314	**0.0745**	0.05	0.1
As-D	mg/L	0.0004	0.00056	0.00053	0.00059	0.0003	0.00141	0.00048	-	-
Ba-D	mg/L	0.0033	0.0037	0.0032	0.0027	0.002	0.0049	0.0030	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-D	mg/L	0.0000130	0.000011	0.0000160	0.0000149	0.0000190	0.0000096	0.000015	0.000080	0.000170
Ca-D	mg/L	7.09	9.71	10.3	7.95	6.55	12.6	8.32	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00069	0.00067	0.00089	0.00073	0.00098	0.00072	0.00079	-	-
Hard-D	mg/L	20.1	26.9	28.3	22.2	18.5	35.3	23.2	-	-
Fe-D	mg/L	0.0284	0.0197	0.023	0.0289	0.0278	0.0084	0.0256	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	0.578	0.654	0.642	0.581	0.533	0.931	0.598	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	0.0010	-	-
Hg-D	mg/L	0.0000031	<0.0000020	<0.0000020	0.0000024	0.0000030	<0.0000020	0.0000025	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.17	0.17	0.198	0.157	0.177	0.217	0.174	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	-	-
Se-D	mg/L	0.00012	0.00018	0.0002	0.00014	<0.00010	0.00019	0.00015	-	-
Na-D	mg/L	0.867	0.846	0.806	0.724	0.627	1.25	0.774	-	-
Sr-D	mg/L	0.0258	0.0338	0.0369	0.0254	0.0189	0.0422	0.0282	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	-	-

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EMS ID	E297231									
Site Description		Iron River Upstream of 7SA5 & Upstream of Reclaimed 242 Mine								
Site Name	IR6	5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	12-Sep-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	5.8	7.4	9.6	9.7	11.9	12.3	8.9	128	-
Alk-T	mg/L	51.0	58.5	67.2	67.1	71.7	61.2	63.1	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	5	25
Al-T	mg/L	0.0216	0.0208	0.0238	0.0253	0.0206	0.0193	0.0224	-	-
As-T	mg/L	0.00200	0.00319	0.00520	0.00565	0.00746	0.00190	0.00470	-	0.005
Ba-T	mg/L	0.006	0.0088	0.0111	0.0105	0.0128	0.0082	0.0098	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	0.050	<0.050	0.050	-	-
Cd-T	mg/L	0.00001	0.000011	0.000011	0.000011	0.000011	0.000010	0.000011	-	-
Ca-T	mg/L	19.2	22.9	27.1	25.5	28.8	25.4	24.70	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.004	0.11
Cu-T	mg/L	0.00077	0.00057	0.00053	0.00068	0.00069	0.00073	0.0007	0.002	0.0070
Hard-T	mg/L	52.8	63.2	74.6	71.2	80.5	69.6	69	-	-
Fe-T	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	0.003	0.005
Mg-T	mg/L	1.18	1.46	1.68	1.85	2.1	1.51	1.65	-	-
Mn-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	0.7	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.233	0.279	0.364	0.348	0.373	0.322	0.319	-	-
S-T	mg/L	<3.0	<3.0	3.3	3.9	3.9	3.9	3.4	-	-
Se-T	mg/L	0.00029	0.00036	0.00029	0.0002	0.00019	0.00073	0.00027	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	0.00005	0.0001
Na-T	mg/L	1.44	1.82	2.24	2.54	2.92	2.07	2.19	-	-
Sr-T	mg/L	0.0628	0.0774	0.0888	0.0845	0.0977	0.0869	0.0822	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.0075	0.03
Al-D	mg/L	0.0222	0.0331	0.0219	0.0194	0.0165	0.0202	0.0226	0.05	0.1
As-D	mg/L	0.002	0.00318	0.00516	0.00543	0.00714	0.00177	0.00458	-	-
Ba-D	mg/L	0.0066	0.0227	0.0107	0.0112	0.0129	0.0083	0.0128	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-D	mg/L	0.00001	0.0000120	0.0000100	0.0000140	0.0000083	0.000009	0.000011	0.000080	0.00017
Ca-D	mg/L	19.4	24.7	25.6	26.3	29.4	25.7	25.1	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00057	0.00064	0.0005	0.00052	0.00053	0.00101	0.00055	-	-
Hard-D	mg/L	53.3	67.5	70.9	72.8	81.9	70.2	69.3	-	-
Fe-D	mg/L	0.0053	0.0096	0.0071	0.0050	<0.0050	0.0054	0.0064	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	1.19	1.39	1.72	1.75	2.08	1.47	1.63	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	0.0010	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.256	0.290	0.341	0.354	0.344	0.3	0.317	-	-
S-D	mg/L	<3.0	<3.0	<3.0	3.1	3.6	4.3	3.1	-	-
Se-D	mg/L	0.0003	0.00033	0.00027	0.00019	0.00017	0.00071	0.00025	-	-
Na-D	mg/L	1.47	1.66	2.31	2.41	2.88	1.93	2.150	-	-
Sr-D	mg/L	0.0616	0.0817	0.0865	0.0893	0.0988	0.0831	0.0836	-	-
Zn-D	mg/L	<0.0050	0.0210	<0.0050	<0.0050	<0.0050	<0.0050	0.0082	-	-

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EMS ID	E297231	Iron River Upstream of 7SA5 & Upstream of Reclaimed 242 Mine							Water Quality Guidelines	
Site Description		5 in 30 Weekly Samples					Monthly			
Site Name	IR6									
Date		11-Oct-18	16-Oct-18	24-Oct-18	31-Oct-18	7-Nov-18	12-Dec-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	3.2	4.6	7.0	4.8	2.2	1.9	4.4	128	-
Alk-T	mg/L	27.3	33.2	43.7	29.9	26	23.8	32.0	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.3	<4.0	<5.3	<4.0	<4.0	4.32	5	25
Al-T	mg/L	0.0516	0.0328	0.0208	0.0532	0.0805	0.0858	0.0478	-	-
As-T	mg/L	0.00082	0.00116	0.00181	0.00099	0.00065	0.00058	0.00109	-	0.005
Ba-T	mg/L	0.0045	0.0049	0.0058	0.0049	0.0042	0.0034	0.0049	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.0500	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	0.000014	0.0000104	-	-
Ca-T	mg/L	9.78	12.9	14.9	12.3	9.52	8.11	11.88	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	0.004	0.11
Cu-T	mg/L	0.00123	0.00073	0.0007	0.00103	0.00089	0.00100	0.00092	0.0020	0.0070
Hard-T	mg/L	27.8	36.2	41.8	34.9	27.2	22.9	33.6	-	-
Fe-T	mg/L	0.035	0.022	<0.010	0.037	0.049	0.047	0.0306	-	1.00
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	0.003	0.005
Mg-T	mg/L	0.809	0.993	1.09	0.998	0.819	0.644	0.942	-	-
Mn-T	mg/L	<0.0010	<0.0010	<0.0010	0.0012	0.0012	0.0012	0.00108	0.7	0.8
Hg-T	mg/L	0.0000026	0.0000042	0.0000027	0.0000045	<0.0000020	<0.0000020	0.00000320	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	0.025
K-T	mg/L	0.188	0.172	0.174	0.21	0.194	0.147	0.188	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.00	-	-
Se-T	mg/L	0.0002	0.00026	0.00037	0.00021	0.00019	0.00014	0.00025	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000200	0.00005	0.0001
Na-T	mg/L	1.1	1.33	1.47	1.39	1.11	0.98	1.28	-	-
Sr-T	mg/L	0.034	0.0443	0.0543	0.0385	0.0327	0.0279	0.0408	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00500	0.0075	0.033
Al-D	mg/L	0.0499	0.0369	0.0234	0.0477	0.073	0.0702	0.0462	0.05	0.1
As-D	mg/L	0.00085	0.00118	0.00181	0.00089	0.00065	0.00053	0.00108	-	-
Ba-D	mg/L	0.0047	0.0051	0.0057	0.0047	0.0042	0.0032	0.0049	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.0500	-	-
Cd-D	mg/L	0.0000094	0.000009	0.0000093	0.000009	0.0000125	0.0000100	0.0000098	0.00008	0.00016
Ca-D	mg/L	9.99	13	16	11.7	9.31	7.95	12.00	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	-
Cu-D	mg/L	0.00073	0.00078	0.00056	0.00071	0.0008	0.00075	0.00072	-	-
Hard-D	mg/L	28.4	36.6	44.9	32.7	26.4	22.8	33.8	-	-
Fe-D	mg/L	0.0241	0.0154	0.0087	0.029	0.0332	0.031	0.0221	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	-
Mg-D	mg/L	0.846	1.02	1.2	0.877	0.763	0.705	0.941	-	-
Mn-D	mg/L	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	0.00104	-	-
Hg-D	mg/L	0.0000035	0.0000032	0.0000035	<0.0000020	<0.0000020	<0.0000020	0.00000284	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	0.00108	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
K-D	mg/L	0.176	0.186	0.194	0.178	0.18	0.15	0.183	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.00	-	-
Se-D	mg/L	0.00018	0.00027	0.00036	0.00017	0.00019	0.00013	0.00023	-	-
Na-D	mg/L	1.18	1.38	1.57	1.21	1.11	1.07	1.29	-	-
Sr-D	mg/L	0.0348	0.0426	0.0538	0.0364	0.0327	0.027	0.0401	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0055	<0.0050	0.00510	-	-

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EMS ID	E297231	Iron River Upstream of 7SA5 & Upstream of Reclaimed 242 Mine			Water Quality Guidelines
Site Description		Monthly Samples			
Site Name	IR6				
Date		24-Jan-19	20-Feb-19	20-Mar-19	Max
Parameter	Unit				
SO4-D	mg/L	1.3		3.6	-
Alk-T	mg/L	14.8		17.8	-
Acidity 8.3	mg/L	<1.0		<1.0	-
TSS	mg/L	<4.0		<4.0	25
Al-T	mg/L	0.119		0.0754	-
As-T	mg/L	0.00059		0.00089	0.005
Ba-T	mg/L	0.0042		0.004	5
B-T	mg/L	<0.050		<0.050	-
Cd-T	mg/L	<0.000010		<0.000010	-
Ca-T	mg/L	5.83		7.05	-
Cr-T	mg/L	<0.0010		<0.0010	-
Co-T	mg/L	<0.00020		<0.00020	0.11
Cu-T	mg/L	0.00078		0.00073	0.007
Hard-T	mg/L	17.1		20.4	-
Fe-T	mg/L	0.066		0.055	1
Pb-T	mg/L	<0.00020		<0.00020	0.004
Mg-T	mg/L	0.605		0.673	-
Mn-T	mg/L	0.0014		0.0015	0.8
Hg-T	mg/L	0.0000021		<0.0000020	0.00001
Mo-T	mg/L	<0.0010		<0.0010	2
Ni-T	mg/L	<0.0010		<0.0010	0.025
K-T	mg/L	0.149		0.154	-
S-T	mg/L	<3.0		<3.0	-
Se-T	mg/L	0.00012		0.00018	-
Ag-T	mg/L	<0.000020		<0.000020	0.0001
Na-T	mg/L	0.901	Dangerous conditions, no samples were collected	1.08	-
Sr-T	mg/L	0.0221		0.0265	-
Zn-T	mg/L	<0.0050		<0.0050	0.033
Al-D	mg/L	0.0819		0.0588	0.1
As-D	mg/L	0.00054		0.00083	-
Ba-D	mg/L	0.0038		0.0039	-
B-D	mg/L	<0.050		<0.050	-
Cd-D	mg/L	0.0000070		0.0000050	0.000017
Ca-D	mg/L	6.17		6.92	-
Cr-D	mg/L	<0.0010		<0.0010	-
Co-D	mg/L	<0.00020		<0.00020	-
Cu-D	mg/L	0.00058		0.00053	-
Hard-D	mg/L	17.8		20	-
Fe-D	mg/L	0.0339		0.0309	0.35
Pb-D	mg/L	<0.00020		<0.00020	-
Mg-D	mg/L	0.574		0.655	-
Mn-D	mg/L	<0.0010		0.0010	-
Hg-D	mg/L	<0.0000020		0.0000023	-
Mo-D	mg/L	<0.0010		<0.0010	-
Ni-D	mg/L	<0.0010		<0.0010	-
K-D	mg/L	0.149		0.158	-
S-D	mg/L	<3.0		<3.0	-
Se-D	mg/L	0.00012		0.00014	-
Na-D	mg/L	0.865		1.02	-
Sr-D	mg/L	0.0231		0.0259	-
Zn-D	mg/L	<0.0050		<0.0050	-

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EMS ID	E297232	Iron River Downstream of 7 South Mine Operation								
Site Description		5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Site Name	IR8									
Date		12-Apr-18	19-Apr-18	25-Apr-18	2-May-18	9-May-18	19-Jun-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	1.30	1.90	1.8	1.30	<1.0	3.6	1.50	128	-
Alk-T	mg/L	20.2	23.5	24.6	21.4	16	35.6	21.1	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	12.3	4.0	5	25
Al-T	mg/L	0.0976	0.0611	0.066	0.0813	0.115	0.0362	0.0842	-	-
As-T	mg/L	0.00051	0.0009	0.00078	0.00038	0.0005	0.00271	0.00061	-	0.005
Ba-T	mg/L	0.0031	0.0034	0.0034	0.0024	0.0025	0.0056	0.0030	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	0.00001	0.000012	0.000014	0.000019	0.000019	<0.000010	0.000015	-	-
Ca-T	mg/L	6.93	9.34	10.1	8.08	6.93	13.7	8.28	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.004	0.11
Cu-T	mg/L	0.00096	0.00064	0.00074	0.00092	0.00081	0.00101	0.0008	0.0020	0.0070
Hard-T	mg/L	20	26.1	27.9	22.6	19.5	38.4	23	-	-
Fe-T	mg/L	0.055	0.023	0.028	0.028	0.057	0.014	0.038	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	0.005
Mg-T	mg/L	0.648	0.674	0.647	0.596	0.535	0.998	0.62	-	-
Mn-T	mg/L	0.0014	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	0.0012	0.7	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000023	0.0000025	<0.0000020	0.0000022	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.146	0.174	0.174	0.178	0.155	0.235	0.165	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	-	-
Se-T	mg/L	0.00017	0.00019	0.00018	0.00013	<0.00010	0.00024	0.00015	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	0.00005	0.0001
Na-T	mg/L	0.94	0.913	0.81	0.717	0.661	1.49	0.808	-	-
Sr-T	mg/L	0.0241	0.0324	0.0355	0.0255	0.0210	0.044	0.0277	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.0075	0.03
Al-D	mg/L	0.07710	0.05420	0.07200	0.06940	0.08900	0.03000	**0.0723**	0.05	0.1
As-D	mg/L	0.00046	0.0009	0.00083	0.00042	0.00043	0.00245	0.00061	-	-
Ba-D	mg/L	0.0031	0.0036	0.0036	0.0025	0.0020	0.0055	0.0030	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-D	mg/L	0.0000130	0.00001	0.0000140	0.0000160	0.0000170	0.0000106	0.000014	0.000088	0.000170
Ca-D	mg/L	7.02	9.7	10.4	7.93	6.79	12.6	8.37	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00105	0.00061	0.00154	0.0007	0.00094	0.00076	0.00097	-	-
Hard-D	mg/L	20	26.9	28.7	22.1	19.2	35.4	23.4	-	-
Fe-D	mg/L	0.0268	0.0258	0.0259	0.019	0.0276	0.0123	0.025	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	0.609	0.64	0.676	0.568	0.551	0.976	0.609	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Hg-D	mg/L	0.0000028	<0.0000020	<0.0000020	0.0000024	0.0000032	<0.0000020	0.0000025	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.148	0.17	0.189	0.153	0.162	0.221	0.164	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	-	-
Se-D	mg/L	0.00012	0.00020	0.00019	0.00015	<0.00010	0.00018	0.00015	-	-
Na-D	mg/L	0.905	0.923	0.836	0.677	0.658	1.42	0.800	-	-
Sr-D	mg/L	0.0243	0.0325	0.0364	0.0249	0.0185	0.0423	0.0273	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	-	-

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EMS ID	E297232									
Site Description		Iron River Downstream of 7 South Mine Operation								
Site Name	IR8	5 in 30 Weekly Samples							Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	12-Sep-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	6.7	6.9	9.4	10.4	10.9	13.6	8.90	128	-
Alk-T	mg/L	50.4	57.7	66.3	69.7	74.8	60.1	63.8	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	5	25
Al-T	mg/L	0.0207	0.0202	0.0248	0.036	0.0206	0.0206	0.0245	-	-
As-T	mg/L	0.00360	0.00612	0.00894	0.00961	0.01140	0.00393	0.00793	-	0.005
Ba-T	mg/L	0.0064	0.0095	0.0112	0.0116	0.0122	0.0096	0.0102	-	-
B-T	mg/L	<0.050	<0.050	<0.050	0.053	0.065	<0.050	0.054	-	-
Cd-T	mg/L	<0.000010	0.000010	0.000011	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	18.8	22.6	27.1	25.7	27.8	25.6	24.40	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.004	0.11
Cu-T	mg/L	0.00082	0.0007	0.00091	0.00089	0.00063	0.00102	0.0008	0.002	0.0070
Hard-T	mg/L	51.9	62.8	75	72.2	77.9	70.6	68	-	-
Fe-T	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	0.003	0.005
Mg-T	mg/L	1.21	1.51	1.75	1.93	2.07	1.63	1.69	-	-
Mn-T	mg/L	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.0010	0.7	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.243	0.3	0.422	0.339	0.352	0.327	0.331	-	-
S-T	mg/L	<3.0	<3.0	<3.0	4.4	3.6	4.4	3.4	-	-
Se-T	mg/L	0.00025	0.00031	0.00023	0.00019	0.00015	0.00074	0.00023	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	0.00005	0.0001
Na-T	mg/L	1.69	2.34	3.13	3.62	3.94	2.38	2.94	-	-
Sr-T	mg/L	0.061	0.0779	0.0904	0.091	0.0961	0.0885	0.0833	-	-
Zn-T	mg/L	<0.0050	<0.0050	0.0053	<0.0050	<0.0050	<0.0050	0.0051	0.0075	0.03
Al-D	mg/L	0.0219	0.0199	0.0213	0.0216	0.0157	0.0181	0.0201	0.05	0.1
As-D	mg/L	0.00377	0.00599	0.00927	0.00928	0.0115	0.00382	0.00796	-	-
Ba-D	mg/L	0.0075	0.0097	0.0112	0.0117	0.0128	0.0099	0.0106	-	-
B-D	mg/L	<0.050	<0.050	<0.050	0.053	0.06	<0.050	0.053	-	-
Cd-D	mg/L	0.00001	0.0000090	0.0000090	0.0000162	0.0000097	0.000008	0.000011	0.000080	0.00017
Ca-D	mg/L	19.7	23.5	25.7	26.3	31	26.2	25.2	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00061	0.00063	0.00067	0.00097	0.00073	0.00101	0.00072	-	-
Hard-D	mg/L	54.4	64.4	71.8	73.2	86.3	72.2	70	-	-
Fe-D	mg/L	0.0070	0.0130	0.0062	0.0102	0.0191	0.0087	0.0111	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	1.27	1.39	1.84	1.82	2.16	1.66	1.7	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	0.0010	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.261	0.314	0.368	0.369	0.358	0.314	0.334	-	-
S-D	mg/L	<3.0	<3.0	3.2	<3.0	3.8	4.7	3.2	-	-
Se-D	mg/L	0.00027	0.00032	0.00025	0.00018	0.00015	0.00071	0.00023	-	-
Na-D	mg/L	1.8	2.11	3.26	3.31	4.21	2.38	2.940	-	-
Sr-D	mg/L	0.0646	0.0794	0.091	0.094	0.103	0.0867	0.0864	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	-	-

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EMS ID	E297232	Iron River Downstream of 7 South Mine Operation							Water Quality Guidelines	
Site Description		5 in 30 Weekly Samples					Monthly			
Site Name	IR8									
Date		11-Oct-18	16-Oct-18	24-Oct-18	31-Oct-18	7-Nov-18	12-Dec-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	3.5	4.8	6.8	3.7	2.3	1.9	4.2	128	-
Alk-T	mg/L	29.1	36.4	41.8	30.5	24.9	17.8	32.5	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.6	<4.0	<4.6	<4.0	<4.0	4.2	5	25
Al-T	mg/L	0.0535	0.0306	0.0206	0.0522	0.0747	0.0827	0.0463	-	-
As-T	mg/L	0.00125	0.00205	0.00348	0.00149	0.00088	0.00082	0.00183	-	0.005
Ba-T	mg/L	0.0049	0.0054	0.0068	0.0052	0.0046	0.0038	0.0054	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	0.000011	<0.000010	<0.000010	0.00001	0.000011	0.000012	0.000010	-	-
Ca-T	mg/L	9.74	12.1	15.3	12.1	9.16	8.05	11.68	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.004	0.11
Cu-T	mg/L	0.00096	0.00084	0.00064	0.00123	0.00092	0.00138	0.0009	0.002	0.0070
Hard-T	mg/L	27.7	34.4	43.3	34.6	26.3	22.9	33	-	-
Fe-T	mg/L	0.034	0.016	<0.010	0.04	0.045	0.044	0.029	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	0.003	0.005
Mg-T	mg/L	0.814	0.989	1.21	1.06	0.841	0.67	0.983	-	-
Mn-T	mg/L	0.0013	<0.0010	<0.0010	0.0012	0.0011	<0.0010	0.0011	0.7	0.8
Hg-T	mg/L	0.0000061	0.0000046	0.0000047	0.000005	<0.0000020	<0.0000020	0.00000448	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.201	0.17	0.185	0.212	0.191	0.149	0.192	-	-
S-T	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	-	-
Se-T	mg/L	0.00017	0.00024	0.00032	0.0002	0.00019	0.00013	0.00022	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	0.00005	0.0001
Na-T	mg/L	1.17	1.47	1.76	1.43	1.14	1.01	1.39	-	-
Sr-T	mg/L	0.0331	0.0425	0.0546	0.0385	0.0313	0.0274	0.0400	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.0075	0.033
Al-D	mg/L	0.0453	0.0324	0.022	0.0459	0.0672	0.0698	0.0426	0.05	0.1
As-D	mg/L	0.00129	0.00201	0.00341	0.00134	0.00086	0.00076	0.00178	-	-
Ba-D	mg/L	0.0049	0.0054	0.0066	0.0052	0.0045	0.0036	0.0053	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-D	mg/L	0.0000075	0.000007	0.0000074	0.00001	0.0000106	0.0000120	0.000009	0.00008	0.00017
Ca-D	mg/L	9.85	12.9	15.9	11.8	8.99	8.09	11.89	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00083	0.00063	0.00057	0.00076	0.00077	0.00083	0.00071	-	-
Hard-D	mg/L	28.2	36.6	44.7	33.2	25.6	23.1	33.7	-	-
Fe-D	mg/L	0.0245	0.0152	0.0087	0.0286	0.0308	0.0349	0.0216	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	0.883	1.06	1.25	0.919	0.778	0.702	0.978	-	-
Mn-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Hg-D	mg/L	0.0000051	0.0000031	0.0000053	0.0000058	<0.0000020	0.0000020	0.00000426	-	-
Mo-D	mg/L	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.181	0.18	0.198	0.19	0.171	0.147	0.184	-	-
S-D	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.0	-	-
Se-D	mg/L	0.00016	0.00027	0.00031	0.00019	0.00019	0.00014	0.00022	-	-
Na-D	mg/L	1.29	1.54	1.84	1.25	1.08	1.06	1.400	-	-
Sr-D	mg/L	0.0348	0.044	0.0539	0.0372	0.032	0.0265	0.0404	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	-	-

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EMS ID	E297232	Iron River Downstream of 7 South Mine Operation			Water Quality Guidelines
Site Description		Monthly Samples			
Site Name	IR8				
Date		23-Jan-19		20-Mar-19	Max
Parameter	Unit				
SO4-D	mg/L	<1.0		3.6	-
Alk-T	mg/L	15.9		18.1	-
Acidity 8.3	mg/L	<1.0		<1.0	-
TSS	mg/L	<4.0		<4.0	25
Al-T	mg/L	0.0858		0.073	-
As-T	mg/L	0.0005		0.0013	0.005
Ba-T	mg/L	0.0033		0.0041	5
B-T	mg/L	<0.050		<0.050	-
Cd-T	mg/L	<0.000010		<0.000010	-
Ca-T	mg/L	5.75		6.97	-
Cr-T	mg/L	<0.0010		<0.0010	-
Co-T	mg/L	<0.00020		<0.00020	0.11
Cu-T	mg/L	0.00066		0.0006	0.007
Hard-T	mg/L	16.9		20.3	-
Fe-T	mg/L	0.044		0.055	1
Pb-T	mg/L	<0.00020		<0.00020	0.004
Mg-T	mg/L	0.624		0.701	-
Mn-T	mg/L	0.0013		0.0015	0.8
Hg-T	mg/L	<0.0000020		<0.0000020	0.00001
Mo-T	mg/L	<0.0010		<0.0010	2
Ni-T	mg/L	<0.0010		<0.0010	0.025
K-T	mg/L	0.118		0.147	-
S-T	mg/L	<3.0		<3.0	-
Se-T	mg/L	<0.00010		0.00015	-
Ag-T	mg/L	<0.000020		<0.000020	0.0001
Na-T	mg/L	0.971	Dangerous conditions, no samples were collected	1.13	-
Sr-T	mg/L	0.0203		0.0261	-
Zn-T	mg/L	<0.0050		<0.0050	0.033
Al-D	mg/L	0.0675		0.0578	0.1
As-D	mg/L	0.00051		0.00131	-
Ba-D	mg/L	0.0031		0.0040	-
B-D	mg/L	<0.050		<0.050	-
Cd-D	mg/L	0.0000073		0.0000060	0.00017
Ca-D	mg/L	6		7.22	-
Cr-D	mg/L	<0.0010		<0.0010	-
Co-D	mg/L	<0.00020		<0.00020	-
Cu-D	mg/L	0.0006		0.00053	-
Hard-D	mg/L	17.5		20.9	-
Fe-D	mg/L	0.0264		0.0339	0.35
Pb-D	mg/L	<0.00020		<0.00020	-
Mg-D	mg/L	0.616		0.705	-
Mn-D	mg/L	<0.0010		<0.0010	-
Hg-D	mg/L	<0.0000020		0.0000020	-
Mo-D	mg/L	<0.0010		<0.0010	-
Ni-D	mg/L	<0.0010		<0.0010	-
K-D	mg/L	0.123		0.147	-
S-D	mg/L	<3.0		<3.0	-
Se-D	mg/L	<0.00010		0.00016	-
Na-D	mg/L	0.965		1.1	-
Sr-D	mg/L	0.021		0.0254	-
Zn-D	mg/L	<0.0050		<0.0050	-

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EMS ID	E299256	Quinsam River Downstream of the Confluence with Iron River								
Site Description		5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Site Name	IRQR									
Date		19-Apr-18	26-Apr-18	1-May-18	9-May-18	17-May-18	19-Jun-18	5x30 Average	Average	Max
Parameter										
SO4-D	mg/L	17.1	12.9	13.4	13.1	28.9	26.1	17.1	128	-
Alk-T	mg/L	26.7	28.9	29.2	26	38.7	35.8	29.9	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	5	25
Al-T	mg/L	0.0393	0.057	0.0485	0.0917	0.0312	0.0253	0.0535	-	-
As-T	mg/L	0.00052	0.00052	0.00047	0.00049	0.00059	0.00056	0.00052	-	0.005
Ba-T	mg/L	0.0032	0.0032	0.0026	0.0030	0.0038	0.0034	0.0032	-	-
B-T	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	10.4	10.8	9.6	9.19	11.9	11.7	10.37	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	0.05
Cu-T	mg/L	0.00064	0.00078	0.00074	0.00084	0.00064	0.00088	0.0007	0.0020	0.0070
Hard-T	mg/L	30.8	31	28.1	26.9	36.1	35.5	31	-	-
Fe-T	mg/L	0.054	0.063	0.051	0.071	0.062	0.067	0.06	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	0.003	0.005
Mg-T	mg/L	1.15	0.981	1.01	0.948	1.54	1.49	1.126	-	-
Mn-T	mg/L	0.0035	0.0032	0.0029	0.0033	0.0040	0.0051	0.0034	0.7	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	0.0000022	<0.0000020	<0.0000020	0.000002	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.231	0.198	0.188	0.193	0.26	0.262	0.214	-	-
S-T	mg/L	5.9	4.8	4.3	4.5	9.4	8.2	5.8	-	-
Se-T	mg/L	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	-	0.0001
Na-T	mg/L	7.06	5.58	5.73	5.77	12.7	12.1	7.37	-	-
Sr-T	mg/L	0.0483	0.0428	0.0412	0.0418	0.0644	0.063	0.0477	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.0075	0.03
Al-D	mg/L	0.0313	0.0378	0.0403	0.063	0.0233	0.0141	0.0391	0.05	0.1
As-D	mg/L	0.00051	0.0005	0.00045	0.00043	0.00056	0.00053	0.00049	-	-
Ba-D	mg/L	0.0032	0.003	0.0028	0.0026	0.004	0.0036	0.0031	-	-
B-D	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	-	-
Cd-D	mg/L	0.0000050	0.0000088	0.0000071	0.000011	0.0000067	<0.0000050	0.000008	0.000088	0.000170
Ca-D	mg/L	10.5	10.1	9.74	10.1	13.2	12.7	10.73	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00064	0.00062	0.00068	0.00094	0.00064	0.00065	0.0007	-	-
Hard-D	mg/L	30.7	29.3	28.6	29.4	39.1	38.2	31.4	-	-
Fe-D	mg/L	0.0371	0.0325	0.0395	0.0418	0.0524	0.0429	0.0407	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	1.12	0.967	1.04	1.00	1.49	1.57	1.123	-	-
Mn-D	mg/L	0.003	0.0022	0.0033	0.0024	0.0038	0.0044	0.0029	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.216	0.195	0.19	0.218	0.257	0.238	0.215	-	-
S-D	mg/L	5.9	4.3	4.3	4.5	9.2	8.4	5.6	-	-
Se-D	mg/L	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	-	-
Na-D	mg/L	7.07	5.67	6.19	6.31	12.1	12.7	7.470	-	-
Sr-D	mg/L	0.05	0.0449	0.0413	0.0376	0.0668	0.0644	0.0481	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	-	-

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EMS ID	E299256									
Site Description		Quinsam River Downstream of the Confluence with Iron River								
Site Name	IRQR	5 in 30 Weekly Samples					Monthly		Water Quality Guidelines	
Date		17-Jul-18	24-Jul-18	1-Aug-18	7-Aug-18	14-Aug-18	12-Sep-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	28.4	28	26.3	25.1	21.8	14.8	25.9	128	-
Alk-T	mg/L	39.7	39.7	40.4	36.8	41.2	34.9	39.6	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	5	25
Al-T	mg/L	0.0301	0.0273	0.022	0.0219	0.0194	0.0140	0.0241	-	-
As-T	mg/L	0.00054	0.0005	0.00051	0.00049	0.00048	0.00056	0.0005	-	0.005
Ba-T	mg/L	0.0031	0.0031	0.0027	0.0025	0.0023	0.0033	0.0027	-	-
B-T	mg/L	0.052	0.054	0.057	0.051	0.050	<0.050	0.053	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	-	-
Ca-T	mg/L	12.6	11.8	12.4	11.1	10.5	11.9	11.70	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	-	0.05
Cu-T	mg/L	0.00114	0.00061	0.00064	0.00057	0.00055	0.00096	0.0007	0.002	0.007
Hard-T	mg/L	37.8	35.5	37.1	33.2	31.3	35	35	-	-
Fe-T	mg/L	0.101	0.096	0.081	0.081	0.074	0.061	0.087	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	0.003	0.005
Mg-T	mg/L	1.52	1.45	1.45	1.35	1.25	1.29	1.4	-	-
Mn-T	mg/L	0.0087	0.0084	0.0078	0.0071	0.0062	0.0047	0.0076	0.7	0.8
Hg-T	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000031	0.000002	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	0.025
K-T	mg/L	0.256	0.253	0.268	0.204	0.212	0.222	0.239	-	-
S-T	mg/L	8.6	8.9	9.3	8.6	6.8	4.9	8.4	-	-
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	-	0.0001
Na-T	mg/L	13.9	14.2	14.8	13.8	11.4	7.45	13.6	-	-
Sr-T	mg/L	0.0633	0.0635	0.0626	0.0575	0.051	0.0483	0.0596	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	0.0075	0.03
Al-D	mg/L	0.0130	0.0118	0.0262	0.0172	0.0114	0.0084	0.0159	0.05	0.1
As-D	mg/L	0.00049	0.00046	0.0005	0.00046	0.00043	0.00052	0.00047	-	-
Ba-D	mg/L	0.0033	0.0030	0.0028	0.0026	0.0024	0.0036	0.0028	-	-
B-D	mg/L	0.054	<0.050	0.054	0.054	<0.050	<0.050	0.052	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000080	<0.0000050	<0.0000050	0.000006	0.00017	0.00043
Ca-D	mg/L	12.9	12.1	11.7	11.4	10.9	12.7	11.8	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Cu-D	mg/L	0.00074	0.00054	0.00413	0.00048	0.00047	0.00065	0.00127	-	-
Hard-D	mg/L	38.4	35.7	35	33.8	32.6	35.4	35.1	-	-
Fe-D	mg/L	0.0459	0.0484	0.0517	0.0587	0.0538	0.0311	0.0517	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	-	-
Mg-D	mg/L	1.49	1.36	1.4	1.31	1.29	1.33	1.37	-	-
Mn-D	mg/L	0.0053	0.0057	0.0055	0.0055	0.0054	0.0041	0.0055	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.000002	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	-	-
K-D	mg/L	0.267	0.26	0.253	0.219	0.206	0.218	0.241	-	-
S-D	mg/L	8.5	9.7	8.1	8.2	6.4	5.1	8.2	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	-	-
Na-D	mg/L	13.9	13.3	13.7	12.9	11.7	7.43	13.100	-	-
Sr-D	mg/L	0.0625	0.0631	0.0622	0.057	0.0522	0.0497	0.0594	-	-
Zn-D	mg/L	<0.0050	0.0063	<0.0050	<0.0050	<0.0050	<0.0050	0.0053	-	-

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EMS ID	E299256	Quinsam River Downstream of the Confluence with Iron River							Water Quality Guidelines	
Site Description		5 in 30 Weekly Samples					Monthly			
Site Name	IRQR									
Date		11-Oct-18	16-Oct-18	24-Oct-18	31-Oct-18	7-Nov-18	12-Dec-18	5x30 Average	Average	Max
Parameter	Unit									
SO4-D	mg/L	47.8	20.7	21.5	17.7	13.7	14.9	24.3	128	-
Alk-T	mg/L	35.3	35.1	35.6	34.7	28.7	25.8	33.9	-	-
Acidity 8.3	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.00	-	-
TSS	mg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.26	5	25
Al-T	mg/L	0.0149	0.0242	0.0132	0.0289	0.0556	0.0649	0.0274	-	-
As-T	mg/L	0.00043	0.00065	0.00052	0.00057	0.00058	0.0006	0.00055	-	0.005
Ba-T	mg/L	0.0045	0.0037	0.0035	0.0036	0.0038	0.0035	0.0038	-	-
B-T	mg/L	0.058	<0.050	<0.050	<0.050	<0.050	<0.050	0.0516	-	-
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000100	-	-
Ca-T	mg/L	20.8	12.4	11.9	11.2	10.7	10.1	13.4	-	-
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Co-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	0.05
Cu-T	mg/L	0.00135	0.00119	0.00066	0.00085	0.00113	0.00085	0.00104	0.0020	0.0070
Hard-T	mg/L	62.3	37.1	35.6	33.3	32.2	29.9	40.1	-	-
Fe-T	mg/L	0.048	0.081	0.074	0.086	0.1	0.086	0.078	-	1
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	0.003	0.005
Mg-T	mg/L	2.5	1.48	1.43	1.32	1.35	1.15	1.62	-	-
Mn-T	mg/L	0.009	0.0055	0.0049	0.0046	0.0056	0.0039	0.0059	0.7	0.8
Hg-T	mg/L	0.0000045	0.0000021	0.0000094	0.0000064	<0.0000020	<0.0000020	0.00000488	-	0.0001
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Ni-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	0.025
K-T	mg/L	0.308	0.219	0.223	0.216	0.217	0.222	0.237	-	-
S-T	mg/L	17	7	6.4	6.1	5	5.4	8.3	-	-
Se-T	mg/L	<0.00010	0.0001	<0.00010	<0.00010	0.0001	<0.00010	0.000100	-	-
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000200	-	0.0001
Na-T	mg/L	9.34	8.22	9.01	7.25	5.59	6.5	7.88	-	-
Sr-T	mg/L	0.127	0.0594	0.0601	0.0532	0.049	0.0456	0.0697	-	-
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00500	0.0075	0.033
Al-D	mg/L	0.0126	0.0173	0.0176	0.0206	0.0364	0.0517	0.0209	0.05	0.1
As-D	mg/L	0.00038	0.00061	0.00053	0.00057	0.00053	0.00056	0.00052	-	-
Ba-D	mg/L	0.0046	0.0036	0.0034	0.0035	0.0037	0.0033	0.0038	-	-
B-D	mg/L	0.056	<0.050	<0.050	<0.050	<0.050	<0.050	0.0512	-	-
Cd-D	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000052	0.0000130	0.00000504	0.000088	0.00017
Ca-D	mg/L	20.4	12.9	12.1	11.6	10.5	10.1	13.5	-	-
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Co-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	-
Cu-D	mg/L	0.00056	0.00059	0.00057	0.00069	0.00075	0.00088	0.00063	-	-
Hard-D	mg/L	61.8	38.3	36.6	34.4	31.4	30	40.5	-	-
Fe-D	mg/L	0.031	0.0584	0.0582	0.0564	0.0545	0.0566	0.0517	-	0.35
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000200	-	-
Mg-D	mg/L	2.63	1.5	1.52	1.34	1.27	1.18	1.65	-	-
Mn-D	mg/L	0.0033	0.0047	0.0048	0.0037	0.0032	0.0024	0.0039	-	-
Hg-D	mg/L	<0.0000020	<0.0000020	0.0000035	0.0000023	<0.0000020	<0.0000020	0.00000236	-	-
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
Ni-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00100	-	-
K-D	mg/L	0.298	0.229	0.232	0.227	0.197	0.198	0.237	-	-
S-D	mg/L	16.3	7.6	7.2	7.0	5	5.2	8.6	-	-
Se-D	mg/L	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	<0.00010	0.000100	-	-
Na-D	mg/L	10.2	8.26	9.87	7.01	5.54	6.52	8.18	-	-
Sr-D	mg/L	0.135	0.0594	0.057	0.0515	0.0491	0.0447	0.0704	-	-
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00500	-	-

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EMS ID / Site Description / Site Name / Date / Parameter	E299256 / IRQR / 24-Jan-19 / Unit	Quinsam River Downstream of the Confluence with Iron River Monthly Samples		20-Mar-19	Water Quality Guidelines Max
SO4-D	mg/L	17.3		29.6	-
Alk-T	mg/L	23.5		33.1	-
Acidity 8.3	mg/L	<1.0		<1.0	-
TSS	mg/L	5.2		<4.0	25
Al-T	mg/L	0.0542		0.0387	-
As-T	mg/L	0.00039		0.00056	0.005
Ba-T	mg/L	0.0026		0.0032	-
B-T	mg/L	<0.050		<0.050	-
Cd-T	mg/L	<0.000010		<0.000010	-
Ca-T	mg/L	8.19		12	-
Cr-T	mg/L	<0.0010		<0.0010	-
Co-T	mg/L	<0.00020		<0.00020	0.05
Cu-T	mg/L	0.00067		0.0006	0.0070
Hard-T	mg/L	24.8		35.9	-
Fe-T	mg/L	0.055		0.067	1
Pb-T	mg/L	<0.00020		<0.00020	0.005
Mg-T	mg/L	1.05		1.45	-
Mn-T	mg/L	0.0028		0.0035	0.8
Hg-T	mg/L	<0.0000020		<0.0000020	0.0001
Mo-T	mg/L	<0.0010		<0.0010	-
Ni-T	mg/L	<0.0010		<0.0010	0.025
K-T	mg/L	0.167		0.267	-
S-T	mg/L	5.3		11.2	-
Se-T	mg/L	<0.00010		<0.00010	-
Ag-T	mg/L	<0.000020		<0.000020	0.0001
Na-T	mg/L	6.86	Dangerous conditions, no samples were collected	14.3	-
Sr-T	mg/L	0.0394		0.0726	-
Zn-T	mg/L	<0.0050		<0.0050	0.033
Al-D	mg/L	0.0385		0.0252	0.1
As-D	mg/L	0.00039		0.00053	-
Ba-D	mg/L	0.0025		0.003	-
B-D	mg/L	<0.050		<0.050	-
Cd-D	mg/L	<0.0000050		<0.0000050	0.00017
Ca-D	mg/L	8.9		12.0	-
Cr-D	mg/L	<0.0010		<0.0010	-
Co-D	mg/L	<0.00020		<0.00020	-
Cu-D	mg/L	0.00064		0.00049	-
Hard-D	mg/L	26.5		36	-
Fe-D	mg/L	0.0353		0.0402	0.35
Pb-D	mg/L	<0.00020		<0.00020	-
Mg-D	mg/L	1.05		1.45	-
Mn-D	mg/L	0.0021		0.0027	-
Hg-D	mg/L	<0.0000020		<0.0000020	-
Mo-D	mg/L	<0.0010		<0.0010	-
Ni-D	mg/L	<0.0010		<0.0010	-
K-D	mg/L	0.179		0.268	-
S-D	mg/L	5.8		11.1	-
Se-D	mg/L	<0.00010		<0.00010	-
Na-D	mg/L	7.1		13.4	-
Sr-D	mg/L	0.042		0.068	-
Zn-D	mg/L	<0.0050		<0.0050	-

Table 166
2018-2019 Annual Report

EMS ID E292127

Site Description: 2 South Pit (CCR Water Cover) Continuos Discharge Inflow

Site Name 2SI

Date	April		May		June		July		August		September		October		November		December		Janaury		February		March	
	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)
1	0.06	1.10	0.01	0.04	0.01	0.02	0.01	0.03	-0.04	0.00	0.13	7.78	0.16	14.16	0.17	17.45	0.15	11.84	0.12	6.80	0.13	7.76	0.09	3.58
2	0.05	0.72	0.01	0.04	0.01	0.02	0.01	0.03	-0.04	0.00	0.13	7.86	0.15	11.62	0.18	19.69	0.15	11.19	0.13	7.87	0.13	8.57	0.09	3.56
3	0.05	0.68	0.01	0.04	0.01	0.03	0.01	0.02	-0.03	0.00	0.13	8.01	0.14	10.18	0.18	18.74	0.14	10.55	0.25	43.61	0.13	9.11	0.09	3.46
4	0.05	0.63	0.01	0.03	0.01	0.03	0.01	0.04	-0.03	0.00	0.11	5.06	0.14	10.58	0.20	24.84	0.14	9.95	0.25	41.49	0.13	9.06	0.09	3.37
5	0.06	1.39	0.01	0.03	0.01	0.02	0.02	0.04	-0.03	0.00	0.13	7.78	0.14	10.87	0.17	17.45	0.14	9.62	0.18	19.80	0.12	7.15	0.09	3.51
6	0.06	1.21	0.01	0.03	0.01	0.03	0.02	0.05	-0.04	0.00	0.12	6.65	0.14	10.66	0.16	14.81	0.14	9.29	0.17	15.67	0.11	5.33	0.09	3.29
7	0.10	4.38	0.01	0.03	0.01	0.03	0.03	0.14	-0.04	0.00	0.10	4.65	0.16	13.10	0.16	13.23	0.14	9.95	0.15	11.13	0.12	7.51	0.09	3.53
8	0.09	3.58	0.02	0.03	0.02	0.09	0.02	0.10	-0.05	0.00	0.10	4.34	0.16	13.38	0.15	11.82	0.14	10.03	0.13	7.87	0.16	13.17	0.09	3.32
9	0.07	1.76	0.02	0.04	0.02	0.08	0.02	0.10	-0.06	0.00	0.11	6.01	0.17	15.70	0.15	12.01	0.16	14.19	0.17	16.19	0.15	11.63	0.09	3.46
10	0.09	3.15	0.02	0.03	0.02	0.06	0.02	0.11	-0.07	0.00	0.10	4.30	0.16	15.04	0.15	11.61	0.15	12.30	0.20	24.01	0.14	10.47	0.09	3.37
11	0.10	3.92	0.02	0.03	0.02	0.09	0.02	0.07	-0.08	0.00	0.08	2.60	0.15	12.66	0.14	10.97	0.17	17.59	0.18	17.80	0.12	7.22	0.09	3.67
12	0.08	2.76	0.01	0.03	0.01	0.04	0.02	0.08	-0.09	0.00	0.06	1.37	0.15	12.87	0.14	10.40	0.17	16.73	0.15	13.00	0.09	3.73	0.10	4.57
13	0.09	2.95	0.02	0.03	0.02	0.13	0.02	0.08	-0.08	0.00	0.11	6.10	0.16	13.23	0.15	12.38	0.19	22.89	0.14	9.94	0.10	4.56	0.11	5.00
14	0.09	3.21	0.02	0.03	0.02	0.05	0.02	0.06	-0.08	0.00	0.15	11.65	0.15	12.71	0.19	20.38	0.23	36.17	0.13	7.78	0.13	7.70	0.11	5.74
15	0.08	2.42	0.02	0.03	0.02	0.11	0.02	0.06	-0.09	0.00	0.15	11.13	0.15	11.08	0.17	16.57	0.20	26.10	0.12	6.73	0.13	8.57	0.11	5.91
16	0.08	2.60	0.02	0.03	0.02	0.13	0.02	0.05	-0.06	0.00	0.16	13.40	0.14	10.31	0.16	15.17	0.25	42.94	0.11	5.92	0.13	8.57	0.12	6.74
17	0.06	1.39	0.03	0.02	0.03	0.16	0.02	0.06	0.11	6.08	0.13	8.26	0.14	10.35	0.15	12.89	0.23	36.33	0.14	10.03	0.13	8.09	0.12	7.12
18	0.06	1.16	0.03	0.02	0.03	0.16	0.02	0.05	0.13	8.53	0.13	8.34	0.14	10.09	0.15	12.06	0.26	46.83	0.15	11.83	0.12	7.14	0.12	6.91
19	0.06	1.07	0.03	0.02	0.03	0.15	0.01	0.03	0.14	9.72	0.13	7.77	0.14	9.51	0.15	11.38	0.19	22.74	0.18	18.60	0.11	5.84	0.12	6.60
20	0.05	0.85	0.03	0.01	0.03	0.15	0.01	0.03	0.12	6.63	0.13	7.81	0.13	8.23	0.15	11.11	0.26	47.66	0.16	13.39	0.11	5.43	0.11	5.99
21	0.05	0.98	0.02	0.01	0.02	0.13	0.01	0.02	0.08	2.46	0.17	15.89	0.12	6.65	0.15	12.03	0.18	20.01	0.14	10.86	0.10	4.65	0.11	5.36
22	0.05	0.62	0.01	0.02	0.01	0.03	0.01	0.01	0.12	7.58	0.16	13.15	0.10	4.58	0.16	13.39	0.16	13.84	0.18	18.42	0.10	4.66	0.11	5.18
23	0.04	0.59	0.02	0.02	0.02	0.04	0.01	0.01	0.13	7.79	0.15	11.15	0.10	3.90	0.17	16.96	0.19	20.87	0.19	21.70	0.10	4.69	0.11	5.01
24	0.04	0.57	0.01	0.02	0.01	0.01	0.01	0.00	0.13	7.86	0.14	10.20	0.11	5.40	0.16	14.67	0.15	12.55	0.17	16.29	0.10	4.56	0.10	4.59
25	0.04	0.54	0.02	0.01	0.02	0.06	0.00	0.00	0.13	8.27	0.14	9.53	0.12	7.26	0.16	13.43	0.13	8.98	0.16	14.56	0.10	4.17	0.10	4.36
26	0.04	0.51	0.01	0.01	0.01	0.04	0.00	0.00	0.13	8.72	0.13	9.15	0.13	9.24	0.21	29.24	0.13	9.10	0.15	12.88	0.10	4.29	0.11	5.50
27	0.04	0.46	0.01	0.01	0.01	0.02	0.00	0.00	0.13	8.33	0.13	8.94	0.13	8.04	0.21	27.77	0.12	7.41	0.15	12.51	0.09	3.82	0.11	5.17
28	0.03	0.31	0.01	0.01	0.01	0.02	-0.01	0.00	0.13	8.51	0.13	8.46	0.15	12.60	0.18	18.04	0.12	7.26	0.14	10.57	0.09	3.74	0.10	4.90
29	0.04	0.52	0.02	0.01	0.02	0.04	-0.02	0.00	0.14	9.24	0.13	8.56	0.15	11.32	0.16	14.20	0.16	14.63	0.13	8.50			0.10	4.51
30	0.04	0.49	0.02	0.01	0.02	0.04	-0.02	0.00	0.13	8.37	0.14	10.08	0.14	10.38	0.15	12.68	0.15	11.91	0.12	6.77			0.10	4.11
31			0.01	0.01	0.03		-0.03	0.00	0.13	7.97			0.15	11.37			0.13	8.15	0.11	5.41			0.10	3.92

WL= Water Level **Q= Quantity**

Table 167
2018-2019 Annual Report

EMS ID	E292127																							
Site Description:	2 South Pit Continuos Discharge Outflow																							
Site Name	2S																							
Date	April		May		June		July		August		September		October		November		December		Janaury		February		March	
	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)	WL	Q (L/s)
1	0.14	10.79	0.13	9.95	0.13	8.60	0.12	7.93	0.11	7.10	0.12	8.19	0.15	12.29	0.20	22.97	0.20	24.00	0.20	22.85	0.16	15.04	0.13	8.90
2	0.14	10.71	0.13	9.83	0.12	8.45	0.12	7.65	0.12	7.57	0.13	8.72	0.15	11.78	0.23	31.48	0.19	21.84	-	-	0.16	14.44	0.13	8.88
3	0.14	10.92	0.13	9.92	0.12	8.31	0.12	7.44	0.11	6.99	0.12	8.28	0.15	12.10	0.22	28.52	0.19	19.89	0.40	108.12	0.16	14.13	0.13	9.45
4	0.14	11.29	0.14	10.29	0.12	8.07	0.12	7.57	0.11	6.80	0.12	8.41	0.14	11.34	0.26	43.02	0.18	18.64	0.38	101.10	0.16	13.71	0.13	8.74
5	0.14	11.36	0.13	9.29	0.13	8.49	0.12	8.10	0.11	6.86	0.12	8.34	0.15	12.24	0.23	31.91	0.18	17.68	0.32	65.66	0.15	13.16	0.13	8.66
6	0.14	10.97	0.13	9.72	0.12	8.15	0.12	7.79	0.11	6.77	0.12	8.36	0.14	11.42	0.21	26.70	0.17	16.49	0.27	43.91	0.15	12.61	0.13	8.59
7	0.15	12.40	0.13	9.37	0.13	8.48	0.13	8.77	0.11	6.77	0.13	9.05	0.17	16.71	0.20	22.96	0.17	16.15	0.23	32.22	0.15	12.17	0.13	8.74
8	0.15	12.48	0.13	9.50	0.13	8.92	0.12	7.53	0.11	6.76	0.13	9.06	0.19	20.97	0.19	21.11	0.17	16.12	0.21	26.15	0.15	12.54	0.13	8.78
9	0.15	12.62	0.13	9.47	0.13	8.66	0.12	7.73	0.11	6.81	0.13	9.58	0.18	18.63	0.19	20.27	0.19	21.71	0.23	31.36	0.16	14.32	0.12	8.45
10	0.15	13.34	0.13	9.36	0.13	8.57	0.12	7.38	0.11	6.80	0.14	10.07	0.19	19.71	0.18	19.05	0.19	21.65	0.29	54.08	0.16	14.75	0.13	8.82
11	0.16	15.03	0.13	8.88	0.12	7.95	0.12	7.22	0.11	7.09	0.13	9.47	0.18	18.16	0.18	17.62	0.21	26.54	0.27	43.71	0.16	14.40	0.13	9.63
12	0.16	15.02	0.13	8.69	0.13	8.82	0.11	7.08	0.12	7.14	0.13	8.95	0.17	16.62	0.17	16.98	0.22	27.81	0.24	35.00	0.15	12.65	0.13	8.82
13	0.17	16.43	0.13	8.56	0.12	8.41	0.11	7.03	0.11	6.94	0.13	9.16	0.17	16.23	0.18	18.41	0.25	38.15	0.22	28.43	0.14	10.78	0.13	9.17
14	0.17	16.69	0.13	8.53	0.12	8.43	0.12	7.13	0.11	6.81	0.13	9.76	0.17	16.53	0.23	31.86	0.30	59.26	0.20	24.01	0.14	11.09	0.13	9.80
15	0.17	15.76	0.12	8.46	0.12	7.73	0.11	6.89	0.11	6.89	0.14	10.41	0.17	15.62	0.22	29.38	0.31	61.07	0.19	20.65	0.14	10.96	0.14	10.19
16	0.17	15.86	0.12	8.34	0.12	7.42	0.11	6.93	0.11	6.79	0.15	12.09	0.16	14.49	0.21	26.35	0.36	86.32	0.18	18.44	0.14	10.88	0.14	9.97
17	0.16	14.95	0.12	8.28	0.12	7.47	0.11	7.06	0.11	6.85	0.14	10.28	0.16	14.02	0.20	23.47	0.34	74.65	0.18	19.22	0.13	9.94	0.13	9.68
18	0.16	14.49	0.12	8.29	0.12	7.30	0.12	7.15	0.11	6.98	0.13	9.66	0.16	13.70	0.19	21.56	0.40	113.72	0.20	23.73	0.14	10.33	0.13	9.73
19	0.16	13.75	0.13	8.77	0.12	7.56	0.12	7.35	0.12	7.70	0.14	10.03	0.15	13.07	0.19	20.29	0.33	70.27	0.23	30.98	0.14	10.60	0.13	9.91
20	0.16	13.49	0.13	8.85	0.12	7.53	0.11	7.04	0.12	7.89	0.14	10.71	0.15	12.52	0.18	19.11	0.41	118.05	0.23	30.16	0.13	9.94	0.13	9.80
21	0.15	12.24	0.13	8.53	0.12	7.58	0.11	6.96	0.12	7.78	0.16	14.39	0.15	11.76	0.19	20.18	0.41	117.55	0.21	25.30	0.13	9.86	0.13	9.80
22	0.15	11.78	0.12	8.03	0.12	8.10	0.11	6.85	0.12	7.54	0.15	13.07	0.14	11.21	0.19	21.81	0.29	53.95	0.21	25.05	0.13	9.82	0.14	9.98
23	0.15	11.68	0.12	8.11	0.12	7.40	0.11	6.74	0.12	7.66	0.15	11.85	0.14	11.45	0.21	26.29	0.28	49.08	0.25	39.46	0.14	10.33	0.14	10.20
24	0.14	11.18	0.13	8.58	0.13	8.91	0.11	6.78	0.12	7.92	0.14	11.47	0.14	11.20	0.21	24.66	0.19	20.50	0.23	31.32	0.13	9.48	0.13	9.61
25	0.14	10.86	0.12	8.05	0.12	7.99	0.11	6.73	0.13	8.49	0.14	11.14	0.14	11.10	0.20	24.38	0.22	28.76	0.22	27.41	0.13	9.20	0.14	10.07
26	0.14	10.69	0.13	8.64	0.12	7.58	0.11	6.77	0.12	8.29	0.14	10.92	0.14	10.69	0.27	44.97	0.21	26.01	0.21	24.78	0.13	9.23	0.14	10.17
27	0.14	10.47	0.12	8.27	0.12	7.94	0.11	6.77	0.12	8.01	0.14	10.77	0.14	11.38	0.29	54.50	0.20	22.03	0.20	22.98	0.13	9.58	0.13	9.49
28	0.14	11.41	0.12	7.98	0.12	8.30	0.11	6.78	0.12	8.11	0.14	10.61	0.16	13.95	0.26	42.42	-	-	0.19	21.23	0.13	9.26	0.13	9.71
29	0.14	11.04	0.12	7.82	0.12	8.41	0.11	6.73	0.12	8.17	0.14	10.80	0.16	14.61	0.23	32.56	0.22	29.33	0.18	18.87			0.13	9.30
30	0.14	10.23	0.12	7.79	0.12	8.09	0.12	7.61	0.12	8.22	0.15	12.00	0.16	15.01	0.22	27.31	0.23	30.64	0.17	17.00			0.13	9.26
31			0.12	7.91			0.11	6.81	0.12	8.45			0.17	15.88			0.21	26.14	0.17	15.42			0.13	9.08
= Water Level			Q= Quantity																					

Table 168
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Taxa and Abundance of Zooplankton Samples- Spring

level of id. : lowest/lowest					
Site Name		**LQL**	**NNL**	**LLM**	**MQL**
Sampling Date(s)		May 29, 2014	May 30, 2014	May 30, 2014	May 30, 2014
units = total organisms/sample					
	stage				
Sub-class : Copepoda					
Order : Cyclopoida					
Cryptocyclops bicolor	adult			54	16
Diacyclops thomasi	adult	507	84	107	
Ectocyclops phaleratus	adult	63			8
Microcyclops varicans rubellus	adult	63	21	18	8
UID	copepodid	718	14	380	186
Order : Calanoida					
Family : Diaptomidae					
Hesperodiaptomus kenai	adult		88		
Hesperodiaptomus novemdecimus	adult				11
Skistodiaptomus oregonensis	adult	39	74	63	218
UID	copepodid	3	52	62	128
UID Calanoida / Cyclopoida	nauplii	451	14	1,393	1,123
Order : Cladocera					
Bosmina longirostris	adult	287	52	550	275
Ceriodaphnia dubia	adult	3	2	88	
Daphnia longiremis	adult	13	19	166	
Daphnia rosea	adult	119	143	564	957
Daphnia sp.	juvenile		2	17	51
Diaphanosoma brachyurum	adult	29	12	96	64
Holopedium gibberum	adult	116	178		
Polyphemus pediculus	adult			90	8
Phylum : Rotifera					
Asplanchna sp.		19		446	
Kellicottia longispina		19	74	437	38
Keratella cochlearis		129	5	13,449	1,095
Keratella quadrata				786	19
Polyarthra sp.		16		218	
UID		3			
Benthic					
Group : Hydracarina	larvae		5		
TOTAL		**2,597**	**839**	**18,984**	**4,205**
UID = unidentified due to lack of size and/or missing morphological characters.					

Table 169
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Taxa and Abundance of Zooplankton Samples - Summer

level of id. : lowest/lowest						
Site Name		**LQL**	**LQL-Replicate**	**NNL**	**LLM**	**MQL**
Sampling Date(s)		Aug. 22, 2018	Aug. 22, 2018	Aug. 23, 2018	Aug. 23, 2018	Aug. 23, 2018
units = total organisms/sample						
	stage					
Sub-class : Copepoda						
Order : Cyclopoida						
Cryptocyclops bicolor	adult	48	27		47	8
Diacyclops thomasi	adult	19	27	25		
Ectocyclops phaleratus	adult	19			8	4
Microcyclops varicans rubellus	adult	10	134			
UID	copepodid	192	198	7	108	19
Order : Calanoida						
Family : Diaptomidae						
Hesperodiaptomus kenai	adult			21		
Hesperodiaptomus novemdecimus	adult	5	8		3	4
Skistodiaptomus oregonensis	adult	115	73	149	49	119
UID	copepodid	91	57	4	15	42
UID Calanoida / Cyclopoida	nauplii	374	146	166	157	222
Order : Cladocera						
Bosmina longirostris	adult	91	99	32		23
Ceriodaphnia dubia	adult				12	
Daphnia rosea	adult	734	898	351	564	529
Daphnia sp.	juvenile	106	21		12	23
Diaphanosoma brachyurum	adult	110	303	21	237	426
Leptodora kindtii	adult	5		11		
Polyphemus pediculus	adult	5	10		6	
Sida crystallina	adult			28	12	
Phylum : Rotifera						
Conochilus sp.	colonies					50
Kellicottia longispina		250	136	89	206	46
Keratella cochlearis		82	37	25	391	58
Keratella quadrata				11	12	
Polyarthra sp.		5	16			
UID					9	23
Benthic						
Group : Hydracarina	larvae	5	11	7		8
Order : Diptera						
Chaoborus sp.	larvae				22	12
TOTAL		2,266	2,201	947	1,870	1,616
UID = unidentified due to lack of size and/or missing morphological characters.						

Table 170
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Taxa and Abundance of Zooplankton Samples- Fall					
level of id. : lowest/lowest					
Site Name		**LQL1**	**NNL1**	**LLM1**	**MQL1**
Sampling Date(s)		Nov.14, 2018	Nov. 8, 2018	Nov. 8, 2018	Nov. 8, 2018
units = total organisms/sample					
	stage				
Subclass : Copepoda					
Order : Cyclopoida					
Cryptocyclops bicolor	adult			14	
Diacyclops thomasi	adult		8	3	
Ectocyclops phaleratus	adult	1		3	
Microcyclops varicans rubellus	adult	6	2	8	1
UID	adult	14	5	30	
Order : Calanoida					
Family : Diaptomidae					
Skistodiaptomus oregonensis	adult	5	15	21	
UID	copepodid			7	
UID Calanoida / Cyclopoida	nauplii	2	20	122	
Order : Cladocera					
Alona rectangula	adult				4
Bosmina longirostris	adult	2	28	125	
Ceriodaphnia dubia	adult				
Daphnia longiremis	adult	3		8	
Daphnia rosea	adult	5	70	7	
Daphnia sp.	juvenile			2	
Diaphanosoma brachyurum	adult				
Holopedium gibberum	adult		47	3	
Leptodora kindtii	adult				
Polyphemus pediculus	adult				
Sida crystallina	adult				
Phylum : Rotifera					
Conochilus sp.	colonies				
Kellicottia longispina		21	51	155	
Keratella cochlearis		40	5	1,056	5
Keratella quadrata		7		18	
Polyarthra sp.		19	10	83	
Trichocerca sp.		2	1		
UID		9	11	8	2
Benthic					
Group : Hydracarina	larvae		1		
TOTAL		**136**	**274**	**1,673**	**12**
UID = unidentified due to lack of size and/or missing morphological characters.					

Table 171
2018-2019 Annual Report

Groundwater Wells - Description

Area	Groundwater ID	In-situ / Ex-situ	Screened Interval	Comment
2-North	1 Mains 2-North (1M2N)	In-situ	No. 1 Seam	Flooded Underground Workings Dewatering well
	5 Mains#2 (5M#2)	In-situ	No. 1 Seam	Flooded Underground Workings Dewatering well
	QU08-21GD	Ex-situ	No. 1 Seam	Down gradient of u/g tailings disposal, measure water quality and hydraulic gradients downstream of forjan fault
	QU08-21GS	Ex-situ	No. 4 Coal Seam and	
	QU10-10D	Ex-situ	No. 1 Seam / mudstone	Down gradient of u/g tailings disposal, measure water quality and hydraulic head downstream of 2 North workings
	QU10-10S	Ex-situ	No. 4 Seam /	
	QU10-11S	Ex-situ	Fractured Sandstone	Measure water quality and hydraulic gradient in Forjan Fault
	QU10-11D	Ex-situ	No.1 Seam	Down gradient of u/g tailings disposal, measure water quality and hydraulic head downstream of 2 North workings
	QU10-13D	In-situ	Caved Zone	Measure hydraulic head above 2 North mine (1 mains), fine tailing disposal
5-South Mine Pool	5SMW	In-situ	Mine Pool (1 Seam)	5-S Mine Pool pumped into 2-North Mine Pool
River Barrier Pillar (RBP)	QU11-05S	Ex-situ	Sandstone	Monitoring water quality and vertical gradients downstream of the RBP and 2-North mine.
	QU11-05D	Ex-situ	Sandstone	Monitoring water quality and vertical gradients downstream of the RBP and 2-North mine.
	QU11-09S	Ex-situ	Sandstone	Monitor water quality & gradients downstream of the RBP and 2-North workings. Mine pool – CCR backfill in River Barrier Pillar
	QU11-09M	In-situ	RBP Mine Pool	Monitor water quality & gradients downstream of the RBP and 2-North workings. Mine pool – CCR backfill in River Barrier Pillar.
2-North Plant Site	MW-00-1S	Ex-situ	Till	Seepage to MQL
	MW-00-1D	Ex-situ	1-Seam	Seepage to MQL
	MW-00-6D	Ex-situ	Till	Seepage to MQL
	MW-00-6S	Ex-situ	Till	Seepage to MQL
4-South	QU10-08D	Ex-situ	No. 3 Seam	4 South (just outside mine pool) up gradient of existing workings
	QU11-01		Foot print area of 4 South GOB	Assess 4 South Mine Pool water quality
	QU10-09S	Ex-situ	Down gradient of existing workings	Access vertical gradients and water quality adjacent to Long Lake.
	QU10-09D	Ex-situ	Down gradient of existing workings	Access vertical gradients and water quality adjacent to Long Lake.
2-South & 3-South	MW002	Ex-situ	1 Seam	3S seepage to Long Lake
	MW004	In-Situ	Mine Pool (1 Seam)	2-South Mine Pool Gob depillared area
	MW1223	Ex-situ	Silt Stone	2-South seepage to No Name Lake
	MW1224	Ex-situ	Silt Stone	2-South seepage to No Name Lake
	QU11-11 (INF)	In-Situ	Mine Pool (1 Seam)	2-South mine pool dewatering well for Passive Treatment System
7-South	1M7S	In-Situ	No. 4 Coal Seam	Underground Sump
	QU08-10	Ex-situ	No. 4 Coal Seam	Downgradient of 7S -screened No. 3 Coal -Southern margin of workings
	QU08-13A	Ex-situ	No. 4 Coal Seam	Down Gradient of the CCR backfill towards QR
	QU08-13B	Ex-situ	Till & SST contact	Down Gradient of the CCR backfill towards QR
	QU14-10	In-Situ	Mine Void	PAG Storage Mine Void
7- South Area 5	7SA5	In-Situ	Mine Void	Groundwater draining into mine void
	QU1128	Ex-situ	N0. 4 Seam and 4L	Upgradiernt of 7SA5. Background 7 South Area 5
	QU1118S	Ex-situ	Till	Down Gradient of 7SA5 - Background info for 7S A5 Subcrop
	QU1118D	Ex-situ	Sandstone	Down Gradient of 7SA5 - Background info for 7S A5 Subcrop
	QU1206S	Ex-situ	Faulted sandstone near No. 4 Seam	Upgradient of 7SA5 along margine with proposed 4S expansion
	QU11-35	Ex-situ	Sandstone above No. 4 Seam	South end of 7SA5 footprint at 100280m N (mine grid)
242 AREA	QU11-36S	Ex-situ	Sandstone below No. 5 seam	Downgradient of 7SA5. Background (Between 242 and IR).
	QU11-36D	Ex-situ	Sandstone below No. 5 seam	Downgradient of 7SA5. Background (Between 242 and IR).
	242MW	In-situ	No. 4 Seam	Mine pool
	242PS	Ex-situ	Shallow groundwater/ rain water	Old Portal Sump

Table 172
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BC CSR Aquatic Life 2019 - Lowest Level Exceedances for Ex-situ Groundwater

Sample No.	Sample ID	Date	Class	Maxxam Labs Sample ID	Maxxam Labs Job ID	Parameter	Criteria	Result (mg/L)	DL
QU1105S-11JUNE18-M	QU1105S	11-Jun-18		TQ1903	B846832	Dissolved Arsenic (As)	0.05	0.0512	0.0001
QU1105S-18SEP18-M	QU1105S	18-Sep-18		UJ0378	B881174			0.0539	0.0001
QU1105S-11DEC18-R	QU1105S	11-Dec-18	Replicate	UY4713	B8A8837			0.059	0.0001
QU1105S-11DEC18-M	QU1105S	11-Dec-18		UY4712	B8A8837			0.0606	0.0001
QU1009S-20DEC18-R	QU1009S	20-Dec-18	Replicate	UZ6914	B8B1299			0.0724	0.0001
QU1009S-20DEC18-M	QU1009S	20-Dec-18		UZ6913	B8B1299			0.073	0.0001
QU1009S-14JUNE18-R	QU1009S	14-Jun-18	Replicate	TQ7297	B847743			0.0786	0.0001
QU1009S-14JUNE18-M	QU1009S	14-Jun-18		TQ7296	B847743			0.0787	0.0001
QU1009D-20DEC18-M	QU1009D	20-Dec-18		UZ6912	B8B1299			0.0883	0.0001
QU1009D-19MAR19-R	QU1009D	19-Mar-19	Replicate	VK1837	B920565			0.0959	0.0001
QU1009D-19MAR19-M	QU1009D	19-Mar-19		VK1836	B920565			0.097	0.0001
QU1010S-29MAY18-M	QU1010S	29-May-18		TN5353	B841665			0.101	0.0001
QU1009D-14JUNE18-M	QU1009D	14-Jun-18		TQ7294	B847743			0.101	0.0001
QU1009D-14JUNE18-R	QU1009D	14-Jun-18	Replicate	TQ7295	B847743			0.104	0.0001
QU1010S-28NOV18-M	QU1010S	28-Nov-18		UW5082	B8A5198			0.113	0.0001
QU1010S-28NOV18-R	QU1010S	28-Nov-18	Replicate	UW5083	B8A5198			0.114	0.0001
QU1109S-30JUL18-M	QU1109S	30-Jul-18		TZ1091	B863627			0.115	0.0005
QU1109S-27NOV18-M	QU1109S	27-Nov-18		UW0397	B8A4251			0.117	0.0005
QU1109S-21JUNE18-M	QU1109S	21-Jun-18		TS1970	B850438			0.123	0.0002
QU1109S-21JUNE18-R	QU1109S	21-Jun-18	Replicate	TS1968	B850438			0.13	0.0002
QU0821GS-22NOV18-M	QU0821GS	22-Nov-18		UV3663	B8A3046			0.137	0.0005
QU1008D-29MAR18-R	QU1008D	29-Mar-18	Replicate	TE8769	B823846			0.149	0.0001
QU1008D-29MAR18-M	QU1008D	29-Mar-18		TE8768	B823846			0.153	0.0001
QU0821D-14MAR19-M	QU0821GD	14-Mar-19		VJ2999	B918963			0.155	0.0005
QU1008D-21MAR19-M	QU1008D	21-Mar-19		VK3148	B920859			0.156	0.0001
QU0821GS-28MAY18-M	QU0821GS	28-May-18		TN8521	B842311			0.159	0.0005
QU0821GD-29AUG18-R	QU0821GD	29-Aug-18	Replicate	UF2995	B874648			0.171	0.0005
QU0821GD-29AUG18-M	QU0821GD	29-Aug-18		UF2994	B874648			0.173	0.0005
QU1128-6MAR19-M	QU1128	6-Mar-19		VI3579	B916980			0.18	0.0001
QU0821GD-11JUNE18-M	QU0821GD	11-Jun-18		TQ1965	B846843			0.187	0.0001
QU0821S-14MAR19-M	QU0821GS	14-Mar-19		VJ2998	B918963			0.211	0.0001
QU0821GD-22NOV18-M	QU0821GD	22-Nov-18		UV3662	B8A3046			0.221	0.0005
QU0821GS-29AUG18-M	QU0821GS	29-Aug-18		UF2996	B874648			0.289	0.0001
QU0813A-25MAR19-M	QU0813A	25-Mar-19		VK8269	B922099			0.368	0.0001
QU0813A-25MAR19-R	QU0813A	25-Mar-19	Replicate	VK8270	B922099			0.377	0.0001
QU0813A-05JUN18-M	QU0813A	5-Jun-18		TO9039	B844466			0.394	0.0001
QU0813A-05JUN18-R	QU0813A	5-Jun-18	Replicate	TO9041	B844466			0.396	0.0001
QU0813A-11SEP18-M	QU0813A	11-Sep-18		UH4186	B878455			0.411	0.0001
QU0813A-13DEC18-M	QU0813A	13-Dec-18		UY7068	B8A9340			0.42	0.0001
QU1206S-28MAR19-M	QU12065	28-Mar-19		VL2356	B922898			0.42	0.0001
QU0813A-13DEC18-R	QU0813A	13-Dec-18	Replicate	UY7069	B8A9340			0.423	0.0001
QU0810-25MAR19-M	QU0810	25-Mar-19		VK8272	B922099			0.454	0.0001
QU0813B-13DEC18-M	QU0813B	13-Dec-18		UY7070	B8A9340			0.499	0.0001
QU0813B-05JUN18-M	QU0813B	5-Jun-18		TO9038	B844466			0.509	0.0001
QU1136D-27FEB19-R	QU1136D	27-Feb-19	Replicate	VH3654	B914784			0.89	0.0001
QU1136D-27FEB19-M	QU1136D	27-Feb-19		VH3653	B914784			0.903	0.0001

Legend

Criteria 1- Applies only to ex-situ wells = BC CSR Aquatic Life 2019 - LOW LEVEL

Table 173
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BC CSR Aquatic Life 2019 - Lowest Level Exceedances for Ex-situ Groundwater									
Sample No.	*Sample ID*	*Date*	*Class*	*Maxxam Labs Sample ID*	*Maxxam Labs Job ID*	*Parameter*	*Criteria*	*Result (mg/L)*	*DL*
QU1010D-29MAY18-M	QU1010D	29-May-18		TN5354	B841665	Dissolved Chloride (Cl)	1500	1600	10
QU1010D-28NOV18-M	QU1010D	28-Nov-18		UW5084	B8A5198			3400	100
QU1008D-21MAR19-M	QU1008D	21-Mar-19		VK3148	B920859	Fluoride (F)	2	2.4	0.02
QU1009S-14JUNE18-M	QU1009S	14-Jun-18		TQ7296	B847743	Total Sulphide (as H2S)	0.02	0.024	0.0053
QU0810-25MAR19-M	QU0810	25-Mar-19		VK8272	B922099			0.029	0.0019
QU0821GD-11JUNE18-M	QU0821GD	11-Jun-18		TQ1965	B846843			0.038	0.0053
QU0813A-05JUN18-R	QU0813A	5-Jun-18	Replicate	TO9041	B844466			0.047	0.0053
QU0821GS-29AUG18-M	QU0821GS	29-Aug-18		UF2996	B874648			0.053	0.005
QU0821GD-22NOV18-M	QU0821GD	22-Nov-18		UV3662	B8A3046			0.061	0.005
QU0821GD-29AUG18-M	QU0821GD	29-Aug-18		UF2994	B874648			0.067	0.005
QU0821GS-22NOV18-M	QU0821GS	22-Nov-18		UV3663	B8A3046			0.074	0.005
QU0821GD-29AUG18-R	QU0821GD	29-Aug-18	Replicate	UF2995	B874648			0.076	0.005
QU0821GS-28MAY18-M	QU0821GS	28-May-18		TN8521	B842311			0.095	0.0053
QU1010S-29MAY18-M	QU1010S	29-May-18		TN5353	B841665			0.1	0.005
QU0813A-25MAR19-R	QU0813A	25-Mar-19	Replicate	VK8270	B922099			0.1	0.0019
QU1105S-18SEP18-R	QU1105S	18-Sep-18	Replicate	UJ0379	B881174			0.11	0.005
QU1009D-14JUNE18-M	QU1009D	14-Jun-18		TQ7294	B847743			0.12	0.0053
QU1009D-14JUNE18-R	QU1009D	14-Jun-18	Replicate	TQ7295	B847743			0.13	0.0053
QU0813A-11SEP18-M	QU0813A	11-Sep-18		UH4186	B878455			0.13	0.0053
QU1105S-18SEP18-M	QU1105S	18-Sep-18		UJ0378	B881174			0.13	0.005
QU1105S-11JUNE18-M	QU1105S	11-Jun-18		TQ1903	B846832			0.14	0.005
QU0813A-25MAR19-M	QU0813A	25-Mar-19		VK8269	B922099			0.15	0.0019
QU0813A-05JUN18-M	QU0813A	5-Jun-18		TO9039	B844466			0.18	0.0053
QU1109S-21JUNE18-R	QU1109S	21-Jun-18	Replicate	TS1968	B850438			0.4	0.01
QU1109S-21JUNE18-M	QU1109S	21-Jun-18		TS1970	B850438			0.44	0.01
QU1109S-30JUL18-M	QU1109S	30-Jul-18		TZ1091	B863627			0.44	0.011
QU1109S-27NOV18-M	QU1109S	27-Nov-18		UW0397	B8A4251			1.2	0.025
QU1105D-18SEP18-M	QU1105D	18-Sep-18		UJ0380	B881174			7.9	0.25
QU1105D-11JUNE18-M	QU1105D	11-Jun-18		TQ1904	B846832			14	0.27
QU1136D-27FEB19-R	QU1136D	27-Feb-19	Replicate	VH3654-03	B914784			0.031	0.01
QU1136S-27FEB19-M	QU1136S	27-Feb-19		VH3655-03	B914784			0.16	0.01
QU1128-6MAR19-M	QU1128	6-Mar-19		VI3579-02	B916980			0.18	0.01
QU1118D-26MAR19-M	QU1118D	26-Mar-19		VK8431-08	B922110			0.1	0.01
QU1105S-12MAR19-M	QU1105S	12-Mar-19		VI9169	B918176	Dissolved Selenium (Se)	0.02	0.045	0.0005
QU1105S-12MAR19-R	QU1105S	12-Mar-19	Replicate	VI9168	B918176			0.0636	0.0005
MW002-22MAY18-M	MW002	22-May-18		TM2525	B839351	Dissolved Sulphate (SO4)	1280	1290	10
MW002-4JUL18-M	MW002	4-Jul-18		TU6074	B855019			1340	10
MW002-7MAR19-M	MW002	7-Mar-19		VI3580	B916980			1340	10
MW002-4JUL18-R	MW002	4-Jul-18	Replicate	TU6075	B855019			1380	10

Legend

Criteria 1- Applies only to ex-situ wells = BC CSR Aquatic Life 2019 - LOW LEVEL

Table 174
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Maximum Values Summary Table

Sample ID	*Maxxam Labs Sample ID*	*Maxxam Labs Job ID*	*Parameter*	*Criteria* [1]	*Result*	*Units*
QU1410-29OCT18-M	UR6045	B896119	Dissolved Hardness (CaCO3)		2280	mg/L
QU1010D-28NOV18-M	UW5084	B8A5198	Dissolved Aluminum (Al)		0.212	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Antimony (Sb)		<0.025	mg/L
QU1136D-27FEB19-M	VH3653	B914784	Dissolved Arsenic (As)	0.05	**0.903**	mg/L
QU0821GS-28MAY18-M	TN8521	B842311	Dissolved Barium (Ba)	10	2.78	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Beryllium (Be)		<0.0050	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Bismuth (Bi)		<0.050	mg/L
QU0821GS-28MAY18-M	TN8521	B842311	Dissolved Boron (B)	12	3.27	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Cadmium (Cd)		0.0005	mg/L
QU1010D-29MAY18-M	TN5354	B841665	Dissolved Calcium (Ca)		632	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Chromium (Cr)		<0.050	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Cobalt (Co)		<0.010	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Copper (Cu)		<0.010	mg/L
QU1101-19MAR19-M	VK1834	B920565	Dissolved Iron (Fe)		198	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Lead (Pb)		<0.010	mg/L
QU0821GS-28MAY18-M	TN8521	B842311	Dissolved Lithium (Li)		0.216	mg/L
QU1410-18JUNE18-M	TR5949	B849375	Dissolved Magnesium (Mg)		229	mg/L
QU1101-19MAR19-M	VK1834	B920565	Dissolved Manganese (Mn)		3.25	mg/L
QU1109S-27NOV18-M	UW0397	B8A4251	Dissolved Mercury (Hg)	0.00025	<0.000020	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Molybdenum (Mo)		<0.050	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Nickel (Ni)		<0.050	mg/L
QU0821GS-28MAY18-M	TN8521	B842311	Dissolved Potassium (K)		10	mg/L
QU1105S-12MAR19-R	VI9168	B918176	Dissolved Selenium (Se)	0.02	**0.0636**	mg/L
QU1009D-14JUNE18-M	TQ7294	B847743	Dissolved Silicon (Si)		9.73	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Silver (Ag)		<0.0010	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Sodium (Na)		1930	mg/L
QU1010D-29MAY18-M	TN5354	B841665	Dissolved Strontium (Sr)		6.22	mg/L
QU1410-19APR18-M	TH5881	B829696	Dissolved Sulphur (S)		711	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Thallium (Tl)	0.003	0.00092	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Tin (Sn)		<0.25	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Titanium (Ti)	1	<0.25	mg/L
MW006S-20AUG18-M	UC9952	B870604	Dissolved Uranium (U)	0.085	0.00657	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Vanadium (V)		<0.25	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Dissolved Zirconium (Zr)		<0.0050	mg/L
MW002-7MAR19-M	VI3580	B916980	Total Hardness (CaCO3)		1220	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Aluminum (Al)		28.5	mg/L
QU1136S-27FEB19-M	VH3655	B914784	Total Antimony (Sb)		0.0252	mg/L
QU1136S-27FEB19-M	VH3655	B914784	Total Arsenic (As)		2.21	mg/L
QU1128-6MAR19-M	VI3579	B916980	Total Barium (Ba)		0.676	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Beryllium (Be)		0.00393	mg/L
QU12065-28MAR19-M	VL2356	B922898	Total Bismuth (Bi)		<0.0050	mg/L
QU12065-28MAR19-M	VL2356	B922898	Total Boron (B)		1.78	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Cadmium (Cd)		0.000677	mg/L
MW002-7MAR19-M	VI3580	B916980	Total Calcium (Ca)		415	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Chromium (Cr)		0.0262	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Cobalt (Co)		0.0241	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Copper (Cu)		0.133	mg/L
QU1136S-27FEB19-M	VH3655	B914784	Total Iron (Fe)		69.5	mg/L

Legend

Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells for dissolved metals.	**BC CSR Aquatic Life 2019 - LOW LEVeL**

Table 175
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Maximum Values Summary Table

Sample ID	Maxxam Labs Sample ID	Maxxam Labs Job ID	Parameter	Criteria [1]	Result	Units
QU1118S-28MAR19-M	VL2357	B922898	Total Lead (Pb)	0.04	0.0312	mg/L
1M7S-12JUL18-M	TV9661	B857925	Total Lithium (Li)		0.0568	mg/L
MW002-7MAR19-M	VI3580	B916980	Total Magnesium (Mg)		45.6	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Manganese (Mn)		2.14	mg/L
QU12065-28MAR19-M	VL2356	B922898	Total Molybdenum (Mo)	10	<0.0050	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Nickel (Ni)	0.25	0.0322	mg/L
1M2N-19MAR19-M	VK1831	B920565	Total Potassium (K)		6.57	mg/L
QU12065-28MAR19-M	VL2356	B922898	Total Selenium (Se)	0.02	<0.00050	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Silicon (Si)		44.4	mg/L
QU12065-28MAR19-M	VL2356	B922898	Total Silver (Ag)	0.0005	<0.00010	mg/L
1M2N-19MAR19-M	VK1831	B920565	Total Sodium (Na)		471	mg/L
MW002-7MAR19-M	VI3580	B916980	Total Strontium (Sr)		3.89	mg/L
MW002-7MAR19-M	VI3580	B916980	Total Sulphur (S)		407	mg/L
242MW-11SEP18-M	UH4187	B878455	Total Thallium (Tl)		0.000201	mg/L
QU12065-28MAR19-M	VL2356	B922898	Total Tin (Sn)		<0.025	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Titanium (Ti)		0.346	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Uranium (U)		0.00523	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Vanadium (V)		0.082	mg/L
1M2N-23MAY18-M	TM5036	B839824	Total Zinc (Zn)		0.122	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Zirconium (Zr)		0.00205	mg/L
QU11-09S-21JUNE18-M	TS1970	B850438	Alkalinity (PP as CaCO3)		13.8	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Alkalinity (Total as CaCO3)		600	mg/L
QU1013D-17DEC18-M	UZ0847	B8B0153	Bicarbonate (HCO3)		732	mg/L
QU11-09S-21JUNE18-M	TS1970	B850438	Carbonate (CO3)		16.6	mg/L
QU1101-19MAR19-M	VK1834	B920565	Acidity (pH 8.3)		140	mg/L
QU1010D-28NOV18-M	UW5084	B8A5198	Dissolved Chloride (Cl)	1500	**3400**	mg/L
QU1008D-21MAR19-M	VK3148	B920859	Fluoride (F)	2	**2.4**	mg/L
QU1410-15MAY18-M	TL1587	B837597	Dissolved Sulphate (SO4)		2000	mg/L
1M7S-12JUL18-M	TV9661	B857925	Total Ammonia (N)		0.047	mg/L
QU1128-6MAR19-M	VI3579	B916980	Dissolved Nitrogen (N)		1.38	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Nitrate plus Nitrite (N)	400	0.07	mg/L
MW004-24APR18-M	TI0908	B830882	Dissolved Organic Carbon (C)		26.3	mg/L
QU1105S-12MAR19-R	VI9168	B918176	Total Sulphide	0.0188	**42**	mg/L
QU1105S-12MAR19-R	VI9168	B918176	Sulphide (as H2S)		45	mg/L
QU1105D-11JUNE18-M	TQ1904	B846832	Total Sulphide (as H2S)	0.002	**14**	mg/L
QU1105D-11DEC18-R	UY4714	B8A8837	Dissolved Phosphorus (P)		0.677	mg/L
1M2N-19MAR19-M	VK1831	B920565	Total Phosphorus (P)		0.0086	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Turbidity		2540	NTU
QU1118S-28MAR19-M	VL2357	B922898	Total Suspended Solids		3630	mg/L
QU1010D-28NOV18-M	UW5084	B8A5198	Dissolved Bromide (Br)		4.7	mg/L
QU1128-6MAR19-M	VI3579	B916980	Total Ammonia (N)	1.31	1.3	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Phosphorus (P)		1.32	mg/L
QU1105D-11JUNE18-M	TQ1904	B846832	Dissolved Phosphorus (P)		0.37	mg/L
QU0821GS-22NOV18-M	UV3663	B8A3046	Dissolved Organic Carbon (C)		17	mg/L
7SA5C-12DEC18-M	UY7071	B8A9340	Nitrite (N)	0.2	0.0194	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Nitrate (N)	400	0.06	mg/L
QU1118S-28MAR19-M	VL2357	B922898	Total Organic Carbon (C)		<10	mg/L
QU1128-6MAR19-M	VI3579	B916980	Total Nitrogen (N)		1.47	mg/L
QU1128-6MAR19-M	VI3579	B916980	Alkalinity (PP as CaCO3)		<10	mg/L
QU1128-6MAR19-M	VI3579	B916980	Alkalinity (Total as CaCO3)		250	mg/L
QU1128-6MAR19-M	VI3579	B916980	Bicarbonate (HCO3)		300	mg/L
QU1128-6MAR19-M	VI3579	B916980	Carbonate (CO3)		<10	mg/L
QU1128-6MAR19-M	VI3579	B916980	Hydroxide (OH)		<10	mg/L
7SA54XC-25MAR19-M	VK8430	B922110	Total Dissolved Solids		174	mg/L

Legend

Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 176
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Summary of Groundwater Samples Collected and Parameters Analyzed in 2018-2019

Samples					*Summary*						
Borehole or Well Area	*Sample ID*	*Sample Collection Date*	*Maxxam Labs Job ID*	*Maxxam Labs Sample ID*	**Water**	PAHs - Water	Diss Metals - Water	Tot Metals - Water	Inorganic - Water	**Others**	Others
7-S Mine Water Pumped to 5-S Mine Pool- In-situ	1M7S-09JAN19-M	9-Jan-19	B902649	VB7261			×		×		×
	1M7S-09JAN19-M Lab-Dup	9-Jan-19	B902649	VB7261					×		
	1M7S-09OCT18-M	9-Oct-18	B888275	UN0471			×	×	×		×
	1M7S-12APR18-M	12-Apr-18	B827653	TG7247			×	×	×		×
	1M7S-12APR18-M Lab-Dup	12-Apr-18	B827653	TG7247			×		×		×
	1M7S-12JUL18-M	12-Jul-18	B857925	TV9661			×	×	×		×
	1M7S-12JUL18-M Lab-Dup	12-Jul-18	B857925	TV9661				×	×		
5-S Mine Water Pumped to 2-N Mine Pool - In-situ	5SMW-03DEC18-M	3-Dec-18	B8A6041	UW9541			x	x	x		x
	5SMW-28FEB19-M	28-Feb-19	B914999	VH4766			x	x	x		x
	5SMW-28FEB19-M Lab-Dup	28-Feb-19	B914999	VH4766							x
	5SMW-30AUG18-M	30-Aug-18	B875548	UF7895			x	x	x		x
	5SMW-30AUG18-R	30-Aug-18	B875548	UF7896			x	x	x		x
2-N Mine Water Pumped to Brinco Brook- In-situ	1M2N-09OCT18-M	9-Oct-18	B888275	UN0472			×	×	×		×
	1M2N-12FEB19-M	12-Feb-19	B911101	VF6815			×	×	×		×
	1M2N-19MAR19-M	19-Mar-19	B920565	VK1831			×	×	×		×
	1M2N-19MAR19-M Lab-Dup	19-Mar-19	B920565	VK1831			×				
	1M2N-23MAY18-M	23-May-18	B839824	TM5036			×	×	×		×
	1M2N-23MAY18-M Lab-Dup	23-May-18	B839824	TM5036					×		
	1M2N-26APR18-M	26-Apr-18	B831668	TI3950			×	×	×		×
	1M2N-9JUL18-M	9-Jul-18	B856306	TV2223			×	×	×		×
	1M2N-9JUL18-M Lab-Dup	9-Jul-18	B856306	TV2223				×	×		
	5M#2-09OCT18-M	9-Oct-18	B888275	UN0470			×	×	×		×
	5M#2-09OCT18-M Lab-Dup	9-Oct-18	B888275	UN0470			×		×		
	5M#2-09OCT18-R	9-Oct-18	B888275	UN0473			×	×	×		×
	5M#2-12FEB19-M	12-Feb-19	B911101	VF6816			×	×	×		×
	5M#2-12FEB19-M Lab-Dup	12-Feb-19	B911101	VF6816			×		×		
	5M#2-19MAR19-M	19-Mar-19	B920565	VK1832			×	×	×		×
	5M#2-19MAR19-M Lab-Dup	19-Mar-19	B920565	VK1832					×		
	5M#2-23MAY18-M	23-May-18	B839824	TM5037			x	x	x		x
	5M#2-23MAY18-M Lab-Dup	23-May-18	B839824	TM5037			x	x	x		
	5M#2-26APR18-M	26-Apr-18	B831668	TI3951			x	x	x		x
	5M#2-26APR18-M Lab-Dup	26-Apr-18	B831668	TI3951				x	x		
	5M#2-9JUL18-M	9-Jul-18	B856306	TV2224			x	x	x		x
2-N In-situ	QU1013D-14MAR19-M	14-Mar-19	B918963	VJ2997			x		x		x
	QU1013D-14MAR19-M Lab-Dup	14-Mar-19	B918963	VJ2997							x
	QU1013D-14MAR19-R	14-Mar-19	B918963	VJ2996			x		x		x
	QU1013D-17DEC18-M	17-Dec-18	B8B0153	UZ0847			x		x		x
	QU1013D-17DEC18-M	17-Dec-18	B8B0153	VE2002			x				
	QU1013D-17DEC18-M Lab-Dup	17-Dec-18	B8B0153	UZ0847			x		x		
	QU1013D-25JUNE18-M	25-Jun-18	B851378	TS6722			x		x		x
	QU1013D-25JUNE18-M Lab-Dup	25-Jun-18	B851378	TS6722							x
	QU1013D-25JUNE18-R	25-Jun-18	B851378	TS6723			x		x		x
	QU1013D-25JUNE18-R Lab-Dup	25-Jun-18	B851378	TS6723					x		
	QU1013D-25SEP18-M	25-Sep-18	B883650	UK4380			x		x		x
	QU1013D-25SEP18-M Lab-Dup	25-Sep-18	B883650	UK4380			x		x		
242 - Flooded Mine Pool- In-situ	242MW-27FEB19-M	27-Feb-19	B914784	VH3656			×	×	×		×
	242MW-11SEP18-M	11-Sep-18	B878455	UH4187			×	×	×		×
	242MW-11SEP18-M	11-Sep-18	B878455	UJ0386			×				×
	242MW-12DEC18-M	12-Dec-18	B8A8835	UY4703			×		×		×
	242MW-12DEC18-R	12-Dec-18	B8A8835	UY4704			×		×		×
	242MW-12DEC18-R Lab-Dup	12-Dec-18	B8A8835	UY4704			×				
	242MW-12JUNE18-M	12-Jun-18	B846841	TQ1946			×		×		×
	242MW-12JUNE18-M Lab-Dup	12-Jun-18	B846841	TQ1946					×		
Old 242 Portal Sump- In-situ	242PS-05JUN18-M	5-Jun-18	B844466	TO9040			×	×	×		×
	242PS-28MAR19-M	28-Mar-19	B922898	VL2358			×	×	×		×
	242PS-28MAR19-M Lab-Dup	28-Mar-19	B922898	VL2358			×		×		
7-S Area 5 Underground samples - In-situ	7SA54XC-25MAR19-M	25-Mar-19	B922110	VK8430			x	x	x		x
	7SA54XC-25MAR19-M Lab-Dup	25-Mar-19	B922110	VK8430					x		x
	7SA5BRD-26FEB19-M	26-Feb-19	B914784	VH3657			x	x	x		x
	7SA5BRD-26FEB19-M Lab-Dup	26-Feb-19	B914784	VH3657					x		x
	7SA5C-12DEC18-M	13-Dec-18	B8A9340	UY7071			x	x	x		x
	7SA5C-12DEC18-M Lab-Dup	13-Dec-18	B8A9340	UY7071					x		x
	7SA5CRD-26FEB19-M	26-Feb-19	B914784	VH3658			x	x	x		x
2-S Mine Pool In-situ	MW004-10DEC18-M	10-Dec-18	B8A8061	UY0307			x		x		x
	MW004-10DEC18-M Lab-Dup	10-Dec-18	B8A8061	UY0307					x		x
	MW004-24APR18-M	24-Apr-18	B830882	TI0908			x		x		x
	MW004-24APR18-M Lab-Dup	24-Apr-18	B830882	TI0908			x		x		
	MW004-5JUL18-M	5-Jul-18	B855218	TU6907			x		x		x
	MW004-5JUL18-R	5-Jul-18	B855218	TU6906			x		x		x
	MW004-5JUL18-R Lab-Dup	5-Jul-18	B855218	TU6906					x		
	MW004-5SEP18-M	5-Sep-18	B876239	UG2165			x		x		x
	MW004-5SEP18-M Lab-Dup	5-Sep-18	B876239	UG2165					x		
	MW004-7MAR19-M	7-Mar-19	B916980	VI3581			x	x	x		x
2-N (below the plant) Ex-situ	MW001D-20AUG18-M	20-Aug-18	B870604	UC9950			x		x		x
	MW001D-20AUG18-M Lab-Dup	20-Aug-18	B870604	UC9950					x		
	MW001D-20AUG18-R	20-Aug-18	B870604	UC9951			x		x		x
	MW001D-20AUG18-R Lab-Dup	20-Aug-18	B870604	UC9951					x		
	MW001D-21FEB19-M	21-Feb-19	B913115	VG5709			x		x		x
	MW001D-21FEB19-M Lab-Dup	21-Feb-19	B913115	VG5709							x
	MW001D-21FEB19-R	21-Feb-19	B913115	VG5710			x		x		x
	MW001D-21FEB19-R Lab-Dup	21-Feb-19	B913115	VG5710					x		
	MW001S-13AUG18-M	13-Aug-18	B868135	UB6295			x		x		x
	MW001S-13AUG18-M Lab-Dup	13-Aug-18	B868135	UB6295					x		
	MW006D-13AUG18-M	13-Aug-18	B868135	UB6296			x		x		x
	MW006D-13AUG18-M Lab-Dup	13-Aug-18	B868135	UB6296					x		
	MW006D-13MAR19-M	13-Mar-19	B918963	VJ2994			x		x		x
	MW006D-13MAR19-M Lab-Dup	13-Mar-19	B918963	VJ2994			x				
	MW006S-14MAR19-M	14-Mar-19	B918963	VJ2995			x		x		x
	MW006S-20AUG18-M	20-Aug-18	B870604	UC9952			x		x		x
	MW006S-20AUG18-M Lab-Dup	20-Aug-18	B870604	UC9952					x		

Table 177
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Summary of Groundwater Samples Collected and Parameters Analyzed in 2018-2019

Samples					*Summary*						
Borehole or Well Area	*Sample ID*	*Sample Collection Date*	*Maxxam Labs Job ID*	*Maxxam Labs Sample ID*	**Water**	PAHs - Water	Diss Metals - Water	Tot Metals - Water	Inorganic - Water	**Others**	Others
Shallow well beside 3-S Pit Ex-situ	MW002-06DEC18-M	6-Dec-18	B8A7382	UX6521			x		x		x
	MW002-06DEC18-M Lab-Dup	6-Dec-18	B8A7382	UX6521			x		x		
	MW002-22MAY18-M	22-May-18	B839351	TM2525			x		x		x
	MW002-22MAY18-M Lab-Dup	22-May-18	B839351	TM2525					x		x
	MW002-24APR18-M	24-Apr-18	B830882	TI0907			x		x		x
	MW002-24APR18-M Lab-Dup	24-Apr-18	B830882	TI0907					x		
	MW002-4JUL18-M	4-Jul-18	B855019	TU6074			x		x		x
	MW002-4JUL18-M Lab-Dup	4-Jul-18	B855019	TU6074					x		
	MW002-4JUL18-R	4-Jul-18	B855019	TU6075			x		x		x
	MW002-5SEP18-M	5-Sep-18	B876239	UG2164			x		x		x
	MW002-5SEP18-M Lab-Dup	5-Sep-18	B876239	UG2164			x		x		
	MW002-7MAR19-M	7-Mar-19	B916980	VI3580			x	x	x		x
	MW002-7MAR19-M Lab-Dup	7-Mar-19	B916980	VI3580					x		x
7-S Ex-situ	QU0810-13DEC18-M	13-Dec-18	B8A9329	UY6902			x		x		x
	QU0810-13DEC18-M Lab-Dup	13-Dec-18	B8A9329	UY6902			x				
	QU0810-25MAR19-M	25-Mar-19	B922099	VK8272			x		x		x
	QU0810-25MAR19-M Lab-Dup	25-Mar-19	B922099	VK8272			x				
	QU0813A-05JUN18-M	5-Jun-18	B844466	TO9039			x		x		x
	QU0813A-05JUN18-R	5-Jun-18	B844466	TO9041			x		x		x
	QU0813A-05JUN18-R Lab-Dup	5-Jun-18	B844466	TO9041			x		x		
	QU0813A-11SEP18-M	11-Sep-18	B878455	UH4186			x		x		x
	QU0813A-11SEP18-M Lab-Dup	11-Sep-18	B878455	UH4186					x		
	QU0813A-13DEC18-M	13-Dec-18	B8A9340	UY7068			x		x		x
	QU0813A-13DEC18-M Lab-Dup	13-Dec-18	B8A9340	UY7068			x				
	QU0813A-13DEC18-R	13-Dec-18	B8A9340	UY7069			x		x		x
	QU0813A-25MAR19-M	25-Mar-19	B922099	VK8269			x		x		x
	QU0813A-25MAR19-M Lab-Dup	25-Mar-19	B922099	VK8269			x				
	QU0813A-25MAR19-R	25-Mar-19	B922099	VK8270			x		x		x
	QU0813A-25MAR19-R Lab-Dup	25-Mar-19	B922099	VK8270					x		
	QU0813B-05JUN18-M	5-Jun-18	B844466	TO9038			x		x		x
	QU0813B-05JUN18-M Lab-Dup	5-Jun-18	B844466	TO9038					x		
	QU0813B-13DEC18-M	13-Dec-18	B8A9340	UY7070			x		x		x
	QU0813B-25MAR19-M	25-Mar-19	B922099	VK8271			x		x		x
	QU0813B-25MAR19-M Lab-Dup	25-Mar-19	B922099	VK8271							x
2-N Ex-situ	QU1010D-28NOV18-M	28-Nov-18	B8A5198	UW5084			x		x		x
	QU1010D-28NOV18-M Lab-Dup	28-Nov-18	B8A5198	UW5084					x		
	QU1010D-29MAY18-M	29-May-18	B841665	TN5354			x		x		x
	QU1010D-29MAY18-M Lab-Dup	29-May-18	B841665	TN5354					x		
	QU1010S-28NOV18-M	28-Nov-18	B8A5198	UW5082			x		x		x
	QU1010S-28NOV18-R	28-Nov-18	B8A5198	UW5083			x		x		x
	QU1010S-28NOV18-R Lab-Dup	28-Nov-18	B8A5198	UW5083							x
	QU1010S-29MAY18-M	29-May-18	B841665	TN5353			x		x		x
	QU1010S-29MAY18-M Lab-Dup	29-May-18	B841665	TN5353					x		
	QU1011D-12FEB19-M	12-Feb-19	B911101	VF6814			x		x		x
	QU1011S-12FEB19-M	12-Feb-19	B911101	VF6812			x		x		x
	QU1011S-12FEB19-M Lab-Dup	12-Feb-19	B911101	VF6812					x		
	QU1011S-12FEB19-R	12-Feb-19	B911101	VF6813			x		x		x
	QU0821GD-14MAR19-M	14-Mar-19	B918963	VJ2999			x		x		x
	QU0821GD-11JUNE18-M	11-Jun-18	B846843	TQ1965			x		x		x
	QU0821GD-22NOV18-M	22-Nov-18	B8A3046	UV3662			x		x		x
	QU0821GD-22NOV18-M Lab-Dup	22-Nov-18	B8A3046	UV3662					x		
	QU0821GD-29AUG18-M	29-Aug-18	B874648	UF2994			x		x		x
	QU0821GD-29AUG18-M Lab-Dup	29-Aug-18	B874648	UF2994			x				
	QU0821GD-29AUG18-R	29-Aug-18	B874648	UF2995			x		x		x
	QU0821GD-29AUG18-R Lab-Dup	29-Aug-18	B874648	UF2995					x		
	QU0821GS-22NOV18-M	22-Nov-18	B8A3046	UV3663			x		x		x
	QU0821GS-22NOV18-M Lab-Dup	22-Nov-18	B8A3046	UV3663			x		x		
	QU0821GS-28MAY18-M	28-May-18	B842311	TN8521			x		x		x
	QU0821GS-29AUG18-M	29-Aug-18	B874648	UF2996			x		x		x
	QU0821GS-29AUG18-M Lab-Dup	29-Aug-18	B874648	UF2996			x		x		
	QU0821GS-14MAR19-M	14-Mar-19	B918963	VJ2998			x		x		x
4-S Ex-situ	QU1008D-21MAR19-M	21-Mar-19	B920859	VK3148			x		x		x
	QU1008D-29MAR18-M	29-Mar-18	B823846	TE8768			x		x		x
	QU1008D-29MAR18-M Lab-Dup	29-Mar-18	B823846	TE8768					x		
	QU1008D-29MAR18-R	29-Mar-18	B823846	TE8769			x		x		x
	QU1008D-29MAR18-R Lab-Dup	29-Mar-18	B823846	TE8769					x		
	QU1009D-14JUNE18-M	14-Jun-18	B847743	TQ7294			x		x		x
	QU1009D-14JUNE18-M Lab-Dup	14-Jun-18	B847743	TQ7294					x		x
	QU1009D-14JUNE18-R	14-Jun-18	B847743	TQ7295			x		x		x
	QU1009D-19MAR19-M	19-Mar-19	B920565	VK1836			x		x		x
	QU1009D-19MAR19-R	19-Mar-19	B920565	VK1837			x		x		x
	QU1009D-20DEC18-M	20-Dec-18	B8B1299	UZ6912			x		x		x
	QU1009D-20DEC18-M Lab-Dup	20-Dec-18	B8B1299	UZ6912					x		
	QU1009S-14JUNE18-M	14-Jun-18	B847743	TQ7296			x		x		x
	QU1009S-14JUNE18-M Lab-Dup	14-Jun-18	B847743	TQ7296			x				
	QU1009S-14JUNE18-R	14-Jun-18	B847743	TQ7297			x		x		x
	QU1009S-14JUNE18-R Lab-Dup	14-Jun-18	B847743	TQ7297					x		
	QU1009S-20DEC18-M	20-Dec-18	B8B1299	UZ6913			x		x		x
	QU1009S-20DEC18-M Lab-Dup	20-Dec-18	B8B1299	UZ6913					x		
	QU1009S-20DEC18-R	20-Dec-18	B8B1299	UZ6914			x		x		x
	QU1009S-20DEC18-R Lab-Dup	20-Dec-18	B8B1299	UZ6914			x				x
4-S In-situ	QU1101-19MAR19-M	19-Mar-19	B920565	VK1834			x		x		x
	QU1101-19MAR19-M Lab-Dup	19-Mar-19	B920565	VK1834					x		
	QU1101-19MAR19-R	19-Mar-19	B920565	VK1835			x		x		x
	QU1101-29MAR18-M	29-Mar-18	B823846	TE8770			x		x		x

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Summary of Groundwater Samples Collected and Parameters Analyzed in 2018-2019

Samples					Summary						
Borehole or Well Area	*Sample ID*	*Sample Collection Date*	*Maxxam Labs Job ID*	*Maxxam Labs Sample ID*	**Water**	PAHs - Water	Diss Metals - Water	Tot Metals - Water	Inorganic - Water	**Others**	Others
River Barrier Pillar Ex-situ	QU1105D-11DEC18-M	11-Dec-18	B8A8837	UY4711			x		x		x
	QU1105D-11DEC18-R	11-Dec-18	B8A8837	UY4714			x		x		x
	QU1105D-11DEC18-R Lab-Dup	11-Dec-18	B8A8837	UY4714					x		
	QU1105D-11JUNE18-M	11-Jun-18	B846832	TQ1904			x		x		x
	QU1105D-11JUNE18-M Lab-Dup	11-Jun-18	B846832	TQ1904					x		
	QU1105D-12MAR19-M	12-Mar-19	B918176	VI9170			x		x		x
	QU1105D-12MAR19-R	12-Mar-19	B918176	VI9171			x		x		x
	QU1105D-12MAR19-R Lab-Dup	12-Mar-19	B918176	VI9171					x		
	QU1105D-18SEP18-M	18-Sep-18	B881174	UJ0380			x		x		x
	QU1105S-11DEC18-M	11-Dec-18	B8A8837	UY4712			x		x		x
	QU1105S-11DEC18-M Lab-Dup	11-Dec-18	B8A8837	UY4712					x		
	QU1105S-11DEC18-R	11-Dec-18	B8A8837	UY4713			x		x		x
	QU1105S-11JUNE18-M	11-Jun-18	B846832	TQ1903			x		x		x
	QU1105S-12MAR19-M	12-Mar-19	B918176	VI9169			x		x		x
	QU1105S-12MAR19-R	12-Mar-19	B918176	VI9168			x		x		x
	QU1105S-12MAR19-R Lab-Dup	12-Mar-19	B918176	VI9168							x
	QU1105S-18SEP18-M	18-Sep-18	B881174	UJ0378			x		x		x
	QU1105S-18SEP18-M Lab-Dup	18-Sep-18	B881174	UJ0378					x		
	QU1105S-18SEP18-R	18-Sep-18	B881174	UJ0379			x		x		x
	QU1105S-18SEP18-R Lab-Dup	18-Sep-18	B881174	UJ0379					x		
	QU1109S-18MAR19-M	18-Mar-19	B920160	VJ9899			x		x		x
	QU1109S-18MAR19-M Lab-Dup	18-Mar-19	B920160	VJ9899					x		
	QU1109S-18MAR19-R	18-Mar-19	B920160	VJ9901			x		x		x
	QU1109S-21JUNE18-M	21-Jun-18	B850438	TS1970			x		x		x
	QU1109S-21JUNE18-M Lab-Dup	21-Jun-18	B850438	TS1970			x				
	QU1109S-21JUNE18-R	21-Jun-18	B850438	TS1968			x		x		x
	QU11-09S-21JUNE18-R Lab-Dup	21-Jun-18	B850438	TS1968					x		
	QU11-09S-27NOV18-M	27-Nov-18	B8A4251	UW0397			x		x		x
	QU11-09S-27NOV18-M Lab-Dup	27-Nov-18	B8A4251	UW0397					x		
	QU11-09S-30JUL18-M	30-Jul-18	B863627	TZ1091			x		x		x
	QU11-09S-30JUL18-M Lab-Dup	30-Jul-18	B863627	TZ1091					x		
River Barrier Pillar In-situ	QU1109M-16MAY18-M	16-May-18	B838491	TL6687			x		x		x
	QU1109M-16MAY18-M Lab-Dup	16-May-18	B838491	TL6687					x		
	QU1109M-18MAR19-M	18-Mar-19	B920160	VJ9900			x		x		x
	QU1109M-18MAR19-M Lab-Dup	18-Mar-19	B920160	VJ9900			x				x
	QU1109M-18MAR19-R	18-Mar-19	B920160	VJ9902			x		x		x
	QU1109M-18MAR19-R Lab-Dup	18-Mar-19	B920160	VJ9902					x		
	QU1109M-21JUNE18-M	21-Jun-18	B850438	TS1969			x		x		x
	QU1109M-21JUNE18-M Lab-Dup	21-Jun-18	B850438	TS1969							x
	QU1109M-23APR18-M	23-Apr-18	B830402	TH8947			x		x		x
	QU1109M-23APR18-M Lab-Dup	23-Apr-18	B830402	TH8947					x		x
	QU11-09M-27NOV18-M	27-Nov-18	B8A4251	UW0398			x		x		x
	QU1109M-27NOV18-M Lab-Dup	27-Nov-18	B8A4251	UW0398					x		
	QU1109M-30JUL18-M	30-Jul-18	B863627	TZ1092			x		x		x
	QU1109M-30JUL18-R	30-Jul-18	B863627	TZ1090			x		x		x
	QU1109M-30JUL18-R Lab-Dup	30-Jul-18	B863627	TZ1090					x		
7S-Area 5 Ex-situ	QU1118D-26MAR19-M	26-Mar-19	B922110	VK8431			x	x	x		x
	QU1118D-26MAR19-M Lab-Dup	26-Mar-19	B922110	VK8431					x		x
	QU1118S-28MAR19-M	28-Mar-19	B922898	VL2357			x	x	x		x
	QU1118S-28MAR19-M Lab-Dup	28-Mar-19	B922898	VL2357			x				
	QU1128-6MAR19-M	6-Mar-19	B916980	VI3579			x	x	x		x
	QU1128-6MAR19-M Lab-Dup	6-Mar-19	B916980	VI3579					x		x
	QU1136D-27FEB19-M	27-Feb-19	B914784	VH3653			x	x	x		x
	QU1136D-27FEB19-R	27-Feb-19	B914784	VH3654			x	x	x		x
	QU1136S-27FEB19-M	27-Feb-19	B914784	VH3655			x	x	x		x
	QU1136S-27FEB19-M Lab-Dup	27-Feb-19	B914784	VH3655			x				
	QU1206S-28MAR19-M	28-Mar-19	B922898	VL2356			x	x	x		x
	QU1206S-28MAR19-M Lab-Dup	28-Mar-19	B922898	VL2356					x		
7S In-situ	QU1410-03DEC18-M	3-Dec-18	B8A6044	UW9543			x		x		x
	QU1410-03DEC18-M Lab-Dup	3-Dec-18	B8A6044	UW9543			x		x		
	QU1410-15MAY18-M	15-May-18	B837597	TL1587			x		x		x
	QU1410-15MAY18-M Lab-Dup	15-May-18	B837597	TL1587			x		x		
	QU1410-15MAY18-R	15-May-18	B837597	TL1586			x		x		x
	QU1410-18JUNE18-M	18-Jun-18	B849375	TR5949			x		x		x
	QU1410-18JUNE18-M Lab-Dup	18-Jun-18	B849375	TR5949					x		
	QU1410-18JUNE18-R	18-Jun-18	B849375	TR5948			x		x		x
	QU1410-18JUNE18-R Lab-Dup	18-Jun-18	B849375	TR5948					x		x
	QU1410-19APR18-M	19-Apr-18	B829696	TH5881			x		x		x
	QU1410-19APR18-R	19-Apr-18	B829696	TH5880			x		x		x
	QU1410-19APR18-R Lab-Dup	19-Apr-18	B829696	TH5880			x				x
	QU1410-23JUL18-M	23-Jul-18	B861068	TX6942			x		x		x
	QU1410-23JUL18-M Lab-Dup	23-Jul-18	B861068	TX6942					x		
	QU1410-24SEP18-M	24-Sep-18	B882926	UK0566			x		x		x
	QU1410-24SEP18-M Lab-Dup	24-Sep-18	B882926	UK0566			x		x		
	QU1410-26FEB19-M	26-Feb-19	B914369	VH1672			x		x		x
	QU1410-26FEB19-M Lab-Dup	26-Feb-19	B914369	VH1672			x				
	QU1410-26FEB19-R	26-Feb-19	B914369	VH1673			x		x		x
	QU1410-26FEB19-R Lab-Dup	26-Feb-19	B914369	VH1673			x				
	QU1410-28AUG18-M	28-Aug-18	B873571	UE7144			x		x		x
	QU1410-28AUG18-M Lab-Dup	28-Aug-18	B873571	UE7144			x		x		
	QU1410-29OCT18-M	29-Oct-18	B896119	UR6045			x		x		x
	QU1410-29OCT18-M Lab-Dup	29-Oct-18	B896119	UR6045					x		
	QU1410-30JAN19-M	30-Jan-19	B908125	VE3038			x		x		x
	QU1410-30JAN19-M Lab-Dup	30-Jan-19	B908125	VE3038					x		x

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	Sample ID	1M2N-26APR18-M	1M2N-23MAY18-M	1M2N-9JUL18-M	1M2N-09OCT18-M	1M2N-12FEB19-M	1M2N-19MAR19-M	1M2N-19MAR19-M Lab-Dup
			Lab Job ID / Sample ID	B831668 / TI3950	B839824 / TM5036	B856306 / TV2223	B888275 / UN0472	B911101 / VF6815	B920565 / VK1831	B920565 / VK1831
			Date	26-Apr-18	23-May-18	9-Jul-18	9-Oct-18	12-Feb-19	19-Mar-19	19-Mar-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	323	326	327	332	561	557	-
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.015	<0.015	<0.0030	<0.0030	<0.015	<0.015	<0.015
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0025	<0.0025	<0.00050	<0.00050	<0.0025	<0.0025	<0.0025
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.00717	0.00702	0.0085	0.0104	0.00477	0.00811	0.00795
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0286	0.0261	0.0269	0.0319	0.0315	0.0314	0.0306
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.92	1.08	1.06	1.01	1.16	1.09	1.06
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000025	<0.000025	<0.0000050	<0.0000050	<0.000025	<0.000025	<0.000025
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	112	114	114	115	193	192	-
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.00020	<0.00020	<0.0010	<0.0010	<0.0010
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.00020	<0.00020	0.0012	<0.0010	<0.0010
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	3.06	3.54	3.66	3.52	6.69	7.77	7.37
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.00020	<0.00020	<0.0010	<0.0010	<0.0010
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.012	0.012	0.0125	0.0142	0.015	0.014	0.013
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	10.6	10.1	10.7	11.1	19	19.1	-
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.367	0.348	0.352	0.331	0.638	0.737	0.705
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000039	<0.0000020	-
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050
Dissolved Potassium (K)		mg/L	0.050 - 2.5	5.04	5.08	5.44	5.41	6.39	6.84	-
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00050	0.00051	<0.00050
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.28	2.86	3.46	3.68	3.44	3.53	3.31
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00010	<0.00010	<0.000020	<0.000020	<0.00010	<0.00010	<0.00010
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	336	332	349	340	444	478	-
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	1.23	1.1	1.1	1.09	2.12	2.03	1.95
Dissolved Sulphur (S)		mg/L	3.0 - 150	211	190	228	234	361	388	-
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.0050	<0.025	<0.025	<0.025
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.0050	<0.025	<0.025	<0.025
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.0050	<0.025	<0.025	<0.025
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.0050	<0.025	<0.025	<0.025
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	1M7S-12APR18-M	1M7S-12APR18-M Lab-Dup	1M7S-12JUL18-M	1M7S-09OCT18-M	1M7S-09JAN19-M	242MP-27FEB19-M	242MW-11SEP18-M
			Lab Job ID / Sample ID	B827653 / TG7247	B827653 / TG7247	B857925 / TV9661	B888275 / UN0471	B902649 / VB7261	B914784 / VH3656	B878455 / UH4187
			Date	12-Apr-18	12-Apr-18	12-Jul-18	9-Oct-18	9-Jan-19	27-Feb-19	11-Sep-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	345	-	515	607	278	112	101
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.0030	<0.0030	0.0032	<0.0030	0.009	<0.0030	<0.0030
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	0.00073	0.0012	0.00098	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.0168	0.0166	0.00186	0.0166	0.0783	0.0496	0.00192
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0498	0.0497	0.0589	0.055	0.0713	0.0744	0.0311
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.4	0.406	0.556	0.598	0.403	0.084	0.075
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	0.000006	0.000006	0.0000233	0.000024	0.000006	<0.0000050	0.000018
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	103	-	150	179	85.3	39	37.4
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	0.00101	0.001	0.00485	0.00658	0.00231	0.00298	0.00157
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	0.00025	0.00027	0.0003	0.00028	0.00054	<0.00020	0.00062
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.0232	0.023	0.0633	0.0109	0.0111	6.71	3.51
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0371	0.0378	0.0548	0.0497	0.032	0.0082	0.0043
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	21.1	-	34.4	38.7	15.9	3.6	1.77
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.0813	0.0812	0.287	0.253	0.142	0.666	0.239
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	-	<0.0000020	0.0000025	<0.0000020	<0.0000020	0.0000032
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	0.001	0.0011	0.0011	0.0012	0.0036	<0.0010	<0.0010
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	0.0039	0.004	0.01	0.0129	0.0055	0.0024	0.0046
Dissolved Potassium (K)		mg/L	0.050 - 2.5	2.15	-	2.82	3.29	2.63	0.531	0.426
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	0.00012	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.22	3.19	2.98	3.82	3.67	3.67	3.44
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	14.6	-	18.7	20.6	22.5	4.16	1.45
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.762	0.772	1.26	1.15	0.587	0.0896	0.0474
Dissolved Sulphur (S)		mg/L	3.0 - 150	81.7	-	143	180	66.8	11.4	22.5
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	0.000025	0.000024	0.000053	0.000035	0.000013	0.000031	0.000172
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	0.0001	<0.00010	0.00018	0.00019	0.00016	<0.00010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	0.0202	0.0205	0.0069	0.011	<0.0050	<0.0050	0.0102
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater										
Parameter	***Criteria*** [1]	***Units***	**Sample ID**	242MW-11SEP18-M	242MW-12DEC18-M	242MW-12DEC18-R	242MW-12DEC18-R Lab-Dup	242MW-12JUNE18-M	242PS-05JUN18-M	242PS-28MAR19-M
			Lab Job ID / Sample ID	B878455 / UJ0386	B8A8835 / UY4703	B8A8835 / UY4704	B8A8835 / UY4704	B846841 / TQ1946	B844466 / TO9040	B922898 / VL2358
			Date	11-Sep-18	12-Dec-18	12-Dec-18	12-Dec-18	12-Jun-18	5-Jun-18	28-Mar-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	99.6	116	116	-	120	92.7	84.5
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	0.0047	0.0101	0.0104	0.0093	<0.0030	0.0142	0.0158
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.00173	0.0735	0.0719	0.0731	0.052	0.0038	0.00651
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.03	0.0723	0.0703	0.0723	0.0671	0.0338	0.0372
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.07	0.096	0.093	0.094	0.083	0.084	0.054
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	0.0000151	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	36.6	39.9	40	-	41.6	31.3	28.3
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	0.00161	0.003	0.00296	0.00295	0.00446	0.00034	0.00509
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	0.00162	<0.00020	0.00075	0.00075	<0.00020	0.00091	<0.00020
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	3.73	9.51	9.49	9.38	7.44	0.159	1.22
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0046	0.0072	0.0071	0.0071	0.0064	<0.0020	<0.0020
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	2.01	3.96	3.91	-	3.84	3.5	3.33
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.25	0.891	0.879	0.895	0.879	0.0944	0.777
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	-	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	0.0048	0.0023	0.0023	0.0023	0.0026	<0.0010	0.0014
Dissolved Potassium (K)		mg/L	0.050 - 2.5	0.444	0.587	0.63	-	0.541	0.663	0.563
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.86	3.35	3.35	3.35	3.59	1.86	2.77
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	1.55	4.59	4.64	-	4.31	2.92	2.68
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.0497	0.107	0.106	0.106	0.0864	0.0778	0.0759
Dissolved Sulphur (S)		mg/L	3.0 - 150	26.2	11	11	-	11.9	21.7	18.8
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	0.000182	0.000025	0.000023	0.000024	0.000026	0.00002	0.000018
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	0.011	<0.0050	<0.0050	0.0051	0.0087	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	242PS-28MAR19-M Lab-Dup	5M#2-09OCT18-M	5M#2-09OCT18-M Lab-Dup	5M#2-09OCT18-R	5M#2-12FEB19-M	5M#2-12FEB19-M Lab-Dup	5M#2-19MAR19-M
			Lab Job ID / Sample ID	B922898 / VL2358	B888275 / UN0470	B888275 / UN0470	B888275 / UN0473	B911101 / VF6816	B911101 / VF6816	B920565 / VK1832
			Date	28-Mar-19	9-Oct-18	9-Oct-18	9-Oct-18	12-Feb-19	12-Feb-19	19-Mar-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	-	127	-	127	175	-	155
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	0.0157	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.00648	0.00721	0.00718	0.0075	0.0074	0.00725	0.0074
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0376	0.0283	0.0294	0.0283	0.0323	0.0317	0.0292
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.055	0.818	0.814	0.872	0.891	0.891	0.837
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	-	45.6	-	45.4	61.3	-	54.4
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	0.00508	<0.00020	<0.00020	<0.00020	0.00031	0.00031	0.00024
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	0.00023	0.00023	0.00021
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	1.21	0.216	0.219	0.299	0.506	0.493	0.447
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	<0.0020	0.0037	0.0039	0.0041	0.008	0.0079	0.0086
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	-	3.23	-	3.31	5.29	-	4.62
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.774	0.0602	0.0602	0.061	0.115	0.115	0.101
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	-	<0.0000020	0.0000027	-	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	-	2.57	-	2.56	2.78	-	2.69
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	2.8	3.48	3.52	3.62	2.65	2.7	3.23
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	-	255	-	258	275	-	259
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.0763	0.431	0.428	0.432	0.725	0.718	0.665
Dissolved Sulphur (S)		mg/L	3.0 - 150	-	54.5	-	51.8	102	-	84.4
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	0.000019	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	5M#2-23MAY18-M	5M#2-23MAY18-M Lab-Dup	5M#2-26APR18-M	5M#2-9JUL18-M	5SMW-03DEC18-M	5SMW-28FEB19-M	5SMW-30AUG18-M
			Lab Job ID / Sample ID	B839824 / TM5037	B839824 / TM5037	B831668 / TI3951	B856306 / TV2224	B8A6041 / UW9541	B914999 / VH4766	B875548 / UF7895
			Date	23-May-18	23-May-18	26-Apr-18	9-Jul-18	3-Dec-18	28-Feb-19	30-Aug-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	124	-	117	133	189	153	118
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.0030	0.0035	<0.015	<0.0030	0.0084	0.0073	0.0037
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.0025	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.00558	0.00551	0.00385	0.00784	0.00952	0.0031	0.00225
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0277	0.0278	0.0262	0.0296	0.0365	0.0356	0.0265
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.82	0.857	0.79	0.963	0.992	0.9	0.842
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.0000050	<0.000025	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	44	-	41.3	47.3	61.9	49.1	39
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.0010	<0.00020	0.0007	0.00324	0.00057
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	0.00033	0.00041	<0.0010	<0.00020	0.00051	0.0002	<0.00020
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.365	0.369	0.34	0.419	4.26	6.71	6.52
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0066	0.0067	<0.010	0.0049	0.0146	0.0133	0.0128
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	3.44	-	3.46	3.64	8.3	7.52	4.99
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.0538	0.0526	0.0523	0.0649	0.165	0.187	0.15
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	-	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0050	<0.0010	0.0024	0.0019	0.0019
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0050	<0.0010	0.0015	0.0052	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	2.42	-	2.42	2.62	5.77	4.95	4.14
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	2.67	2.66	2.81	3.21	3.45	2.78	2.73
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	245	-	248	258	262	224	165
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.485	0.479	0.451	0.478	0.739	0.735	0.502
Dissolved Sulphur (S)		mg/L	3.0 - 150	55.8	-	60	59.7	119	94.7	68.1
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	0.0139	0.0137	<0.025	0.0096	<0.0050	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	5SMW-30AUG18-R	7SA5-12DEC18-M	7SA5-26FEB19-M	7SA5-26FEB19-M	7SA5-25MAR19-M	MW001D-20AUG18-M	MW001D-20AUG18-R
			Lab Job ID / Sample ID	B875548 / UF7896	B8A9340 / UY7071	B914784 / VH3657	B914784 / VH3658	B922110 / VK8430	B870604 / UC9950	B870604 / UC9951
			Date	30-Aug-18	13-Dec-18	26-Feb-19	26-Feb-19	25-Mar-19	20-Aug-18	20-Aug-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	119	112	124	129	110	23.7	21.6
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	0.0034	0.0045	<0.0030	<0.0030	<0.0030	0.0354	0.0327
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.00226	0.271	0.34	0.259	0.311	0.0215	0.0212
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0268	0.332	0.239	0.565	0.174	0.0039	0.0036
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.829	0.409	0.667	0.458	0.521	0.08	0.08
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	39.2	34.7	38.5	39.8	33.6	9.02	8.48
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	0.00056	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	0.00118	0.00123
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	6.43	0.222	0.0251	0.0055	0.13	0.0058	<0.0050
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0129	0.0376	0.0437	0.0435	0.0453	<0.0020	<0.0020
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	5.16	6.25	6.9	7.27	6.28	0.291	0.108
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.152	0.0345	0.0203	0.0289	0.0182	0.0061	0.0057
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	0.0019	0.0044	<0.0010	<0.0010	<0.0010	0.011	0.0112
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	4.27	2.14	2.5	2.4	2.02	0.608	0.566
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	2.72	4.36	7.87	4.64	4.44	2.75	2.7
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	166	22.8	27.1	19.8	25.9	43.5	41.2
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.506	0.382	0.483	0.452	0.432	0.0393	0.0318
Dissolved Sulphur (S)		mg/L	3.0 - 150	69.1	<3.0	3.1	<3.0	<3.0	9	9.5
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00079	0.00079
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0063	0.0061
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater										
Parameter	***Criteria*** [1]	***Units***	**Sample ID**	MW001D-21FEB19-M	MW001D-21FEB19-R	MW001S-13AUG18-M	MW002-06DEC18-M	MW002-06DEC18-M Lab-Dup	MW002-22MAY18-M	MW002-24APR18-M
			Lab Job ID / Sample ID	B913115 / VG5709	B913115 / VG5710	B868135 / UB6295	B8A7382 / UX6521	B8A7382 / UX6521	B839351 / TM2525	B830882 / TI0907
			Date	21-Feb-19	21-Feb-19	13-Aug-18	6-Dec-18	6-Dec-18	22-May-18	24-Apr-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	22.8	22.2	930	1350	-	1470	1230
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	0.0299	0.0285	<0.0060	<0.0060	<0.0060	<0.015	<0.015
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.0010	<0.0010	<0.0010	<0.0025	<0.0025
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.0212	0.0213	<0.00020	0.00135	0.00131	0.00112	0.00088
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0037	0.004	0.0217	0.0154	0.0145	0.0144	0.0148
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	<0.00050	<0.00050
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.078	0.079	0.43	0.74	0.76	0.7	0.69
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.0000050	0.000104	<0.000010	<0.000010	<0.000025	0.00003
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	8.93	8.72	283	463	-	502	410
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	0.00021	0.00022	0.00075	0.00333	0.00346	0.0042	0.0039
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	0.00083	0.00074	0.00135	<0.00040	<0.00040	<0.0010	<0.0010
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.0091	0.0094	0.059	3.44	3.52	3.54	2.61
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00040	<0.00040	<0.00040	<0.0010	<0.0010
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	<0.0020	<0.0020	<0.0040	0.014	0.0139	0.013	0.012
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	0.109	0.105	54.1	48	-	53.6	48.9
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.0217	0.0219	2.83	1.5	1.53	1.83	1.76
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	0.0000055	0.0000057	<0.0000020	<0.0000020	-	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	0.0107	0.0108	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0010	0.0025	0.002	0.0024	<0.0050	<0.0050
Dissolved Potassium (K)		mg/L	0.050 - 2.5	0.551	0.563	2.06	5.21	-	4.76	4.59
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	<0.00050	<0.00050
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	2.71	2.71	9.09	3.74	3.75	3.68	2.98
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000040	<0.000040	<0.000040	<0.00010	<0.00010
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	41.7	43.4	103	93	-	108	101
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.0309	0.0306	1.51	3.64	3.55	3.36	3.33
Dissolved Sulphur (S)		mg/L	3.0 - 150	9	8.1	271	486	-	469	459
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000020	<0.000020	<0.000020	<0.000050	<0.000050
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.025	<0.025
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.025	<0.025
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	0.00075	0.00079	0.00307	0.00049	0.00047	<0.00050	<0.00050
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	0.0052	<0.010	<0.010	<0.010	<0.025	<0.025
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.025	<0.025
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	<0.00050	<0.00050

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	MW002-4JUL18-M	MW002-4JUL18-R	MW002-5SEP18-M	MW002-5SEP18-M Lab-Dup	MW002-7MAR19-M	MW004-10DEC18-M	MW004-24APR18-M
			Lab Job ID / Sample ID	B855019 / TU6074	B855019 / TU6075	B876239 / UG2164	B876239 / UG2164	B916980 / VI3580	B8A8061 / UY0307	B830882 / TI0908
			Date	4-Jul-18	4-Jul-18	5-Sep-18	5-Sep-18	7-Mar-19	10-Dec-18	24-Apr-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	1190	1290	1320	-	1240	330	337
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.015	<0.015	<0.015	-	0.018	0.0049	0.0075
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0025	<0.0025	<0.0025	-	<0.0025	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.00113	0.0011	0.00115	-	0.00186	0.00027	0.00024
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0133	0.0135	0.015	-	0.0137	0.0223	0.0251
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.71	0.67	0.73	-	0.79	0.246	0.236
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000025	<0.000025	0.000096	-	<0.000025	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	396	439	449	-	425	110	113
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	-	0.0124	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	0.004	0.0038	0.0036	-	0.0041	<0.00020	<0.00020
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.0010	-	0.001	0.00094	0.00081
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	2.89	3.25	3.47	-	4.2	<0.0050	<0.0050
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.012	0.012	0.014	-	0.014	0.0074	0.0082
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	49.5	47.7	49.1	-	44.5	13.1	13
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	1.69	1.59	1.72	-	1.3	0.011	0.0015
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0010	<0.0010
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	-	0.0142	0.0012	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	4.07	3.89	4.4	-	4.09	1.83	1.74
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.03	2.85	3.43	-	3.14	3.19	2.66
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	93.5	89.6	93.4	-	82.3	36.5	36.2
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	3.25	3.13	3.59	-	3.98	0.795	0.892
Dissolved Sulphur (S)		mg/L	3.0 - 150	404	382	447	-	398	115	105
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	-	<0.025	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	-	<0.025	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	-	<0.025	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.025	<0.025	0.063	-	<0.025	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	MW004-24APR18-M Lab-Dup	MW004-5JUL18-M	MW004-5JUL18-R	MW004-5SEP18-M	MW004-7MAR19-M	MW006D-13AUG18-M	MW006D-13MAR19-M
			Lab Job ID / Sample ID	B830882 / TI0908	B855218 / TU6907	B855218 / TU6906	B876239 / UG2165	B916980 / VI3581	B868135 / UB6296	B918963 / VJ2994
			Date	24-Apr-18	5-Jul-18	5-Jul-18	5-Sep-18	7-Mar-19	13-Aug-18	13-Mar-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	-	391	388	421	332	46.8	44.8
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	-	0.0069	0.0054	0.0078	0.0052	0.017	0.016
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	-	0.00033	0.0003	0.00034	0.00065	0.0276	0.027
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	-	0.0315	0.0314	0.034	0.0247	0.0093	0.0097
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	-	0.3	0.298	0.285	0.231	0.052	0.053
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	-	133	131	143	112	17.8	17.1
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	-	<0.00020	<0.00020	0.00025	0.00023	<0.00020	<0.00020
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	-	0.00142	0.00147	0.00187	0.00042	0.00073	0.00116
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	-	0.0077	0.0062	0.0053	0.0117	<0.0050	<0.0050
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	-	0.0085	0.0087	0.0093	0.0074	<0.0020	<0.0020
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	-	14.5	14.6	15.6	12.4	0.55	0.528
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	-	0.0132	0.0142	0.0592	0.0296	0.0011	<0.0010
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	0.0000025	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	-	0.0095	0.0113	<0.0010	<0.0010	0.0035	0.0036
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	-	0.0236	0.0283	0.0026	<0.0010	<0.0010	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	-	1.85	1.88	1.92	1.37	0.674	0.655
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	-	2.67	2.63	2.43	2.52	3.5	3.31
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	-	50.3	51	53.4	32.3	21.6	21
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	-	1.01	1.01	1.14	0.937	0.0814	0.0822
Dissolved Sulphur (S)		mg/L	3.0 - 150	-	117	114	124	94.4	3.9	3.9
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	-	<0.00010	<0.00010	<0.00010	<0.00010	0.00071	0.00073
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater										
Parameter	***Criteria*** [1]	***Units***	**Sample ID**	MW006D-13MAR19-M Lab-Dup	MW006S-14MAR19-M	MW006S-20AUG18-M	QU0810-13DEC18-M	QU0810-13DEC18-M Lab-Dup	QU0810-25MAR19-M	QU0810-25MAR19-M Lab-Dup
			Lab Job ID / Sample ID	B918963 / VJ2994	B918963 / VJ2995	B870604 / UC9952	B8A9329 / UY6902	B8A9329 / UY6902	B922099 / VK8272	B922099 / VK8272
			Date	13-Mar-19	14-Mar-19	20-Aug-18	13-Dec-18	13-Dec-18	25-Mar-19	25-Mar-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	-	400	416	186	-	106	-
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	0.0187	<0.0030	0.0034	<0.0030	<0.0030	0.0031	<0.0030
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.0269	0.00149	0.00167	0.00057	0.0006	**0.454**	**0.456**
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0098	0.0338	0.0342	0.108	0.108	0.0507	0.0493
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.054	0.181	0.172	0.208	0.207	0.293	0.321
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	0.000013	0.0000205	0.000013	0.000008	0.000007	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	-	138	144	58.2	-	32.7	-
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	0.0012	0.00071	0.00101	0.00059	0.00065	<0.00020	<0.00020
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	0.0123	<0.0050	<0.0050	0.178	0.186
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0246	0.0262
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	-	13.2	13.8	9.96	-	5.85	-
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	<0.0010	0.0108	0.0322	0.0027	0.003	0.0761	0.0759
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	-	<0.0000020	<0.0000020	<0.0000020	-	<0.0000020	-
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	0.0037	0.0308	0.0319	0.001	0.0011	0.0022	0.0021
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	-	2.11	2.24	2.06	-	1.35	-
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	0.00028	0.00035	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.4	4.83	4.87	3.93	3.75	4.02	4.39
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	-	139	139	4.36	-	23.2	-
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.0826	0.88	0.862	0.334	0.347	0.268	0.274
Dissolved Sulphur (S)		mg/L	3.0 - 150	-	196	205	4.9	-	14.9	-
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000010	0.000014	0.000014	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	0.00074	0.00601	0.00657	0.00054	0.00052	<0.00010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater										
Parameter	***Criteria*** [1]	***Units***	**Sample ID**	QU0813A-05JUN18-M	QU0813A-05JUN18-R	QU0813A-05JUN18-R Lab-Dup	QU0813A-11SEP18-M	QU0813A-13DEC18-M	QU0813A-13DEC18-M Lab-Dup	QU0813A-13DEC18-R
			Lab Job ID / Sample ID	B844466 / TO9039	B844466 / TO9041	B844466 / TO9041	B878455 / UH4186	B8A9340 / UY7068	B8A9340 / UY7068	B8A9340 / UY7069
			Date	5-Jun-18	5-Jun-18	5-Jun-18	11-Sep-18	13-Dec-18	13-Dec-18	13-Dec-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	116	135	-	119	119	-	120
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.394**	**0.396**	**0.393**	**0.411**	**0.42**	**0.419**	**0.423**
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.256	0.237	0.241	0.238	0.248	0.248	0.253
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.801	0.827	0.821	0.643	0.722	0.713	0.714
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	32.8	40.4	-	34.7	33.7	-	34
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.171	0.209	0.185	0.209	0.197	0.196	0.199
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0523	0.0569	0.0554	0.0449	0.0492	0.0485	0.0481
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	8.35	8.38	-	7.94	8.51	-	8.41
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.0428	0.0435	0.0435	0.0475	0.0387	0.0383	0.0382
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	-	0.0000027	<0.0000020	-	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	1.98	2.06	-	2.04	2.19	-	2.17
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.43	4.21	3.86	3.39	3.69	3.63	3.59
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	43.7	41.5	-	43.5	46.9	-	46.6
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.446	0.433	0.436	0.477	0.483	0.478	0.48
Dissolved Sulphur (S)		mg/L	3.0 - 150	10.8	10.8	-	10.5	12.2	-	12
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU0813A-25MAR19-M	QU0813A-25MAR19-M Lab-Dup	QU0813A-25MAR19-R	QU0813B-05JUN18-M	QU0813B-13DEC18-M	QU0813B-25MAR19-M	QU0821D-14MAR19-M
			Lab Job ID / Sample ID	B922099 / VK8269	B922099 / VK8269	B922099 / VK8270	B844466 / TO9038	B8A9340 / UY7070	B922099 / VK8271	B918963 / VJ2999
			Date	25-Mar-19	25-Mar-19	25-Mar-19	5-Jun-18	13-Dec-18	25-Mar-19	14-Mar-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	115	-	117	148	116	136	328
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.0030	-	<0.0030	0.0039	0.003	0.0049	<0.015
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.0025
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.368**	-	**0.377**	**0.509**	**0.499**	0.00067	**0.155**
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.236	-	0.239	0.0762	0.0526	0.101	2.44
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.707	-	0.767	0.372	0.284	0.208	3.08
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	0.000005	<0.000025
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	32.6	-	34	45.6	35.8	40.7	107
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	-	<0.00020	<0.00020	<0.00020	0.0003	<0.0010
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00020	-	<0.00020	<0.00020	<0.00020	0.0007	<0.0010
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.217	-	0.224	0.272	0.127	<0.0050	0.951
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.0010
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0461	-	0.0485	0.0355	0.0258	<0.0020	0.185
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	8.08	-	7.77	8.28	6.5	8.32	14.6
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.0513	-	0.0529	0.0773	0.0894	0.0956	0.0994
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	-	<0.0010	0.0025	0.0025	0.0016	<0.0050
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	-	<0.0010	<0.0010	<0.0010	0.0011	<0.0050
Dissolved Potassium (K)		mg/L	0.050 - 2.5	2.06	-	2.1	1.58	1.49	2.33	9.29
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	0.00048	-	0.00066	<0.00010	<0.00010	0.0001	<0.00050
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.67	-	3.9	4.12	4.07	3.43	4.18
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.00010
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	43.6	-	44.4	24.9	24.8	4.54	509
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.435	-	0.438	0.369	0.305	0.347	2.27
Dissolved Sulphur (S)		mg/L	3.0 - 150	9.8	-	10	29.5	17.3	5.6	<15
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	-	<0.00010	<0.00010	<0.00010	0.00054	<0.00050
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU0821GD-11JUNE18-M	QU0821GD-22NOV18-M	QU0821GD-29AUG18-M	QU0821GD-29AUG18-M Lab-Dup	QU0821GD-29AUG18-R	QU0821GS-22NOV18-M	QU0821GS-22NOV18-M Lab-Dup
			Lab Job ID / Sample ID	B846843 / TQ1965	B8A3046 / UV3662	B874648 / UF2994	B874648 / UF2994	B874648 / UF2995	B8A3046 / UV3663	B8A3046 / UV3663
			Date	11-Jun-18	22-Nov-18	29-Aug-18	29-Aug-18	29-Aug-18	22-Nov-18	22-Nov-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	73.5	77.1	350	-	346	352	-
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	0.0041	<0.015	0.026	0.022	0.016	<0.015	-
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	-
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.187**	**0.221**	**0.173**	**0.174**	**0.171**	**0.137**	-
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.477	0.434	2.6	2.65	2.61	1.88	-
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	2.19	2.01	3.16	3.23	3.22	2.94	-
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.000025	<0.000025	<0.000025	<0.000025	<0.000025	-
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	22.1	22.7	115	-	114	121	-
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.555	0.621	1.4	1.4	1.38	3.31	-
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.08	0.083	0.188	0.188	0.19	0.1	-
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	4.45	4.97	15.4	-	15	12	-
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.0798	0.119	0.119	0.119	0.116	0.461	-
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	0.0000022	-	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Potassium (K)		mg/L	0.050 - 2.5	4.51	4.48	9.47	-	9.73	8.42	-
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.71	3.49	4.15	4.21	4.17	4.8	-
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	119	151	542	-	531	704	-
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.526	0.563	2.31	2.34	2.32	2.33	-
Dissolved Sulphur (S)		mg/L	3.0 - 150	<3.0	<15	<15	-	<15	<15	-
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.025	<0.025	<0.025	<0.025	<0.025	-
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.025	<0.025	<0.025	<0.025	<0.025	-
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.025	<0.025	<0.025	<0.025	<0.025	-
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	<0.025	<0.025	<0.025	<0.025	<0.025	-
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU0821GS-28MAY18-M	QU0821GS-29AUG18-M	QU0821GS-29AUG18-M Lab-Dup	QU0821S-14MAR19-M	QU1008D-21MAR19-M	QU1008D-29MAR18-M	QU1008D-29MAR18-R
			Lab Job ID / Sample ID	B842311 / TN8521	B874648 / UF2996	B874648 / UF2996	B918963 / VJ2998	B920859 / VK3148	B823846 / TE8768	B823846 / TE8769
			Date	28-May-18	29-Aug-18	29-Aug-18	14-Mar-19	21-Mar-19	29-Mar-18	29-Mar-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	406	67.2	-	68.5	8.43	6.11	6.66
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.015	0.0037	-	0.0067	0.0037	0.135	0.177
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0025	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.159**	**0.289**	-	**0.211**	**0.156**	**0.153**	**0.149**
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	2.78	0.46	-	0.419	0.0269	0.0168	0.0184
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00050	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0050	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	3.27	1.93	-	1.91	2.14	1.8	1.72
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000025	<0.0000050	-	0.0000118	<0.0000050	<0.0000050	0.000005
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	133	19.8	-	20.1	2.92	2.11	2.28
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0050	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.00020	-	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.0010	<0.00020	-	<0.00020	<0.00020	0.00037	<0.00020
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	1.48	0.884	-	0.423	0.145	0.115	0.15
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.00020	-	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.216	0.078	-	0.0811	0.0153	0.0152	0.0151
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	18.2	4.28	-	4.42	0.275	0.204	0.237
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.115	0.0972	-	0.0625	0.205	0.104	0.111
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0050	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0050	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	10	4.29	-	4.19	0.696	0.683	0.708
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00050	<0.00010	-	<0.00010	0.00221	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	4.48	3.29	-	3.7	4.74	6.38	6.08
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00010	<0.000020	-	<0.000020	<0.000020	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	618	125	-	134	134	104	111
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	2.77	0.503	-	0.576	0.0865	0.0548	0.0597
Dissolved Sulphur (S)		mg/L	3.0 - 150	<15	<3.0	-	<3.0	<3.0	3	3.2
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000050	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.025	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.025	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00050	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.025	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.025	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00050	<0.00010	-	<0.00010	0.00011	0.00017	0.00026

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater										
Parameter	***Criteria*** [1]	***Units***	**Sample ID**	QU1009D-14JUNE18-M	QU1009D-14JUNE18-R	QU1009D-19MAR19-M	QU1009D-19MAR19-R	QU1009D-20DEC18-M	QU1009S-14JUNE18-M	QU1009S-14JUNE18-M Lab-Dup
			Lab Job ID / Sample ID	B847743 / TQ7294	B847743 / TQ7295	B920565 / VK1836	B920565 / VK1837	B8B1299 / UZ6912	B847743 / TQ7296	B847743 / TQ7296
			Date	14-Jun-18	14-Jun-18	19-Mar-19	19-Mar-19	20-Dec-18	14-Jun-18	14-Jun-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	169	160	173	173	176	225	-
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.101**	**0.104**	**0.097**	**0.0959**	**0.0883**	**0.0787**	-
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.127	0.125	0.117	0.12	0.113	0.124	-
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.576	0.591	0.38	0.392	0.42	0.067	-
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	50.5	47.4	52.2	52.3	52.5	72.5	-
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	0.0002	<0.00020	<0.00020	<0.00020	<0.00020	-
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0003	-
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.434	0.396	0.724	0.722	0.701	4.77	-
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	-
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0364	0.0362	0.0279	0.0285	0.0338	0.015	-
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	10.5	10.2	10.5	10.3	10.8	10.6	-
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.111	0.11	0.0774	0.0771	0.0618	0.353	-
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Potassium (K)		mg/L	0.050 - 2.5	1.86	1.84	1.58	1.6	1.57	0.782	-
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	9.73	9.03	8.01	8.15	8.96	9.45	-
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	-
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	39.9	40.3	30	29.8	28.9	9.69	-
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.852	0.879	0.873	0.869	0.955	0.259	-
Dissolved Sulphur (S)		mg/L	3.0 - 150	26.4	26.6	24.3	24.2	24.8	40.9	-
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1009S-14JUNE18-R	QU1009S-20DEC18-M	QU1009S-20DEC18-R	QU1009S-20DEC18-R Lab-Dup	QU1010D-28NOV18-M	QU1010D-29MAY18-M	QU1010S-28NOV18-M
			Lab Job ID / Sample ID	B847743 / TQ7297	B8B1299 / UZ6913	B8B1299 / UZ6914	B8B1299 / UZ6914	B8A5198 / UW5084	B841665 / TN5354	B8A5198 / UW5082
			Date	14-Jun-18	20-Dec-18	20-Dec-18	20-Dec-18	28-Nov-18	29-May-18	28-Nov-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	221	223	222	-	1540	1630	86.7
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.0030	<0.0030	<0.0030	<0.0030	0.212	<0.030	0.0039
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.0025	<0.0050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.0786**	**0.073**	**0.0724**	**0.0722**	0.0142	0.0135	**0.113**
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.119	0.129	0.131	0.132	1.2	1.24	0.34
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.0010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.062	0.055	0.051	0.052	0.31	<0.50	0.502
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000025	<0.000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	71.1	71.8	71.3	-	598	632	25
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.0010	<0.0020	<0.00020
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.0010	<0.0020	<0.00020
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	4.66	4.57	4.57	4.61	8.82	8.82	0.175
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.0010	<0.0020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0144	0.013	0.0131	0.0135	<0.010	<0.020	0.0403
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	10.6	10.6	10.7	-	11.2	11.7	5.88
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.349	0.368	0.363	0.374	0.346	0.348	0.0422
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	-	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.010	<0.0010
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.010	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	0.731	0.653	0.661	-	8.33	8.23	3.56
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.0010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	9.24	8.33	8.34	8.41	3.91	3.8	4.21
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.000020	<0.00010	<0.00020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	9.68	8.46	8.5	-	1350	1380	35.8
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.256	0.275	0.273	0.274	5.94	6.22	0.433
Dissolved Sulphur (S)		mg/L	3.0 - 150	39.6	31.5	31.8	-	<15	<30	5.2
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.00010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	<0.050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	<0.050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.0010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	<0.050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	0.0316	<0.0050	<0.0050	<0.0050	<0.025	<0.050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.0010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater										
Parameter	***Criteria*** [1]	***Units***	**Sample ID**	QU1010S-28NOV18-R	QU1010S-29MAY18-M	QU1011D-12FEB19-M	QU1011S-12FEB19-M	QU1011S-12FEB19-R	QU1013D-14MAR19-M	QU1013D-14MAR19-R
			Lab Job ID / Sample ID	B8A5198 / UW5083	B841665 / TN5353	B911101 / VF6814	B911101 / VF6812	B911101 / VF6813	B918963 / VJ2997	B918963 / VJ2996
			Date	28-Nov-18	29-May-18	12-Feb-19	12-Feb-19	12-Feb-19	14-Mar-19	14-Mar-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	86.8	87	210	66.8	66.7	177	177
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.0030	<0.0030	<0.015	0.0035	<0.0030	<0.015	0.0087
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.0025	<0.00050	<0.00050	<0.0025	<0.0010
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.114**	**0.101**	0.00712	0.00156	0.00157	0.00475	0.0046
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.338	0.341	0.423	0.141	0.14	0.0395	0.0397
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00050	<0.00020
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050	<0.0020
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.511	0.574	1.39	0.146	0.152	1.6	1.59
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.0000050	<0.000025	<0.0000050	<0.0000050	<0.000025	<0.000010
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	25	25.5	72.6	19.3	19.6	65.2	65.3
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050	<0.0020
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.0010	<0.00020	<0.00020	<0.0010	<0.00040
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00020	<0.00020	0.0011	<0.00020	<0.00020	<0.0010	<0.00040
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.175	0.21	3.24	0.378	0.375	0.643	0.652
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.0010	<0.00020	<0.00020	<0.0010	<0.00040
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0422	0.0497	0.024	0.0191	0.0191	<0.010	<0.0040
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	5.92	5.65	6.96	4.54	4.33	3.42	3.49
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.0419	0.0417	0.36	0.0521	0.0507	0.219	0.222
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	0.0000061	0.0000028	0.0000058	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050	0.0031
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050	<0.0020
Dissolved Potassium (K)		mg/L	0.050 - 2.5	3.59	3.55	5.11	1.04	1.03	3.85	3.91
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00050	0.0003
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	4.27	4.67	5.05	2.84	2.95	3.57	3.52
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.00010	<0.000020	<0.000020	<0.00010	<0.000040
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	36.4	34.6	454	7.83	7.82	506	519
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.437	0.45	1.08	0.222	0.218	0.808	0.807
Dissolved Sulphur (S)		mg/L	3.0 - 150	4.4	4	<15	<3.0	<3.0	265	269
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000050	<0.000020
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.025	<0.010
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.025	<0.010
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00050	<0.00020
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.025	<0.010
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.025	<0.010
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00050	<0.00020

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1013D-17DEC18-M	QU1013D-25JUNE18-M	QU1013D-25JUNE18-R	QU1013D-25SEP18-M	QU1013D-25SEP18-M Lab-Dup	QU1101-19MAR19-M	QU1101-19MAR19-R
			Lab Job ID / Sample ID	B8B0153 / VE2002	B851378 / TS6722	B851378 / TS6723	B883650 / UK4380	B883650 / UK4380	B920565 / VK1834	B920565 / VK1835
			Date	17-Dec-18	25-Jun-18	25-Jun-18	25-Sep-18	25-Sep-18	19-Mar-19	19-Mar-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	105	244	233	235	-	1100	1090
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	0.0137	<0.015	<0.015	0.0079	0.0062	<0.015	<0.015
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0010	<0.0025	<0.0025	<0.0010	<0.0010	<0.0025	<0.0025
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.00632	0.0067	0.00618	0.00456	0.00476	0.105	0.0976
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0378	0.0272	0.0266	0.0247	0.0246	0.0124	0.0121
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00020	<0.00050	<0.00050	<0.00020	<0.00020	<0.00050	<0.00050
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0020	<0.0050	<0.0050	<0.0020	<0.0020	<0.0050	<0.0050
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	1.22	1.24	1.23	1.04	1.07	1.07	1.01
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000010	<0.000025	<0.000025	<0.000010	<0.000010	<0.000025	<0.000025
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	37.8	86.1	82.3	83.2	-	347	340
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0020	<0.0050	<0.0050	<0.0020	<0.0020	<0.0050	<0.0050
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00040	<0.0010	<0.0010	0.00133	0.00133	<0.0010	<0.0010
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00040	<0.0010	<0.0010	<0.00040	<0.00040	<0.0010	<0.0010
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.386	1.11	1.07	0.751	0.758	198	196
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00040	<0.0010	<0.0010	<0.00040	<0.00040	<0.0010	<0.0010
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	<0.0040	<0.010	<0.010	<0.0040	<0.0040	0.055	0.053
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	2.65	7	6.58	6.59	-	56.1	58.9
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.323	0.478	0.467	0.886	0.888	3.25	3.21
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	-	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	0.0031	<0.0050	<0.0050	<0.0020	<0.0020	<0.0050	<0.0050
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0020	<0.0050	<0.0050	<0.0020	<0.0020	<0.0050	<0.0050
Dissolved Potassium (K)		mg/L	0.050 - 2.5	3.14	4.37	4.23	4.17	-	6.39	6.55
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00020	<0.00050	<0.00050	<0.00020	<0.00020	<0.00050	<0.00050
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.23	3.94	3.7	3.5	3.45	5.32	5.49
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000040	<0.00010	<0.00010	<0.000040	<0.000040	<0.00010	<0.00010
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	375	438	439	417	-	124	125
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.483	0.903	0.859	0.808	0.783	1.95	1.97
Dissolved Sulphur (S)		mg/L	3.0 - 150	56.8	227	220	208	-	513	504
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000020	<0.000050	<0.000050	<0.000020	<0.000020	<0.000050	<0.000050
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.010	<0.025	<0.025	<0.010	<0.010	<0.025	<0.025
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.010	<0.025	<0.025	<0.010	<0.010	<0.025	<0.025
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	0.00026	<0.00050	<0.00050	0.00022	0.00022	<0.00050	<0.00050
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.010	<0.025	<0.025	<0.010	<0.010	<0.025	<0.025
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.010	<0.025	<0.025	<0.010	<0.010	<0.025	<0.025
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00020	<0.00050	<0.00050	<0.00020	<0.00020	<0.00050	<0.00050

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 197
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Dissolved Metals- Groundwater										
Parameter	***Criteria*** [1]	***Units***	**Sample ID**	QU1101-29MAR18-M	QU1105D-11DEC18-M	QU1105D-11DEC18-R	QU1105D-11JUNE18-M	QU1105D-12MAR19-M	QU1105D-12MAR19-R	QU1105D-18SEP18-M
			Lab Job ID / Sample ID	B823846 / TE8770	B8A8837 / UY4711	B8A8837 / UY4714	B846832 / TQ1904	B918176 / VI9170	B918176 / VI9171	B881174 / UJ0380
			Date	29-Mar-18	11-Dec-18	11-Dec-18	11-Jun-18	12-Mar-19	12-Mar-19	18-Sep-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	1170	374	373	398	72.5	72.2	367
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.030	0.0243	0.0254	<0.015	<0.0030	<0.0030	<0.015
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0050	<0.00050	<0.00050	<0.0025	<0.00050	<0.00050	<0.0025
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.156	0.0139	0.0202	0.0127	0.0214	0.0218	0.0192
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.014	0.349	0.348	0.301	0.0855	0.0853	0.297
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.0010	<0.00010	<0.00010	<0.00050	<0.00010	<0.00010	<0.00050
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	1.15	0.47	0.527	0.49	0.43	0.421	0.52
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000050	<0.0000050	<0.0000050	<0.000025	<0.0000050	<0.0000050	<0.000025
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	398	141	141	152	21.9	22	139
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.0020	<0.00020	<0.00020	<0.0010	<0.00020	<0.00020	<0.0010
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.0020	<0.00020	<0.00020	<0.0010	<0.00020	<0.00020	<0.0010
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	132	0.0075	0.0069	<0.025	0.201	0.206	<0.025
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0020	<0.00020	<0.00020	<0.0010	<0.00020	<0.00020	<0.0010
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.085	0.0022	0.0023	<0.010	0.0246	0.0244	<0.010
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	43	4.93	5.03	4.76	4.31	4.21	4.56
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	2.48	0.153	0.151	0.14	0.0837	0.083	0.233
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0050
Dissolved Potassium (K)		mg/L	0.050 - 2.5	6.51	5.12	5.11	5.35	1.81	1.86	4.77
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.0010	<0.00050	0.00172	<0.00050	0.00022	0.00021	<0.00050
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	5.7	4.46	4.45	4.88	2.53	2.57	4.62
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00020	<0.000020	<0.000020	<0.00010	<0.000020	<0.000020	<0.00010
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	121	970	971	827	53.8	53.7	839
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	1.77	1.71	1.73	1.62	0.243	0.244	1.57
Dissolved Sulphur (S)		mg/L	3.0 - 150	487	73.6	61.3	106	26.7	26.6	95
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.00010	0.000016	<0.000010	<0.000050	<0.000010	<0.000010	<0.000050
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.050	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.025
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.050	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.025
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.0010	0.0004	0.00042	<0.00050	<0.00010	<0.00010	<0.00050
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.050	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.025
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.050	<0.0050	<0.0050	<0.025	<0.0050	<0.0050	<0.025
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.0010	0.00039	0.00039	<0.00050	<0.00010	<0.00010	<0.00050

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1105S-11DEC18-M	QU1105S-11DEC18-R	QU1105S-11JUNE18-M	QU1105S-12MAR19-M	QU1105S-12MAR19-R	QU1105S-18SEP18-M	QU1105S-18SEP18-R
			Lab Job ID / Sample ID	B8A8837 / UY4712	B8A8837 / UY4713	B846832 / TQ1903	B918176 / VI9169	B918176 / VI9168	B881174 / UJ0378	B881174 / UJ0379
			Date	11-Dec-18	11-Dec-18	11-Jun-18	12-Mar-19	12-Mar-19	18-Sep-18	18-Sep-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	149	150	80.5	396	369	76.3	76.9
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	0.0037	<0.0030	<0.0030	<0.015	0.019	0.0034	<0.0030
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	<0.00050	<0.00050	<0.0025	<0.0025	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.0606**	**0.059**	**0.0512**	0.00609	0.00778	**0.0539**	0.0495
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0911	0.0867	0.056	0.233	0.235	0.0609	0.0566
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.872	0.848	0.442	0.45	0.44	0.38	0.349
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	<0.0000050	<0.0000050	<0.000025	<0.000025	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	44.1	44.4	25	151	140	23.6	23.6
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.0010	<0.0010	<0.00020	<0.00020
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.0010	<0.0010	<0.00020	<0.00020
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	1.16	1.15	0.642	<0.025	<0.025	0.756	0.782
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.0010	<0.0010	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0565	0.0568	0.0236	<0.010	<0.010	0.0188	0.0183
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	9.41	9.6	4.41	4.88	4.96	4.24	4.35
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.183	0.18	0.102	0.0795	0.0798	0.0995	0.0884
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0010	<0.0010
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0010	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	3.16	3.2	1.86	4.72	4.79	1.35	1.31
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	**0.045**	**0.0636**	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.27	3.26	2.56	4.57	4.22	2.31	2.14
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.00010	<0.00010	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	113	114	46.2	919	911	37.3	34
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.52	0.522	0.239	1.75	1.71	0.223	0.224
Dissolved Sulphur (S)		mg/L	3.0 - 150	47.4	47.8	26.1	276	278	20.7	21.1
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.025	<0.025	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.025	<0.025	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00010	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.025	<0.025	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.025	<0.025	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1109M-16MAY18-M	QU1109M-18MAR19-M	QU1109M-18MAR19-M Lab-Dup	QU1109M-18MAR19-R	QU11-09M-21JUNE18-M	QU1109M-23APR18-M	QU11-09M-27NOV18-M
			Lab Job ID / Sample ID	B838491 / TL6687	B920160 / VJ9900	B920160 / VJ9900	B920160 / VJ9902	B850438 / TS1969	B830402 / TH8947	B8A4251 / UW0398
			Date	16-May-18	18-Mar-19	18-Mar-19	18-Mar-19	21-Jun-18	23-Apr-18	27-Nov-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	284	103	-	104	298	178	257
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.015	<0.0030	<0.0030	<0.0030	<0.0060	0.0151	<0.015
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0025	<0.00050	<0.00050	<0.00050	<0.0010	<0.0010	<0.0025
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.00216	0.116	0.115	0.118	0.00202	0.118	0.00264
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0128	0.061	0.0602	0.0626	0.0124	0.0514	0.014
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00050
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0050
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	1.16	1.99	1.83	1.82	1.24	1.89	1.04
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000025	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.000010	<0.000025
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	94.8	28.8	-	28.9	99.8	49.8	87.6
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0050
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00040	<0.00040	<0.0010
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00040	<0.00040	<0.0010
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	13.3	0.146	0.144	0.144	8.26	0.121	9.33
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00040	<0.00040	<0.0010
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.013	0.0619	0.0614	0.0606	0.0125	0.0706	0.01
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	11.5	7.56	-	7.59	12	13.1	9.16
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.263	0.0267	0.0266	0.0269	0.281	0.0501	0.186
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0050	<0.0010	<0.0010	<0.0010	0.0034	<0.0020	<0.0050
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0050	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0050
Dissolved Potassium (K)		mg/L	0.050 - 2.5	5.6	3.78	-	3.66	5.67	4.29	4.93
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00050	0.00366	0.00344	0.00263	<0.00020	<0.00020	<0.00050
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3	5.87	5.78	5.89	3.4	6.47	3.01
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00010	<0.000020	<0.000020	<0.000020	<0.000040	<0.000040	<0.00010
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	537	252	-	256	540	317	485
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	1.17	0.394	0.393	0.406	1.08	0.603	0.958
Dissolved Sulphur (S)		mg/L	3.0 - 150	280	73.9	-	74.7	299	149	254
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020	<0.000050
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.025	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.025
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.025	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.025
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00050
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.025	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.025
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.025	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.025
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00050

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1109M-30JUL18-M	QU11-09M-30JUL18-R	QU1109S-18MAR19-M	QU1109S-18MAR19-R	QU11-09S-21JUNE18-M	QU11-09S-21JUNE18-M Lab-Dup	QU11-09S-21JUNE18-R
			Lab Job ID / Sample ID	B863627 / TZ1092	B863627 / TZ1090	B920160 / VJ9899	B920160 / VJ9901	B850438 / TS1970	B850438 / TS1970	B850438 / TS1968
			Date	30-Jul-18	30-Jul-18	18-Mar-19	18-Mar-19	21-Jun-18	21-Jun-18	21-Jun-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	272	270	269	267	156	-	160
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.015	<0.015	<0.0030	<0.015	0.0068	-	0.0089
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0025	<0.0025	<0.00050	<0.0025	<0.0010	-	<0.0010
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.00263	0.00221	0.00344	0.00345	**0.123**	-	**0.13**
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0121	0.0119	0.0168	0.0168	0.048	-	0.048
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	<0.00050	<0.00020	-	<0.00020
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0050	<0.0020	-	<0.0020
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	1.03	1.01	0.836	0.76	2.3	-	2.26
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000025	<0.000025	<0.0000050	<0.000025	<0.000010	-	<0.000010
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	92.9	91.8	90.6	89.8	42.9	-	43.1
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0050	<0.0020	-	<0.0020
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.00020	<0.0010	<0.00040	-	<0.00040
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.00020	<0.0010	<0.00040	-	<0.00040
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	10.5	10.5	10	10.3	0.33	-	0.316
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.00020	<0.0010	<0.00040	-	<0.00040
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.012	0.012	0.0093	<0.010	0.0726	-	0.0725
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	9.8	9.97	10.3	10.3	12	-	12.8
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.202	0.204	0.309	0.316	0.041	-	0.0418
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0050	<0.0050	0.0014	<0.0050	<0.0020	-	<0.0020
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0050	<0.0020	-	<0.0020
Dissolved Potassium (K)		mg/L	0.050 - 2.5	4.74	4.8	6.01	5.42	4.08	-	4.15
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	0.00044	<0.00050	<0.00020	-	<0.00020
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	2.73	2.7	3.09	3.11	6.41	-	6.29
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00010	<0.00010	<0.000020	<0.00010	<0.000040	-	<0.000040
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	491	490	397	379	324	-	332
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	1.07	1.09	1.14	1.07	0.584	-	0.585
Dissolved Sulphur (S)		mg/L	3.0 - 150	249	251	256	247	129	-	134
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000050	<0.000050	<0.000010	<0.000050	<0.000020	-	<0.000020
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.025	<0.010	-	<0.010
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.025	<0.010	-	<0.010
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	<0.00050	<0.00020	-	<0.00020
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.025	<0.010	-	<0.010
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.025	<0.010	-	<0.010
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	<0.00050	<0.00020	-	<0.00020

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 201
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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU11-09S-27NOV18-M	QU11-09S-30JUL18-M	QU1118D-26MAR19-M	QU1118S-28MAR19-M	QU1118S-28MAR19-M Lab-Dup	QU1128-6MAR19-M	QU1136D-27FEB19-M
			Lab Job ID / Sample ID	B8A4251 / UW0397	B863627 / TZ1091	B922110 / VK8431	B922898 / VL2357	B922898 / VL2357	B916980 / VI3579	B914784 / VH3653
			Date	27-Nov-18	30-Jul-18	26-Mar-19	28-Mar-19	28-Mar-19	6-Mar-19	27-Feb-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	116	151	64.3	52	-	121	143
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.015	<0.015	0.0049	0.007	-	0.0241	<0.0030
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0025	<0.0025	<0.00050	<0.00050	-	<0.00050	<0.00050
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.117**	**0.115**	0.0357	0.00646	-	**0.18**	**0.903**
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0446	0.0447	0.0572	0.0099	-	0.496	0.11
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	<0.00010	-	<0.00010	<0.00010
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0010	-	<0.0010	<0.0010
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	1.87	1.81	0.508	<0.050	-	0.321	0.692
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000025	<0.000025	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	31.7	41.7	19.5	17.1	-	36.8	43.6
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0010	-	<0.0010	<0.0010
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.00020	<0.00020	-	0.00029	<0.00020
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.00020	0.00026	-	<0.00020	<0.00020
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.161	0.325	0.101	<0.0050	-	0.846	0.541
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.00020	<0.00020	-	<0.00020	<0.00020
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.062	0.065	0.0145	<0.0020	-	0.0272	0.053
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	8.99	11.4	3.76	2.22	-	7.1	8.2
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.0317	0.0395	0.0784	0.0136	-	0.3	0.0402
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0050	<0.0050	0.0015	0.0018	-	<0.0010	0.0032
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0010	<0.0010	-	<0.0010	<0.0010
Dissolved Potassium (K)		mg/L	0.050 - 2.5	3.8	3.78	1.53	0.816	-	2.4	0.893
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00050	0.00225	<0.00010	<0.00010	-	<0.00010	<0.00010
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	6.01	5.77	5.01	3.73	-	4.27	5.16
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00010	<0.00010	<0.000020	<0.000020	-	<0.000020	<0.000020
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	305	304	33.8	31.8	-	24.2	10.4
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.456	0.566	0.175	0.103	-	0.454	0.412
Dissolved Sulphur (S)		mg/L	3.0 - 150	97	121	<3.0	<3.0	-	<3.0	4.3
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000050	<0.000050	<0.000010	<0.000010	-	<0.000010	<0.000010
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.0050	-	<0.0050	<0.0050
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.0050	-	<0.0050	<0.0050
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	0.0013	-	0.00013	<0.00010
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.0050	-	<0.0050	<0.0050
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.0050	<0.0050	-	<0.0050	<0.0050
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00010	<0.00010	-	<0.00010	<0.00010

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 202
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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1136D-27FEB19-R	QU1136S-27FEB19-M	QU1136S-27FEB19-M Lab-Dup	QU1206S-28MAR19-M	QU1410-03DEC18-M	QU1410-03DEC18-M Lab-Dup	QU1410-15MAY18-M
			Lab Job ID / Sample ID	B914784 / VH3654	B914784 / VH3655	B914784 / VH3655	B922898 / VL2356	B8A6044 / UW9543	B8A6044 / UW9543	B837597 / TL1587
			Date	27-Feb-19	27-Feb-19	27-Feb-19	28-Mar-19	3-Dec-18	3-Dec-18	15-May-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	146	78	-	10.1	2010	-	2040
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.0030	0.0122	0.0114	0.0081	0.0061	<0.0060	<0.015
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.00050	0.00119	0.00121	<0.00050	<0.0010	<0.0010	<0.0025
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	**0.89**	0.00975	0.00991	**0.42**	0.0827	0.0819	0.0919
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.109	0.0988	0.101	0.0637	0.0158	0.0159	0.192
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00050
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0050
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	0.714	<0.050	<0.050	1.87	1.14	1.06	1.3
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.0000050	0.000022	0.000023	<0.0000050	<0.000010	<0.000010	<0.000025
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	44.5	26.4	-	3.17	517	-	489
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0050
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.00020	0.00136	0.00135	<0.00020	0.0006	0.00059	0.0014
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	0.00046	<0.00040	<0.0010
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.567	0.0829	0.0739	0.0246	1.73	1.84	1.55
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00040	<0.00040	<0.0010
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.0526	0.0045	0.0045	0.0523	0.138	0.134	0.141
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	8.36	2.9	-	0.537	175	-	200
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	0.0404	0.123	0.122	0.0455	1.46	1.5	1.66
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	-	<0.0000020	<0.0000020	-	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	0.0033	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0050
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0010	0.0012	0.0012	<0.0010	0.0034	0.0037	<0.0050
Dissolved Potassium (K)		mg/L	0.050 - 2.5	0.862	0.178	-	1.04	7.93	-	7.56
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	0.00206	<0.00020	<0.00020	<0.00050
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	5.21	3.03	3.13	4.1	3.14	3.4	3.18
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000040	<0.000040	<0.00010
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	10.8	0.955	-	122	53.3	-	61.1
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	0.404	0.03	0.0312	0.0938	4.42	4.45	4.63
Dissolved Sulphur (S)		mg/L	3.0 - 150	4.1	<3.0	-	<3.0	667	-	647
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020	<0.000050
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.025
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.025
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	0.00107	0.00109	0.00115
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.025
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.0050	0.0089	0.0091	<0.0050	<0.010	<0.010	<0.025
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00050

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 203
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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1410-15MAY18-M Lab-Dup	QU1410-15MAY18-R	QU1410-18JUNE18-M	QU1410-18JUNE18-R	QU1410-19APR18-M	QU1410-19APR18-R	QU1410-19APR18-R Lab-Dup
			Lab Job ID / Sample ID	B837597 / TL1587	B837597 / TL1586	B849375 / TR5949	B849375 / TR5948	B829696 / TH5881	B829696 / TH5880	B829696 / TH5880
			Date	15-May-18	15-May-18	18-Jun-18	18-Jun-18	19-Apr-18	19-Apr-18	19-Apr-18
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	-	2020	2240	2240	2120	2120	-
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	-
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	-
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.0939	0.0942	0.0831	0.0832	0.0864	0.0882	-
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.193	0.0206	0.0161	0.0162	0.0163	0.0162	-
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	1.3	1.25	1.2	1.14	1.27	1.23	-
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000025	<0.000025	<0.000025	<0.000025	<0.000025	<0.000025	-
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	-	469	518	522	516	522	-
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	1.65	1.6	1.54	1.54	1.72	1.74	-
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.144	0.14	0.155	0.153	0.139	0.143	-
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	-	208	229	227	202	199	-
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	1.68	1.5	1.63	1.62	1.52	1.49	-
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	-	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Dissolved Potassium (K)		mg/L	0.050 - 2.5	-	7.79	7.67	7.67	7.93	7.42	-
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.24	3	3.02	3	3.22	3.2	-
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	-	60.6	64.8	65.1	56.2	55.2	-
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	4.8	4.58	4.92	5.03	4.6	4.65	-
Dissolved Sulphur (S)		mg/L	3.0 - 150	-	686	675	670	711	677	-
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	-
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	-
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	0.00117	0.00105	0.0012	0.00116	0.00115	0.00114	-
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	-
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	-
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 204
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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1410-23JUL18-M	QU1410-24SEP18-M	QU1410-24SEP18-M Lab-Dup	QU1410-26FEB19-M	QU1410-26FEB19-M Lab-Dup	QU1410-26FEB19-R	QU1410-26FEB19-R Lab-Dup
			Lab Job ID / Sample ID	B861068 / TX6942	B882926 / UK0566	B882926 / UK0566	B914369 / VH1672	B914369 / VH1672	B914369 / VH1673	B914369 / VH1673
			Date	23-Jul-18	24-Sep-18	24-Sep-18	26-Feb-19	26-Feb-19	26-Feb-19	26-Feb-19
			RDL							
Dissolved Hardness (CaCO3)		mg/L	0.5	2070	1940	-	1990	-	1970	-
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.015	<0.015	<0.015	<0.0060	<0.0060	<0.0060	-
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0025	<0.0025	<0.0025	<0.0010	<0.0010	<0.0010	-
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.101	0.0799	0.0808	0.0879	0.088	0.088	-
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.016	0.0164	0.0157	0.0168	0.0168	0.0165	-
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00020	-
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020	<0.0020	-
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	1.21	1.32	1.37	1.13	1.12	1.11	-
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000025	<0.000025	<0.000025	0.000084	0.000077	0.000018	-
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	504	474	-	497	-	489	-
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020	<0.0020	-
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.0010	0.00072	0.00072	0.00068	-
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.0010	<0.00040	<0.00040	<0.00040	-
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	1.69	1.38	1.41	1.7	1.7	1.67	-
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.0010	<0.00040	<0.00040	<0.00040	-
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.142	0.142	0.142	0.128	0.124	0.118	-
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	198	184	-	182	-	183	-
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	1.52	1.43	1.46	1.5	1.53	1.47	-
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	-	<0.0000020	-	<0.0000020	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	0.0052	<0.0050	<0.0050	<0.0020	<0.0020	<0.0020	-
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	0.0128	<0.0050	0.0052	0.0037	0.0038	0.0036	-
Dissolved Potassium (K)		mg/L	0.050 - 2.5	7.51	7.48	-	7.52	-	7.44	-
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00020	-
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	3.16	3.08	3.07	2.79	2.72	2.7	-
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00010	<0.00010	<0.00010	<0.000040	<0.000040	<0.000040	-
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	58.9	53.2	-	55.6	-	56.1	-
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	4.83	4.37	4.42	4.82	4.75	4.76	-
Dissolved Sulphur (S)		mg/L	3.0 - 150	666	649	-	640	-	636	-
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000050	<0.000050	<0.000050	<0.000020	<0.000020	<0.000020	-
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.010	<0.010	<0.010	-
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.010	<0.010	<0.010	-
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	0.00104	0.00109	0.00109	0.00125	0.00123	0.00117	-
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.010	<0.010	<0.010	-
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.010	<0.010	<0.010	-
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00020	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 205
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Dissolved Metals- Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1410-28AUG18-M	QU1410-28AUG18-M Lab-Dup	QU1410-29OCT18-M	QU1410-30JAN19-M
			Lab Job ID / Sample ID	B873571 / UE7144	B873571 / UE7144	B896119 / UR6045	B908125 / VE3038
			Date	28-Aug-18	28-Aug-18	29-Oct-18	30-Jan-19
			RDL				
Dissolved Hardness (CaCO3)		mg/L	0.5	2010	-	2280	1970
Dissolved Aluminum (Al)		mg/L	0.0030 - 0.15	<0.015	<0.015	<0.015	0.016
Dissolved Antimony (Sb)	0.09	mg/L	0.00050 - 0.025	<0.0025	<0.0025	<0.0025	<0.0025
Dissolved Arsenic (As)	0.05	mg/L	0.00010 - 0.0050	0.0568	0.056	0.0851	0.0831
Dissolved Barium (Ba)	10	mg/L	0.0010 - 0.050	0.0138	0.0141	0.0175	0.0154
Dissolved Beryllium (Be)	0.0015	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Bismuth (Bi)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Boron (B)	12	mg/L	0.050 - 2.5	1.09	1.08	1.3	1.11
Dissolved Cadmium (Cd)	0.0005	mg/L	0.0000050 - 0.00025	<0.000025	<0.000025	<0.000025	<0.000025
Dissolved Calcium (Ca)		mg/L	0.050 - 2.5	472	-	566	476
Dissolved Chromium (Cr)		mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Cobalt (Co)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Copper (Cu)	0.02	mg/L	0.00020 - 0.010	0.0016	0.0017	<0.0010	<0.0010
Dissolved Iron (Fe)		mg/L	0.0050 - 0.25	0.997	0.988	1.56	1.51
Dissolved Lead (Pb)	0.04	mg/L	0.00020 - 0.010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Lithium (Li)		mg/L	0.0020 - 0.10	0.136	0.134	0.166	0.132
Dissolved Magnesium (Mg)		mg/L	0.050 - 2.5	201	-	210	189
Dissolved Manganese (Mn)		mg/L	0.0010 - 0.050	1.13	1.13	1.59	1.46
Dissolved Mercury (Hg)	0.00025	mg/L	0.0000020 - 0.000020	<0.0000020	<0.0000020	0.0000042	<0.0000020
Dissolved Molybdenum (Mo)	10	mg/L	0.0010 - 0.050	<0.0050	<0.0050	<0.0050	<0.0050
Dissolved Nickel (Ni)	0.25	mg/L	0.0010 - 0.050	0.0062	0.0062	<0.0050	<0.0050
Dissolved Potassium (K)		mg/L	0.050 - 2.5	6.92	-	8.06	7.34
Dissolved Selenium (Se)	0.02	mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Silicon (Si)		mg/L	0.10 - 5.0	2.8	2.74	3.3	2.7
Dissolved Silver (Ag)	0.0005	mg/L	0.000020 - 0.0010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Sodium (Na)		mg/L	0.050 - 2.5	51.8	-	58.7	57.8
Dissolved Strontium (Sr)		mg/L	0.0010 - 0.050	4.36	4.29	5.35	4.37
Dissolved Sulphur (S)		mg/L	3.0 - 150	600	-	708	625
Dissolved Thallium (Tl)	0.003	mg/L	0.000010 - 0.00050	<0.000050	<0.000050	<0.000050	<0.000050
Dissolved Tin (Sn)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.025
Dissolved Titanium (Ti)	1	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.025
Dissolved Uranium (U)	0.085	mg/L	0.00010 - 0.0050	0.00096	0.00098	0.00118	0.00103
Dissolved Vanadium (V)		mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.025
Dissolved Zinc (Zn)	0.075	mg/L	0.0050 - 0.25	<0.025	<0.025	<0.025	<0.025
Dissolved Zirconium (Zr)		mg/L	0.00010 - 0.0050	<0.00050	<0.00050	<0.00050	<0.00050

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 206
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Total Metals- Groundwater

Parameter	*Units*	Sample ID	1M2N-09OCT18-M	1M2N-12FEB19-M	1M2N-19MAR19-M	1M2N-23MAY18-M	1M2N-26APR18-M	1M2N-9JUL18-M	1M2N-9JUL18-M Lab-Dup
		Lab Job ID / Sample ID	B888275 / UN0472	B911101 / VF6815	B920565 / VK1831	B839824 / TM5036	B831668 / TI3950	B856306 / TV2223	B856306 / TV2223
		Date	2018/10/09	2019/02/12	2019/03/19	2018/05/23	2018/04/26	2018/07/09	2018/07/09
		RDL							
Total Hardness (CaCO3)	mg/L	0.5	321	558	542	326	316	332	-
Total Aluminum (Al)	mg/L	0.0030 - 0.015	0.003	<0.015	<0.015	<0.015	0.0033	0.0038	0.0039
Total Antimony (Sb)	mg/L	0.00050 - 0.0025	<0.00050	<0.0025	<0.0025	<0.0025	<0.00050	<0.00050	<0.00050
Total Arsenic (As)	mg/L	0.00010 - 0.00050	0.0123	0.00501	0.00776	0.00899	0.00895	0.00973	0.00978
Total Barium (Ba)	mg/L	0.0010 - 0.0050	0.0357	0.0323	0.0298	0.0281	0.0292	0.0285	0.0286
Total Beryllium (Be)	mg/L	0.00010 - 0.00050	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010
Total Bismuth (Bi)	mg/L	0.0010 - 0.0050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010
Total Boron (B)	mg/L	0.050 - 0.25	1.19	1.14	1.16	1.09	0.983	0.992	0.986
Total Cadmium (Cd)	mg/L	0.000010 - 0.000050	<0.000010	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010
Total Calcium (Ca)	mg/L	0.050 - 0.25	110	192	186	113	109	117	-
Total Chromium (Cr)	mg/L	0.0010 - 0.0050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010
Total Cobalt (Co)	mg/L	0.00020 - 0.0010	<0.00020	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.00020
Total Copper (Cu)	mg/L	0.00050 - 0.0025	0.0303	0.0051	0.0035	<0.0025	0.0516	0.0038	0.00398
Total Iron (Fe)	mg/L	0.010 - 0.050	4.58	6.41	7.19	4.3	4.87	3.68	3.72
Total Lead (Pb)	mg/L	0.00020 - 0.0010	0.00233	<0.0010	<0.0010	<0.0010	0.00086	0.00053	0.00055
Total Lithium (Li)	mg/L	0.0020 - 0.010	0.015	0.015	0.014	0.012	0.012	0.0128	0.0129
Total Magnesium (Mg)	mg/L	0.050 - 0.25	10.9	19.4	19	10.4	10.7	9.79	-
Total Manganese (Mn)	mg/L	0.0010 - 0.0050	0.334	0.642	0.696	0.373	0.377	0.354	0.357
Total Mercury (Hg)	mg/L	0.000002	<0.0000020	-	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Total Molybdenum (Mo)	mg/L	0.0010 - 0.0050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010
Total Nickel (Ni)	mg/L	0.0010 - 0.0050	0.0015	<0.0050	0.008	<0.0050	<0.0010	<0.0010	<0.0010
Total Potassium (K)	mg/L	0.050 - 0.25	5.11	6.53	6.57	5.29	4.69	5.15	-
Total Selenium (Se)	mg/L	0.00010 - 0.00050	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010
Total Silicon (Si)	mg/L	0.10 - 0.50	3.73	3.95	3.83	3.43	3.2	3.61	3.52
Total Silver (Ag)	mg/L	0.000020 - 0.00010	<0.000020	<0.00010	<0.00010	<0.00010	<0.000020	<0.000020	<0.000020
Total Sodium (Na)	mg/L	0.050 - 0.25	323	444	471	325	332	314	-
Total Strontium (Sr)	mg/L	0.0010 - 0.0050	1.13	2.23	1.87	1.08	1.09	1.13	1.14
Total Sulphur (S)	mg/L	3.0 - 15	230	380	377	218	214	219	-
Total Thallium (Tl)	mg/L	0.000010 - 0.000050	<0.000010	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010
Total Tin (Sn)	mg/L	0.0050 - 0.025	<0.0050	<0.025	<0.025	<0.025	<0.0050	<0.0050	<0.0050
Total Titanium (Ti)	mg/L	0.0050 - 0.025	<0.0050	<0.025	<0.025	<0.025	<0.0050	<0.0050	<0.0050
Total Uranium (U)	mg/L	0.00010 - 0.00050	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010
Total Vanadium (V)	mg/L	0.0050 - 0.025	<0.0050	<0.025	<0.025	<0.025	<0.0050	<0.0050	<0.0050
Total Zinc (Zn)	mg/L	0.0050 - 0.025	0.0636	<0.025	<0.025	0.122	0.0493	<0.0050	<0.0050
Total Zirconium (Zr)	mg/L	0.00010 - 0.00050	<0.00010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010

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Total Metals- Groundwater

Parameter	*Units*	**Sample ID**	1M7S-09OCT18-M	1M7S-12APR18-M	1M7S-12JUL18-M	1M7S-12JUL18-M Lab-Dup	242MP-27FEB19-M	242MW-11SEP18-M	242PS-05JUN18-M	242PS-28MAR19-M
		Lab Job ID / Sample ID	B888275 / UN0471	B827653 / TG7247	B857925 / TV9661	B857925 / TV9661	B914784 / VH3656	B878455 / UH4187	B844466 / TO9040	B922898 / VL2358
		Date	2018/10/09	2018/04/12	2018/07/12	2018/07/12	2019/02/27	2018/09/11	2018/06/05	2019/03/28
		RDL								
Total Hardness (CaCO3)	mg/L	0.5	549	376	548	-	112	102	97.8	88
Total Aluminum (Al)	mg/L	0.0030 - 0.015	0.0137	0.126	0.0469	-	0.0242	0.039	0.231	0.0044
Total Antimony (Sb)	mg/L	0.00050 - 0.0025	0.00132	<0.00050	0.00082	-	<0.00050	<0.00050	<0.00050	<0.00050
Total Arsenic (As)	mg/L	0.00010 - 0.00050	0.0207	0.0185	0.00886	-	0.0499	0.00391	0.00566	0.00346
Total Barium (Ba)	mg/L	0.0010 - 0.0050	0.0568	0.0511	0.0531	-	0.0765	0.0307	0.0353	0.0369
Total Beryllium (Be)	mg/L	0.00010 - 0.00050	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Total Bismuth (Bi)	mg/L	0.0010 - 0.0050	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010
Total Boron (B)	mg/L	0.050 - 0.25	0.601	0.397	0.6	-	0.087	0.07	0.08	0.056
Total Cadmium (Cd)	mg/L	0.000010 - 0.000050	0.000026	<0.000010	0.00003	-	<0.000010	0.000019	<0.000010	<0.000010
Total Calcium (Ca)	mg/L	0.050 - 0.25	159	113	157	-	38.7	37.8	32.8	29.6
Total Chromium (Cr)	mg/L	0.0010 - 0.0050	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010
Total Cobalt (Co)	mg/L	0.00020 - 0.0010	0.0068	0.00161	0.00516	-	0.00313	0.0016	0.00038	0.00531
Total Copper (Cu)	mg/L	0.00050 - 0.0025	<0.00050	0.00084	0.00117	-	0.00096	0.0023	0.00076	<0.00050
Total Iron (Fe)	mg/L	0.010 - 0.050	0.08	0.331	0.871	-	6.51	4.15	0.311	0.292
Total Lead (Pb)	mg/L	0.00020 - 0.0010	<0.00020	<0.00020	<0.00020	-	<0.00020	<0.00020	<0.00020	<0.00020
Total Lithium (Li)	mg/L	0.0020 - 0.010	0.0507	0.0378	0.0568	-	0.0079	0.0044	<0.0020	<0.0020
Total Magnesium (Mg)	mg/L	0.050 - 0.25	36.8	22.6	37.7	-	3.71	1.85	3.87	3.43
Total Manganese (Mn)	mg/L	0.0010 - 0.0050	0.254	0.117	0.295	-	0.697	0.247	0.106	0.797
Total Mercury (Hg)	mg/L	0.000002	<0.0000020	<0.0000020	<0.0000020	<0.0000020	-	<0.0000020	<0.0000020	<0.0000020
Total Molybdenum (Mo)	mg/L	0.0010 - 0.0050	0.0012	<0.0010	0.0011	-	<0.0010	<0.0010	<0.0010	<0.0010
Total Nickel (Ni)	mg/L	0.0010 - 0.0050	0.0143	0.0048	0.0101	-	0.0025	0.0049	<0.0010	0.0015
Total Potassium (K)	mg/L	0.050 - 0.25	3.03	2.36	2.89	-	0.585	0.452	0.709	0.576
Total Selenium (Se)	mg/L	0.00010 - 0.00050	<0.00010	0.00011	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Total Silicon (Si)	mg/L	0.10 - 0.50	3.63	3.32	3.15	-	3.72	4.04	2	2.88
Total Silver (Ag)	mg/L	0.000020 - 0.00010	<0.000020	<0.000020	<0.000020	-	<0.000020	0.00002	<0.000020	<0.000020
Total Sodium (Na)	mg/L	0.050 - 0.25	19.8	15.6	20.1	-	4.21	1.43	3.09	2.7
Total Strontium (Sr)	mg/L	0.0010 - 0.0050	1.17	0.848	1.3	-	0.0911	0.0511	0.0843	0.077
Total Sulphur (S)	mg/L	3.0 - 15	180	95.5	155	-	10.8	25.7	22.8	18.9
Total Thallium (Tl)	mg/L	0.000010 - 0.000050	0.000036	0.000033	0.000058	-	0.000031	0.000201	0.000019	0.000012
Total Tin (Sn)	mg/L	0.0050 - 0.025	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050
Total Titanium (Ti)	mg/L	0.0050 - 0.025	<0.0050	0.0055	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050
Total Uranium (U)	mg/L	0.00010 - 0.00050	0.00019	0.0001	0.00018	-	<0.00010	<0.00010	<0.00010	<0.00010
Total Vanadium (V)	mg/L	0.0050 - 0.025	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050
Total Zinc (Zn)	mg/L	0.0050 - 0.025	0.0133	0.0284	0.0108	-	<0.0050	0.0115	<0.0050	<0.0050
Total Zirconium (Zr)	mg/L	0.00010 - 0.00050	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010

Table 208
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Total Metals- Groundwater

Parameter	*Units*	**Sample ID**	5M#2-09OCT18-M	5M#2-09OCT18-R	5M#2-12FEB19-M	5M#2-19MAR19-M	5M#2-23MAY18-M	5M#2-23MAY18-M Lab-Dup	5M#2-26APR18-M	5M#2-26APR18-M Lab-Dup
		Lab Job ID / Sample ID	B888275 / UN0470	B888275 / UN0473	B911101 / VF6816	B920565 / VK1832	B839824 / TM5037	B839824 / TM5037	B831668 / TI3951	B831668 / TI3951
		Date	2018/10/09	2018/10/09	2019/02/12	2019/03/19	2018/05/23	2018/05/23	2018/04/26	2018/04/26
		RDL								
Total Hardness (CaCO3)	mg/L	0.5	123	125	176	145	123	-	130	-
Total Aluminum (Al)	mg/L	0.0030 - 0.015	0.009	0.0078	<0.0030	<0.0030	0.0076	0.0064	0.0034	<0.0030
Total Antimony (Sb)	mg/L	0.00050 - 0.0025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Total Arsenic (As)	mg/L	0.00010 - 0.00050	0.00799	0.0075	0.00762	0.0078	0.00614	0.00575	0.00483	0.00478
Total Barium (Ba)	mg/L	0.0010 - 0.0050	0.0305	0.0304	0.0323	0.0279	0.0274	0.0267	0.0288	0.028
Total Beryllium (Be)	mg/L	0.00010 - 0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Total Bismuth (Bi)	mg/L	0.0010 - 0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Boron (B)	mg/L	0.050 - 0.25	0.929	0.948	0.882	0.965	0.902	0.882	0.813	0.83
Total Cadmium (Cd)	mg/L	0.000010 - 0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Total Calcium (Ca)	mg/L	0.050 - 0.25	43.9	44.4	61.8	50.1	43.6	-	46.1	-
Total Chromium (Cr)	mg/L	0.0010 - 0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Cobalt (Co)	mg/L	0.00020 - 0.0010	0.00027	0.00021	0.00031	0.00024	<0.00020	<0.00020	<0.00020	<0.00020
Total Copper (Cu)	mg/L	0.00050 - 0.0025	0.00109	0.00068	0.00076	0.00144	0.00121	0.00118	0.0285	0.0275
Total Iron (Fe)	mg/L	0.010 - 0.050	0.863	0.408	0.554	0.712	0.416	0.385	0.63	0.63
Total Lead (Pb)	mg/L	0.00020 - 0.0010	0.00555	0.00056	<0.00020	0.00025	<0.00020	<0.00020	0.00166	0.00166
Total Lithium (Li)	mg/L	0.0020 - 0.010	0.004	0.0042	0.0083	0.0075	0.0069	0.0065	0.0074	0.0074
Total Magnesium (Mg)	mg/L	0.050 - 0.25	3.31	3.38	5.32	4.8	3.34	-	3.54	-
Total Manganese (Mn)	mg/L	0.0010 - 0.0050	0.0663	0.0635	0.118	0.0985	0.0565	0.0544	0.055	0.0548
Total Mercury (Hg)	mg/L	0.000002	<0.0000020	<0.0000020	-	<0.0000020	<0.0000020	-	<0.0000020	-
Total Molybdenum (Mo)	mg/L	0.0010 - 0.0050	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Nickel (Ni)	mg/L	0.0010 - 0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Potassium (K)	mg/L	0.050 - 0.25	2.37	2.44	2.78	2.84	2.42	-	2.54	-
Total Selenium (Se)	mg/L	0.00010 - 0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Total Silicon (Si)	mg/L	0.10 - 0.50	3.47	3.68	2.87	2.64	2.93	2.85	3.12	3.13
Total Silver (Ag)	mg/L	0.000020 - 0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Total Sodium (Na)	mg/L	0.050 - 0.25	255	251	277	257	234	-	250	-
Total Strontium (Sr)	mg/L	0.0010 - 0.0050	0.452	0.441	0.738	0.568	0.446	0.427	0.436	0.43
Total Sulphur (S)	mg/L	3.0 - 15	51.9	53.7	105	83.4	56.4	-	61.7	-
Total Thallium (Tl)	mg/L	0.000010 - 0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Total Tin (Sn)	mg/L	0.0050 - 0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Titanium (Ti)	mg/L	0.0050 - 0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Uranium (U)	mg/L	0.00010 - 0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Total Vanadium (V)	mg/L	0.0050 - 0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Zinc (Zn)	mg/L	0.0050 - 0.025	<0.0050	<0.0050	<0.0050	<0.0050	0.0252	0.0236	0.0679	0.067
Total Zirconium (Zr)	mg/L	0.00010 - 0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Table 209
2018-2019 Annual Report

Total Metals- Groundwater

Parameter	*Units*	**Sample ID**	5M#2-9JUL18-M	5SMW-03DEC18-M	5SMW-28FEB19-M	5SMW-30AUG18-M	5SMW-30AUG18-R	7SA54XC-25MAR19-M	7SA5BRD-26FEB19-M	7SA5C-12DEC18-M
		Lab Job ID / Sample ID	B856306 / TV2224	B8A6041 / UW9541	B914999 / VH4766	B875548 / UF7895	B875548 / UF7896	B922110 / VK8430	B914784 / VH3657	B8A9340 / UY7071
		Date	2018/07/09	2018/12/03	2019/02/28	2018/08/30	2018/08/30	2019/03/25	2019/02/26	2018/12/13
		RDL								
Total Hardness (CaCO3)	mg/L	0.5	127	-	153	-	-	106	121	120
Total Aluminum (Al)	mg/L	0.0030 - 0.015	0.0049	-	0.0186	-	-	0.0723	0.0244	2.17
Total Antimony (Sb)	mg/L	0.00050 - 0.0025	<0.00050	-	<0.00050	-	-	<0.00050	<0.00050	<0.00050
Total Arsenic (As)	mg/L	0.00010 - 0.00050	0.00922	-	0.00328	-	-	0.347	0.363	0.286
Total Barium (Ba)	mg/L	0.0010 - 0.0050	0.0299	-	0.0362	-	-	0.182	0.244	0.387
Total Beryllium (Be)	mg/L	0.00010 - 0.00050	<0.00010	-	<0.00010	-	-	<0.00010	<0.00010	<0.00010
Total Bismuth (Bi)	mg/L	0.0010 - 0.0050	<0.0010	-	<0.0010	-	-	<0.0010	<0.0010	<0.0010
Total Boron (B)	mg/L	0.050 - 0.25	0.831	-	0.924	-	-	0.486	0.635	0.386
Total Cadmium (Cd)	mg/L	0.000010 - 0.000050	<0.000010	-	0.000012	-	-	<0.000010	<0.000010	<0.000010
Total Calcium (Ca)	mg/L	0.050 - 0.25	45.6	-	49.3	-	-	32.1	36.9	37
Total Chromium (Cr)	mg/L	0.0010 - 0.0050	<0.0010	-	<0.0010	-	-	<0.0010	<0.0010	0.0024
Total Cobalt (Co)	mg/L	0.00020 - 0.0010	<0.00020	-	0.00323	-	-	<0.00020	<0.00020	0.0015
Total Copper (Cu)	mg/L	0.00050 - 0.0025	0.00258	-	0.00259	-	-	<0.00050	<0.00050	0.0062
Total Iron (Fe)	mg/L	0.010 - 0.050	0.725	-	6.66	-	-	0.26	0.132	2.4
Total Lead (Pb)	mg/L	0.00020 - 0.0010	0.00088	-	<0.00020	-	-	<0.00020	<0.00020	0.00034
Total Lithium (Li)	mg/L	0.0020 - 0.010	0.0046	-	0.0154	-	-	0.0412	0.044	0.0371
Total Magnesium (Mg)	mg/L	0.050 - 0.25	3.23	-	7.18	-	-	6.4	6.94	6.79
Total Manganese (Mn)	mg/L	0.0010 - 0.0050	0.0635	-	0.191	-	-	0.0197	0.0207	0.0623
Total Mercury (Hg)	mg/L	0.000002	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Total Molybdenum (Mo)	mg/L	0.0010 - 0.0050	<0.0010	-	0.0019	-	-	<0.0010	<0.0010	<0.0010
Total Nickel (Ni)	mg/L	0.0010 - 0.0050	<0.0010	-	0.0055	-	-	<0.0010	<0.0010	0.0021
Total Potassium (K)	mg/L	0.050 - 0.25	2.42	-	4.95	-	-	2.16	2.46	2.27
Total Selenium (Se)	mg/L	0.00010 - 0.00050	<0.00010	-	<0.00010	-	-	<0.00010	<0.00010	<0.00010
Total Silicon (Si)	mg/L	0.10 - 0.50	3.24	-	3.23	-	-	4.32	7.85	8.3
Total Silver (Ag)	mg/L	0.000020 - 0.00010	<0.000020	-	<0.000020	-	-	<0.000020	<0.000020	<0.000020
Total Sodium (Na)	mg/L	0.050 - 0.25	221	-	217	-	-	27.1	26.5	22.9
Total Strontium (Sr)	mg/L	0.0010 - 0.0050	0.455	-	0.751	-	-	0.444	0.485	0.408
Total Sulphur (S)	mg/L	3.0 - 15	55.3	-	97.2	-	-	<3.0	<3.0	<3.0
Total Thallium (Tl)	mg/L	0.000010 - 0.000050	<0.000010	-	<0.000010	-	-	<0.000010	<0.000010	<0.000010
Total Tin (Sn)	mg/L	0.0050 - 0.025	<0.0050	-	<0.0050	-	-	<0.0050	<0.0050	<0.0050
Total Titanium (Ti)	mg/L	0.0050 - 0.025	<0.0050	-	<0.0050	-	-	<0.0050	<0.0050	0.136
Total Uranium (U)	mg/L	0.00010 - 0.00050	<0.00010	-	<0.00010	-	-	<0.00010	<0.00010	<0.00010
Total Vanadium (V)	mg/L	0.0050 - 0.025	<0.0050	-	<0.0050	-	-	<0.0050	<0.0050	0.0087
Total Zinc (Zn)	mg/L	0.0050 - 0.025	0.0082	-	0.005	-	-	<0.0050	<0.0050	0.0072
Total Zirconium (Zr)	mg/L	0.00010 - 0.00050	<0.00010	-	<0.00010	-	-	<0.00010	<0.00010	0.00079

Table 210
2018-2019 Annual Report

Total Metals- Groundwater

Parameter	*Units*	**Sample ID**	7SA5CRD-26FEB19-M	MW002-7MAR19-M	MW004-7MAR19-M	QU1118D-26MAR19-M	QU1118S-28MAR19-M	QU1128-6MAR19-M	QU1136D-27FEB19-M	QU1136D-27FEB19-R
		Lab Job ID / Sample ID	B914784 / VH3658	B916980 / VI3580	B916980 / VI3581	B922110 / VK8431	B922898 / VL2357	B916980 / VI3579	B914784 / VH3653	B914784 / VH3654
		Date	2019/02/26	2019/03/07	2019/03/07	2019/03/26	2019/03/28	2019/03/06	2019/02/27	2019/02/27
		RDL								
Total Hardness (CaCO3)	mg/L	0.5	141	1220	314	65.4	217	156	151	139
Total Aluminum (Al)	mg/L	0.0030 - 0.015	0.339	0.0123	0.104	0.0588	28.5	4.87	0.273	0.253
Total Antimony (Sb)	mg/L	0.00050 - 0.0025	<0.00050	<0.0010	<0.00050	<0.00050	<0.0025	<0.00050	<0.0010	<0.0010
Total Arsenic (As)	mg/L	0.00010 - 0.00050	0.313	0.0017	0.00311	0.037	0.0152	0.195	1.01	0.918
Total Barium (Ba)	mg/L	0.0010 - 0.0050	0.571	0.0134	0.0276	0.0579	0.379	0.676	0.116	0.109
Total Beryllium (Be)	mg/L	0.00010 - 0.00050	<0.00010	<0.00020	<0.00010	<0.00010	0.00393	0.00113	<0.00020	<0.00020
Total Bismuth (Bi)	mg/L	0.0010 - 0.0050	<0.0010	<0.0020	<0.0010	<0.0010	<0.0050	<0.0010	<0.0020	<0.0020
Total Boron (B)	mg/L	0.050 - 0.25	0.428	0.78	0.222	0.51	<0.25	0.305	0.74	0.7
Total Cadmium (Cd)	mg/L	0.000010 - 0.000050	<0.000010	<0.000020	<0.000010	<0.000010	0.000677	0.000091	<0.000020	0.000021
Total Calcium (Ca)	mg/L	0.050 - 0.25	44.2	415	106	20.2	63	48.4	45.4	42.4
Total Chromium (Cr)	mg/L	0.0010 - 0.0050	<0.0010	0.0038	<0.0010	<0.0010	0.0262	0.0011	<0.0020	<0.0020
Total Cobalt (Co)	mg/L	0.00020 - 0.0010	0.00021	0.00374	0.00084	<0.00020	0.0241	0.00133	<0.00040	<0.00040
Total Copper (Cu)	mg/L	0.00050 - 0.0025	0.00058	<0.0010	0.00183	<0.00050	0.133	0.00389	0.0045	0.0503
Total Iron (Fe)	mg/L	0.010 - 0.050	0.799	4.04	0.588	0.142	44.8	2.91	0.749	0.662
Total Lead (Pb)	mg/L	0.00020 - 0.0010	<0.00020	<0.00040	<0.00020	<0.00020	0.0312	0.00854	0.00054	0.00397
Total Lithium (Li)	mg/L	0.0020 - 0.010	0.0431	0.0135	0.0074	0.0142	0.012	0.0292	0.0554	0.0522
Total Magnesium (Mg)	mg/L	0.050 - 0.25	7.5	45.6	12.3	3.66	14.5	8.55	9.12	8.13
Total Manganese (Mn)	mg/L	0.0010 - 0.0050	0.0343	1.31	0.0911	0.0786	2.14	0.425	0.0442	0.0402
Total Mercury (Hg)	mg/L	0.000002	<0.0000020	-	-	<0.0000020	<0.0000020	<0.0000020	-	-
Total Molybdenum (Mo)	mg/L	0.0010 - 0.0050	<0.0010	<0.0020	<0.0010	0.0013	<0.0050	<0.0010	0.0035	0.0033
Total Nickel (Ni)	mg/L	0.0010 - 0.0050	0.0019	0.0065	0.0014	<0.0010	0.0322	0.0021	<0.0020	<0.0020
Total Potassium (K)	mg/L	0.050 - 0.25	2.51	4.5	1.42	1.56	3.31	3.01	0.99	0.92
Total Selenium (Se)	mg/L	0.00010 - 0.00050	<0.00010	<0.00020	<0.00010	<0.00010	<0.00050	<0.00010	<0.00020	<0.00020
Total Silicon (Si)	mg/L	0.10 - 0.50	5.89	3.31	2.74	5.27	44.4	13.7	5.98	5.54
Total Silver (Ag)	mg/L	0.000020 - 0.00010	<0.000020	<0.000040	<0.000020	<0.000020	<0.00010	<0.000020	<0.000040	<0.000040
Total Sodium (Na)	mg/L	0.050 - 0.25	20.6	84.7	31.3	34.3	35.2	24.4	11.3	10.5
Total Strontium (Sr)	mg/L	0.0010 - 0.0050	0.445	3.89	0.938	0.179	0.417	0.599	0.414	0.4
Total Sulphur (S)	mg/L	3.0 - 15	<3.0	407	96.5	<3.0	<15	<3.0	<6.0	<6.0
Total Thallium (Tl)	mg/L	0.000010 - 0.000050	<0.000010	<0.000020	<0.000010	<0.000010	0.000191	0.000053	<0.000020	<0.000020
Total Tin (Sn)	mg/L	0.0050 - 0.025	<0.0050	<0.010	<0.0050	<0.0050	<0.025	<0.0050	<0.010	<0.010
Total Titanium (Ti)	mg/L	0.0050 - 0.025	0.027	<0.010	<0.0050	<0.0050	0.346	0.0222	<0.010	<0.010
Total Uranium (U)	mg/L	0.00010 - 0.00050	<0.00010	0.0004	<0.00010	<0.00010	0.00523	0.00173	<0.00020	<0.00020
Total Vanadium (V)	mg/L	0.0050 - 0.025	<0.0050	<0.010	<0.0050	<0.0050	0.082	<0.0050	<0.010	<0.010
Total Zinc (Zn)	mg/L	0.0050 - 0.025	<0.0050	<0.010	<0.0050	<0.0050	0.103	0.0102	<0.010	<0.010
Total Zirconium (Zr)	mg/L	0.00010 - 0.00050	0.00011	<0.00020	0.00026	<0.00010	0.00205	0.00129	<0.00020	<0.00020

Table 211
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Total Metals- Groundwater

Parameter	*Units*	**Sample ID**	QU1136S-27FEB19-M	QU1206S-28MAR19-M
		Lab Job ID / Sample ID	B914784 / VH3655	B922898 / VL2356
		Date	2019/02/27	2019/03/28
		RDL		
Total Hardness (CaCO3)	mg/L	0.5	98.5	13.1
Total Aluminum (Al)	mg/L	0.0030 - 0.015	7.93	1.84
Total Antimony (Sb)	mg/L	0.00050 - 0.0025	0.0252	<0.0025
Total Arsenic (As)	mg/L	0.00010 - 0.00050	2.21	0.43
Total Barium (Ba)	mg/L	0.0010 - 0.0050	0.303	0.0904
Total Beryllium (Be)	mg/L	0.00010 - 0.00050	0.0009	<0.00050
Total Bismuth (Bi)	mg/L	0.0010 - 0.0050	<0.0050	<0.0050
Total Boron (B)	mg/L	0.050 - 0.25	<0.25	1.78
Total Cadmium (Cd)	mg/L	0.000010 - 0.000050	0.000589	<0.000050
Total Calcium (Ca)	mg/L	0.050 - 0.25	31.9	3.54
Total Chromium (Cr)	mg/L	0.0010 - 0.0050	0.0068	<0.0050
Total Cobalt (Co)	mg/L	0.00020 - 0.0010	0.0229	<0.0010
Total Copper (Cu)	mg/L	0.00050 - 0.0025	0.0292	<0.0025
Total Iron (Fe)	mg/L	0.010 - 0.050	69.5	0.514
Total Lead (Pb)	mg/L	0.00020 - 0.0010	0.0091	0.001
Total Lithium (Li)	mg/L	0.0020 - 0.010	0.014	0.049
Total Magnesium (Mg)	mg/L	0.050 - 0.25	4.6	1.03
Total Manganese (Mn)	mg/L	0.0010 - 0.0050	0.97	0.0697
Total Mercury (Hg)	mg/L	0.000002	-	<0.0000020
Total Molybdenum (Mo)	mg/L	0.0010 - 0.0050	<0.0050	<0.0050
Total Nickel (Ni)	mg/L	0.0010 - 0.0050	0.02	<0.0050
Total Potassium (K)	mg/L	0.050 - 0.25	0.95	1.17
Total Selenium (Se)	mg/L	0.00010 - 0.00050	<0.00050	<0.00050
Total Silicon (Si)	mg/L	0.10 - 0.50	15.5	9.42
Total Silver (Ag)	mg/L	0.000020 - 0.00010	<0.00010	<0.00010
Total Sodium (Na)	mg/L	0.050 - 0.25	1.12	126
Total Strontium (Sr)	mg/L	0.0010 - 0.0050	0.0403	0.107
Total Sulphur (S)	mg/L	3.0 - 15	<15	<15
Total Thallium (Tl)	mg/L	0.000010 - 0.000050	0.000171	<0.000050
Total Tin (Sn)	mg/L	0.0050 - 0.025	<0.025	<0.025
Total Titanium (Ti)	mg/L	0.0050 - 0.025	0.123	0.05
Total Uranium (U)	mg/L	0.00010 - 0.00050	0.00192	<0.00050
Total Vanadium (V)	mg/L	0.0050 - 0.025	0.05	<0.025
Total Zinc (Zn)	mg/L	0.0050 - 0.025	0.073	<0.025
Total Zirconium (Zr)	mg/L	0.00010 - 0.00050	0.00201	0.00153

Table 212
2018-2019 Annual Report

Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	1M2N-09OCT18-M	1M2N-12FEB19-M	1M2N-19MAR19-M	1M2N-23MAY18-M	1M2N-23MAY18-M Lab-Dup	1M2N-26APR18-M	1M2N-9JUL18-M	1M2N-9JUL18-M Lab-Dup
			Lab Job ID / Sample ID	B888275 / UN0472	B911101 / VF6815	B920565 / VK1831	B839824 / TM5036	B839824 / TM5036	B831668 / TI3950	B856306 / TV2223	B856306 / TV2223
			Date	2018/10/09	2019/02/12	2019/03/19	2018/05/23	2018/05/23	2018/04/26	2018/07/09	2018/07/09
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	<1.0	<1.0	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	1	409	460	459	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	1	498	562	560	-	-	-	-	-
Carbonate (CO3)		mg/L	1	<1.0	<1.0	<1.0	-	-	-	-	-
Hydroxide (OH)		mg/L	1	<1.0	<1.0	<1.0	-	-	-	-	-
Acidity (pH 4.5)		mg/L	1	<1.0	<1.0	<1.0	-	-	-	-	-
Acidity (pH 8.3)		mg/L	1	16	25.9	8.7	-	-	-	-	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	14	16	-	-	-	-	-
Fluoride (F)	2	mg/L	0.020 - 0.20	-	0.11	0.12	-	-	-	-	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	620	1110	1060	-	-	-	-	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.34	0.438	0.392	0.303	-	0.363	0.341	0.329
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	<0.020	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	1.11	-	<0.50	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	0.0697	0.16	-	0.0089	0.0072	0.0396	0.187	0.168
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	0.18	-	-	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	0.074	-	-	0.009	-	0.042	0.2	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	<0.0020	0.0099	0.0063	0.0051	-	0.0031	0.0065	0.006
Total Phosphorus (P)		mg/L	0.002	-	-	0.0086	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	59.4	60	70.8	32.6	-	-	51.7	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	13.7	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 213
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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	1M7S-09JAN19-M	1M7S-09JAN19-M Lab-Dup	1M7S-09OCT18-M	1M7S-12APR18-M	1M7S-12APR18-M Lab-Dup	1M7S-12JUL18-M	1M7S-12JUL18-M Lab-Dup	242MP-27FEB19-M
			Lab Job ID / Sample ID	B902649 / VB7261	B902649 / VB7261	B888275 / UN0471	B827653 / TG7247	B827653 / TG7247	B857925 / TV9661	B857925 / TV9661	B914784 / VH3656
			Date	2019/01/09	2019/01/09	2018/10/09	2018/04/12	2018/04/12	2018/07/12	2018/07/12	2019/02/27
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	-	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	120	-	123	122	-	131	-	96.4
Bicarbonate (HCO3)		mg/L	1	147	-	150	149	-	160	-	118
Carbonate (CO3)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	-	<1.0
Hydroxide (OH)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	-	<1.0
Acidity (pH 4.5)		mg/L	1	<1.0	-	<1.0	<1.0	<1.0	<1.0	-	-
Acidity (pH 8.3)		mg/L	1	2.3	-	3.4	<1.0	<1.0	1.9	-	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	13	-	-	-	-	-	-	<1.0
Fluoride (F)	2	mg/L	0.020 - 0.20	0.41	-	-	-	-	-	-	<0.20
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	183	-	479	242	-	429	-	29.4
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	0.047	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	1.34	1.33	0.322	-	-	-	-	0.147
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	0.069	-	0.064	-	<0.020
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	<0.0019	-	<0.0050	-	-	-	-	0.003
Sulphide (as H2S)		mg/L	0.0019 - 0.40	<0.0020	-	-	-	-	-	-	0.003
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	<0.0053	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0109	-	<0.0020	0.0063	-	<0.0020	-	0.0113
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	0.0033	0.0032	-
Turbidity		NTU	0.10 - 1.0	4.19	-	1.34	7.76	-	5.76	5.63	76.9
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 214
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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	242MW-11SEP18-M	242MW-12DEC18-M	242MW-12DEC18-R	242MW-12JUNE18-M	242MW-12JUNE18-M Lab-Dup	242PS-05JUN18-M	242PS-28MAR19-M	242PS-28MAR19-M Lab-Dup
			Lab Job ID / Sample ID	B878455 / UH4187	B8A8835 / UY4703	B8A8835 / UY4704	B846841 / TQ1946	B846841 / TQ1946	B844466 / TO9040	B922898 / VL2358	B922898 / VL2358
			Date	2018/09/11	2018/12/12	2018/12/12	2018/06/12	2018/06/12	2018/06/05	2019/03/28	2019/03/28
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	-	98.5	98.9	87.5	-	39.6	42.1	-
Bicarbonate (HCO3)		mg/L	1	-	120	121	107	-	48.3	51.3	-
Carbonate (CO3)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	-
Hydroxide (OH)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	-
Acidity (pH 4.5)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	-
Acidity (pH 8.3)		mg/L	1	-	15.9	18.7	7.1	-	1.8	3.4	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	<1.0	1.2	1.4	1.1	-	<1.0	<1.0	-
Fluoride (F)	2	mg/L	0.020 - 0.20	0.041	0.11	0.11	0.097	-	0.026	0.021	0.02
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	72.9	32.1	32.4	35.6	-	71.3	55.2	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.05	0.127	0.096	0.087	-	-	-	-
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	<0.020	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	0.56	-	2.62	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	<0.0050	<0.0038	<0.0019	<0.0050	<0.0050	-	-	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	<0.0040	<0.0020	-	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	<0.0053	-	-	<0.0050	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0022	0.0196	0.0187	-	-	-	0.0047	-
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	11.7	97.1	95.6	96.2	-	1	3.03	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	<4.0	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 215
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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	5M#2-09OCT18-M	5M#2-09OCT18-M Lab-Dup	5M#2-09OCT18-R	5M#2-12FEB19-M	5M#2-12FEB19-M Lab-Dup	5M#2-19MAR19-M	5M#2-19MAR19-M Lab-Dup	5M#2-23MAY18-M
			Lab Job ID / Sample ID	B888275 / UN0470	B888275 / UN0470	B888275 / UN0473	B911101 / VF6816	B911101 / VF6816	B920565 / VK1832	B920565 / VK1832	B839824 / TM5037
			Date	2018/10/09	2018/10/09	2018/10/09	2019/02/12	2019/02/12	2019/03/19	2019/03/19	2018/05/23
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	2.1	-	7.4	<1.0	-	3.6	-	-
Alkalinity (Total as CaCO3)		mg/L	1	518	-	527	499	-	464	-	-
Bicarbonate (HCO3)		mg/L	1	627	-	625	609	-	557	-	-
Carbonate (CO3)		mg/L	1	2.6	-	8.9	<1.0	-	4.3	-	-
Hydroxide (OH)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	-	-
Acidity (pH 4.5)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	-	-
Acidity (pH 8.3)		mg/L	1	<1.0	-	1.2	4	-	1.9	-	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	-	-	9.1	-	8.6	-	-
Fluoride (F)	2	mg/L	0.020 - 0.20	-	-	-	0.089	0.086	0.098	-	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	153	-	151	279	-	234	-	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.147	-	0.135	0.158	-	0.133	-	0.157
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	<0.020	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	-	-	-	1.39
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	0.0106	0.0082	0.0274	0.016	-	-	-	0.0378
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	0.017	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	0.011	-	0.029	-	-	-	-	0.04
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0042	-	0.0031	0.0061	-	0.0036	-	0.0034
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	0.003	-	-
Turbidity		NTU	0.10 - 1.0	5.48	-	1.74	1.78	-	1.23	1.28	1.82
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 216
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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	5M#2-23MAY18-M Lab-Dup	5M#2-26APR18-M	5M#2-26APR18-M Lab-Dup	5M#2-9JUL18-M	5SMW-03DEC18-M	5SMW-28FEB19-M	5SMW-30AUG18-M	5SMW-30AUG18-R
			Lab Job ID / Sample ID	B839824 / TM5037	B831668 / TI3951	B831668 / TI3951	B856306 / TV2224	B8A6041 / UW9541	B914999 / VH4766	B875548 / UF7895	B875548 / UF7896
			Date	2018/05/23	2018/04/26	2018/04/26	2018/07/09	2018/12/03	2019/02/28	2018/08/30	2018/08/30
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	-	-	-	<1.0	4.9	<1.0	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	-	-	-	-	399	376	297	297
Bicarbonate (HCO3)		mg/L	1	-	-	-	-	487	446	362	362
Carbonate (CO3)		mg/L	1	-	-	-	-	<1.0	5.9	<1.0	<1.0
Hydroxide (OH)		mg/L	1	-	-	-	-	<1.0	<1.0	<1.0	<1.0
Acidity (pH 4.5)		mg/L	1	-	-	-	-	<1.0	<1.0	<1.0	<1.0
Acidity (pH 8.3)		mg/L	1	-	-	-	-	17.2	<1.0	9.3	2.9
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	-	-	-	16	13	3.2	3.8
Fluoride (F)	2	mg/L	0.020 - 0.20	-	-	-	-	0.19	0.2	0.19	0.19
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	-	-	-	268	235	182	173
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	-	0.138	-	0.169	0.332	0.338	0.32	0.306
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	<0.020	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	1.19	0.6	0.8	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	0.126	-	0.0379	-	0.041	0.0418	0.0329
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	-	0.044	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	0.13	-	0.04	-	-	0.044	0.035
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0031	0.0028	-	0.0035	0.0235	0.0056	<0.0020	0.0028
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	-	-	2.36	8.43	38.3	40.3	45.2
Total Suspended Solids		mg/L	4.0 - 20	-	4.5	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	7SA54XC-25MAR19-M	7SA54XC-25MAR19-M Lab-Dup	7SA5BRD-26FEB19-M	7SA5BRD-26FEB19-M Lab-Dup	7SA5C-12DEC18-M	7SA5C-12DEC18-M Lab-Dup	7SA5CRD-26FEB19-M	MW001D-20AUG18-M
			Lab Job ID / Sample ID	B922110 / VK8430	B922110 / VK8430	B914784 / VH3657	B914784 / VH3657	B8A9340 / UY7071	B8A9340 / UY7071	B914784 / VH3658	B870604 / UC9950
			Date	2019/03/25	2019/03/25	2019/02/26	2019/02/26	2018/12/13	2018/12/13	2019/02/26	2018/08/20
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	-	<1.0	-	<1.0	-	<1.0	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	179	-	184	-	163	-	187	90.3
Bicarbonate (HCO3)		mg/L	1	218	-	224	-	199	-	228	110
Carbonate (CO3)		mg/L	1	<1.0	-	<1.0	-	<1.0	-	<1.0	<1.0
Hydroxide (OH)		mg/L	1	<1.0	-	<1.0	-	<1.0	-	<1.0	<1.0
Acidity (pH 4.5)		mg/L	1	<1.0	-	<1.0	-	<1.0	-	<1.0	<1.0
Acidity (pH 8.3)		mg/L	1	<1.0	-	<1.0	-	<1.0	-	<1.0	<1.0
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	<1.0	-	<1.0	-	1.1	-	1.4	1.8
Fluoride (F)	2	mg/L	0.020 - 0.20	0.45	-	0.43	-	0.56	0.57	0.6	0.13
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	4.9	-	4.5	-	6.1	-	8.7	27.8
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	-	-	0.246	0.24	-	-	0.61	0.269
Nitrate plus Nitrite (N)	400	mg/L	0.02	<0.020	<0.020	-	-	<0.020	0.02	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	-	-	-	2.89
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	-	0.0052	-	-	-	0.015	<0.0050
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	0.006	-	-	-	0.016	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	-	-	-	-	-	<0.0050
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0675	0.0757	0.0671	-	-	-	0.0483	0.173
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	0.83	-	10.8	-	48	-	2.18	69.8
Total Suspended Solids		mg/L	4.0 - 20	<4.0	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	MW001D-20AUG18-M Lab-Dup	MW001D-20AUG18-R	MW001D-20AUG18-R Lab-Dup	MW001D-21FEB19-M	MW001D-21FEB19-R	MW001D-21FEB19-R Lab-Dup	MW001S-13AUG18-M	MW001S-13AUG18-M Lab-Dup
			Lab Job ID / Sample ID	B870604 / UC9950	B870604 / UC9951	B870604 / UC9951	B913115 / VG5709	B913115 / VG5710	B913115 / VG5710	B868135 / UB6295	B868135 / UB6295
			Date	2018/08/20	2018/08/20	2018/08/20	2019/02/21	2019/02/21	2019/02/21	2018/08/13	2018/08/13
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	-	<1.0	<1.0	-	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	-	89	-	94	93.9	-	327	-
Bicarbonate (HCO3)		mg/L	1	-	109	-	115	115	-	399	-
Carbonate (CO3)		mg/L	1	-	<1.0	-	<1.0	<1.0	-	<1.0	-
Hydroxide (OH)		mg/L	1	-	<1.0	-	<1.0	<1.0	-	<1.0	-
Acidity (pH 4.5)		mg/L	1	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Acidity (pH 8.3)		mg/L	1	-	<1.0	<1.0	<1.0	<1.0	<1.0	27.2	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	1.5	-	1.4	<1.0	<1.0	6.8	-
Fluoride (F)	2	mg/L	0.020 - 0.20	-	0.13	0.13	0.14	0.14	0.14	<0.020	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	27.9	-	26.8	26	25.4	799	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.269	0.269	-	0.208	0.212	-	0.098	-
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	2.19	-	-	-	-	2.67	2.36
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	<0.0050	-	<0.0019	0.0068	-	<0.0050	<0.0050
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	<0.0020	0.007	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	<0.0050	-	-	-	-	<0.0050	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.174	0.176	-	0.173	0.166	-	0.005	0.0049
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	69.7	-	70.8	72.7	-	1.74	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	MW002-06DEC18-M	MW002-06DEC18-M Lab-Dup	MW002-22MAY18-M	MW002-22MAY18-M Lab-Dup	MW002-24APR18-M	MW002-24APR18-M Lab-Dup	MW002-4JUL18-M	MW002-4JUL18-M Lab-Dup
			Lab Job ID / Sample ID	B8A7382 / UX6521	B8A7382 / UX6521	B839351 / TM2525	B839351 / TM2525	B830882 / TI0907	B830882 / TI0907	B855019 / TU6074	B855019 / TU6074
			Date	2018/12/06	2018/12/06	2018/05/22	2018/05/22	2018/04/24	2018/04/24	2018/07/04	2018/07/04
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	257	259	241	-	246	-	244	-
Bicarbonate (HCO3)		mg/L	1	314	316	294	-	300	-	297	-
Carbonate (CO3)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	-
Hydroxide (OH)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	-
Acidity (pH 4.5)		mg/L	1	<1.0	-	<1.0	-	<1.0	-	<1.0	-
Acidity (pH 8.3)		mg/L	1	27.5	-	22.8	-	17.6	-	15.5	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	2.7	-	2.6	-	2.2	-	2.3	2.2
Fluoride (F)	2	mg/L	0.020 - 0.20	0.14	-	0.12	-	0.12	-	0.12	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	1280	-	**1290**	-	1240	-	**1340**	**1330**
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.193	0.193	0.456	0.454	0.221	-	0.199	-
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	1.43	-	0.76	0.92	1.41	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	<0.0019	<0.0019	<0.0050	-	0.0051	-	<0.0050	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	<0.0020	-	-	-	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	<0.0050	-	0.005	-	<0.0050	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0063	-	0.0054	-	0.0037	-	0.0106	0.0105
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	38.4	-	44.1	-	37.3	-	43.6	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	MW002-4JUL18-R	MW002-5SEP18-M	MW002-5SEP18-M Lab-Dup	MW002-7MAR19-M	MW002-7MAR19-M Lab-Dup	MW004-10DEC18-M	MW004-10DEC18-M Lab-Dup	MW004-24APR18-M
			Lab Job ID / Sample ID	B855019 / TU6075	B876239 / UG2164	B876239 / UG2164	B916980 / VI3580	B916980 / VI3580	B8A8061 / UY0307	B8A8061 / UY0307	B830882 / TI0908
			Date	2018/07/04	2018/09/05	2018/09/05	2019/03/07	2019/03/07	2018/12/10	2018/12/10	2018/04/24
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	<1.0	-	<1.0	-	<1.0	-	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	247	239	-	271	-	95.2	-	120
Bicarbonate (HCO3)		mg/L	1	301	291	-	331	-	116	-	146
Carbonate (CO3)		mg/L	1	<1.0	<1.0	-	<1.0	-	<1.0	-	<1.0
Hydroxide (OH)		mg/L	1	<1.0	<1.0	-	<1.0	-	<1.0	-	<1.0
Acidity (pH 4.5)		mg/L	1	<1.0	<1.0	-	<1.0	-	<1.0	-	<1.0
Acidity (pH 8.3)		mg/L	1	15.9	16.5	-	7.9	-	2.6	-	3.3
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	2.9	1.9	-	2.2	-	<1.0	-	<1.0
Fluoride (F)	2	mg/L	0.020 - 0.20	0.12	0.14	-	0.12	-	0.078	-	0.081
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	**1380**	1280	-	**1340**	-	276	-	300
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.162	0.175	0.194	0.201	0.189	0.163	0.163	0.114
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	<0.020	<0.020	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	1.28	-	-	-	-	-	-	26.3
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	<0.0050	<0.0050	-	<0.0019	-	<0.0019	-	0.0074
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	<0.0020	-	<0.0020	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	<0.0050	<0.0053	-	-	-	-	-	0.008
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0064	0.0032	0.0036	0.0046	0.0051	0.0036	0.0038	<0.0020
Total Phosphorus (P)		mg/L	0.002	-	-	-	0.0057	-	-	-	-
Turbidity		NTU	0.10 - 1.0	42	4.4	-	37.1	-	0.27	-	0.23
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 221
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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	MW004-24APR18-M Lab-Dup	MW004-5JUL18-M	MW004-5JUL18-R	MW004-5JUL18-R Lab-Dup	MW004-5SEP18-M	MW004-5SEP18-M Lab-Dup	MW004-7MAR19-M	MW006D-13AUG18-M
			Lab Job ID / Sample ID	B830882 / TI0908	B855218 / TU6907	B855218 / TU6906	B855218 / TU6906	B876239 / UG2165	B876239 / UG2165	B916980 / VI3581	B868135 / UB6296
			Date	2018/04/24	2018/07/05	2018/07/05	2018/07/05	2018/09/05	2018/09/05	2019/03/07	2018/08/13
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	<1.0	-	<1.0	-	<1.0	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	-	151	154	-	168	-	120	79.8
Bicarbonate (HCO3)		mg/L	1	-	184	188	-	204	-	146	97.4
Carbonate (CO3)		mg/L	1	-	<1.0	<1.0	-	<1.0	-	<1.0	<1.0
Hydroxide (OH)		mg/L	1	-	<1.0	<1.0	-	<1.0	-	<1.0	<1.0
Acidity (pH 4.5)		mg/L	1	-	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0
Acidity (pH 8.3)		mg/L	1	-	3.7	3.5	-	1.8	2	<1.0	<1.0
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	2.5	<1.0	-	<1.0	-	<1.0	<1.0
Fluoride (F)	2	mg/L	0.020 - 0.20	0.08	0.085	0.085	-	0.096	-	0.084	0.1
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	304	286	-	373	-	296	12
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	-	0.09	0.152	0.137	0.186	0.172	0.35	0.087
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	0.031	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	1.85	1.99	-	-	-	-	1.09
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	0.0095	0.0073	-	<0.0050	<0.0050	<0.0019	<0.0050
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	-	-	<0.0020	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	0.01	0.008	-	<0.0053	-	-	<0.0050
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	-	0.0023	0.0139	-	0.0027	0.003	0.0035	0.163
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	0.0066	-
Turbidity		NTU	0.10 - 1.0	-	0.75	0.35	-	0.37	-	0.92	0.39
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	MW006D-13AUG18-M Lab-Dup	MW006D-13MAR19-M	MW006S-14MAR19-M	MW006S-20AUG18-M	MW006S-20AUG18-M Lab-Dup	QU0810-13DEC18-M	QU0810-25MAR19-M	QU0813A-05JUN18-M
			Lab Job ID / Sample ID	B868135 / UB6296	B918963 / VJ2994	B918963 / VJ2995	B870604 / UC9952	B870604 / UC9952	B8A9329 / UY6902	B922099 / VK8272	B844466 / TO9039
			Date	2018/08/13	2019/03/13	2019/03/14	2018/08/20	2018/08/20	2018/12/13	2019/03/25	2018/06/05
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	-	84	158	155	-	173	144	181
Bicarbonate (HCO3)		mg/L	1	-	102	193	189	-	211	176	221
Carbonate (CO3)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0
Hydroxide (OH)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0
Acidity (pH 4.5)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0
Acidity (pH 8.3)		mg/L	1	-	<1.0	1.3	9.1	-	<1.0	1.1	<1.0
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	<1.0	4	3.6	-	<1.0	<1.0	8.8
Fluoride (F)	2	mg/L	0.020 - 0.20	0.1	<0.20	<0.20	0.06	-	0.58	0.75	0.71
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	12.7	519	573	-	14.5	15.5	37
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	-	0.229	0.33	0.313	-	0.084	0.222	0.225
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	2.08	2.02	-	-	0.59
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	<0.0019	<0.0019	<0.0050	-	<0.0019	0.027	0.169
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	<0.0020	<0.0020	-	-	<0.0020	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	-	<0.0050	-	-	**0.029**	**0.18**
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	-	0.157	0.0558	0.0516	-	0.0178	0.109	-
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	0.41	0.35	0.64	0.64	-	23.3	2.03	1.29
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU0813A-05JUN18-R	QU0813A-05JUN18-R Lab-Dup	QU0813A-11SEP18-M	QU0813A-11SEP18-M Lab-Dup	QU0813A-13DEC18-M	QU0813A-13DEC18-R	QU0813A-25MAR19-M	QU0813A-25MAR19-R
			Lab Job ID / Sample ID	B844466 / TO9041	B844466 / TO9041	B878455 / UH4186	B878455 / UH4186	B8A9340 / UY7068	B8A9340 / UY7069	B922099 / VK8269	B922099 / VK8270
			Date	2018/06/05	2018/06/05	2018/09/11	2018/09/11	2018/12/13	2018/12/13	2019/03/25	2019/03/25
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	-	<1.0	-	1.4	<1.0	<1.0	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	180	-	178	-	181	178	182	183
Bicarbonate (HCO3)		mg/L	1	220	-	217	-	217	217	222	224
Carbonate (CO3)		mg/L	1	<1.0	-	<1.0	-	1.7	<1.0	<1.0	<1.0
Hydroxide (OH)		mg/L	1	<1.0	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Acidity (pH 4.5)		mg/L	1	<1.0	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Acidity (pH 8.3)		mg/L	1	<1.0	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	8.4	-	7.8	-	8.9	9	12	12
Fluoride (F)	2	mg/L	0.020 - 0.20	0.7	-	0.76	-	0.74	0.75	0.73	0.73
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	32.6	-	30	-	32.3	36.7	27.5	27.6
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.209	-	<0.20	-	0.207	0.155	0.26	0.259
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	0.88	0.71	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	0.0443	-	0.119	0.115	0.15	0.098	0.14	0.098
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	0.16	0.1	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	**0.047**	-	**0.13**	-	-	-	**0.15**	**0.1**
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	0.0775	-	0.0805	0.0884	0.0826	0.0944
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	1.35	-	1.4	-	3.71	3.26	5.33	4.29
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU0813A-25MAR19-R Lab-Dup	QU0813B-05JUN18-M	QU0813B-05JUN18-M Lab-Dup	QU0813B-13DEC18-M	QU0813B-25MAR19-M	QU0821D-14MAR19-M	QU0821GD-11JUNE18-M	QU0821GD-22NOV18-M
			Lab Job ID / Sample ID	B922099 / VK8270	B844466 / TO9038	B844466 / TO9038	B8A9340 / UY7070	B922099 / VK8271	B918963 / VJ2999	B846843 / TQ1965	B8A3046 / UV3662
			Date	2019/03/25	2018/06/05	2018/06/05	2018/12/13	2019/03/25	2019/03/14	2018/06/11	2018/11/22
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	-	125	-	122	124	213	192	196
Bicarbonate (HCO3)		mg/L	1	-	152	-	149	152	260	234	239
Carbonate (CO3)		mg/L	1	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0
Hydroxide (OH)		mg/L	1	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0
Acidity (pH 4.5)		mg/L	1	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0
Acidity (pH 8.3)		mg/L	1	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	2.8
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	1.4	-	1	1.1	930	100	150
Fluoride (F)	2	mg/L	0.020 - 0.20	-	0.36	-	0.37	0.38	1.1	1.7	1.7
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	91.9	-	42.5	42.3	<1.0	1	<1.0
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.255	0.135	0.145	0.168	0.267	0.609	0.205	0.228
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	1.03	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	0.0122	-	0.036	0.019	0.076	0.0361	0.057
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	0.038	-	0.08	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	0.013	-	-	0.02	-	**0.038**	**0.061**
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0959	-	-	0.141	0.022	0.038	-	0.163
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	7.98	-	464	78.1	5.46	1.41	7.62
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU0821GD-22NOV18-M Lab-Dup	QU0821GD-29AUG18-M	QU0821GD-29AUG18-R	QU0821GD-29AUG18-R Lab-Dup	QU0821GS-22NOV18-M	QU0821GS-22NOV18-M Lab-Dup	QU0821GS-28MAY18-M	QU0821GS-29AUG18-M
			Lab Job ID / Sample ID	B8A3046 / UV3662	B874648 / UF2994	B874648 / UF2995	B874648 / UF2995	B8A3046 / UV3663	B8A3046 / UV3663	B842311 / TN8521	B874648 / UF2996
			Date	2018/11/22	2018/08/29	2018/08/29	2018/08/29	2018/11/22	2018/11/22	2018/05/28	2018/08/29
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	<1.0	-	<1.0	-	<1.0	4.5
Alkalinity (Total as CaCO3)		mg/L	1	-	186	183	-	207	-	213	197
Bicarbonate (HCO3)		mg/L	1	-	227	223	-	253	-	260	229
Carbonate (CO3)		mg/L	1	-	<1.0	<1.0	-	<1.0	-	<1.0	5.4
Hydroxide (OH)		mg/L	1	-	<1.0	<1.0	-	<1.0	-	<1.0	<1.0
Acidity (pH 4.5)		mg/L	1	-	<1.0	<1.0	-	<1.0	-	<1.0	<1.0
Acidity (pH 8.3)		mg/L	1	-	<1.0	<1.0	-	9.8	-	7.4	<1.0
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	960	960	-	1200	-	1100	120
Fluoride (F)	2	mg/L	0.020 - 0.20	-	1.1	1.1	1.1	0.6	-	1	1.8
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	<1.0	<1.0	-	<1.0	-	<1.0	<1.0
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.228	0.41	0.371	-	0.476	-	0.53	0.244
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	-	-	1.18	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	0.0634	0.0716	-	0.07	0.0717	0.0896	0.0495
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	**0.067**	**0.076**	-	**0.074**	-	**0.095**	**0.053**
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.164	0.0374	0.0445	-	0.207	-	-	0.155
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	8.41	8.87	-	31.8	-	10.2	1.36
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU0821GS-29AUG18-M Lab-Dup	QU0821S-14MAR19-M	QU1008D-21MAR19-M	QU1008D-29MAR18-M	QU1008D-29MAR18-M Lab-Dup	QU1008D-29MAR18-R	QU1008D-29MAR18-R Lab-Dup	QU1009D-14JUNE18-M
			Lab Job ID / Sample ID	B874648 / UF2996	B918963 / VJ2998	B920859 / VK3148	B823846 / TE8768	B823846 / TE8768	B823846 / TE8769	B823846 / TE8769	B847743 / TQ7294
			Date	2018/08/29	2019/03/14	2019/03/21	2018/03/29	2018/03/29	2018/03/29	2018/03/29	2018/06/14
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	7.3	7	-	6.7	-	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	-	205	301	260	-	259	-	158
Bicarbonate (HCO3)		mg/L	1	-	250	349	300	-	300	-	193
Carbonate (CO3)		mg/L	1	-	<1.0	8.8	8.4	-	8	-	<1.0
Hydroxide (OH)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Acidity (pH 4.5)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0
Acidity (pH 8.3)		mg/L	1	-	<1.0	<1.0	<1.0	-	<1.0	<1.0	1.2
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	130	7.5	5.2	-	4.1	-	1.7
Fluoride (F)	2	mg/L	0.020 - 0.20	-	1.6	**2.4**	1.9	-	1.9	-	0.18
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	<1.0	6.8	3.6	-	4.6	-	99.9
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.23	0.399	0.216	0.156	0.146	0.177	-	0.157
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	3.12	-	2.86	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	0.12	0.12	<0.0050	-	<0.0050	-	0.112
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	0.12	0.12	-	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	-	<0.0050	-	<0.0050	-	**0.12**
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.157	0.0958	0.255	0.164	0.163	0.165	-	-
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	2.1	63.5	177	-	212	-	3.93
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1009D-14JUNE18-M Lab-Dup	QU1009D-14JUNE18-R	QU1009D-19MAR19-M	QU1009D-19MAR19-R	QU1009D-20DEC18-M	QU1009D-20DEC18-M Lab-Dup	QU1009S-14JUNE18-M	QU1009S-14JUNE18-R
			Lab Job ID / Sample ID	B847743 / TQ7294	B847743 / TQ7295	B920565 / VK1836	B920565 / VK1837	B8B1299 / UZ6912	B8B1299 / UZ6912	B847743 / TQ7296	B847743 / TQ7297
			Date	2018/06/14	2018/06/14	2019/03/19	2019/03/19	2018/12/20	2018/12/20	2018/06/14	2018/06/14
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	3.3	<1.0	<1.0	<1.0	-	<1.0	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	-	182	185	180	177	-	130	157
Bicarbonate (HCO3)		mg/L	1	-	215	226	219	215	-	159	192
Carbonate (CO3)		mg/L	1	-	3.9	<1.0	<1.0	<1.0	-	<1.0	<1.0
Hydroxide (OH)		mg/L	1	-	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
Acidity (pH 4.5)		mg/L	1	-	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
Acidity (pH 8.3)		mg/L	1	-	<1.0	<1.0	<1.0	2.3	-	3.2	1.2
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	2.2	1.6	1.6	1.5	-	1.1	1.4
Fluoride (F)	2	mg/L	0.020 - 0.20	-	0.25	0.25	0.24	0.22	0.22	0.065	0.16
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	81.5	80.1	82.1	81.4	-	124	115
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	-	0.189	0.221	0.199	0.155	-	0.177	0.119
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	0.111	0.123	0.1	0.1	0.098	-	0.0225	0.0051
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	0.1	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	**0.13**	-	-	-	-	**0.024**	<0.0053
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	0.01	0.0254	0.0227	-	-	-
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	4.23	5.23	290	8.29	-	35.6	24.2
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1009S-14JUNE18-R Lab-Dup	QU1009S-20DEC18-M	QU1009S-20DEC18-M Lab-Dup	QU1009S-20DEC18-R	QU1010D-28NOV18-M	QU1010D-28NOV18-M Lab-Dup	QU1010D-29MAY18-M	QU1010D-29MAY18-M Lab-Dup
			Lab Job ID / Sample ID	B847743 / TQ7297	B8B1299 / UZ6913	B8B1299 / UZ6913	B8B1299 / UZ6914	B8A5198 / UW5084	B8A5198 / UW5084	B841665 / TN5354	B841665 / TN5354
			Date	2018/06/14	2018/12/20	2018/12/20	2018/12/20	2018/11/28	2018/11/28	2018/05/29	2018/05/29
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	-	<1.0	<1.0	-	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	-	157	-	157	86.3	-	92.3	-
Bicarbonate (HCO3)		mg/L	1	-	191	-	192	105	-	113	-
Carbonate (CO3)		mg/L	1	-	<1.0	-	<1.0	<1.0	-	<1.0	-
Hydroxide (OH)		mg/L	1	-	<1.0	-	<1.0	<1.0	-	<1.0	-
Acidity (pH 4.5)		mg/L	1	-	<1.0	-	<1.0	<1.0	-	<1.0	-
Acidity (pH 8.3)		mg/L	1	-	4.1	-	<1.0	19.4	-	10.8	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	<1.0	-	<1.0	**3400**	**3400**	**1600**	-
Fluoride (F)	2	mg/L	0.020 - 0.20	0.16	0.067	-	0.069	<0.020	-	<0.020	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	109	-	111	<1.0	<1.0	<1.0	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.124	0.075	0.095	0.096	0.623	-	0.75	0.746
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	-	-	<0.50	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	<0.0019	-	0.0068	<0.0050	-	0.0072	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	<0.0020	-	0.007	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	-	-	<0.0050	-	0.008	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	-	0.0213	-	0.02	0.0994	-	0.0521	-
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	38.2	-	0.23	91.8	-	-	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1010S-28NOV18-M	QU1010S-28NOV18-R	QU1010S-29MAY18-M	QU1010S-29MAY18-M Lab-Dup	QU1011D-12FEB19-M	QU1011S-12FEB19-M	QU1011S-12FEB19-M Lab-Dup	QU1011S-12FEB19-R
			Lab Job ID / Sample ID	B8A5198 / UW5082	B8A5198 / UW5083	B841665 / TN5353	B841665 / TN5353	B911101 / VF6814	B911101 / VF6812	B911101 / VF6812	B911101 / VF6813
			Date	2018/11/28	2018/11/28	2018/05/29	2018/05/29	2019/02/12	2019/02/12	2019/02/12	2019/02/12
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	<1.0	1.6	-	<1.0	<1.0	-	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	153	154	151	-	350	81.2	-	81.6
Bicarbonate (HCO3)		mg/L	1	187	187	180	-	427	99.1	-	99.6
Carbonate (CO3)		mg/L	1	<1.0	<1.0	2	-	<1.0	<1.0	-	<1.0
Hydroxide (OH)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	<1.0	-	<1.0
Acidity (pH 4.5)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	<1.0	-	<1.0
Acidity (pH 8.3)		mg/L	1	<1.0	<1.0	<1.0	-	7.6	2.2	-	2
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	3.2	3.1	3.8	-	670	2.4	-	1.8
Fluoride (F)	2	mg/L	0.020 - 0.20	0.57	0.58	0.56	-	0.25	0.081	-	0.082
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	11.4	10.6	13.5	-	<1.0	6.5	-	5.8
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.201	0.213	0.237	-	0.375	0.068	0.067	0.082
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	0.79	0.65	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	<0.0050	<0.0050	0.0981	0.0858	0.061	<0.0019	<0.0019	<0.0019
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	0.064	<0.0020	-	<0.0020
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	<0.0050	<0.0050	**0.1**	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0482	0.0465	0.0475	-	0.0684	0.0112	-	0.0132
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	91.6	97	-	-	1150	1.45	-	1.47
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1013D-14MAR19-M	QU1013D-14MAR19-R	QU1013D-17DEC18-M	QU1013D-17DEC18-M Lab-Dup	QU1013D-25JUNE18-M	QU1013D-25JUNE18-R	QU1013D-25JUNE18-R Lab-Dup	QU1013D-25SEP18-M
			Lab Job ID / Sample ID	B918963 / VJ2997	B918963 / VJ2996	B8B0153 / UZ0847	B8B0153 / UZ0847	B851378 / TS6722	B851378 / TS6723	B851378 / TS6723	B883650 / UK4380
			Date	2019/03/14	2019/03/14	2018/12/17	2018/12/17	2018/06/25	2018/06/25	2018/06/25	2018/09/25
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	3.8	6.8	<1.0	-	<1.0	<1.0	-	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	515	510	600	-	483	480	-	462
Bicarbonate (HCO3)		mg/L	1	619	606	732	-	590	585	-	564
Carbonate (CO3)		mg/L	1	4.6	8.1	<1.0	-	<1.0	<1.0	-	<1.0
Hydroxide (OH)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	<1.0	-	<1.0
Acidity (pH 4.5)		mg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0
Acidity (pH 8.3)		mg/L	1	<1.0	<1.0	10.3	10.9	11.9	9.7	-	8.4
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	57	51	130	-	17	17	-	22
Fluoride (F)	2	mg/L	0.020 - 0.20	<0.20	<0.20	0.18	-	0.094	0.098	-	0.12
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	765	787	164	-	659	654	-	581
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.409	0.368	0.236	-	0.271	0.296	0.276	0.414
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	0.58	1.27	1.21	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	0.13	0.13	0.0058	-	<0.0050	<0.0050	-	0.432
Sulphide (as H2S)		mg/L	0.0019 - 0.40	0.14	0.14	0.006	-	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	-	-	<0.0050	<0.0050	-	0.46
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0136	0.0116	0.0134	-	0.0068	0.0159	0.017	0.015
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	6.06	6.2	2.13	-	-	-	-	4.87
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1013D-25SEP18-M Lab-Dup	QU1101-19MAR19-M	QU1101-19MAR19-M Lab-Dup	QU1101-19MAR19-R	QU1101-29MAR18-M	QU1105D-11DEC18-M	QU1105D-11DEC18-R	QU1105D-11DEC18-R Lab-Dup
			Lab Job ID / Sample ID	B883650 / UK4380	B920565 / VK1834	B920565 / VK1834	B920565 / VK1835	B823846 / TE8770	B8A8837 / UY4711	B8A8837 / UY4714	B8A8837 / UY4714
			Date	2018/09/25	2019/03/19	2019/03/19	2019/03/19	2018/03/29	2018/12/11	2018/12/11	2018/12/11
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	-	3.3	-	2	82	370	368	-
Bicarbonate (HCO3)		mg/L	1	-	4.1	-	2.4	100	451	449	-
Carbonate (CO3)		mg/L	1	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	-
Hydroxide (OH)		mg/L	1	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	-
Acidity (pH 4.5)		mg/L	1	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	-
Acidity (pH 8.3)		mg/L	1	-	140	-	108	105	<1.0	<1.0	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	3.7	-	3.4	3.8	1300	1300	-
Fluoride (F)	2	mg/L	0.020 - 0.20	-	0.35	0.36	0.37	0.2	0.042	0.041	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	1540	-	1470	1380	126	143	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	-	0.424	-	0.426	0.274	0.476	0.18	0.171
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	1.79	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	<0.019	-	-	0.0674	5.3	14	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	-	5.6	15	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	-	-	0.072	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0133	0.0153	-	0.0107	0.0203	0.649	0.677	0.663
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	232	-	302	174	50.8	49.7	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1105D-11JUNE18-M	QU1105D-11JUNE18-M Lab-Dup	QU1105D-12MAR19-M	QU1105D-12MAR19-R	QU1105D-12MAR19-R Lab-Dup	QU1105D-18SEP18-M	QU1105S-11DEC18-M	QU1105S-11DEC18-M Lab-Dup
			Lab Job ID / Sample ID	B846832 / TQ1904	B846832 / TQ1904	B918176 / VI9170	B918176 / VI9171	B918176 / VI9171	B881174 / UJ0380	B8A8837 / UY4712	B8A8837 / UY4712
			Date	2018/06/11	2018/06/11	2019/03/12	2019/03/12	2019/03/12	2018/09/18	2018/12/11	2018/12/11
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	304	-	116	118	-	299	242	-
Bicarbonate (HCO3)		mg/L	1	371	-	142	144	-	365	295	-
Carbonate (CO3)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	<1.0	-
Hydroxide (OH)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	<1.0	-
Acidity (pH 4.5)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	<1.0	-
Acidity (pH 8.3)		mg/L	1	<1.0	-	1.5	1.4	-	<1.0	2	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	1200	-	1.4	1.4	-	1200	2.1	1.9
Fluoride (F)	2	mg/L	0.020 - 0.20	0.026	0.025	0.22	0.2	-	0.036	0.24	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	220	-	79.2	79	-	182	131	129
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.513	-	0.18	0.123	0.122	0.341	0.213	-
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	12.9	-	0.11	0.11	-	7.39	0.099	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	0.12	0.12	-	-	0.11	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	**14**	-	-	-	-	**7.9**	-	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	0.0103	0.0119	-	0.377	0.0287	-
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	79	-	0.81	0.99	-	1.7	4.8	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1105S-11DEC18-R	QU1105S-11JUNE18-M	QU1105S-12MAR19-M	QU1105S-12MAR19-R	QU1105S-18SEP18-M	QU1105S-18SEP18-M Lab-Dup	QU1105S-18SEP18-R	QU1105S-18SEP18-R Lab-Dup
			Lab Job ID / Sample ID	B8A8837 / UY4713	B846832 / TQ1903	B918176 / VI9169	B918176 / VI9168	B881174 / UJ0378	B881174 / UJ0378	B881174 / UJ0379	B881174 / UJ0379
			Date	2018/12/11	2018/06/11	2019/03/12	2019/03/12	2018/09/18	2018/09/18	2018/09/18	2018/09/18
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	<1.0	<1.0	2.8	<1.0	-	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	236	113	314	319	96.3	-	96.3	-
Bicarbonate (HCO3)		mg/L	1	288	138	383	382	117	-	117	-
Carbonate (CO3)		mg/L	1	<1.0	<1.0	<1.0	3.3	<1.0	-	<1.0	-
Hydroxide (OH)		mg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-
Acidity (pH 4.5)		mg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-
Acidity (pH 8.3)		mg/L	1	4.5	<1.0	<1.0	<1.0	<1.0	-	<1.0	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	2.1	1.9	1400	1400	2.3	-	1.6	1.7
Fluoride (F)	2	mg/L	0.020 - 0.20	0.24	0.18	0.025	0.027	0.2	-	0.2	0.2
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	143	73.7	214	214	56.5	-	55	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.184	0.111	0.452	0.42	0.083	0.077	0.052	-
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	1.28	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	0.076	0.128	39	42	0.119	-	0.104	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	0.081	-	42	45	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	**0.14**	-	-	**0.13**	-	**0.11**	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0257	-	0.259	0.265	0.0237	-	0.0351	-
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	5.47	2.4	70.2	81.6	3.05	-	2.95	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1109M-16MAY18-M	QU1109M-16MAY18-M Lab-Dup	QU1109M-18MAR19-M	QU1109M-18MAR19-R	QU1109M-18MAR19-R Lab-Dup	QU11-09M-21JUNE18-M	QU1109M-23APR18-M	QU1109M-23APR18-M Lab-Dup
			Lab Job ID / Sample ID	B838491 / TL6687	B838491 / TL6687	B920160 / VJ9900	B920160 / VJ9902	B920160 / VJ9902	B850438 / TS1969	B830402 / TH8947	B830402 / TH8947
			Date	2018/05/16	2018/05/16	2019/03/18	2019/03/18	2019/03/18	2018/06/21	2018/04/23	2018/04/23
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	5.9	-	4.8	4.6	-	9.7	9.7	-
Alkalinity (Total as CaCO3)		mg/L	1	446	-	464	459	-	543	446	-
Bicarbonate (HCO3)		mg/L	1	530	-	554	549	-	638	520	-
Carbonate (CO3)		mg/L	1	7.1	-	5.8	5.6	-	11.7	11.7	-
Hydroxide (OH)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	<1.0	-
Acidity (pH 4.5)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	<1.0	-
Acidity (pH 8.3)		mg/L	1	<1.0	-	<1.0	<1.0	-	4.9	<1.0	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	67	-	44	48	-	69	48	-
Fluoride (F)	2	mg/L	0.020 - 0.20	0.1	-	0.58	0.58	0.58	0.11	0.42	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	852	-	212	207	-	845	397	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.323	-	0.459	0.374	-	0.329	0.66	0.51
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	1.19	1.21	-	-	-	0.91	1.01	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	0.025	-	0.34	0.41	-	<0.0050	0.213	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	0.026	-	0.36	0.44	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	-	-	-	<0.0050	0.23	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0036	-	0.0536	0.058	-	0.0022	0.0455	0.0463
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	221	-	1.66	1.36	-	68	1.47	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU11-09M-27NOV18-M	QU11-09M-27NOV18-M Lab-Dup	QU11-09M-30JUL18-M	QU11-09M-30JUL18-R	QU11-09M-30JUL18-R Lab-Dup	QU1109S-18MAR19-M	QU1109S-18MAR19-M Lab-Dup	QU1109S-18MAR19-R
			Lab Job ID / Sample ID	B8A4251 / UW0398	B8A4251 / UW0398	B863627 / TZ1092	B863627 / TZ1090	B863627 / TZ1090	B920160 / VJ9899	B920160 / VJ9899	B920160 / VJ9901
			Date	2018/11/27	2018/11/27	2018/07/30	2018/07/30	2018/07/30	2019/03/18	2019/03/18	2019/03/18
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	-	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	498	-	531	532	-	462	-	466
Bicarbonate (HCO3)		mg/L	1	608	-	648	649	-	564	-	569
Carbonate (CO3)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	-	<1.0
Hydroxide (OH)		mg/L	1	<1.0	-	<1.0	<1.0	-	<1.0	-	<1.0
Acidity (pH 4.5)		mg/L	1	<1.0	-	<1.0	<1.0	<1.0	<1.0	-	<1.0
Acidity (pH 8.3)		mg/L	1	16.9	-	16.8	18.6	18.1	10.2	-	11.1
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	67	-	56	59	60	44	-	44
Fluoride (F)	2	mg/L	0.020 - 0.20	0.12	0.12	0.1	0.1	-	0.11	-	0.11
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	719	-	804	874	861	712	-	685
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.253	-	0.294	0.296	-	0.388	0.449	0.518
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	0.0591	-	0.0579	0.0594	-	0.061	-	0.073
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	-	0.065	-	0.077
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	0.063	-	0.062	0.063	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.006	-	0.0037	0.0063	-	0.0058	-	0.0068
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	118	-	150	118	-	47.4	-	50.8
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU11-09S-21JUNE18-M	QU11-09S-21JUNE18-R	QU11-09S-21JUNE18-R Lab-Dup	QU11-09S-27NOV18-M	QU11-09S-27NOV18-M Lab-Dup	QU11-09S-30JUL18-M	QU11-09S-30JUL18-M Lab-Dup	QU1118D-26MAR19-M
			Lab Job ID / Sample ID	B850438 / TS1970	B850438 / TS1968	B850438 / TS1968	B8A4251 / UW0397	B8A4251 / UW0397	B863627 / TZ1091	B863627 / TZ1091	B922110 / VK8431
			Date	2018/06/21	2018/06/21	2018/06/21	2018/11/27	2018/11/27	2018/07/30	2018/07/30	2019/03/26
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	13.8	9.8	-	7.4	-	10.6	-	<1.0
Alkalinity (Total as CaCO3)		mg/L	1	438	435	-	440	-	427	-	143
Bicarbonate (HCO3)		mg/L	1	501	507	-	519	-	495	-	174
Carbonate (CO3)		mg/L	1	16.6	11.7	-	8.9	-	12.8	-	<1.0
Hydroxide (OH)		mg/L	1	<1.0	<1.0	-	<1.0	-	<1.0	-	<1.0
Acidity (pH 4.5)		mg/L	1	<1.0	<1.0	-	<1.0	-	<1.0	-	<1.0
Acidity (pH 8.3)		mg/L	1	<1.0	<1.0	-	<1.0	-	1.4	-	<1.0
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	44	44	-	44	-	38	-	<1.0
Fluoride (F)	2	mg/L	0.020 - 0.20	0.5	0.51	-	0.64	-	0.49	-	1.1
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	357	363	-	273	-	353	-	3.1
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.374	0.378	-	0.294	-	0.41	0.426	-
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	<0.020
Dissolved Organic Carbon (C)		mg/L	0.5	<0.50	<0.50	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	0.414	0.38	-	1.13	-	0.414	0.389	0.094
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	-	-	-	0.1
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	**0.44**	**0.4**	-	**1.2**	-	**0.44**	-	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0727	0.074	0.0747	0.0621	0.0569	0.0834	0.0837	0.0618
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	1.43	1.92	-	1.52	1.62	2.47	-	8.78
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	10.4

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1118D-26MAR19-M Lab-Dup	QU1118S-28MAR19-M	QU1128-6MAR19-M	QU1128-6MAR19-M Lab-Dup	QU1136D-27FEB19-M	QU1136D-27FEB19-R	QU1136S-27FEB19-M	QU12065-28MAR19-M
			Lab Job ID / Sample ID	B922110 / VK8431	B922898 / VL2357	B916980 / VI3579	B916980 / VI3579	B914784 / VH3653	B914784 / VH3654	B914784 / VH3655	B922898 / VL2356
			Date	2019/03/26	2019/03/28	2019/03/06	2019/03/06	2019/02/27	2019/02/27	2019/02/27	2019/03/28
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	-	-	<1.0	<1.0	<1.0	7.1
Alkalinity (Total as CaCO3)		mg/L	1	-	126	-	-	161	161	77.4	288
Bicarbonate (HCO3)		mg/L	1	-	154	-	-	196	197	94.4	334
Carbonate (CO3)		mg/L	1	-	<1.0	-	-	<1.0	<1.0	<1.0	8.6
Hydroxide (OH)		mg/L	1	-	<1.0	-	-	<1.0	<1.0	<1.0	<1.0
Acidity (pH 4.5)		mg/L	1	<1.0	<1.0	<1.0	-	-	-	-	<1.0
Acidity (pH 8.3)		mg/L	1	<1.0	<1.0	<1.0	-	-	-	-	<1.0
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	2	<1.0	-	1	<1.0	<1.0	5.1
Fluoride (F)	2	mg/L	0.020 - 0.20	1.1	0.11	0.35	-	0.69	0.69	<0.20	2
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	8.8	1.6	-	11.1	11.1	7.8	1.4
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	-	-	1.38	-	0.237	0.322	0.128	-
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	0.07	<0.020	-	<0.020	<0.020	<0.020	<0.020
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	<0.0095	0.16	0.16	0.017	0.029	0.15	0.016
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	0.18	-	0.018	0.031	0.16	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	<0.0095	-	-	-	-	-	0.017
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	-	0.0605	0.057	-	0.148	0.141	0.003	0.102
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	2540	960	-	7.84	8.97	223	17.6
Total Suspended Solids		mg/L	4.0 - 20	-	3630	-	-	-	-	-	55.2

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU12065-28MAR19-M Lab-Dup	QU1410-03DEC18-M	QU1410-03DEC18-M Lab-Dup	QU1410-15MAY18-M	QU1410-15MAY18-M Lab-Dup	QU1410-15MAY18-R	QU1410-18JUNE18-M	QU1410-18JUNE18-M Lab-Dup
			Lab Job ID / Sample ID	B922898 / VL2356	B8A6044 / UW9543	B8A6044 / UW9543	B837597 / TL1587	B837597 / TL1587	B837597 / TL1586	B849375 / TR5949	B849375 / TR5949
			Date	2019/03/28	2018/12/03	2018/12/03	2018/05/15	2018/05/15	2018/05/15	2018/06/18	2018/06/18
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	-	<1.0	-	<1.0	-	<1.0	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	-	280	-	291	-	293	301	-
Bicarbonate (HCO3)		mg/L	1	-	341	-	355	-	357	368	-
Carbonate (CO3)		mg/L	1	-	<1.0	-	<1.0	-	<1.0	<1.0	-
Hydroxide (OH)		mg/L	1	-	<1.0	-	<1.0	-	<1.0	<1.0	-
Acidity (pH 4.5)		mg/L	1	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	-
Acidity (pH 8.3)		mg/L	1	<1.0	8.2	-	30.6	31	35.9	15.2	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	-	5.5	5.5	6	-	6.2	5.7	-
Fluoride (F)	2	mg/L	0.020 - 0.20	-	0.16	-	0.17	0.17	0.16	0.17	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	-	1690	1720	2000	-	1980	1940	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	-	0.205	0.204	0.19	-	0.18	0.24	0.234
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	-	2.65	2.44	0.73	0.7	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	-	<0.0050	-	<0.0019	-	<0.0019	<0.0050	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	<0.0020	-	<0.0020	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	<0.0050	-	-	-	-	<0.0050	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	-	0.0093	0.0084	0.0147	0.0149	0.0162	-	-
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	-	20.5	-	23.9	-	21.6	11.8	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	**Sample ID**	QU1410-18JUNE18-R	QU1410-18JUNE18-R Lab-Dup	QU1410-19APR18-M	QU1410-19APR18-R	QU1410-23JUL18-M	QU1410-23JUL18-M Lab-Dup	QU1410-24SEP18-M	QU1410-24SEP18-M Lab-Dup
			Lab Job ID / Sample ID	B849375 / TR5948	B849375 / TR5948	B829696 / TH5881	B829696 / TH5880	B861068 / TX6942	B861068 / TX6942	B882926 / UK0566	B882926 / UK0566
			Date	2018/06/18	2018/06/18	2018/04/19	2018/04/19	2018/07/23	2018/07/23	2018/09/24	2018/09/24
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	-	<1.0	<1.0	<1.0	-	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	304	-	285	283	298	-	304	-
Bicarbonate (HCO3)		mg/L	1	371	-	348	345	363	-	370	-
Carbonate (CO3)		mg/L	1	<1.0	-	<1.0	<1.0	<1.0	-	<1.0	-
Hydroxide (OH)		mg/L	1	<1.0	-	<1.0	<1.0	<1.0	-	<1.0	-
Acidity (pH 4.5)		mg/L	1	<1.0	-	<1.0	<1.0	<1.0	-	<1.0	-
Acidity (pH 8.3)		mg/L	1	5.5	-	15.5	19.8	46	-	26	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	5.7	-	6.6	5.8	5.9	-	5.4	-
Fluoride (F)	2	mg/L	0.020 - 0.20	0.17	-	0.18	0.17	0.17	-	0.16	-
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	1990	-	1870	1930	1960	-	1860	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.216	-	0.138	0.238	0.335	0.331	0.298	0.285
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	1.59	-	2.05	0.98	-	-	2.05	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	<0.0050	<0.0050	<0.0050	0.0067	<0.0050	-	0.0077	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	-	-	-	-	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	<0.0050	-	<0.0050	0.007	<0.0050	-	0.008	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	0.0157	0.0118	0.0246	-	0.0158	0.0157
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	14.4	-	24.8	23.6	14.9	-	19.8	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Inorganic - Groundwater

Parameter	*Criteria* [1]	*Units*	Sample ID	QU1410-26FEB19-M	QU1410-26FEB19-R	QU1410-28AUG18-M	QU1410-28AUG18-M Lab-Dup	QU1410-29OCT18-M	QU1410-29OCT18-M Lab-Dup	QU1410-30JAN19-M	QU1410-30JAN19-M Lab-Dup
			Lab Job ID / Sample ID	B914369 / VH1672	B914369 / VH1673	B873571 / UE7144	B873571 / UE7144	B896119 / UR6045	B896119 / UR6045	B908125 / VE3038	B908125 / VE3038
			Date	2019/02/26	2019/02/26	2018/08/28	2018/08/28	2018/10/29	2018/10/29	2019/01/30	2019/01/30
			RDL								
Alkalinity (PP as CaCO3)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	-
Alkalinity (Total as CaCO3)		mg/L	1	306	309	310	-	299	-	308	-
Bicarbonate (HCO3)		mg/L	1	373	377	379	-	365	-	375	-
Carbonate (CO3)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	-
Hydroxide (OH)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	-
Acidity (pH 4.5)		mg/L	1	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	-
Acidity (pH 8.3)		mg/L	1	5.7	8.2	9.9	-	26.4	-	21.8	-
Bromide (Br)		mg/L		-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1500	mg/L	1.0 - 100	5.9	5.5	5.2	-	5.2	-	5.8	-
Fluoride (F)	2	mg/L	0.020 - 0.20	0.18	0.18	0.67	-	0.19	-	0.19	0.19
Dissolved Sulphate (SO4)	1280 @ 30 mg/L hardness	mg/L	1.0 - 10	1780	1770	1940	-	1790	-	1990	-
Biochemical Oxygen Demand		mg/L		-	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Nitrogen (N)		mg/L	0.020 - 0.20	0.215	-	0.3	0.304	0.471	0.484	0.271	0.256
Nitrate plus Nitrite (N)	400	mg/L	0.02	-	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.5	-	-	<0.50	-	1.66	-	-	-
Total Organic Carbon (C)		mg/L		-	-	-	-	-	-	-	-
Total Sulphide		mg/L	0.0019 - 0.38	<0.0019	<0.0019	<0.0050	-	<0.0050	-	<0.0050	-
Sulphide (as H2S)		mg/L	0.0019 - 0.40	<0.0020	<0.0020	-	-	-	-	-	-
Total Sulphide (as H2S)	0.02	mg/L	0.0019 - 0.27	-	-	<0.0050	-	<0.0050	-	<0.0050	-
Dissolved Phosphorus (P)		mg/L	0.0020 - 0.020	0.0129	-	0.0025	0.0025	0.0079	0.0077	-	-
Total Phosphorus (P)		mg/L	0.002	-	-	-	-	-	-	-	-
Turbidity		NTU	0.10 - 1.0	17.8	17.9	16.1	-	16.9	-	17.7	-
Total Suspended Solids		mg/L	4.0 - 20	-	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	1M2N-09OCT18-M	1M2N-12FEB19-M	1M2N-19MAR19-M	1M2N-23MAY18-M	1M2N-26APR18-M	1M2N-9JUL18-M
			Lab Job ID / Sample ID	B888275 / UN0472	B911101 / VF6815	B920565 / VK1831	B839824 / TM5036	B831668 / TI3950	B856306 / TV2223
			Date	2018/10/09	2019/02/12	2019/03/19	2018/05/23	2018/04/26	2018/07/09
			RDL						
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	-	0.27	0.28	-	-	-
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	<0.50	<0.50	<1.0	-	-	<1.0
Nitrite (N)	0.2	mg/L	0.005	-	-	<0.0050	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	<0.020	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	<0.50	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	0.33	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	0.383	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	1M7S-09JAN19-M	1M7S-09OCT18-M	1M7S-12APR18-M	1M7S-12APR18-M Lab-Dup	1M7S-12JUL18-M	242MP-27FEB19-M	242MW-11SEP18-M
			Lab Job ID / Sample ID	B902649 / VB7261	B888275 / UN0471	B827653 / TG7247	B827653 / TG7247	B857925 / TV9661	B914784 / VH3656	B878455 / UH4187
			Date	2019/01/09	2018/10/09	2018/04/12	2018/04/12	2018/07/12	2019/02/27	2018/09/11
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.031	-	-	-	-	-	0.01
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	-	FIELD	FIELD	LAB
Total Ammonia (N)	1.31	mg/L	0.02	-	-	0.026	0.033	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	0.0039	0.004	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	0.8	<0.50	-	-	-	<0.50	<0.50
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	<0.0050	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	<0.020	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	242MW-11SEP18-M	242MW-12DEC18-M	242MW-12DEC18-R	242MW-12JUNE18-M	242PS-05JUN18-M	242PS-28MAR19-M	5M#2-09OCT18-M
			Lab Job ID / Sample ID	B878455 / UJ0386	B8A8835 / UY4703	B8A8835 / UY4704	B846841 / TQ1946	B844466 / TO9040	B922898 / VL2358	B888275 / UN0470
			Date	2018/09/11	2018/12/12	2018/12/12	2018/06/12	2018/06/05	2019/03/28	2018/10/09
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	-	<0.010	0.018	<0.010	0.025	0.026	-
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	0.0095	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	<0.0020	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	<0.50	0.51	-	-	1.5	<0.50
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	<0.0050	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	<0.020	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	1.5	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	<0.015	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	0.758	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	5M#2-09OCT18-R	5M#2-12FEB19-M	5M#2-19MAR19-M	5M#2-23MAY18-M	5M#2-26APR18-M	5M#2-9JUL18-M	5SMW-03DEC18-M
			Lab Job ID / Sample ID	B888275 / UN0473	B911101 / VF6816	B920565 / VK1832	B839824 / TM5037	B831668 / TI3951	B856306 / TV2224	B8A6041 / UW9541
			Date	2018/10/09	2019/02/12	2019/03/19	2018/05/23	2018/04/26	2018/07/09	2018/12/03
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	-	0.064	0.052	-	-	-	0.081
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	<0.50	<0.50	0.78	-	-	<0.50	2.1
Nitrite (N)	0.2	mg/L	0.005	-	-	<0.0050	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	<0.020	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	<0.50	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	0.061	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	0.124	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	5SMW-28FEB19-M	5SMW-28FEB19-M Lab-Dup	5SMW-30AUG18-M	5SMW-30AUG18-R	7SA54XC-25MAR19-M	7SA54XC-25MAR19-M Lab-Dup	7SA5BRD-26FEB19-M
			Lab Job ID / Sample ID	B914999 / VH4766	B914999 / VH4766	B875548 / UF7895	B875548 / UF7896	B922110 / VK8430	B922110 / VK8430	B914784 / VH3657
			Date	2019/02/28	2019/02/28	2018/08/30	2018/08/30	2019/03/25	2019/03/25	2019/02/26
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	<0.010	-	0.031	0.031	<0.010	-	<0.010
Filter and HNO3 Preservation		N/A		FIELD	-	FIELD	FIELD	FIELD	-	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	0.0054	-	-	-	0.0841	-	0.0564
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	2.1	2.1	2.4	1.9	1.4	-	<0.50
Nitrite (N)	0.2	mg/L	0.005	<0.0050	-	-	-	0.008	0.0078	-
Nitrate (N)	400	mg/L	0.02	<0.020	-	-	-	<0.020	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	1.3	-	-	-	1	-	0.95
Total Ammonia (N)	1.31	mg/L	0.015	0.24	-	-	-	0.19	0.2	0.17
Total Nitrogen (N)		mg/L	0.020 - 0.20	0.375	-	-	-	0.245	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	174	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	7SA5BRD-26FEB19-M Lab-Dup	7SA5C-12DEC18-M	7SA5C-12DEC18-M Lab-Dup	7SA5CRD-26FEB19-M	MW001D-20AUG18-M	MW001D-20AUG18-R	MW001D-21FEB19-M
			Lab Job ID / Sample ID	B914784 / VH3657	B8A9340 / UY7071	B8A9340 / UY7071	B914784 / VH3658	B870604 / UC9950	B870604 / UC9951	B913115 / VG5709
			Date	2019/02/26	2018/12/13	2018/12/13	2019/02/26	2018/08/20	2018/08/20	2019/02/21
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	-	<0.010	-	<0.010	0.013	0.013	<0.010
Filter and HNO3 Preservation		N/A		-	FIELD	-	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	0.28	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	0.0607	-	-	0.0711	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	-	-	1	-	-	2.1
Nitrite (N)	0.2	mg/L	0.005	-	0.0194	0.0187	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	<0.020	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	2.1	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	0.47	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	MW001D-21FEB19-M Lab-Dup	MW001D-21FEB19-R	MW001S-13AUG18-M	MW002-06DEC18-M	MW002-22MAY18-M	MW002-22MAY18-M Lab-Dup	MW002-24APR18-M
			Lab Job ID / Sample ID	B913115 / VG5709	B913115 / VG5710	B868135 / UB6295	B8A7382 / UX6521	B839351 / TM2525	B839351 / TM2525	B830882 / TI0907
			Date	2019/02/21	2019/02/21	2018/08/13	2018/12/06	2018/05/22	2018/05/22	2018/04/24
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	-	<0.010	0.11	0.24	0.26	0.26	0.31
Filter and HNO3 Preservation		N/A		-	FIELD	FIELD	FIELD	FIELD	-	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	2.3	2.9	-	0.75	-	-	-
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	MW002-4JUL18-M	MW002-4JUL18-R	MW002-5SEP18-M	MW002-7MAR19-M	MW002-7MAR19-M Lab-Dup	MW004-10DEC18-M	MW004-10DEC18-M Lab-Dup
			Lab Job ID / Sample ID	B855019 / TU6074	B855019 / TU6075	B876239 / UG2164	B916980 / VI3580	B916980 / VI3580	B8A8061 / UY0307	B8A8061 / UY0307
			Date	2018/07/04	2018/07/04	2018/09/05	2019/03/07	2019/03/07	2018/12/10	2018/12/10
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.2	0.19	0.17	0.22	-	0.055	0.055
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	-	FIELD	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	-	0.69	1	-	1.8	2.1
Nitrite (N)	0.2	mg/L	0.005	-	-	-	<0.0050	<0.0050	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	<0.020	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	0.44	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	MW004-24APR18-M	MW004-5JUL18-M	MW004-5JUL18-R	MW004-5SEP18-M	MW004-7MAR19-M	MW006D-13AUG18-M	MW006D-13MAR19-M
			Lab Job ID / Sample ID	B830882 / TI0908	B855218 / TU6907	B855218 / TU6906	B876239 / UG2165	B916980 / VI3581	B868135 / UB6296	B918963 / VJ2994
			Date	2018/04/24	2018/07/05	2018/07/05	2018/09/05	2019/03/07	2018/08/13	2019/03/13
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.074	0.057	0.06	0.076	0.044	0.058	<0.010
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	LAB	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	-	-	2.8	1.6	-	0.53
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	<0.0050	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	0.031	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	0.023	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	MW006S-14MAR19-M	MW006S-20AUG18-M	QU0810-13DEC18-M	QU0810-25MAR19-M	QU0813A-05JUN18-M	QU0813A-05JUN18-R	QU0813A-11SEP18-M
			Lab Job ID / Sample ID	B918963 / VJ2995	B870604 / UC9952	B8A9329 / UY6902	B922099 / VK8272	B844466 / TO9039	B844466 / TO9041	B878455 / UH4186
			Date	2019/03/14	2018/08/20	2018/12/13	2019/03/25	2018/06/05	2018/06/05	2018/09/11
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.13	0.12	<0.010	<0.010	0.019	0.018	<0.010
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	0.044	0.042	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	1.8	-	<0.50	1	-	-	<0.50
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU0813A-13DEC18-M	QU0813A-13DEC18-R	QU0813A-25MAR19-M	QU0813A-25MAR19-R	QU0813B-05JUN18-M	QU0813B-13DEC18-M	QU0813B-25MAR19-M
			Lab Job ID / Sample ID	B8A9340 / UY7068	B8A9340 / UY7069	B922099 / VK8269	B922099 / VK8270	B844466 / TO9038	B8A9340 / UY7070	B922099 / VK8271
			Date	2018/12/13	2018/12/13	2019/03/25	2019/03/25	2018/06/05	2018/12/13	2019/03/25
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.013	0.011	0.015	0.022	0.021	<0.010	0.012
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	0.066	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	0.53	0.55	0.72	0.66	-	0.9	0.93
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU0813B-25MAR19-M Lab-Dup	QU0821D-14MAR19-M	QU0821GD-11JUNE18-M	QU0821GD-22NOV18-M	QU0821GD-29AUG18-M	QU0821GD-29AUG18-R	QU0821GS-22NOV18-M
			Lab Job ID / Sample ID	B922099 / VK8271	B918963 / VJ2999	B846843 / TQ1965	B8A3046 / UV3662	B874648 / UF2994	B874648 / UF2995	B8A3046 / UV3663
			Date	2019/03/25	2019/03/14	2018/06/11	2018/11/22	2018/08/29	2018/08/29	2018/11/22
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.012	1.4	0.14	0.19	1.4	1.4	1.8
Filter and HNO3 Preservation		N/A		-	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	0.082	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	2.8	<2.5	0.54	1.1	1.1	17
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU0821GS-28MAY18-M	QU0821GS-29AUG18-M	QU0821S-14MAR19-M	QU1008D-21MAR19-M	QU1008D-29MAR18-M	QU1008D-29MAR18-R	QU1009D-14JUNE18-M
			Lab Job ID / Sample ID	B842311 / TN8521	B874648 / UF2996	B918963 / VJ2998	B920859 / VK3148	B823846 / TE8768	B823846 / TE8769	B847743 / TQ7294
			Date	2018/05/28	2018/08/29	2019/03/14	2019/03/21	2018/03/29	2018/03/29	2018/06/14
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	1.6	0.17	0.16	0.016	<0.010	<0.010	0.024
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	0.0703	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	0.012
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	0.99	0.74	7	-	-	-
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1009D-14JUNE18-M Lab-Dup	QU1009D-14JUNE18-R	QU1009D-19MAR19-M	QU1009D-19MAR19-R	QU1009D-20DEC18-M	QU1009S-14JUNE18-M	QU1009S-14JUNE18-R
			Lab Job ID / Sample ID	B847743 / TQ7294	B847743 / TQ7295	B920565 / VK1836	B920565 / VK1837	B8B1299 / UZ6912	B847743 / TQ7296	B847743 / TQ7297
			Date	2018/06/14	2018/06/14	2019/03/19	2019/03/19	2018/12/20	2018/06/14	2018/06/14
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.023	0.021	0.032	0.021	0.015	0.035	0.037
Filter and HNO3 Preservation		N/A		-	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	0.012	-	-	-	0.0089	0.0097
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	-	0.63	0.81	-	-	-
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	0.11	0.094	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1009S-20DEC18-M	QU1009S-20DEC18-R	QU1009S-20DEC18-R Lab-Dup	QU1010D-28NOV18-M	QU1010D-29MAY18-M	QU1010S-28NOV18-M	QU1010S-28NOV18-R
			Lab Job ID / Sample ID	B8B1299 / UZ6913	B8B1299 / UZ6914	B8B1299 / UZ6914	B8A5198 / UW5084	B841665 / TN5354	B8A5198 / UW5082	B8A5198 / UW5083
			Date	2018/12/20	2018/12/20	2018/12/20	2018/11/28	2018/05/29	2018/11/28	2018/11/28
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.027	0.029	0.028	4.7	4.5	<0.010	<0.010
Filter and HNO3 Preservation		N/A		FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	-	-	<5.0	-	0.53	1.4
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1010S-28NOV18-R Lab-Dup	QU1010S-29MAY18-M	QU1011D-12FEB19-M	QU1011S-12FEB19-M	QU1011S-12FEB19-R	QU1013D-14MAR19-M	QU1013D-14MAR19-M Lab-Dup
			Lab Job ID / Sample ID	B8A5198 / UW5083	B841665 / TN5353	B911101 / VF6814	B911101 / VF6812	B911101 / VF6813	B918963 / VJ2997	B918963 / VJ2997
			Date	2018/11/28	2018/05/29	2019/02/12	2019/02/12	2019/02/12	2019/03/14	2019/03/14
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	-	<0.010	1.2	<0.010	<0.010	0.23	-
Filter and HNO3 Preservation		N/A		-	FIELD	FIELD	FIELD	FIELD	FIELD	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	1.5	-	3.2	<0.50	0.51	1.2	1.3
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1013D-14MAR19-R	QU1013D-17DEC18-M	QU1013D-25JUNE18-M	QU1013D-25JUNE18-M Lab-Dup	QU1013D-25JUNE18-R	QU1013D-25SEP18-M	QU1101-19MAR19-M
			Lab Job ID / Sample ID	B918963 / VJ2996	B8B0153 / UZ0847	B851378 / TS6722	B851378 / TS6722	B851378 / TS6723	B883650 / UK4380	B920565 / VK1834
			Date	2019/03/14	2018/12/17	2018/06/25	2018/06/25	2018/06/25	2018/09/25	2019/03/19
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.23	0.27	0.15	0.13	0.13	0.16	0.3
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	-	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	0.62	-	-	-	-	-	2.2
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	0.34
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1101-19MAR19-R	QU1101-29MAR18-M	QU1105D-11DEC18-M	QU1105D-11DEC18-R	QU1105D-11JUNE18-M	QU1105D-12MAR19-M	QU1105D-12MAR19-R
			Lab Job ID / Sample ID	B920565 / VK1835	B823846 / TE8770	B8A8837 / UY4711	B8A8837 / UY4714	B846832 / TQ1904	B918176 / VI9170	B918176 / VI9171
			Date	2019/03/19	2018/03/29	2018/12/11	2018/12/11	2018/06/11	2019/03/12	2019/03/12
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.3	0.31	2.1	2.2	2.1	<0.010	0.031
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	0.37	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	1.6	-	3.4	3.4	<2.5	1.8	1.7
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	0.36	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1105D-18SEP18-M	QU1105S-11DEC18-M	QU1105S-11DEC18-R	QU1105S-11JUNE18-M	QU1105S-12MAR19-M	QU1105S-12MAR19-R	QU1105S-12MAR19-R Lab-Dup
			Lab Job ID / Sample ID	B881174 / UJ0380	B8A8837 / UY4712	B8A8837 / UY4713	B846832 / TQ1903	B918176 / VI9169	B918176 / VI9168	B918176 / VI9168
			Date	2018/09/18	2018/12/11	2018/12/11	2018/06/11	2019/03/12	2019/03/12	2019/03/12
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	2.2	0.013	0.016	0.011	2.1	2.1	2.1
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	0.011	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	<5.0	1.2	1.2	-	<5.0	<5.0	-
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1105S-18SEP18-M	QU1105S-18SEP18-R	QU1109M-16MAY18-M	QU1109M-18MAR19-M	QU1109M-18MAR19-M Lab-Dup	QU1109M-18MAR19-R	QU11-09M-21JUNE18-M
			Lab Job ID / Sample ID	B881174 / UJ0378	B881174 / UJ0379	B838491 / TL6687	B920160 / VJ9900	B920160 / VJ9900	B920160 / VJ9902	B850438 / TS1969
			Date	2018/09/18	2018/09/18	2018/05/16	2019/03/18	2019/03/18	2019/03/18	2018/06/21
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	<0.010	0.011	0.25	0.084	0.091	0.091	0.29
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	1.3	1.1	-	1.5	-	1.2	-
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU11-09M-21JUNE18-M Lab-Dup	QU1109M-23APR18-M	QU1109M-23APR18-M Lab-Dup	QU11-09M-27NOV18-M	QU11-09M-30JUL18-M	QU11-09M-30JUL18-R	QU1109S-18MAR19-M
			Lab Job ID / Sample ID	B850438 / TS1969	B830402 / TH8947	B830402 / TH8947	B8A4251 / UW0398	B863627 / TZ1092	B863627 / TZ1090	B920160 / VJ9899
			Date	2018/06/21	2018/04/23	2018/04/23	2018/11/27	2018/07/30	2018/07/30	2019/03/18
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.28	0.19	0.17	0.24	0.26	0.26	0.18
Filter and HNO3 Preservation		N/A		-	FIELD	-	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	-	-	0.84	<1.0	<1.0	1.2
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

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Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1109S-18MAR19-R	QU11-09S-21JUNE18-M	QU11-09S-21JUNE18-R	QU11-09S-27NOV18-M	QU11-09S-30JUL18-M	QU1118D-26MAR19-M	QU1118D-26MAR19-M Lab-Dup
			Lab Job ID / Sample ID	B920160 / VJ9901	B850438 / TS1970	B850438 / TS1968	B8A4251 / UW0397	B863627 / TZ1091	B922110 / VK8431	B922110 / VK8431
			Date	2019/03/18	2018/06/21	2018/06/21	2018/11/27	2018/07/30	2019/03/26	2019/03/26
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.19	0.15	0.2	0.1	0.13	<0.010	-
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	0.0785	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	1.4	-	-	0.79	1.5	0.77	0.93
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	<0.0050	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	<0.020	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	0.64	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	0.21	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	<0.20	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	156	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 263
2018-2019 Annual Report

Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1118S-28MAR19-M	QU1128-6MAR19-M	QU1128-6MAR19-M Lab-Dup	QU1136D-27FEB19-M	QU1136D-27FEB19-R	QU1136S-27FEB19-M	QU12065-28MAR19-M
			Lab Job ID / Sample ID	B922898 / VL2357	B916980 / VI3579	B916980 / VI3579	B914784 / VH3653	B914784 / VH3654	B914784 / VH3655	B922898 / VL2356
			Date	2019/03/28	2019/03/06	2019/03/06	2019/02/27	2019/02/27	2019/02/27	2019/03/28
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	<0.010	<0.010	-	-	-	-	<0.010
Filter and HNO3 Preservation		N/A		FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	1.32	0.187	-	-	-	-	0.156
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	<0.50	3.1	-	<0.50	<0.50	<0.50	2.1
Nitrite (N)	0.2	mg/L	0.005	0.0093	<0.0050	-	<0.0050	<0.0050	<0.0050	0.017
Nitrate (N)	400	mg/L	0.02	0.06	<0.020	-	<0.020	<0.020	<0.020	<0.020
Total Organic Carbon (C)		mg/L	0.50 - 10	<10	2.9	-	-	-	-	2.2
Total Ammonia (N)	1.31	mg/L	0.015	0.28	1.3	-	-	-	-	0.12
Total Nitrogen (N)		mg/L	0.020 - 0.20	0.752	1.47	1.42	-	-	-	0.238
Alkalinity (PP as CaCO3)		mg/L	10	-	<10	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	250	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	300	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	<10	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	<10	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 264
2018-2019 Annual Report

Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1410-03DEC18-M	QU1410-15MAY18-M	QU1410-15MAY18-R	QU1410-18JUNE18-M	QU1410-18JUNE18-R	QU1410-18JUNE18-R Lab-Dup	QU1410-19APR18-M
			Lab Job ID / Sample ID	B8A6044 / UW9543	B837597 / TL1587	B837597 / TL1586	B849375 / TR5949	B849375 / TR5948	B849375 / TR5948	B829696 / TH5881
			Date	2018/12/03	2018/05/15	2018/05/15	2018/06/18	2018/06/18	2018/06/18	2018/04/19
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.34	0.43	0.44	0.39	0.38	0.4	0.44
Filter and HNO3 Preservation		N/A		FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	0.0064	<0.0040	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	<0.50	-	-	-	-	-	-
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 265
2018-2019 Annual Report

Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1410-19APR18-R	QU1410-19APR18-R Lab-Dup	QU1410-23JUL18-M	QU1410-24SEP18-M	QU1410-26FEB19-M	QU1410-26FEB19-R	QU1410-28AUG18-M
			Lab Job ID / Sample ID	B829696 / TH5880	B829696 / TH5880	B861068 / TX6942	B882926 / UK0566	B914369 / VH1672	B914369 / VH1673	B873571 / UE7144
			Date	2018/04/19	2018/04/19	2018/07/23	2018/09/24	2019/02/26	2019/02/26	2018/08/28
			RDL							
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.45	0.46	0.31	0.34	0.31	0.31	0.34
Filter and HNO3 Preservation		N/A		FIELD	-	FIELD	FIELD	FIELD	FIELD	FIELD
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-	-	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-	-	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	-	-	-	-	-	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	-	2.3	-	1.1	-	-
Nitrite (N)	0.2	mg/L	0.005	-	-	-	-	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-	-	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-	-	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-	-	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-	-	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-	-	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-	-	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-	-	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-	-	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-	-	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 266
2018-2019 Annual Report

Other Parameters - Groundwater

Parameter	*Criteria1*	*Units*	**Sample ID**	QU1410-29OCT18-M	QU1410-30JAN19-M	QU1410-30JAN19-M Lab-Dup
			Lab Job ID / Sample ID	B896119 / UR6045	B908125 / VE3038	B908125 / VE3038
			Date	2018/10/29	2019/01/30	2019/01/30
			RDL			
Dissolved Bromide (Br)		mg/L	0.010 - 0.10	0.36	0.75	0.73
Filter and HNO3 Preservation		N/A		FIELD	FIELD	-
Total Ammonia (N)	1.31	mg/L	0.02	-	-	-
Total Phosphorus (P)		mg/L	0.0020 - 0.020	-	-	-
Dissolved Phosphorus (P)		mg/L	0.0010 - 0.0040	-	<0.0010	-
Dissolved Organic Carbon (C)		mg/L	0.50 - 5.0	-	0.72	-
Nitrite (N)	0.2	mg/L	0.005	-	-	-
Nitrate (N)	400	mg/L	0.02	-	-	-
Total Organic Carbon (C)		mg/L	0.50 - 10	-	-	-
Total Ammonia (N)	1.31	mg/L	0.015	-	-	-
Total Nitrogen (N)		mg/L	0.020 - 0.20	-	-	-
Alkalinity (PP as CaCO3)		mg/L	10	-	-	-
Alkalinity (Total as CaCO3)		mg/L	10	-	-	-
Bicarbonate (HCO3)		mg/L	10	-	-	-
Carbonate (CO3)		mg/L	10	-	-	-
Hydroxide (OH)		mg/L	10	-	-	-
Total Dissolved Solids		mg/L	10	-	-	-

Legend	
Exceeds one Criteria	**Result**
DL > Criteria	Result
Criteria 1- Applies only to ex-situ wells.	**BC CSR Aquatic Life 2019 - LOW**

Table 267
2018-2019 Annual Report

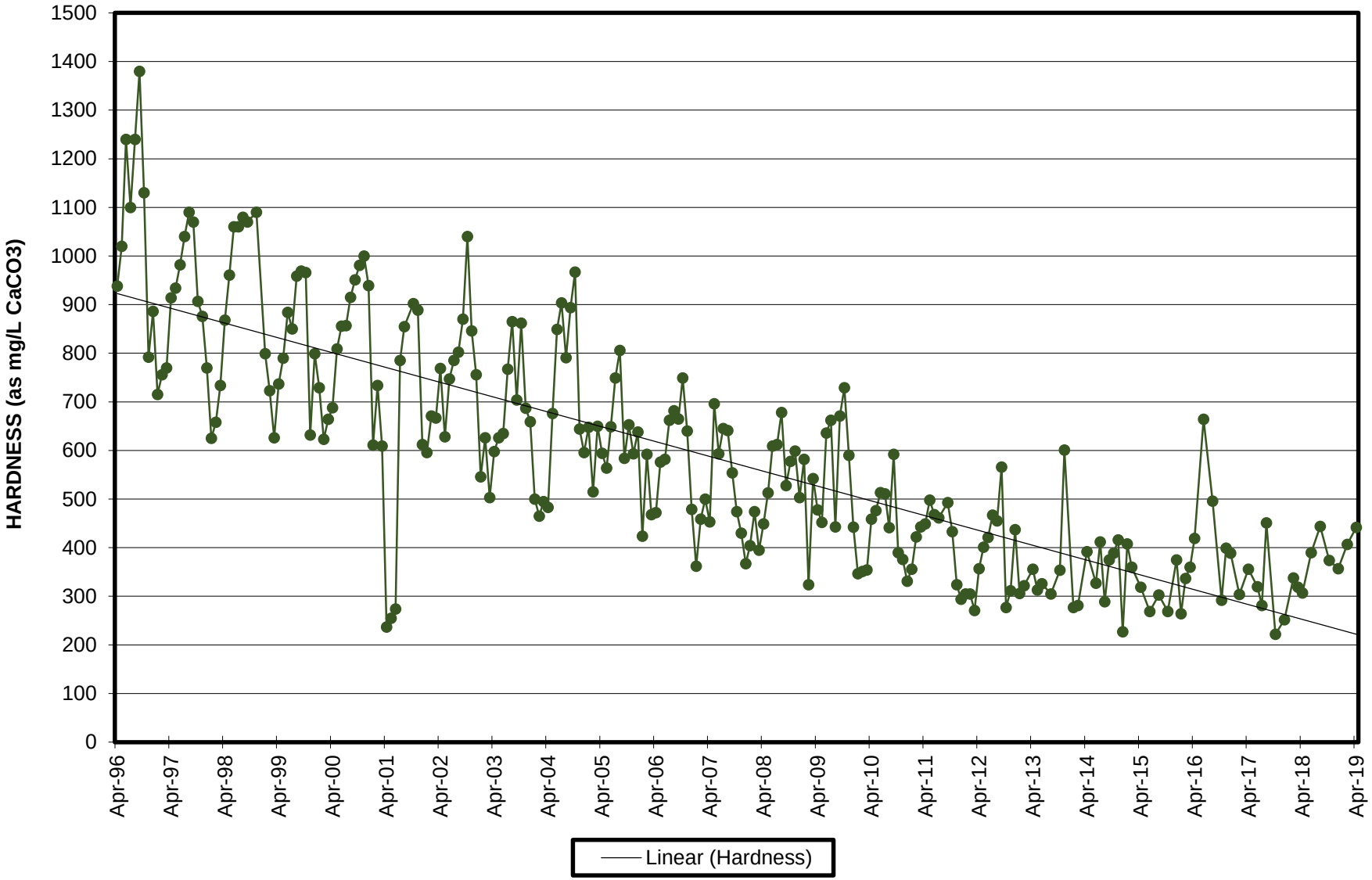
EMS ID		E292110										
Site Description		Sump that collects surface runnoff from coal pad and mine water from underground. Water is pumped to 5S mine pool then to 2N.										
Site Name		7-South Adit / Portal Sump (7SPS)										
Date		19-Apr-18	15-May-18	5-Jun-18	3-Jul-18	8-Aug-18	4-Sep-18	1-Oct-18	13-Nov-18	10-Dec-18	10-Jan-19	21-Mar-19
Parameter	Unit											
SO4-D	mg/L	291	310	316	1080	944	599	415	442	224	87.4	401
Alk-T	mg/L	73.3	141	172	<1.0	<1.0	103	13.4	6.7	108	57.8	147
Acidity83	mg/L	3.1	8.3	4.7	222	53.4	8.5	26.1	29.1	1.2	1.3	1.1
Al-T	mg/L	0.700	0.497	0.652	4.22	0.629	0.862	1.69	2.75	9.48	2.00	1.73
As-T	mg/L	0.00437	0.00253	0.00334	0.00171	0.00082	0.00706	0.00408	0.00637	0.0284	0.00430	0.0308
Ba-T	mg/L	0.0336	0.0400	0.0276	0.0417	0.0392	0.0455	0.0302	0.031	0.112	0.0223	0.0839
B-T	mg/L	0.168	0.233	0.092	0.40	0.65	0.63	0.133	<0.25	0.147	<0.050	0.483
Cd-T	mg/L	0.000030	0.000012	0.000012	0.000827	0.000270	0.000083	0.000154	0.000149	0.000088	0.000028	0.000021
Ca-T	mg/L	102	129	128	219	249	201	125	136	110	36.1	167
Cr-T	mg/L	<0.0010	<0.0010	0.0010	0.0169	<0.0050	<0.0020	0.0031	<0.0050	0.0123	0.0025	0.0033
Co-T	mg/L	0.00668	0.00223	0.00172	0.0984	0.0449	0.0114	0.0252	0.0275	0.0123	0.00367	0.00718
Cu-T	mg/L	0.00296	0.00185	0.00320	0.152	0.0213	0.0086	0.0128	0.0203	0.0460	0.00899	0.00981
Hard-T	mg/L	353	437	446	765	888	694	431	498	356	119	547
Fe-T	mg/L	6.02	1.57	2.23	78.6	32.5	11.5	17.1	35.9	16.4	3.89	6.50
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	0.00064	<0.0010	<0.00040	0.00031	<0.0010	0.00323	0.00051	0.00059
Mg-T	mg/L	24.0	27.8	30.7	52.8	64.4	46.8	29.2	38.3	19.7	7.06	31.6
Mn-T	mg/L	0.420	0.274	0.230	1.63	1.21	0.440	0.921	0.881	0.307	0.149	0.417
Hg-T	mg/L	<0.0000020	0.0000023	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000074
Mo-T	mg/L	0.0013	0.0016	<0.0010	<0.0020	<0.0050	<0.0020	<0.0010	<0.0050	0.0031	<0.0010	0.0048
Ni-T	mg/L	0.0121	0.0055	0.0040	0.150	0.0776	0.0225	0.0431	0.0473	0.0175	0.0065	0.0136
K-T	mg/L	1.91	2.14	1.79	2.87	3.99	3.23	1.73	1.58	4.27	0.984	3.75
S-T	mg/L	107	106	113	315	323	229	148	180	80.2	25.4	146
Se-T	mg/L	0.00014	<0.00010	<0.00010	<0.00020	<0.00050	<0.00020	0.00025	<0.00050	0.00033	0.00010	0.00012
Si-T	mg/L	5.87	6.21	6.23	8.03	5.07	5.17	6.25	9.28	16.1	6.19	6.16
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000040	<0.00010	<0.000040	<0.000020	<0.00010	0.000025	<0.000020	<0.000020
Na-T	mg/L	11.2	18.8	20.4	21.0	30.1	22.0	10.9	9.29	41.1	3.41	27.1
Sr-T	mg/L	0.463	0.663	0.517	1.26	1.52	1.34	0.513	0.49	0.473	0.137	1.08
Zn-T	mg/L	0.0207	0.0072	0.0083	0.375	0.197	0.044	0.0682	0.1	0.0414	0.0121	0.0122
Al-D	mg/L	0.0046	0.0050	0.0039	4.22	0.583	0.0053	0.0218	0.0071	0.0063	0.0240	<0.0030
As-D	mg/L	0.00124	0.00112	0.00160	0.00040	0.00088	<0.00010	0.00054	0.00078	0.00110	0.00055	0.00433
Ba-D	mg/L	0.0303	0.0355	0.0257	0.0384	0.0390	0.0356	0.0266	0.0198	0.0306	0.0127	0.0680
B-D	mg/L	0.171	0.194	0.092	0.366	0.56	0.555	0.126	0.079	0.148	<0.050	0.444
Be-D	mg/L	<0.00010	<0.00010	<0.00010	0.00075	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cd-D	mg/L	0.0000240	0.0000076	0.0000080	0.000759	0.000279	0.0000397	0.000148	0.000133	0.0000090	0.0000160	0.0000052
Ca-D	mg/L	105	120	135	228	248	193	119	124	101	37.1	159
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	0.0173	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	0.00627	0.00217	0.00150	0.115	0.0454	0.00983	0.0257	0.0254	0.00059	0.00253	0.00496
Cu-D	mg/L	0.00050	0.00079	0.00045	0.176	0.0183	0.00032	0.00368	0.00275	0.00108	0.00161	<0.00020
Hard-D	mg/L	356	409	466	814	892	670	412	458	321	121	531
Fe-D	mg/L	2.55	0.0178	0.0078	75.2	31.3	1.05	11.4	25.6	0.0054	0.705	0.0971
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	0.00051	<0.0010	<0.00020	<0.00020	<0.00020	0.00039	<0.00020	<0.00020
Mg-D	mg/L	22.6	26.6	31.6	59.6	66.2	45.6	27.9	36.3	17.0	6.92	32.3
Mn-D	mg/L	0.404	0.335	0.270	1.82	1.21	0.421	0.856	0.883	0.0605	0.123	0.350
Hg-D	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000023	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Mo-D	mg/L	0.0013	0.0017	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010	0.0048	<0.0010	0.0049
Ni-D	mg/L	0.0112	0.0047	0.0034	0.170	0.0779	0.0199	0.0435	0.0433	0.0013	0.0050	0.0101
K-D	mg/L	1.85	2.17	1.63	3.23	4.12	3.07	1.86	1.37	3.71	0.792	3.39
S-D	mg/L	105	109	108	332	2260	205	154	168	83.4	27.8	148
Se-D	mg/L	0.00016	<0.00010	<0.00010	0.00013	<0.00050	<0.00010	0.00022	0.00014	0.00017	<0.00010	0.00013
Si-D	mg/L	5.20	4.98	5.80	7.08	4.77	3.17	4.82	5.65	3.47	3.59	3.23
Na-D	mg/L	10.9	17.6	20.6	23.3	31.3	21.5	10.4	8.63	44.2	3.31	29.1
Sr-D	mg/L	0.467	0.683	0.579	1.32	1.44	1.35	0.486	0.507	0.377	0.132	1.08
Zn-D	mg/L	0.0172	<0.0050	<0.0050	0.417	0.194	0.0157	0.069	0.0771	<0.0050	0.0070	<0.0050
N-NH3	mg/L	0.036	0.028	0.040	0.063	1.4	0.043	0.046		0.65	0.018	0.071
N-NO23	mg/L	0.087	0.040	0.032	0.044		0.061	0.056		0.087	0.107	0.078
P-D	mg/L		0.0026		0.0089							<0.0020
P-T	mg/L	0.0138	0.0283	0.015	0.0191	0.0037	0.0022	0.0272		0.122	0.0666	0.0644

APPENDIX II

GRAPH 1

HARDNESS

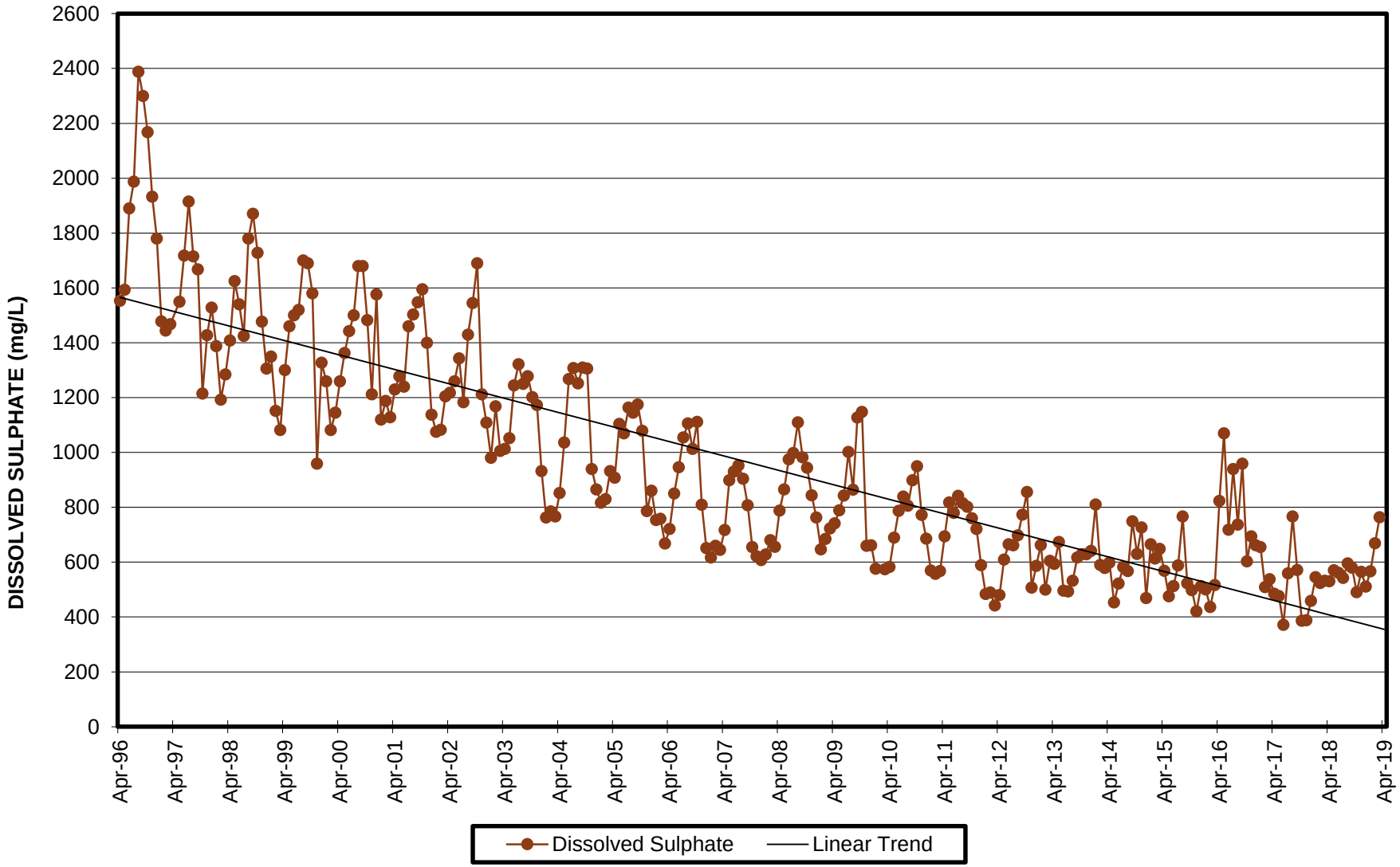
SETTLING POND 4



GRAPH 2

AVERAGE MONTHLY DISSOLVED SULPHATE

SETTLING POND 4

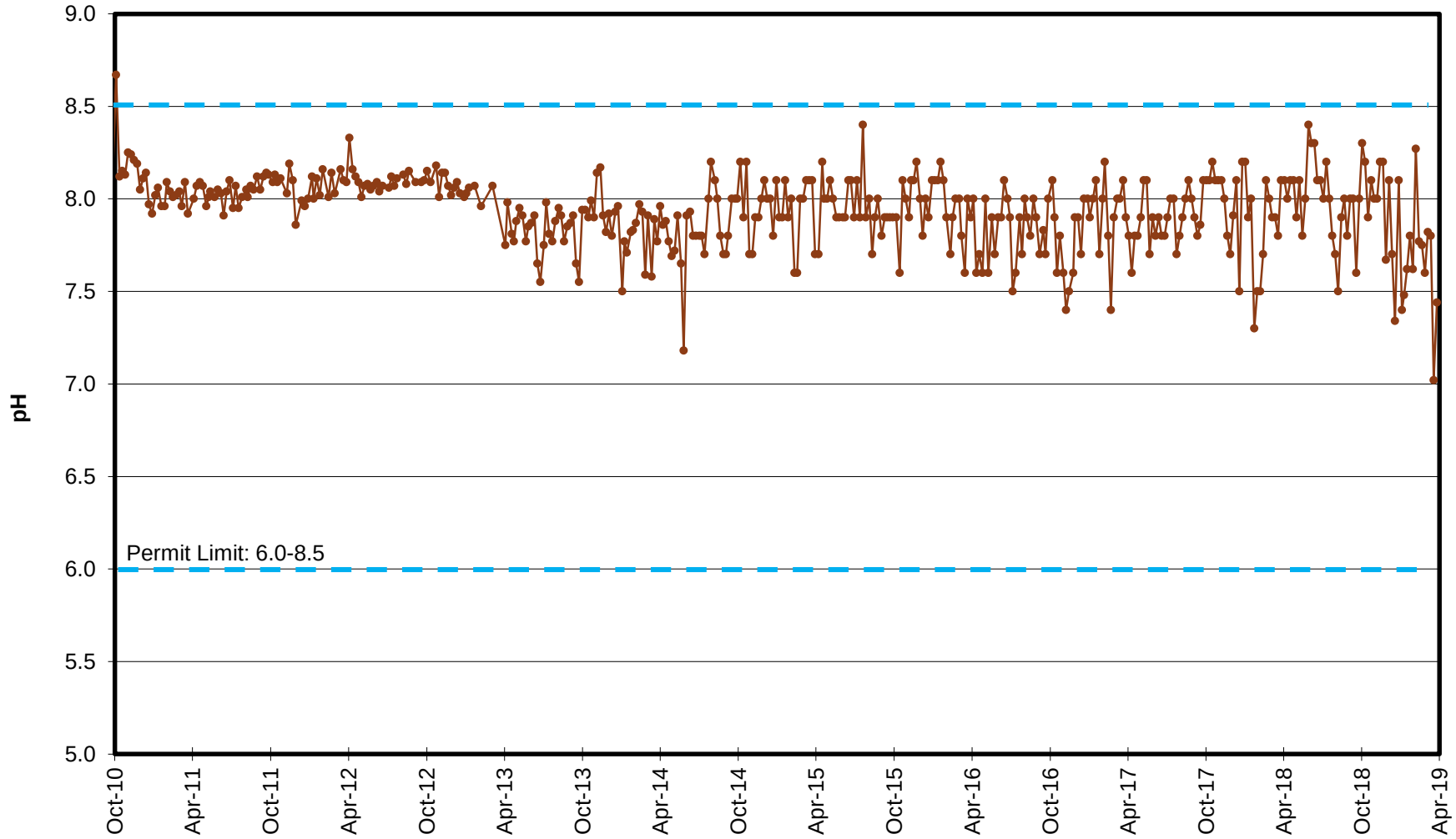


QUINSAM COAL

GRAPH 3

WEEKLY pH

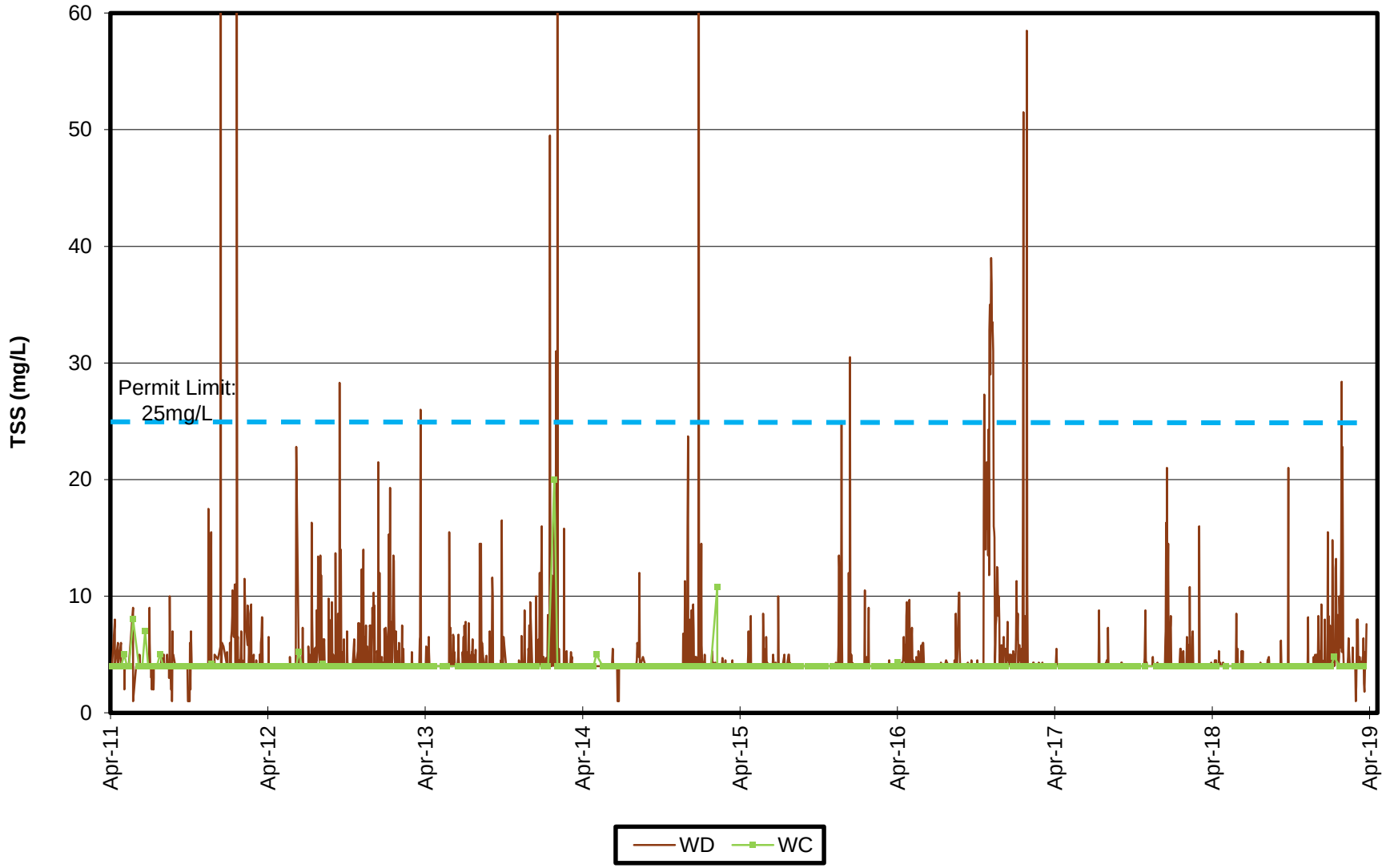
SETTLING POND 4



GRAPH 4

TOTAL SUSPENDED SOLIDS

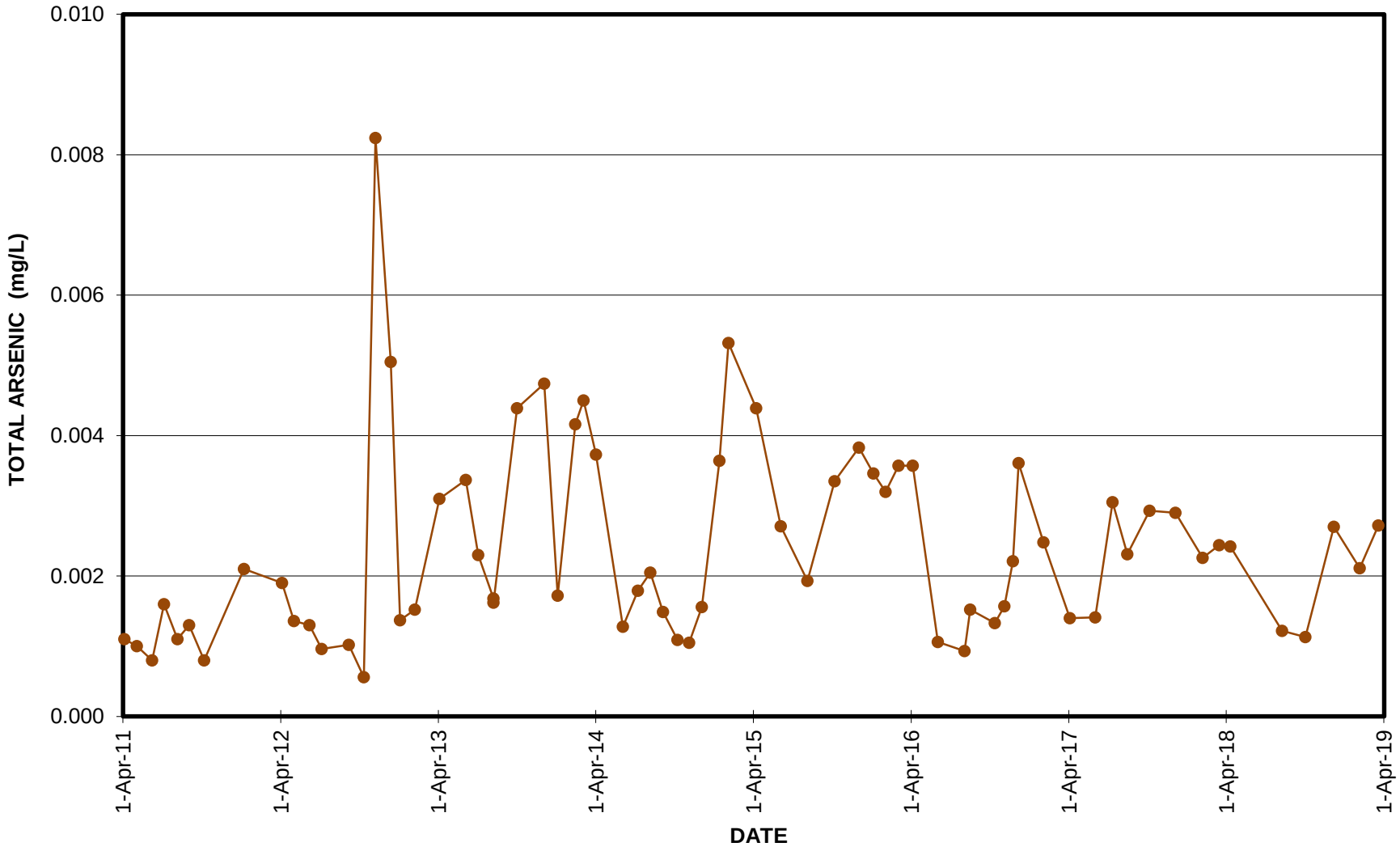
SETTLING POND 4 & WC



GRAPH 5

TOTAL ARSENIC

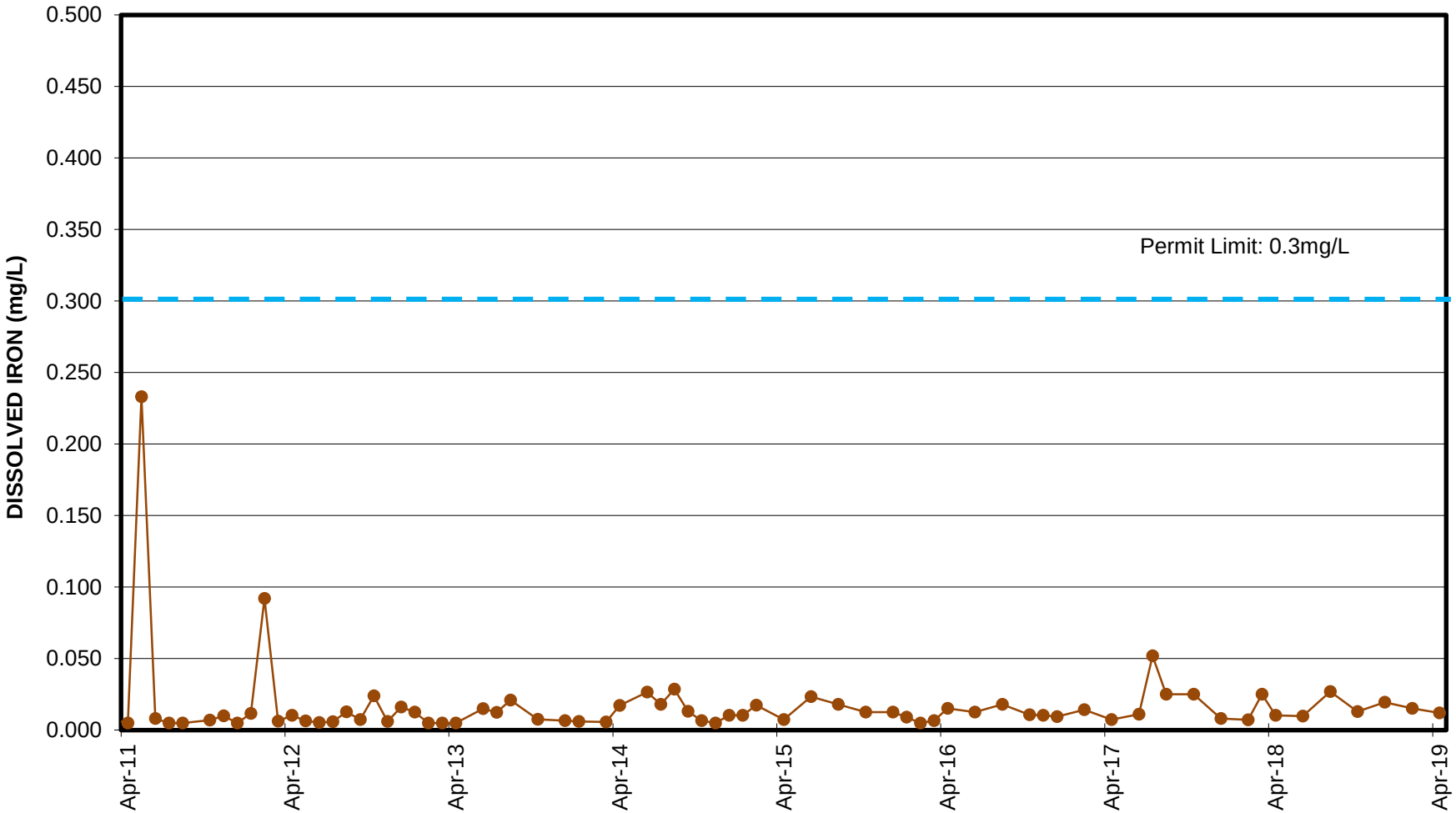
SETTLING POND 4



GRAPH 6

DISSOLVED IRON

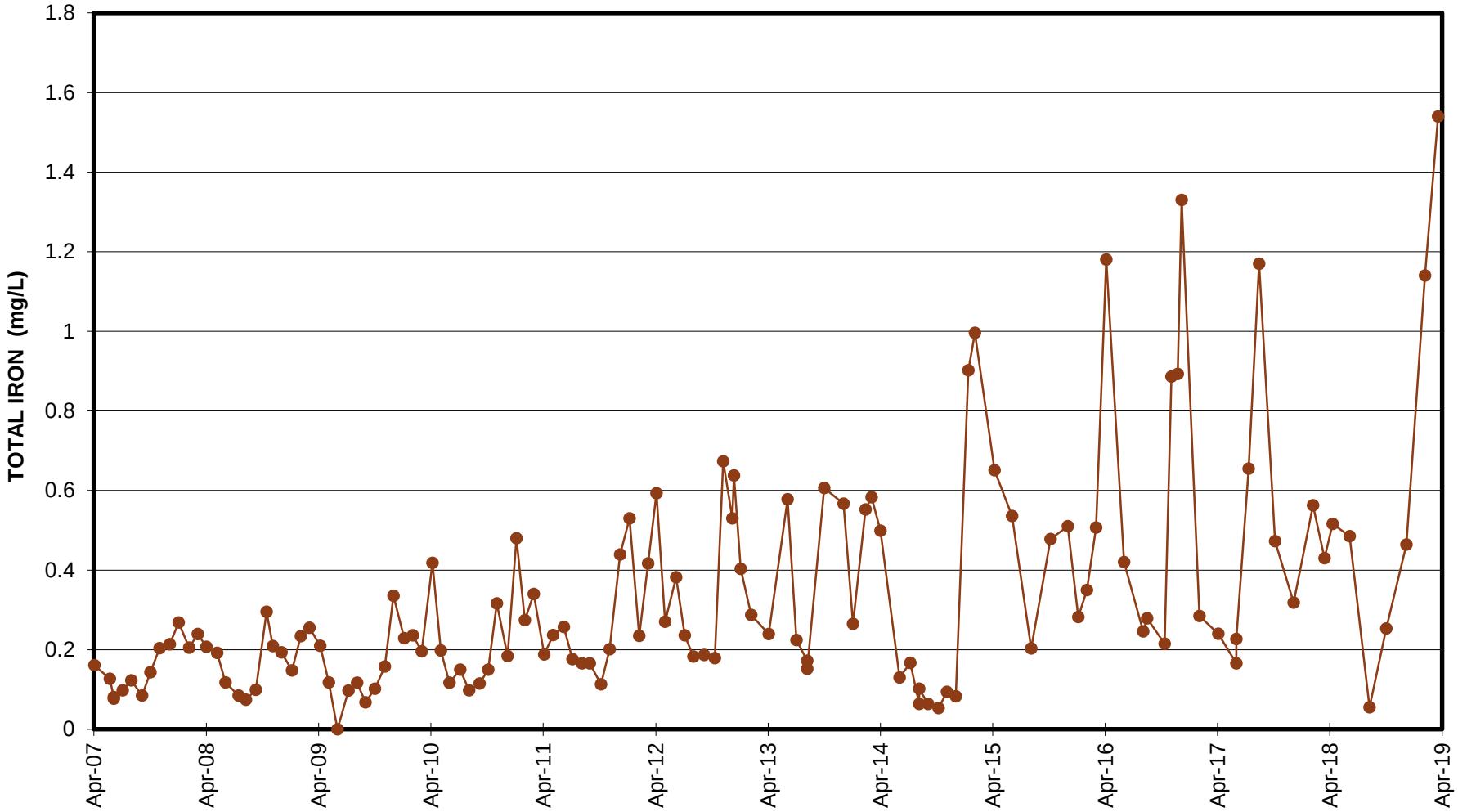
SETTLING POND 4



GRAPH 7

TOTAL IRON

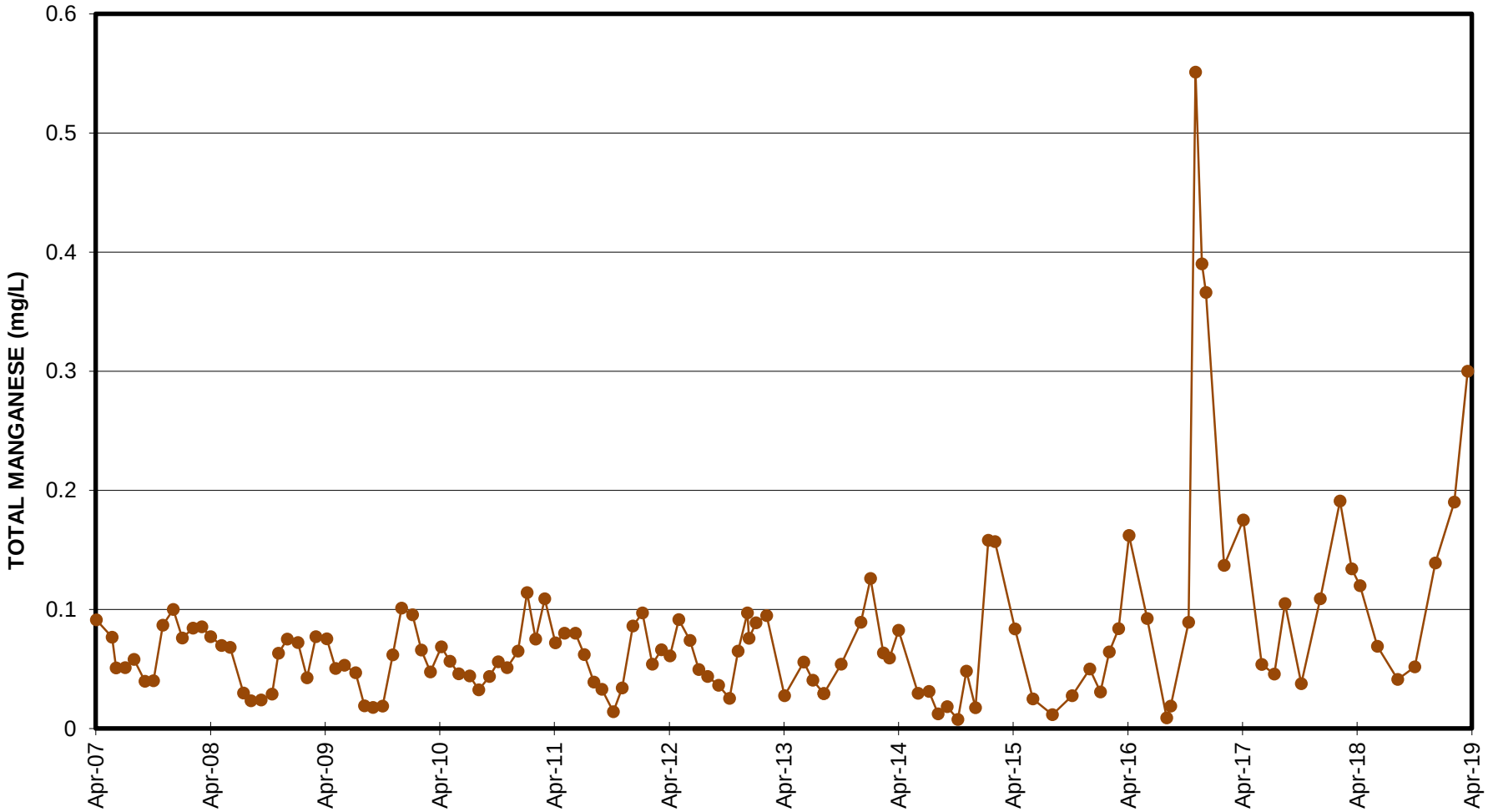
SETTLING POND 4



GRAPH 8

TOTAL MANGANESE

SETTLING POND 4

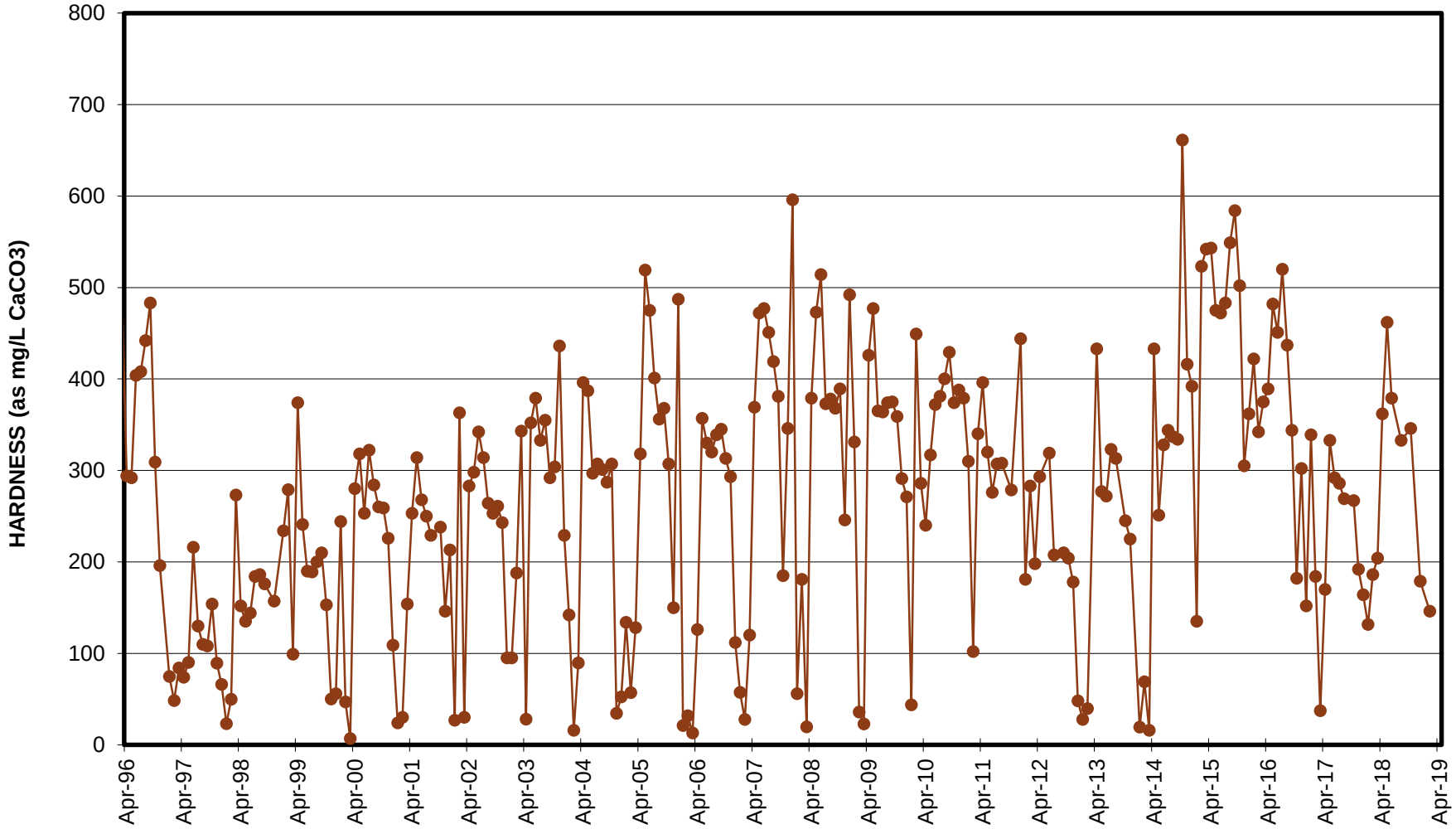


QUINSAM COAL

GRAPH 9

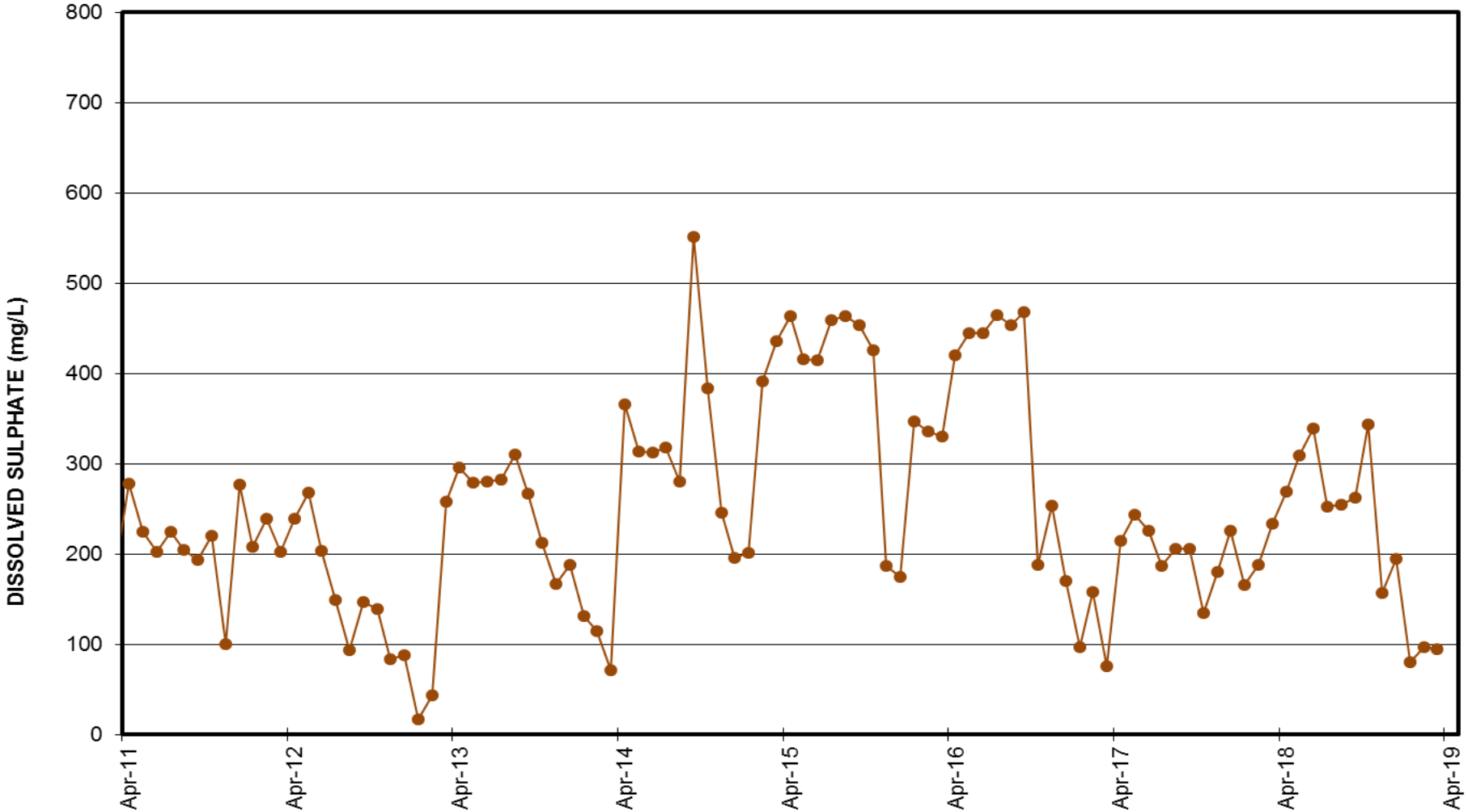
HARDNESS

SETTLING POND 1



QUINSAM COAL

GRAPH 10
AVERAGE MONTHLY DISSOLVED SULPHATE
SETTLING POND 1

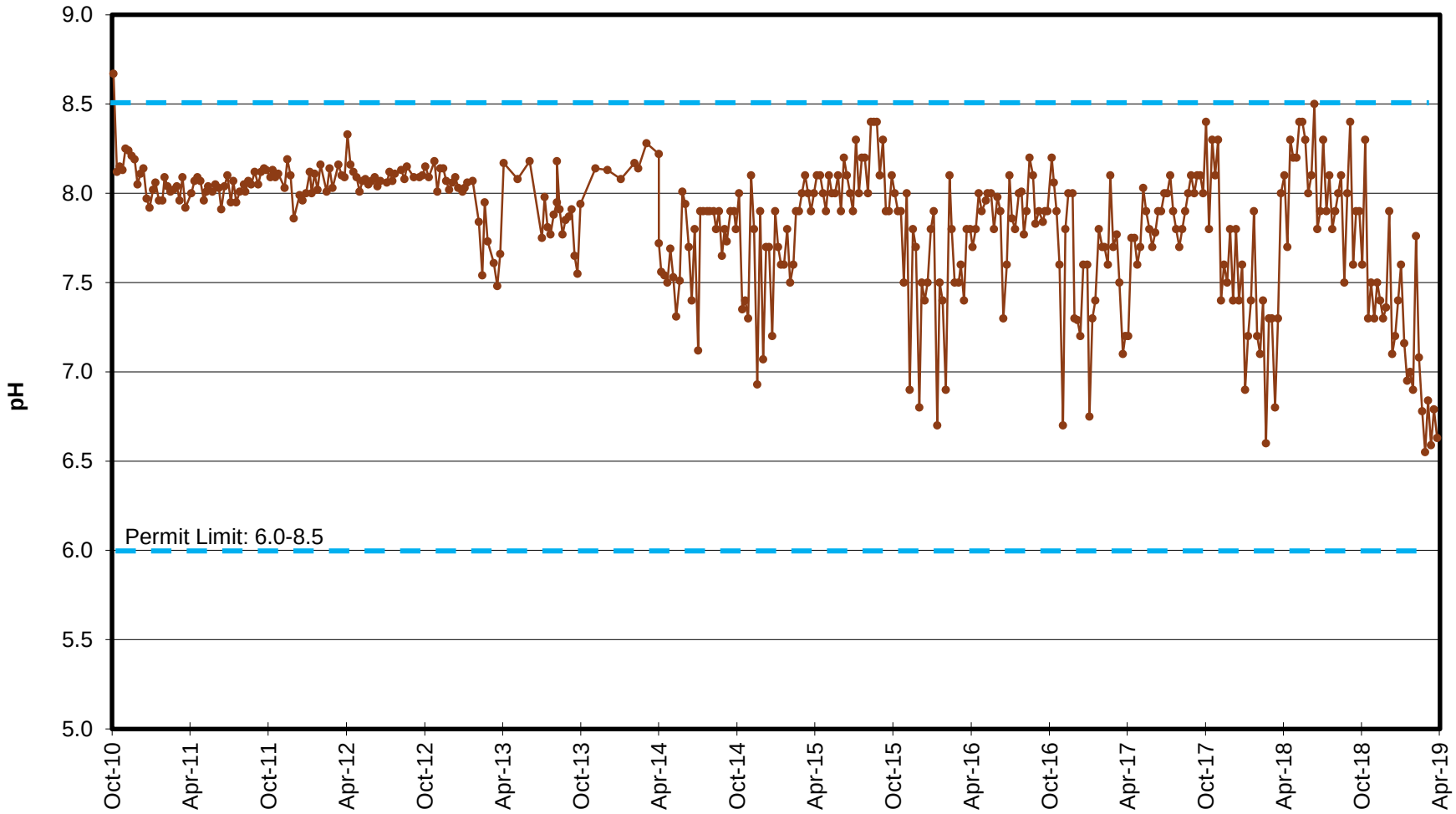


QUINSAM COAL

GRAPH 11

WEEKLY FIELD pH

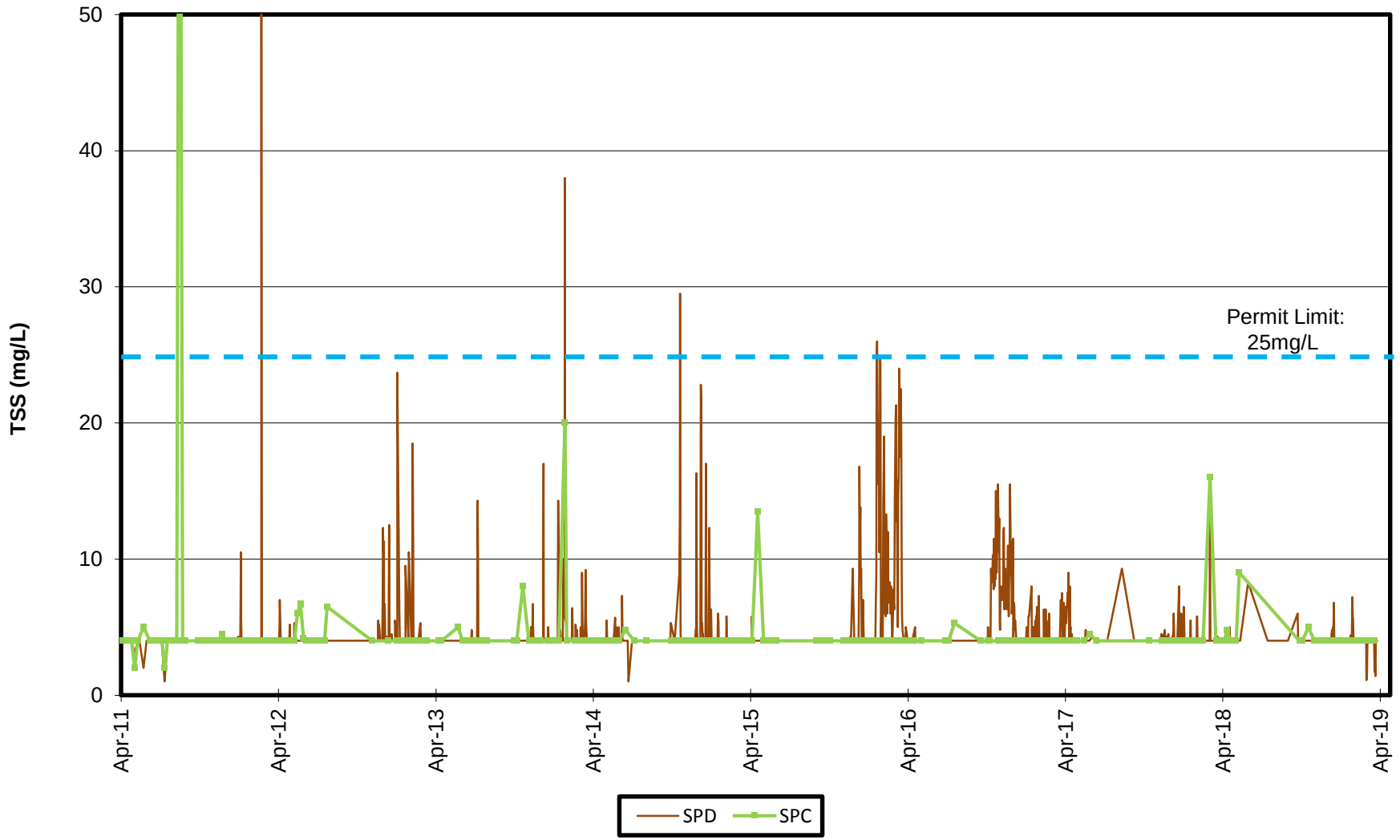
SETTLING POND 1



GRAPH 12

TOTAL SUSPENDED SOLIDS

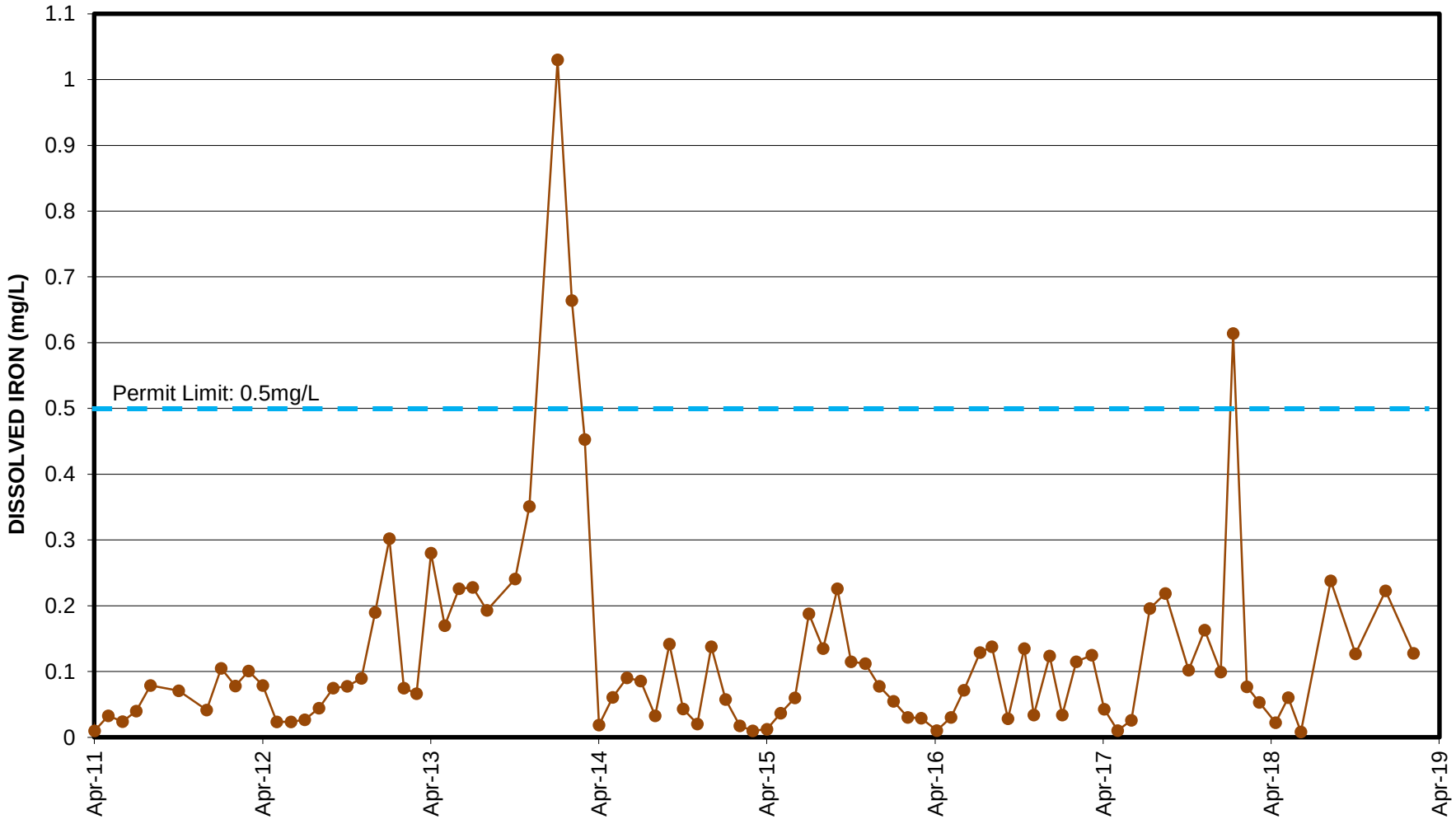
SETTLING POND 1 and SPC



GRAPH 13

DISSOLVED IRON

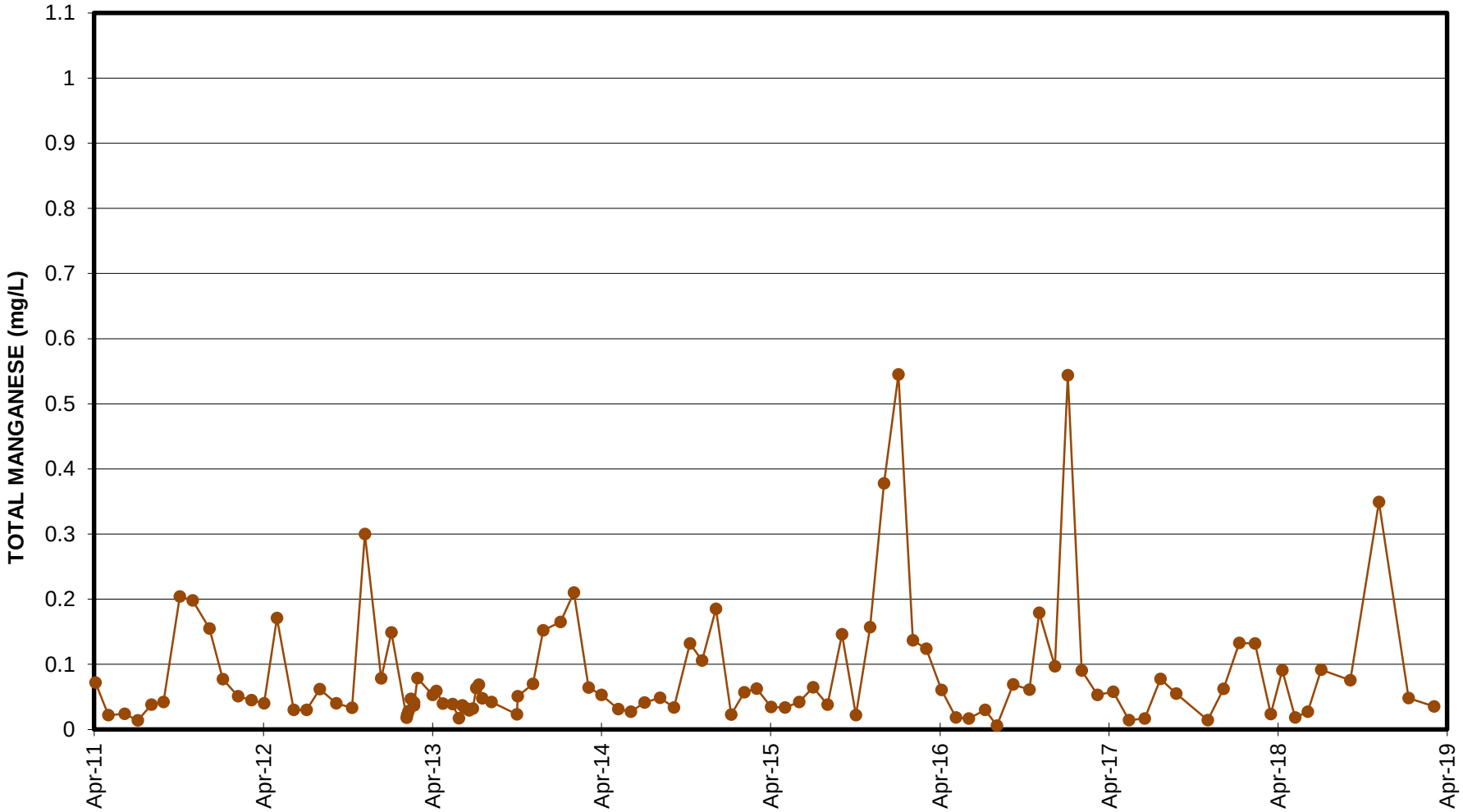
SETTLING POND 1



GRAPH 14

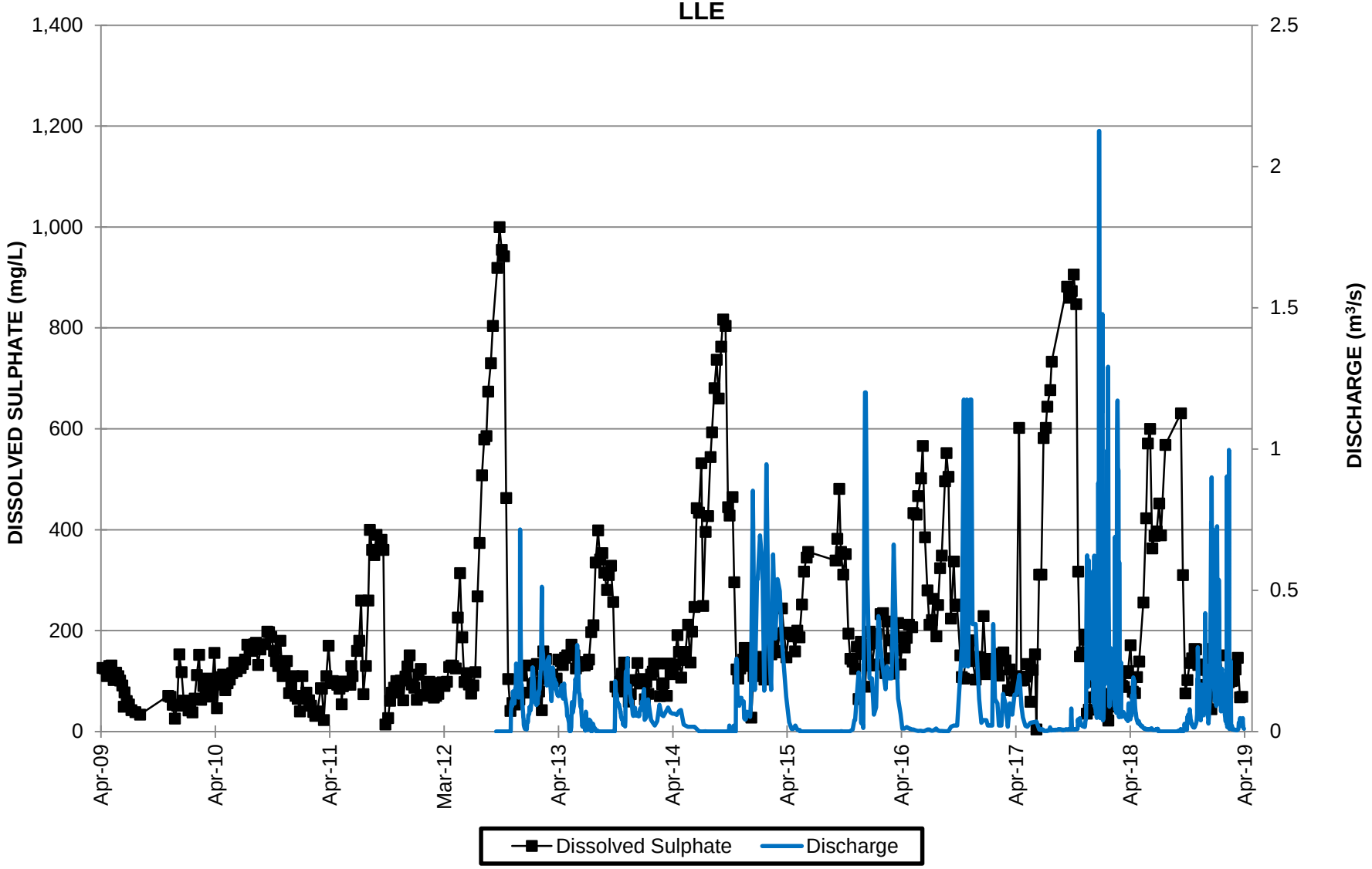
TOTAL MANGANESE

SETTLING POND 1



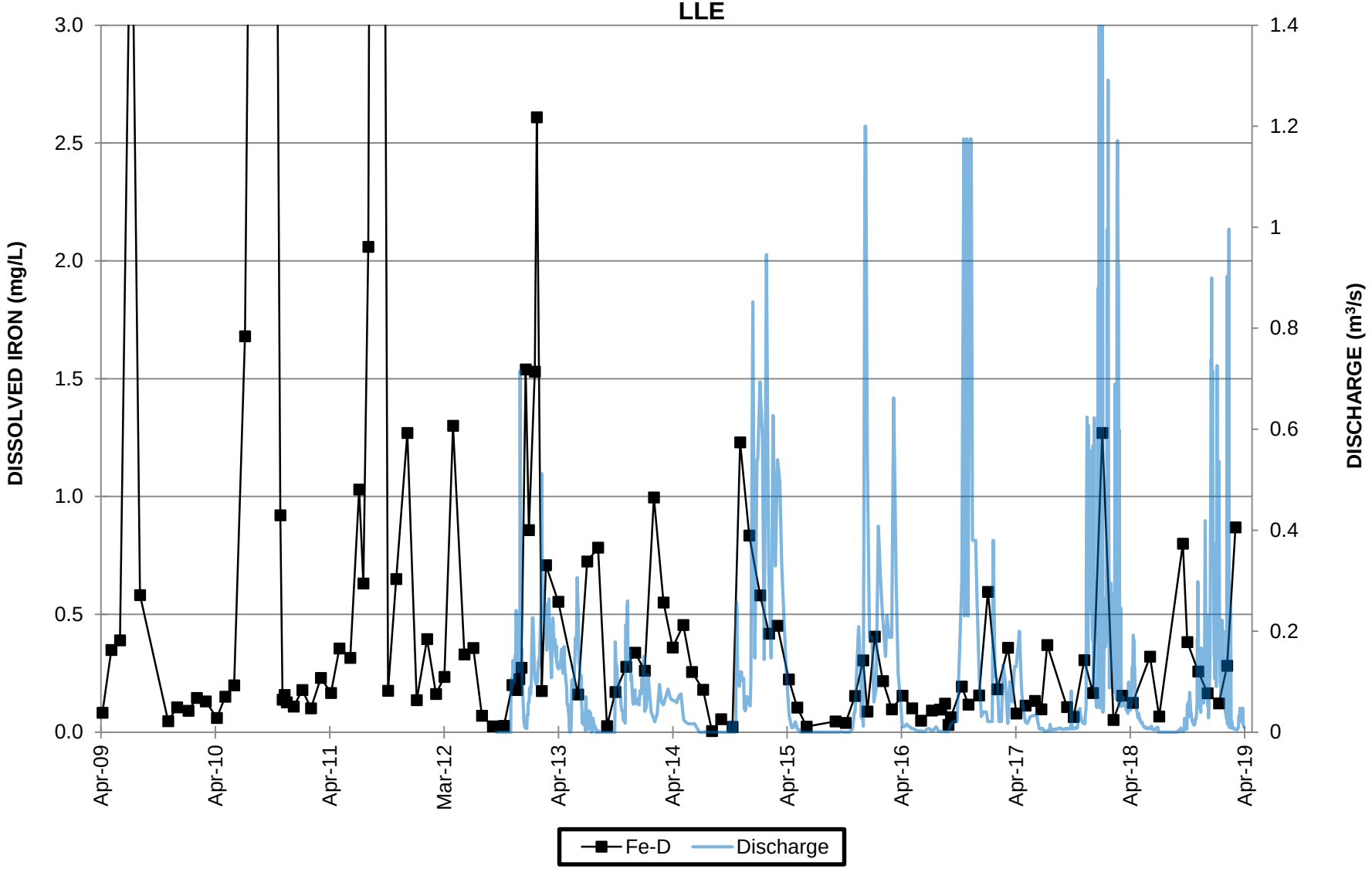
QUINSAM COAL

GRAPH 15
DISSOLVED SULPHATE VS DISCHARGE
LLE



QUINSAM COAL

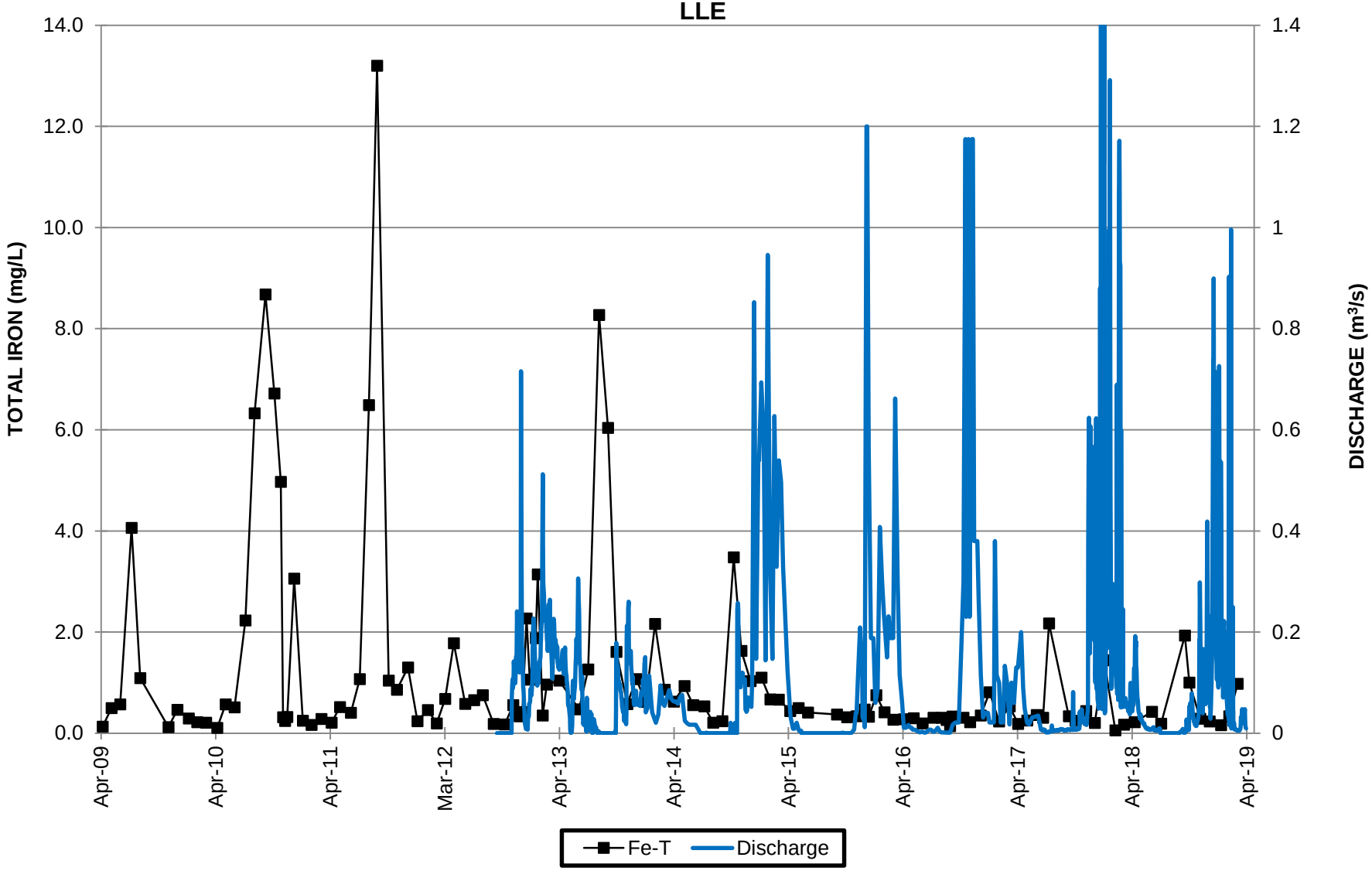
GRAPH 16
DISSOLVED IRON VS DISCHARGE
LLE



GRAPH 17

TOTAL IRON VS DISCHARGE

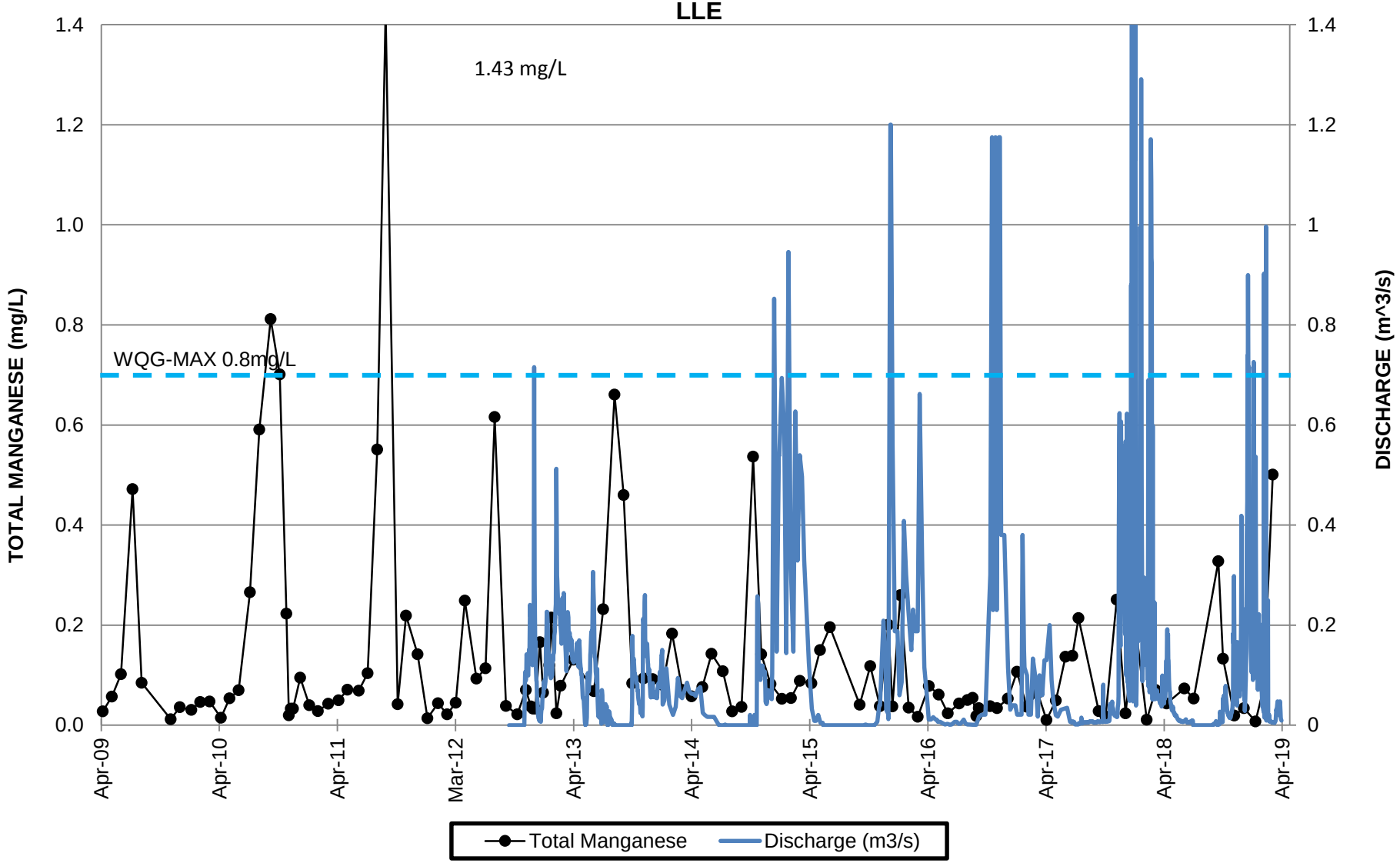
LLE



GRAPH 18

TOTAL MANGANESE VS DISCHARGE

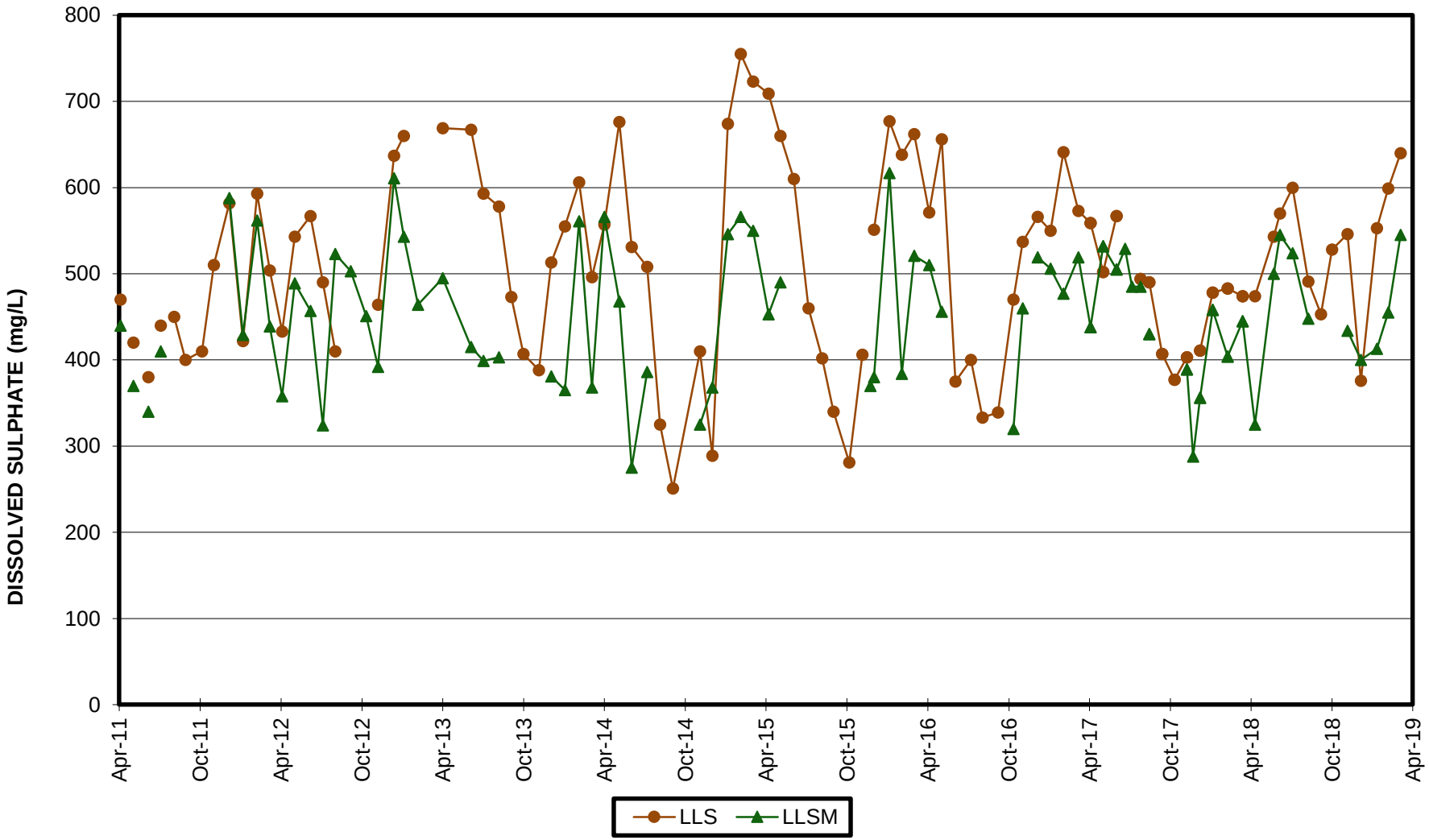
LLE



GRAPH 19

DISSOLVED SULPHATE

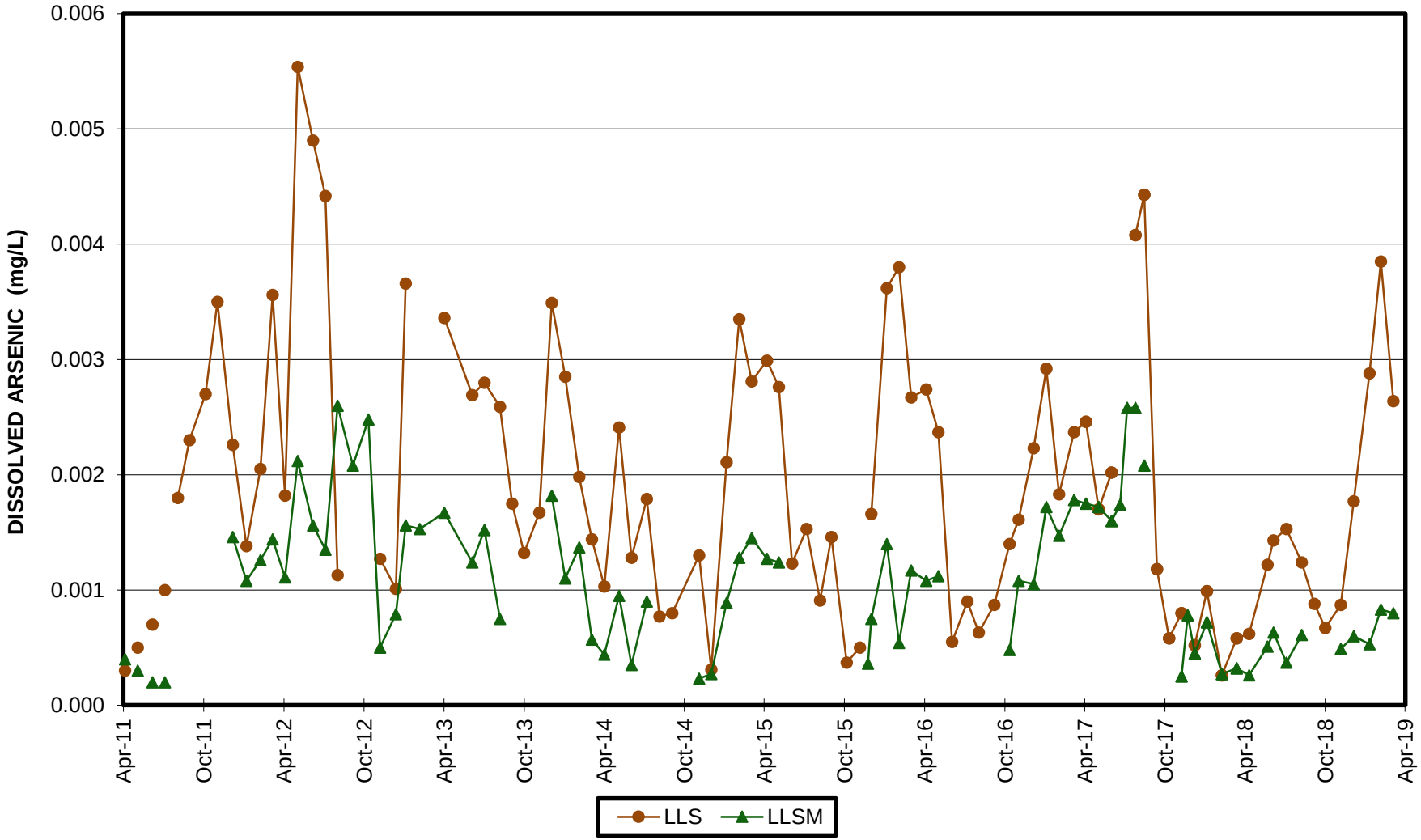
SEEPS INTO LONG LAKE



GRAPH 20

DISSOLVED ARSENIC

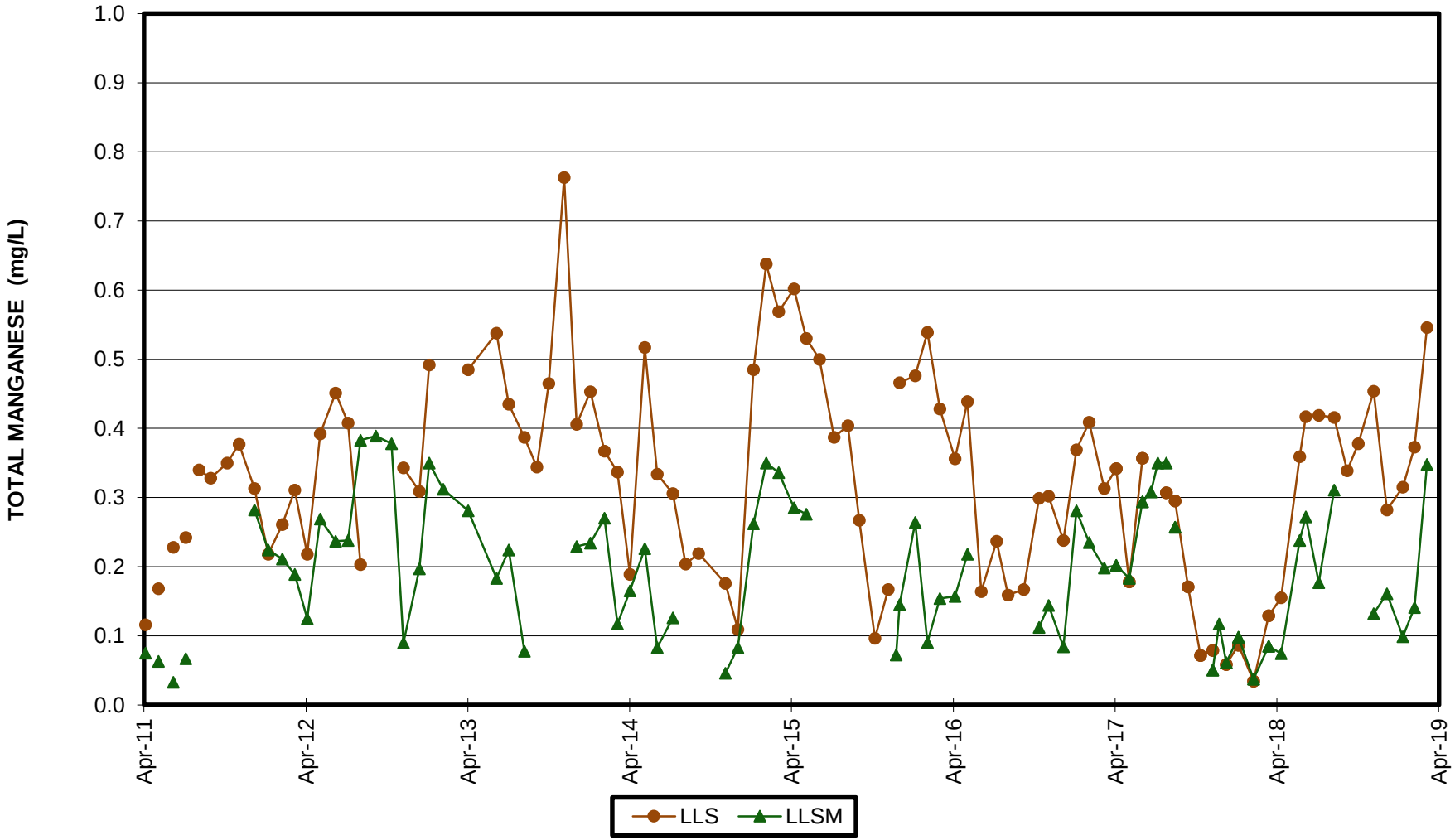
SEEPS INTO LONG LAKE



GRAPH 21

TOTAL MANGANESE

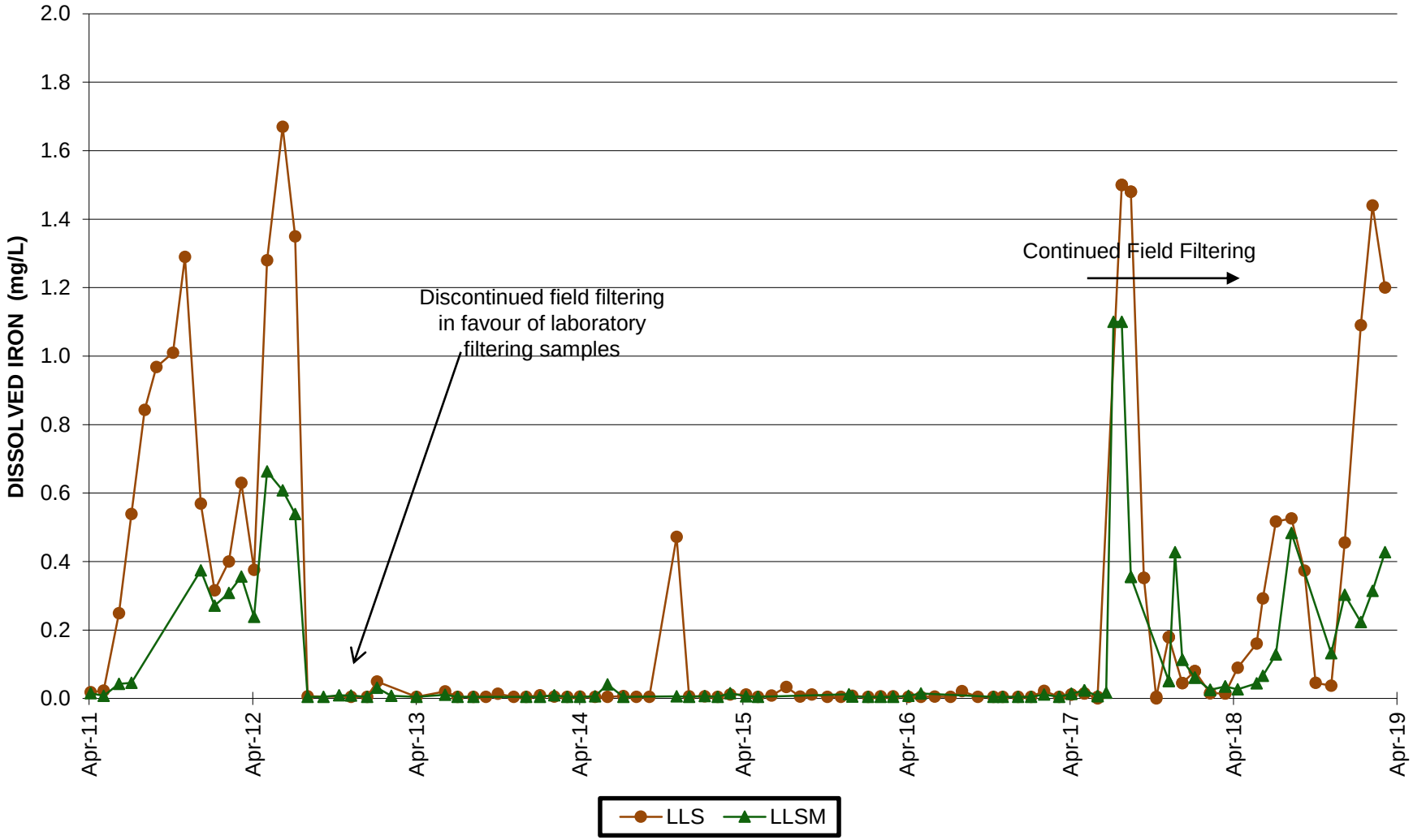
SEEPS INTO LONG LAKE



GRAPH 22

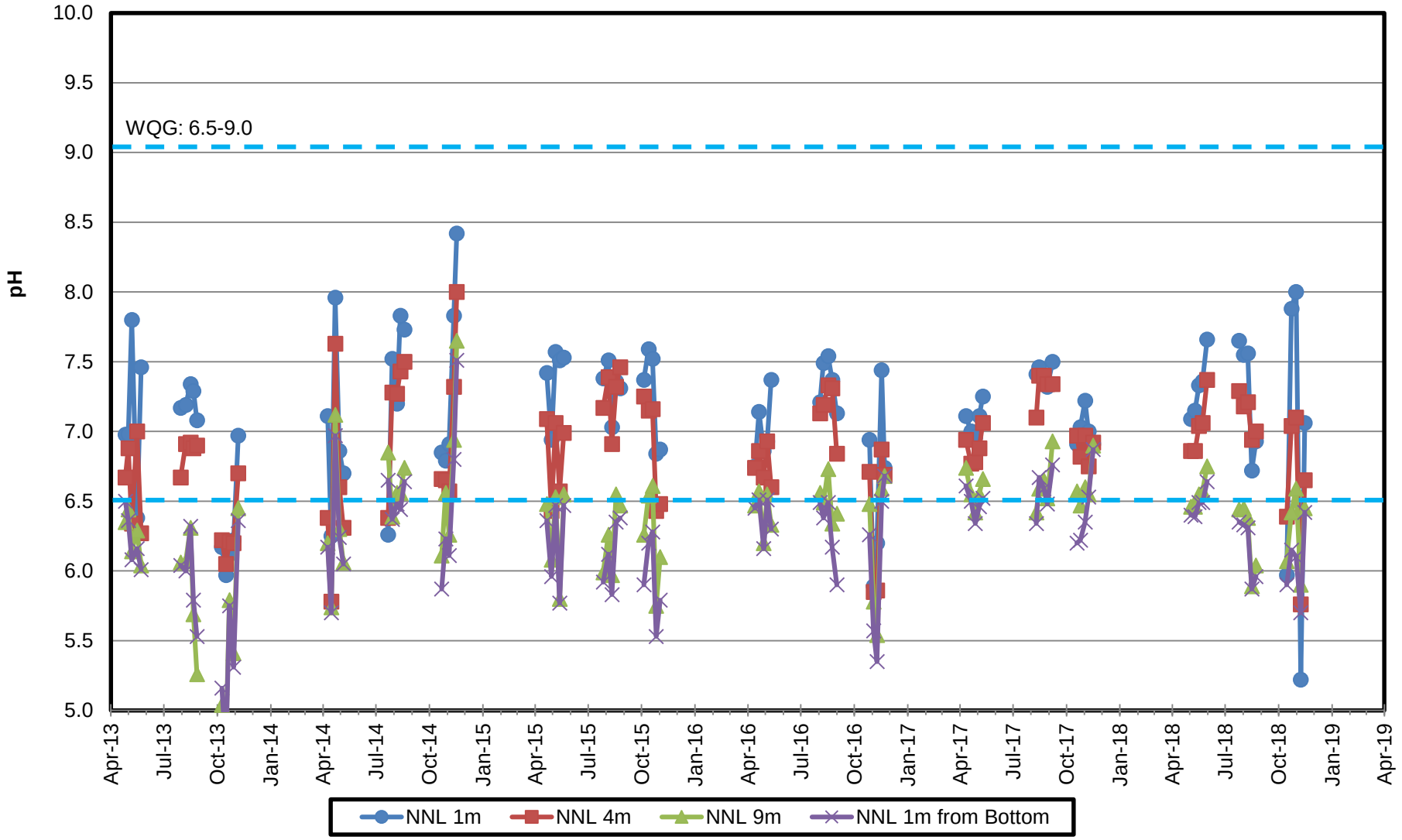
DISSOLVED IRON

SEEPS INTO LONG LAKE



QUINSAM COAL

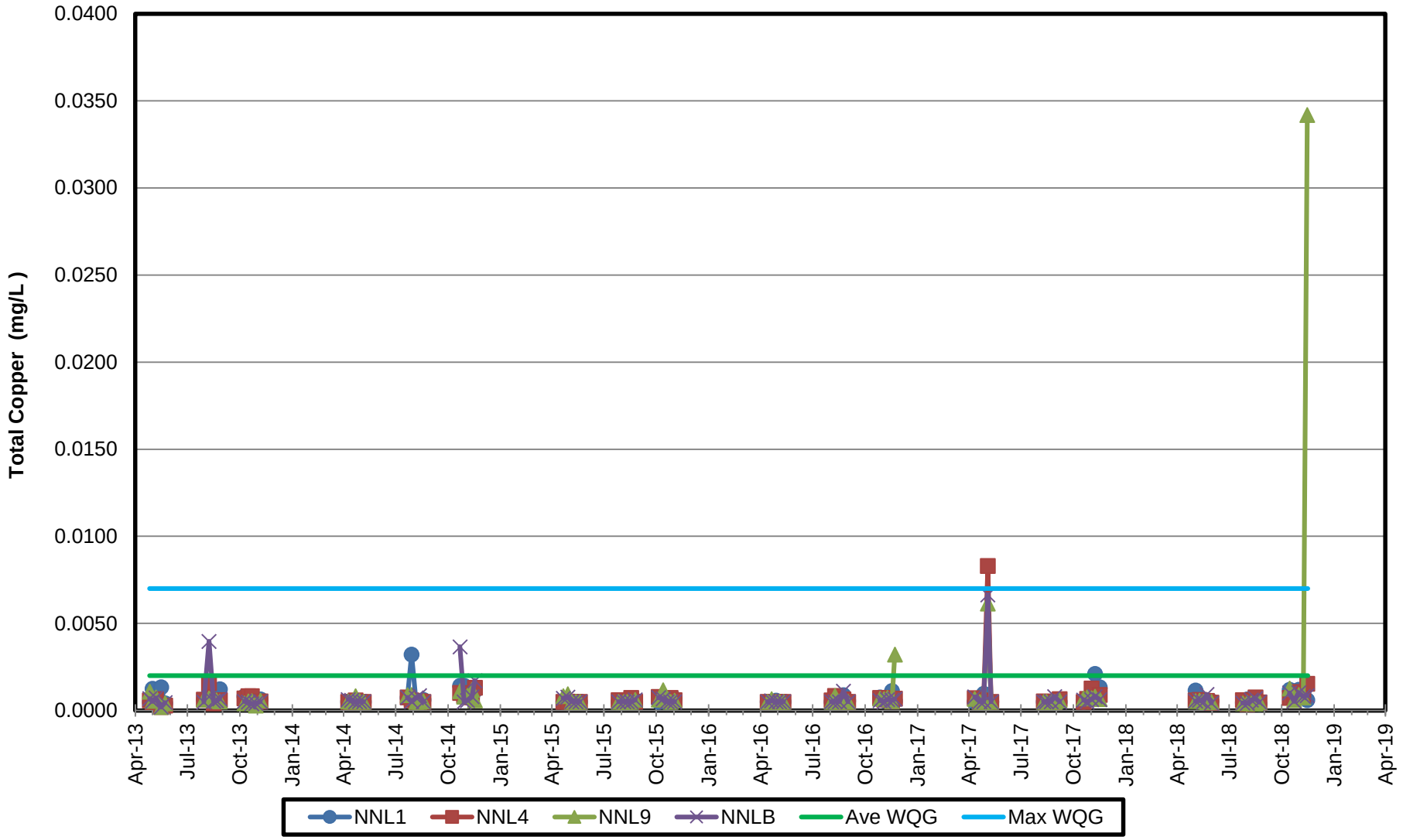
GRAPH 23
5 in 30 PH
NO NAME LAKE



GRAPH 24

5 in 30 TOTAL COPPER

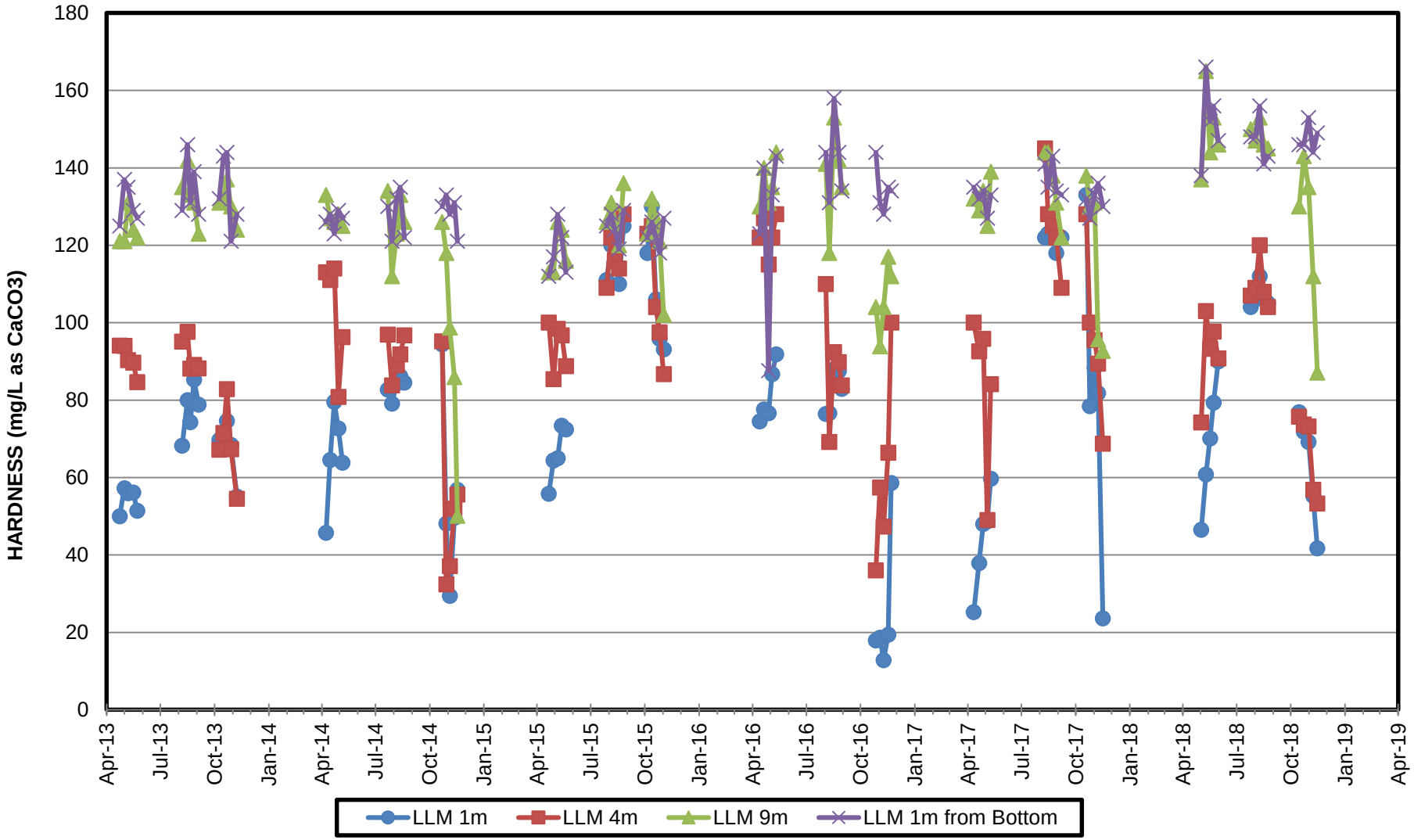
NO NAME LAKE



GRAPH 25

5 in 30 HARDNESS

LONG LAKE

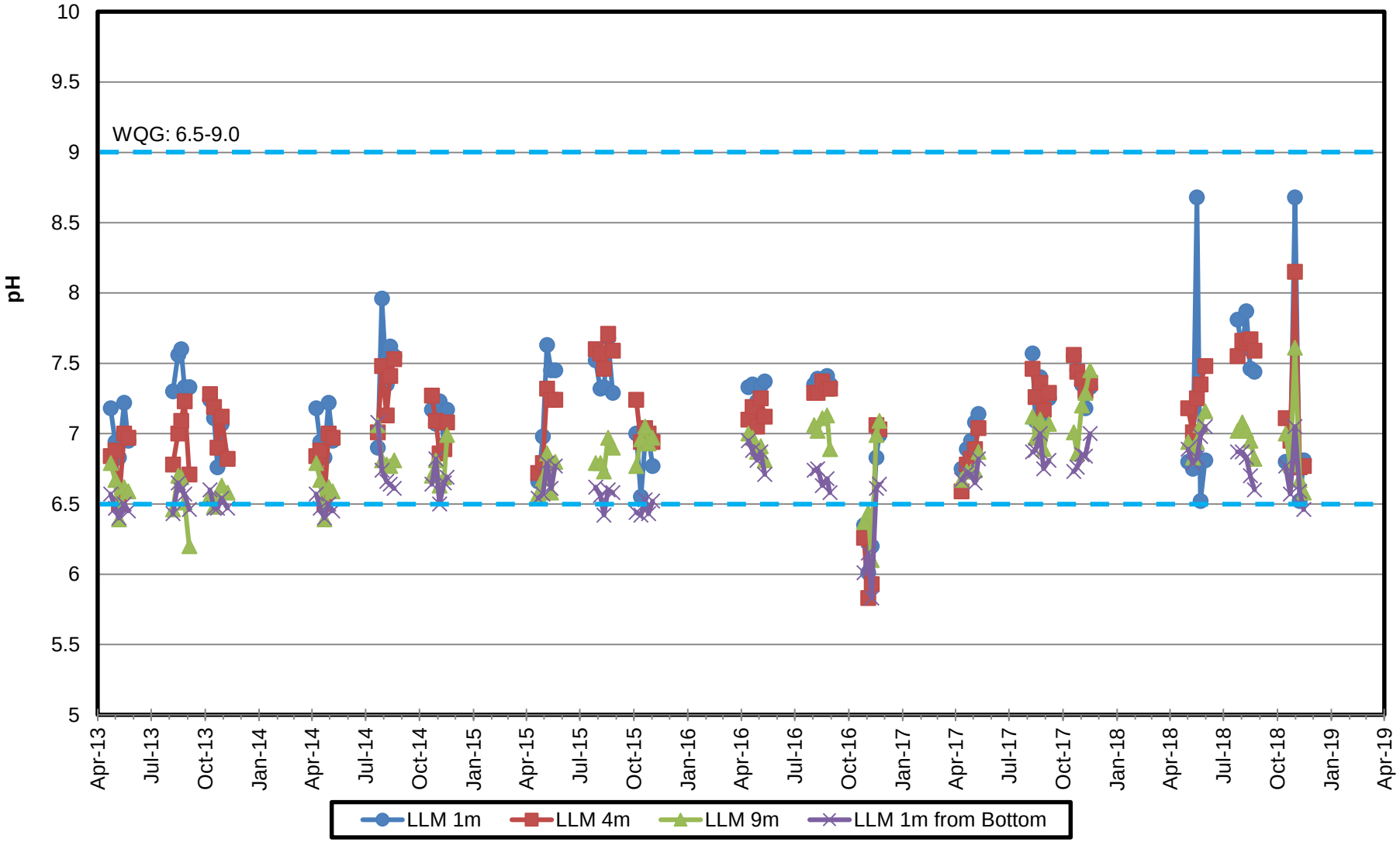


QUINSAM COAL

GRAPH 26

5 in 30 PH

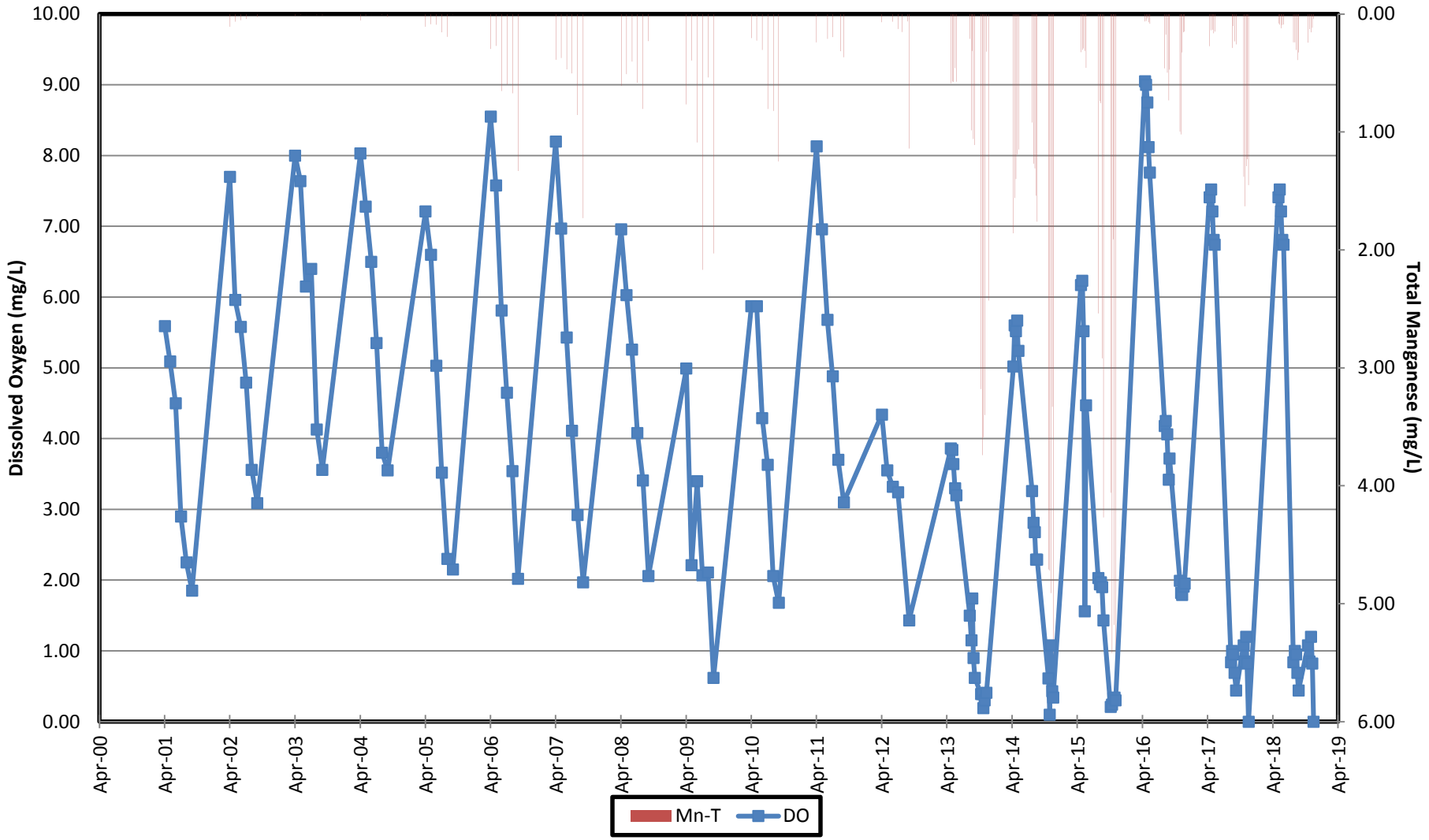
LONG LAKE



GRAPH 27

DO vs Mn-T - Long Lake 1 Metre From Bottom

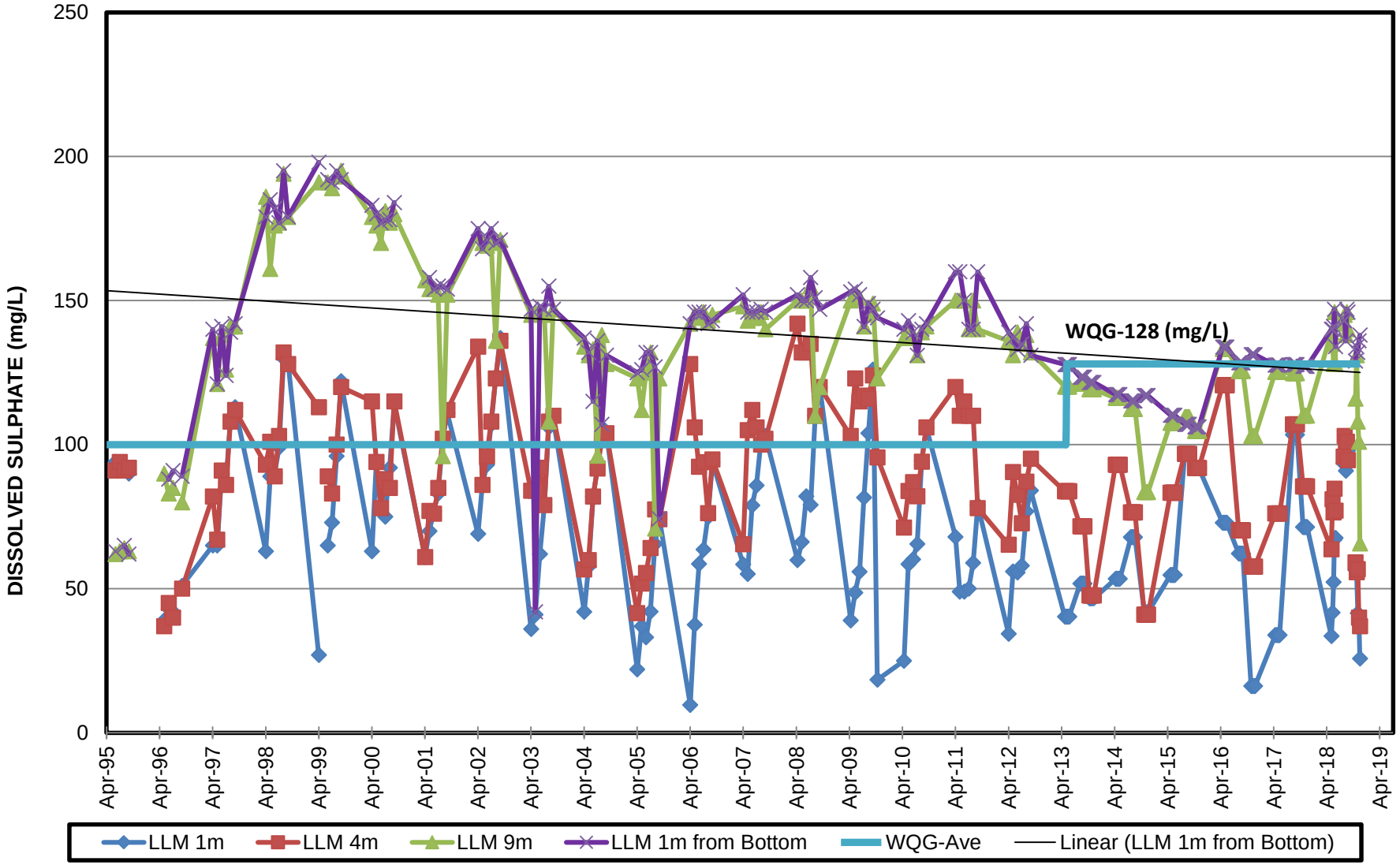
2000-2018



GRAPH 28

HISTORIC DISSOLVED SULPHATE

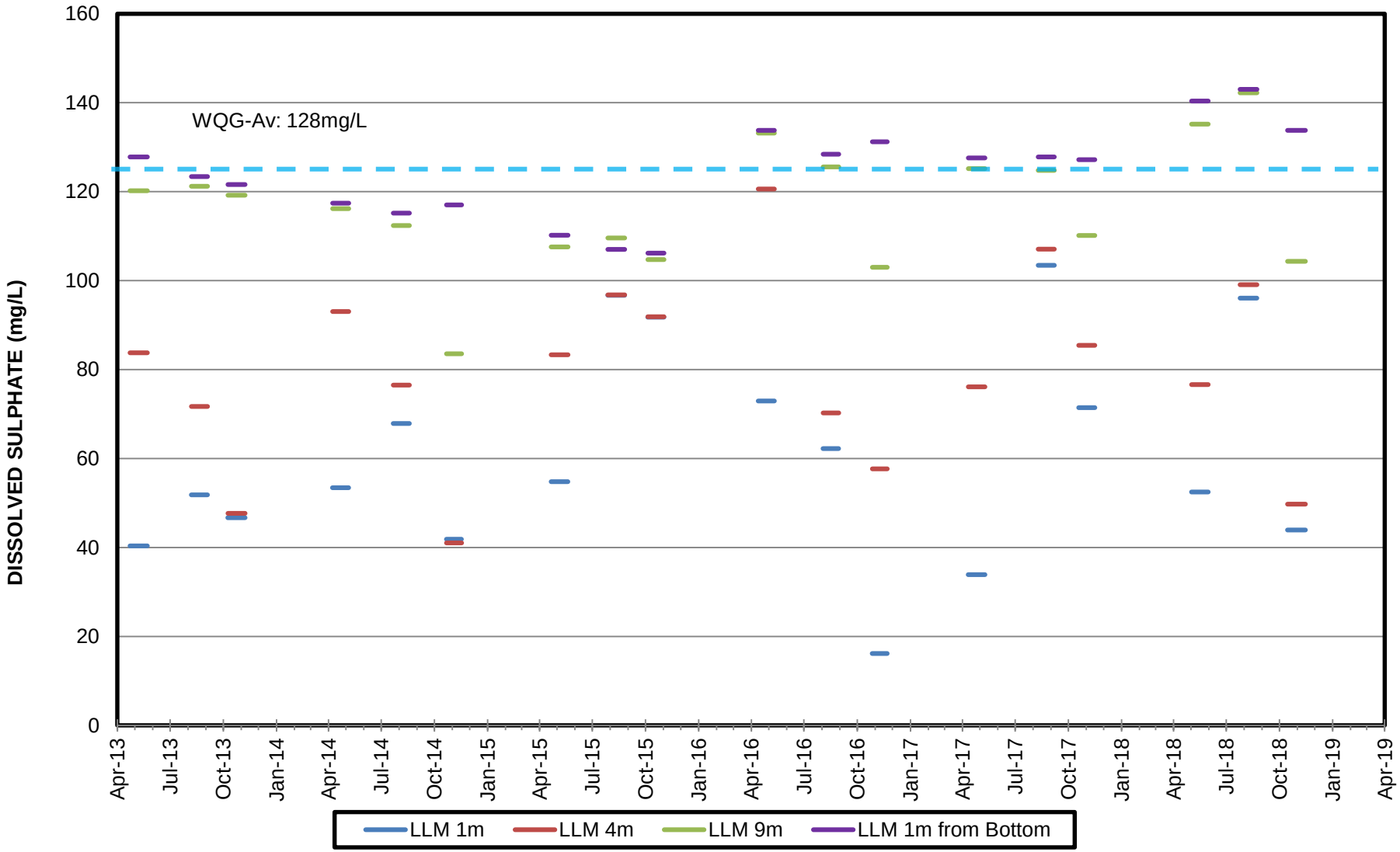
LONG LAKE



GRAPH 29

5 in 30 AVERAGE DISSOLVED SULPHATE

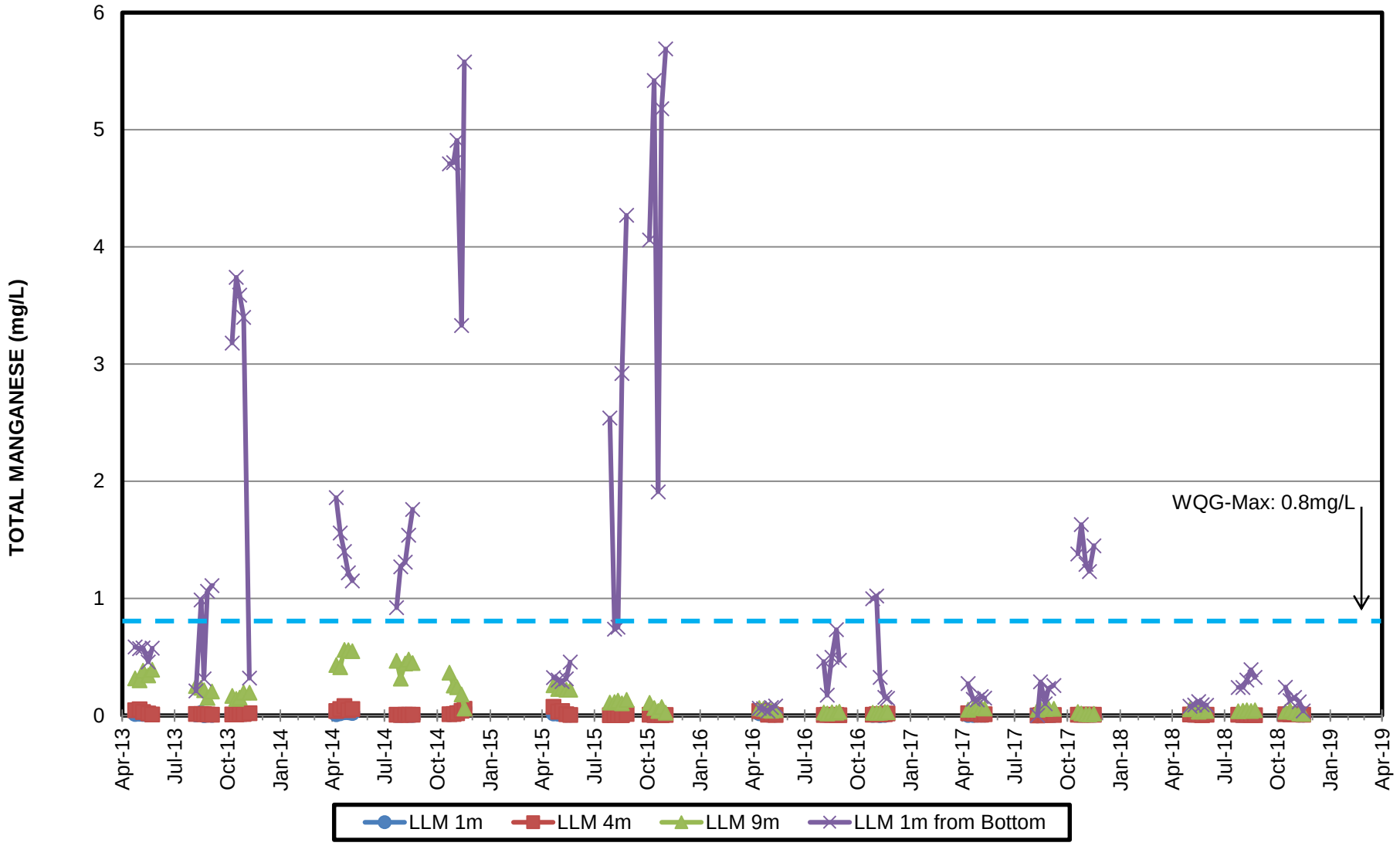
LONG LAKE



GRAPH 30

5 in 30 TOTAL MANGANESE

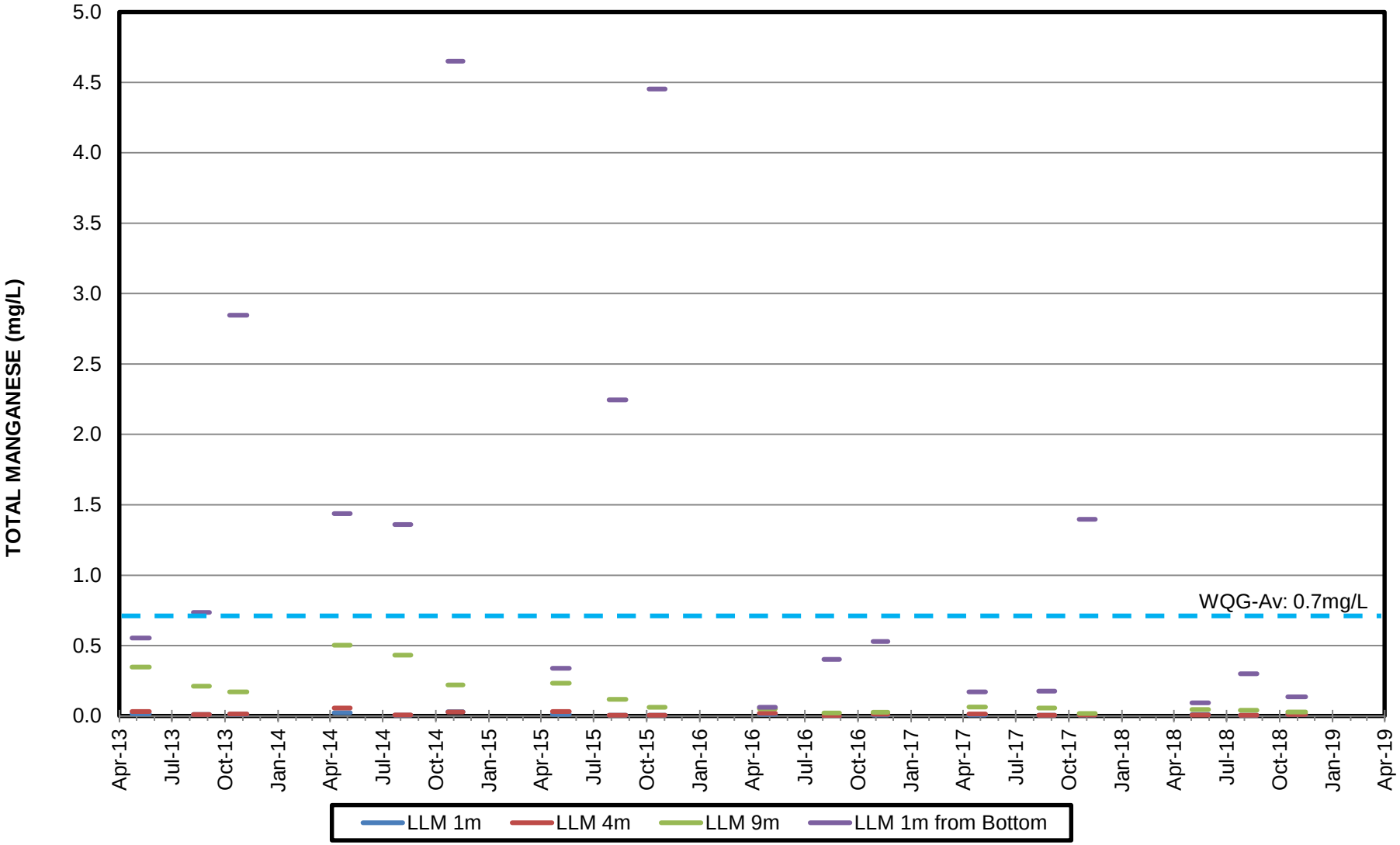
LONG LAKE



GRAPH 31

5 in 30 AVERAGE TOTAL MANGANESE

LONG LAKE

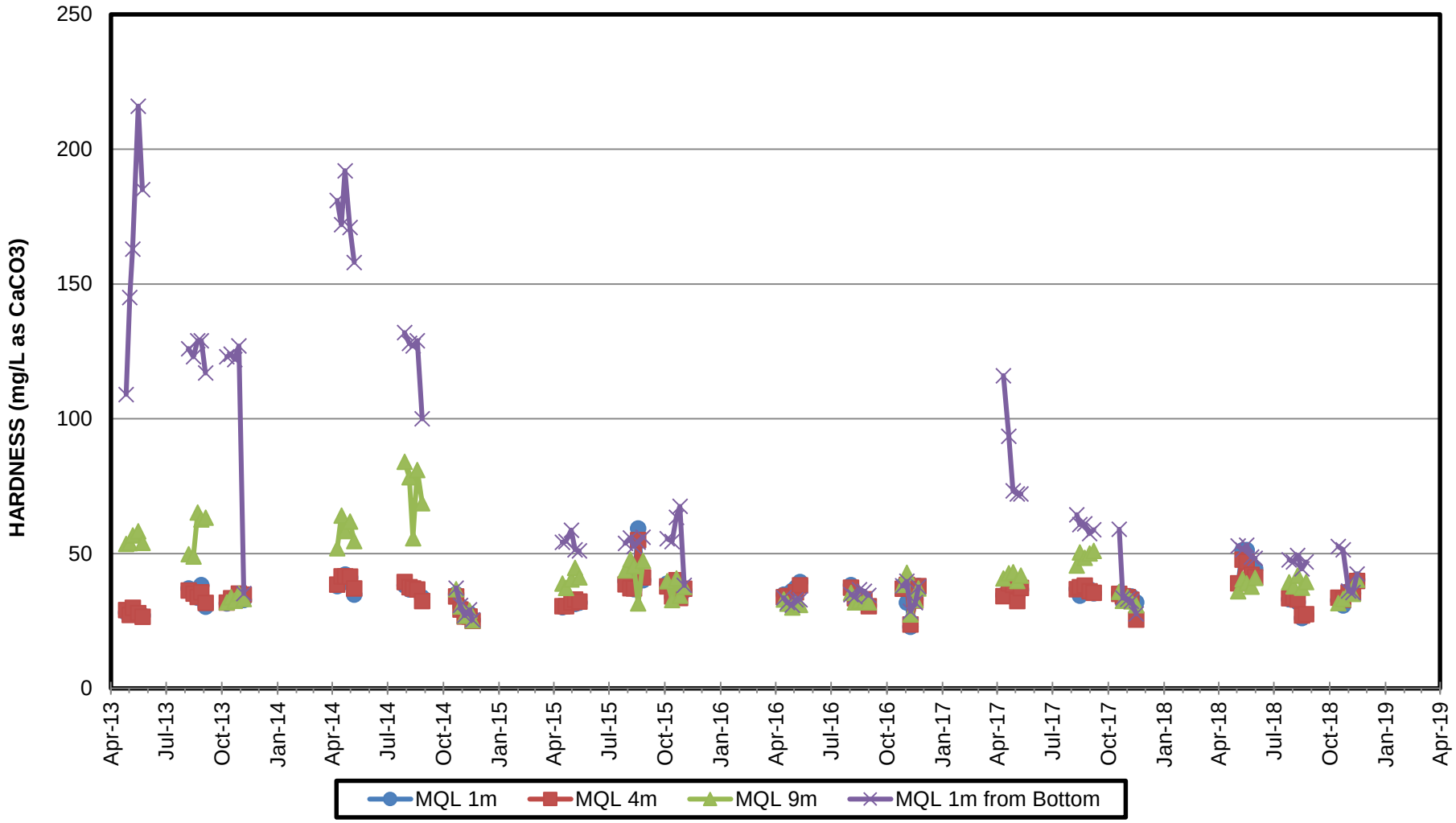


QUINSAM COAL

GRAPH 32

5 in 30 HARDNESS

MIDDLE QUINSAM LAKE

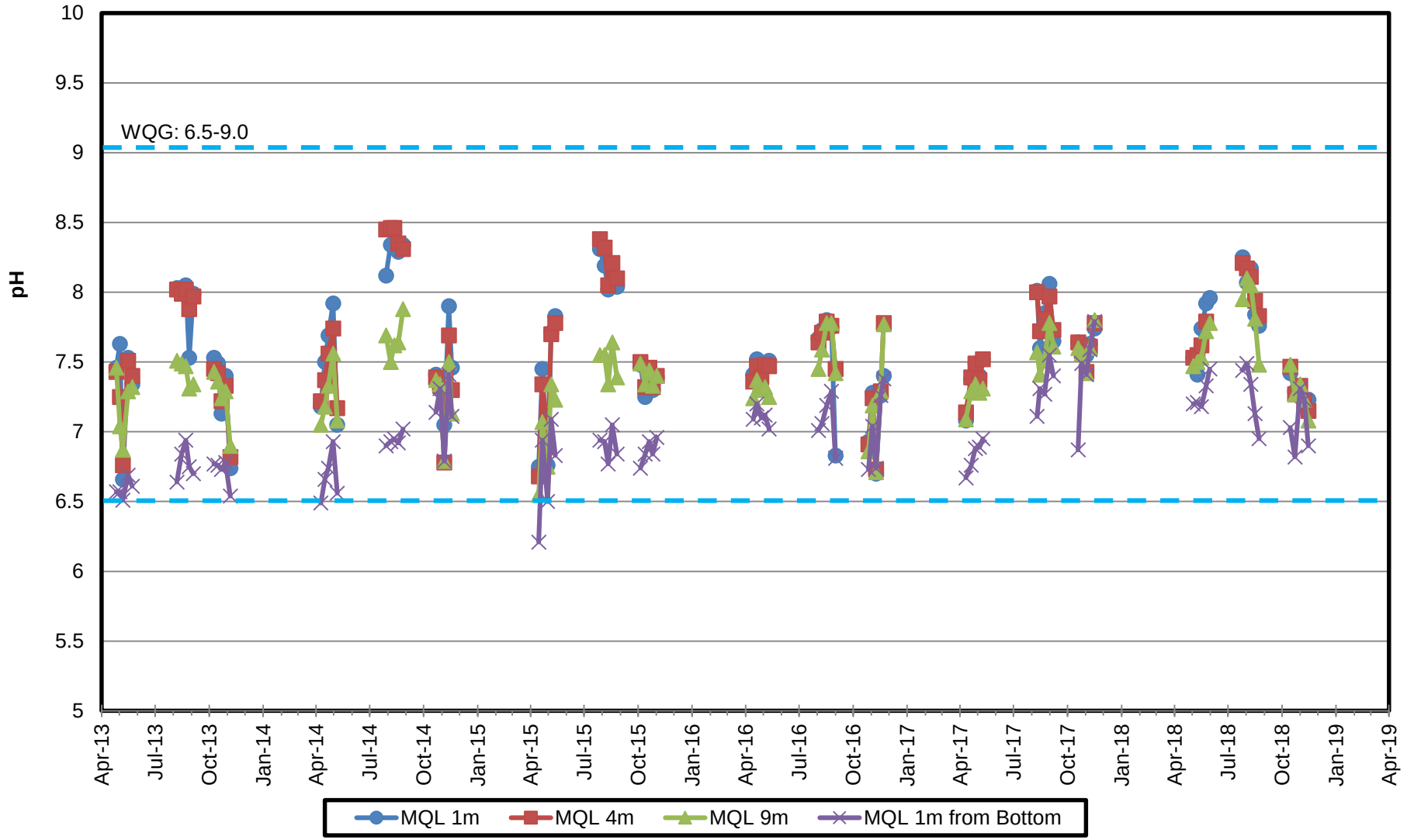


QUINSAM COAL

GRAPH 33

5 in 30 PH

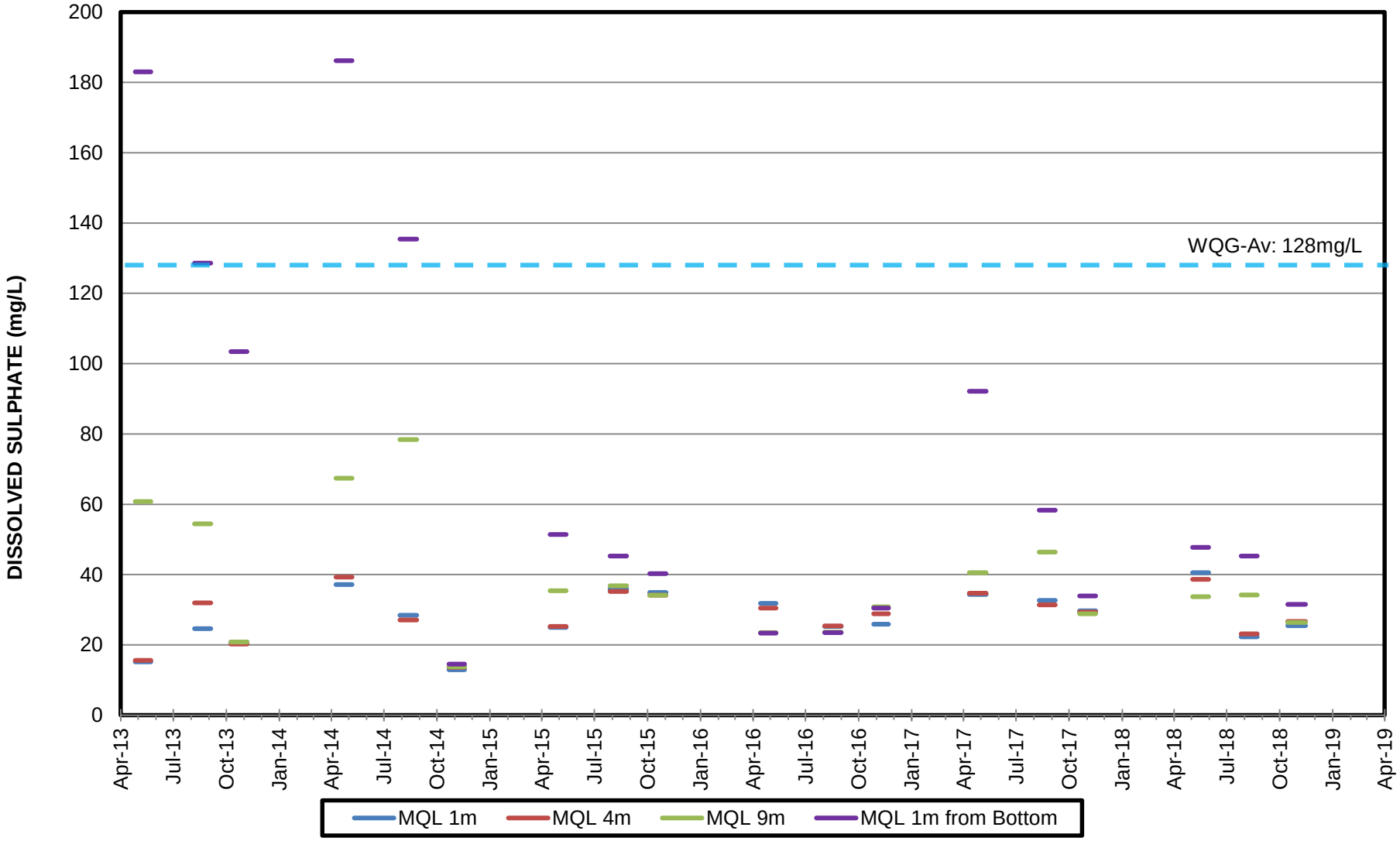
MIDDLE QUINSAM LAKE



GRAPH 34

5 in 30 AVERAGE DISSOLVED SULPHATE

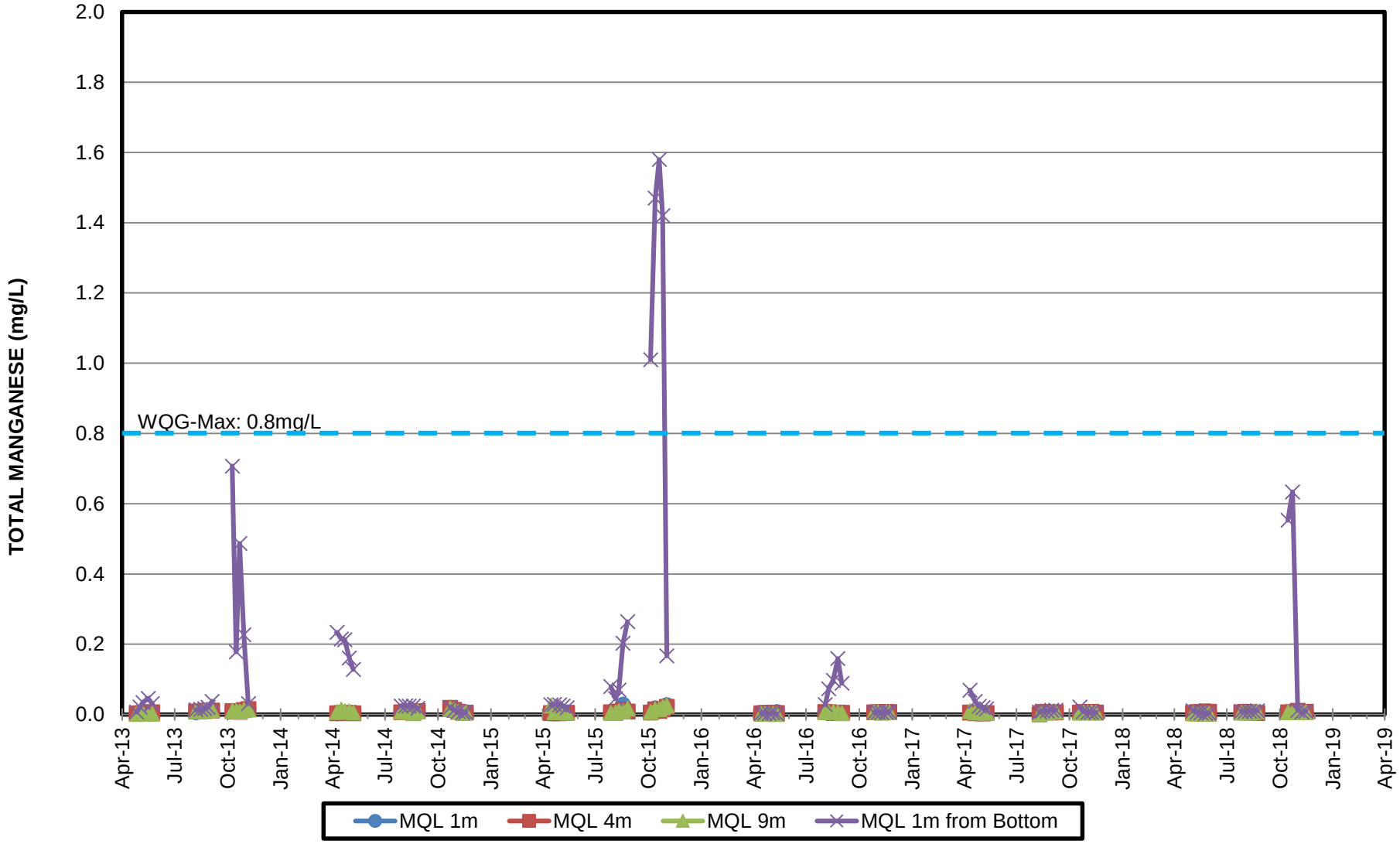
MIDDLE QUINSAM LAKE



GRAPH 35

5 in 30 TOTAL MANGANESE

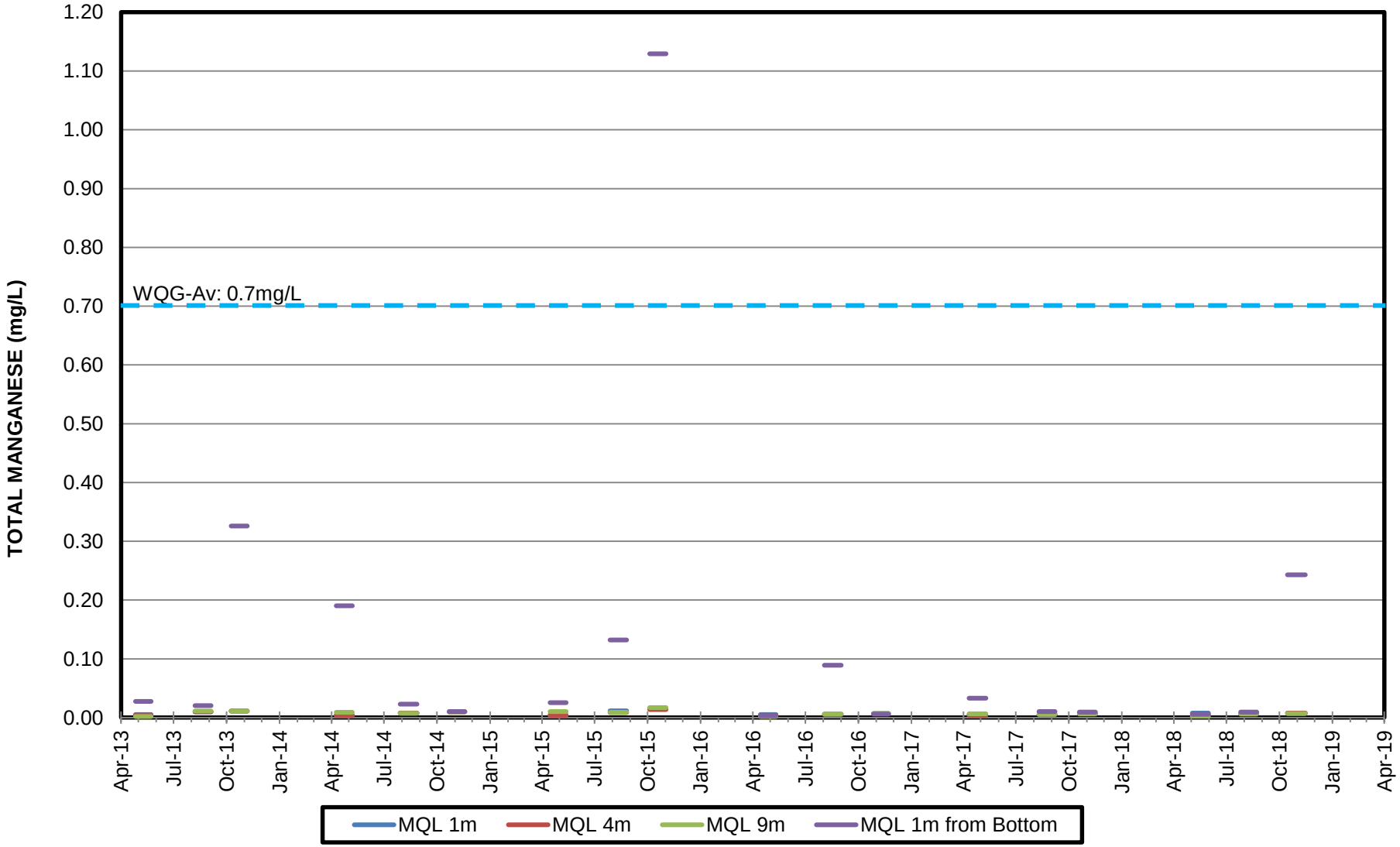
MIDDLE QUINSAM LAKE



GRAPH 36

5 in 30 AVERAGE TOTAL MANGANESE

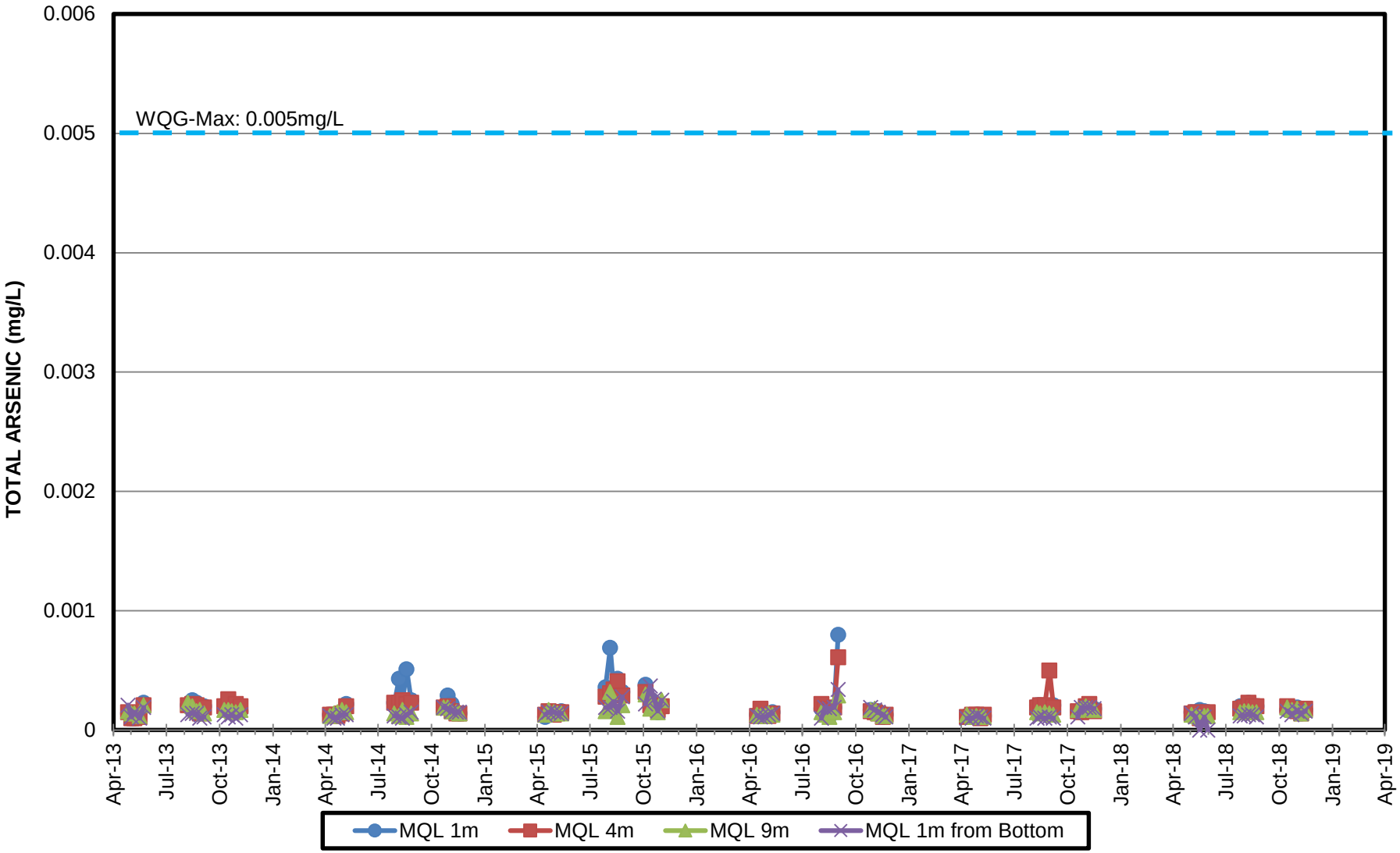
MIDDLE QUINSAM LAKE



GRAPH 37

5 in 30 TOTAL ARSENIC

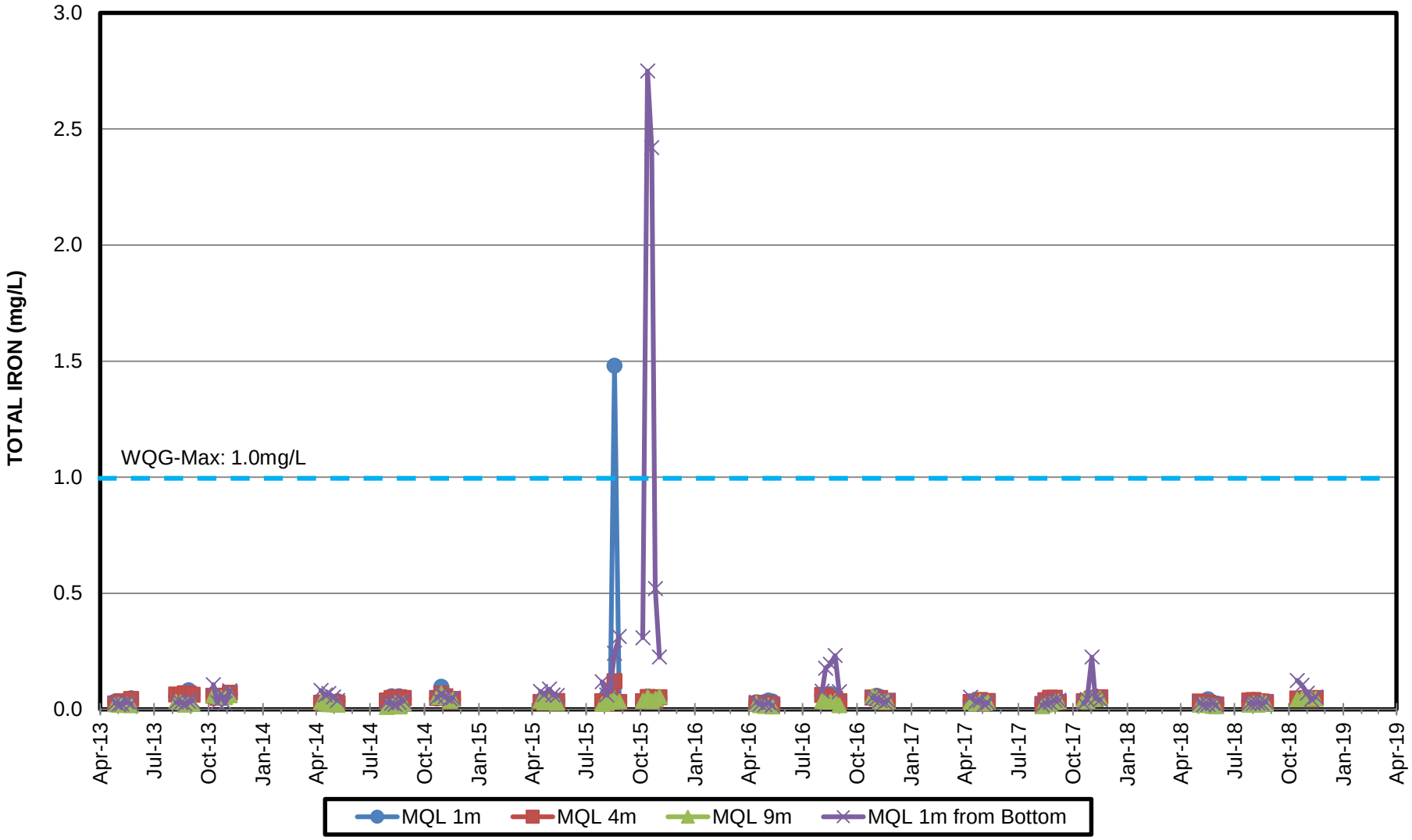
MIDDLE QUINSAM LAKE



GRAPH 38

5 in 30 TOTAL IRON

MIDDLE QUINSAM LAKE

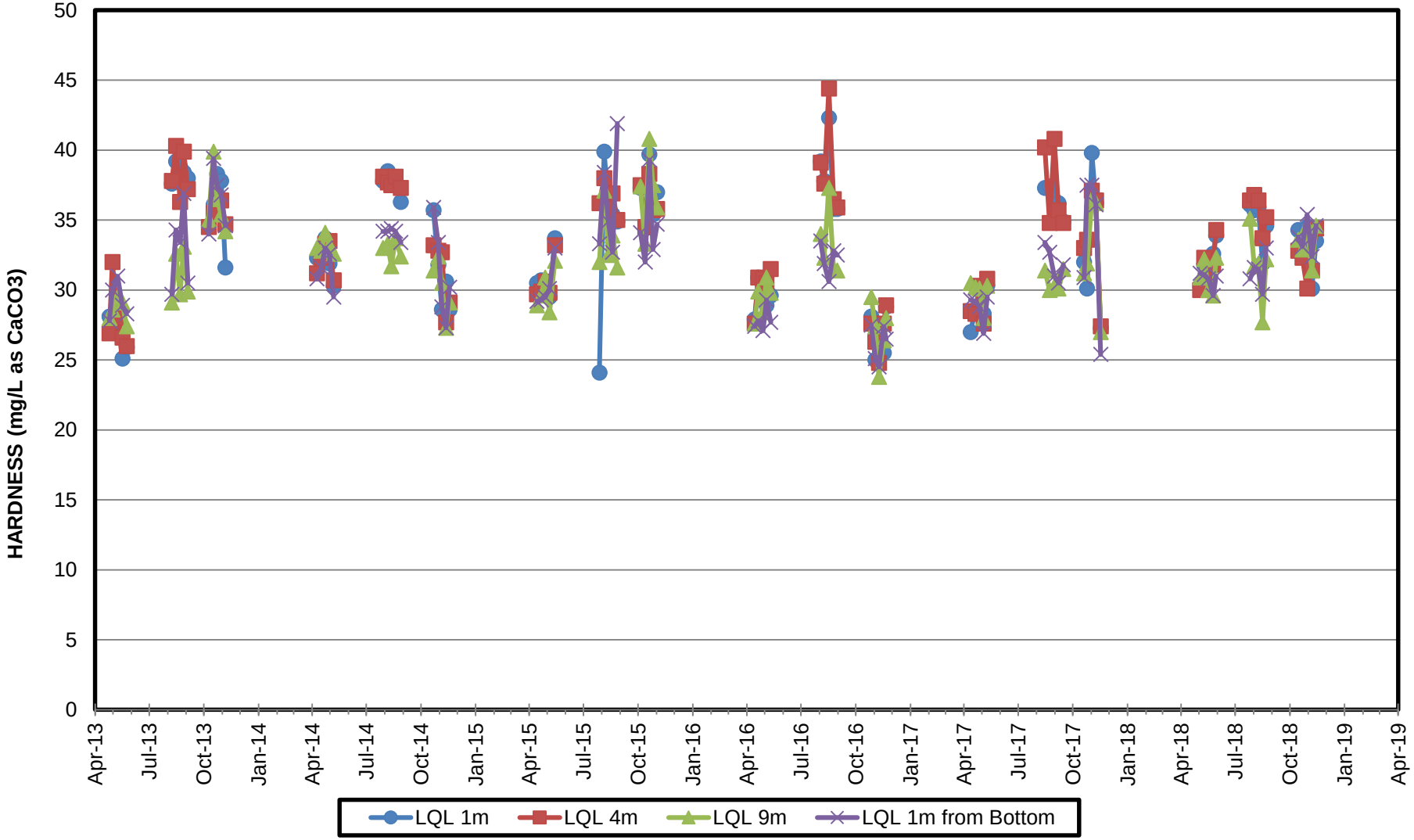


QUINSAM COAL

GRAPH 39

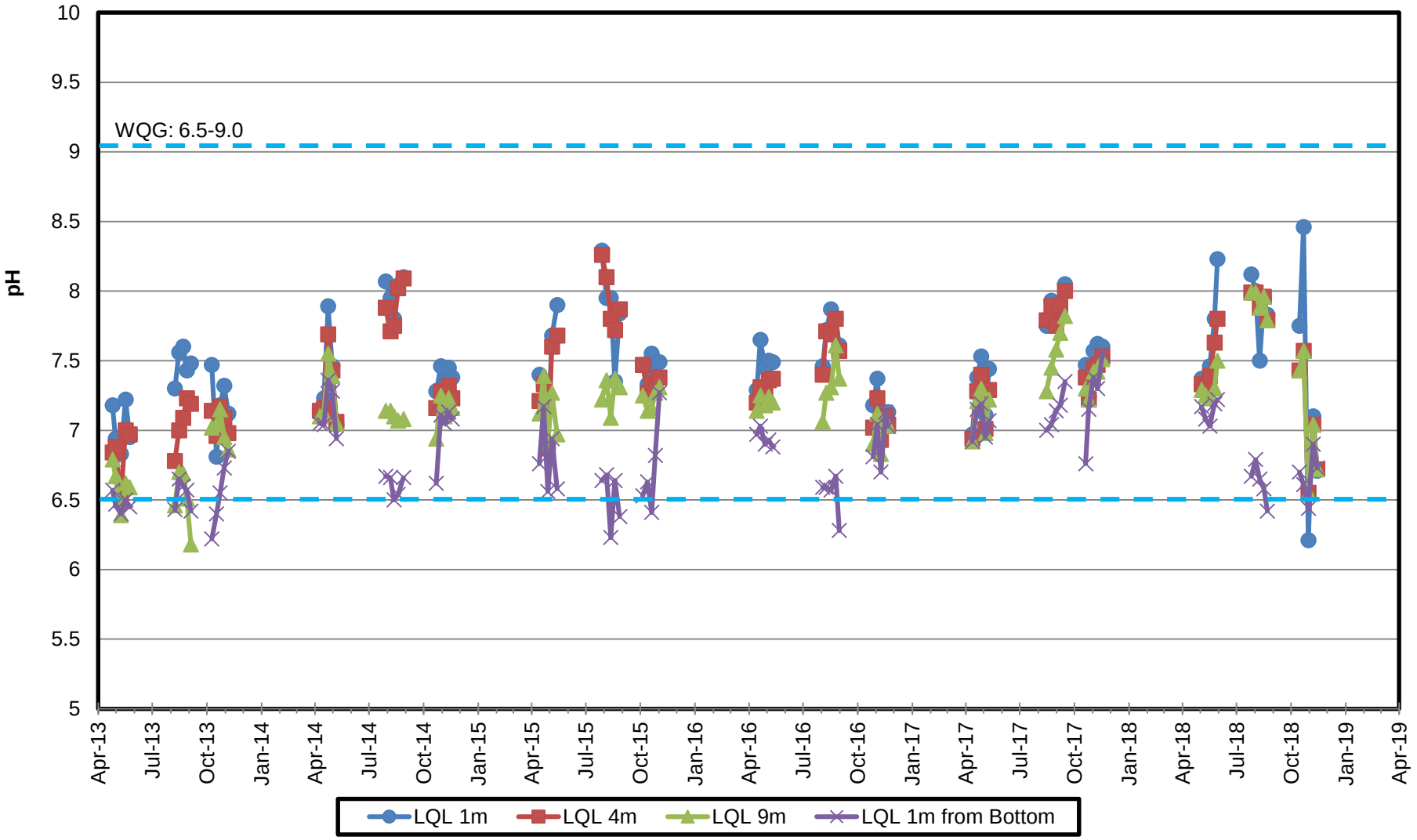
5 in 30 HARDNESS

LOWER QUINSAM LAKE



QUINSAM COAL

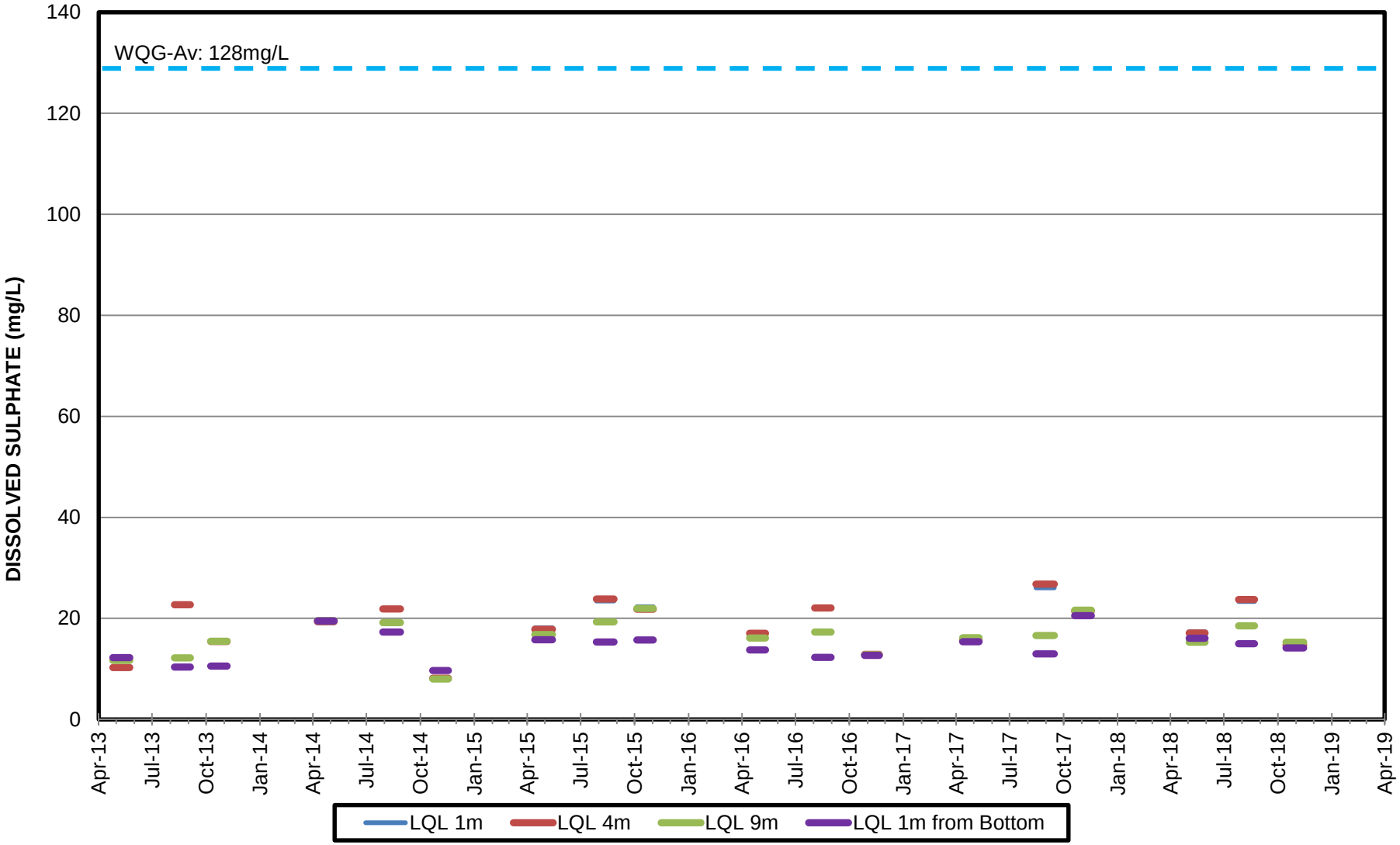
GRAPH 40
5 in 30 PH
LOWER QUINSAM LAKE



Graph 41

5 in 30 AVERAGE DISSOLVED SULPHATE

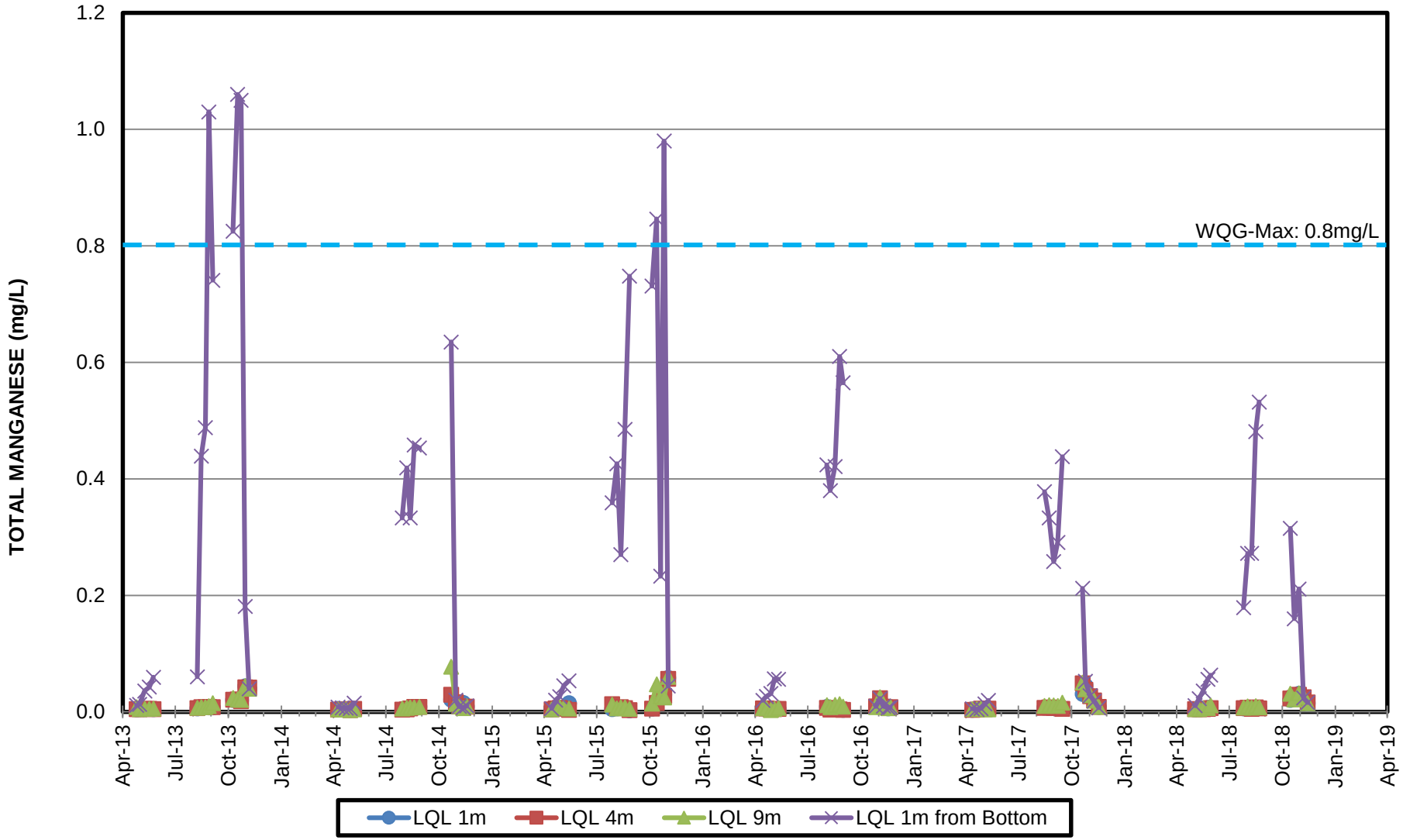
LOWER QUINSAM LAKE



GRAPH 42

5 in 30 TOTAL MANGANESE

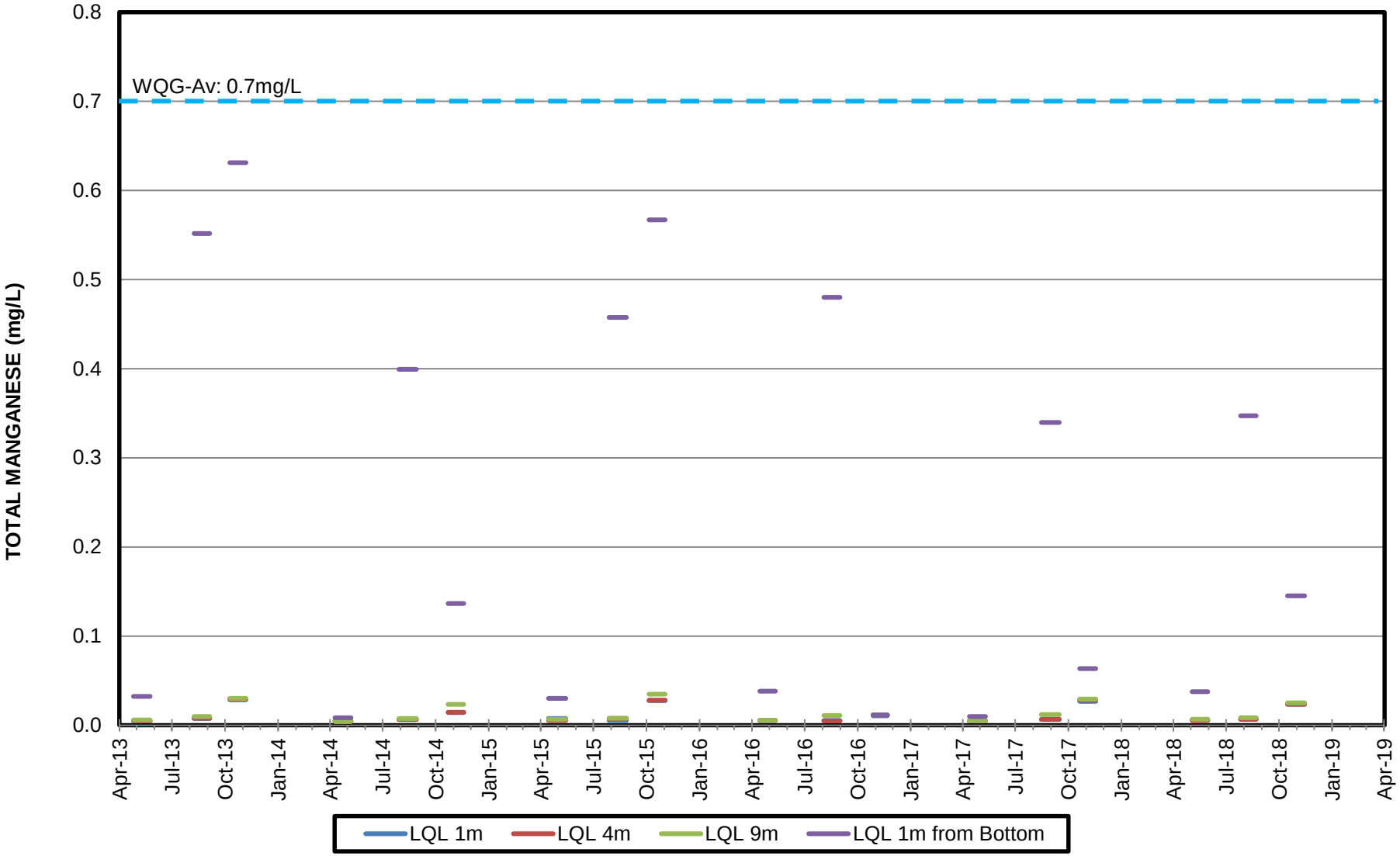
LOWER QUINSAM LAKE



GRAPH 43

5 in 30 AVERAGE TOTAL MANGANESE

LOWER QUINSAM LAKE

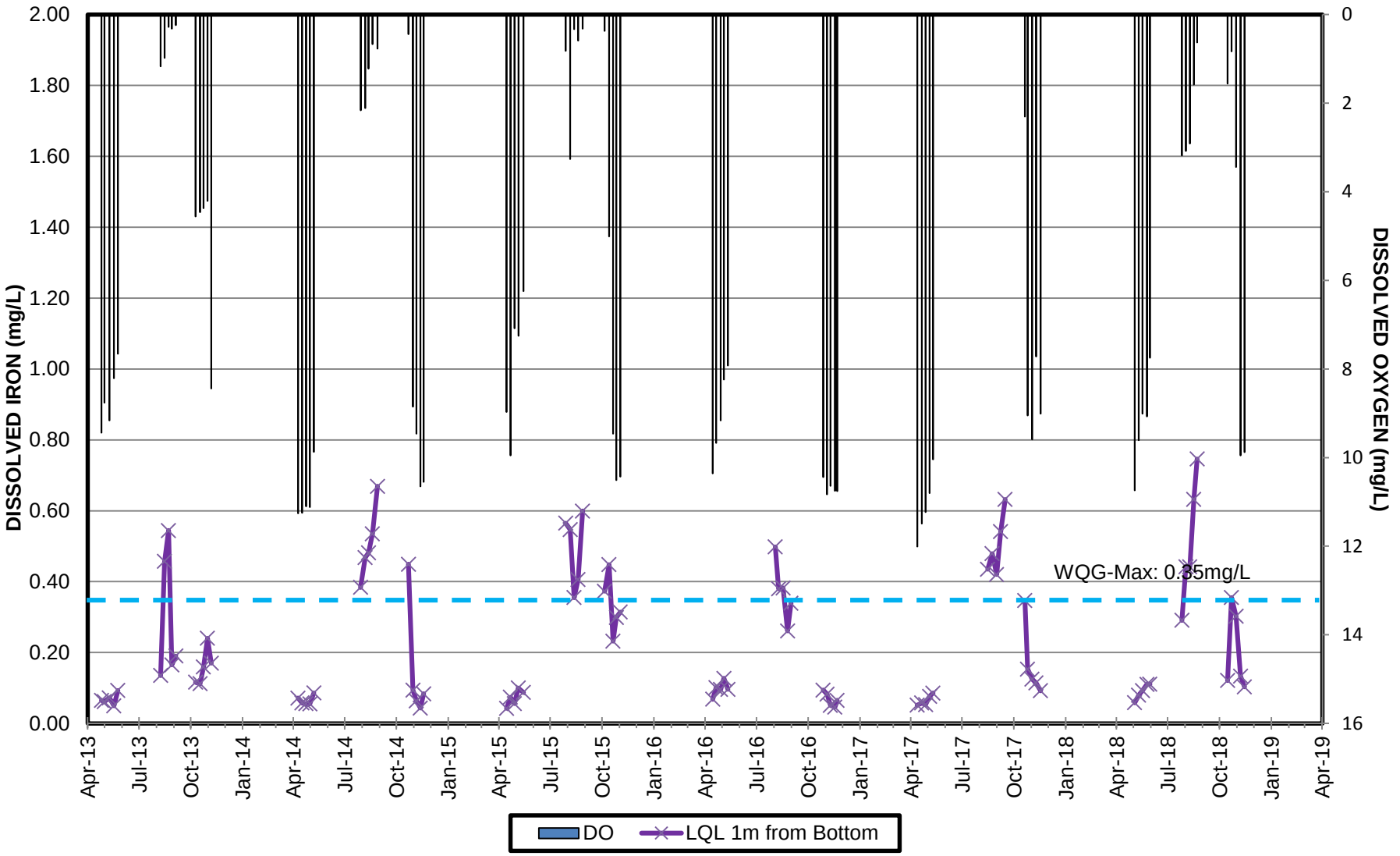


QUINSAM COAL

GRAPH 44

5 in 30 DISSOLVED IRON VS DISSOLVED OXYGEN

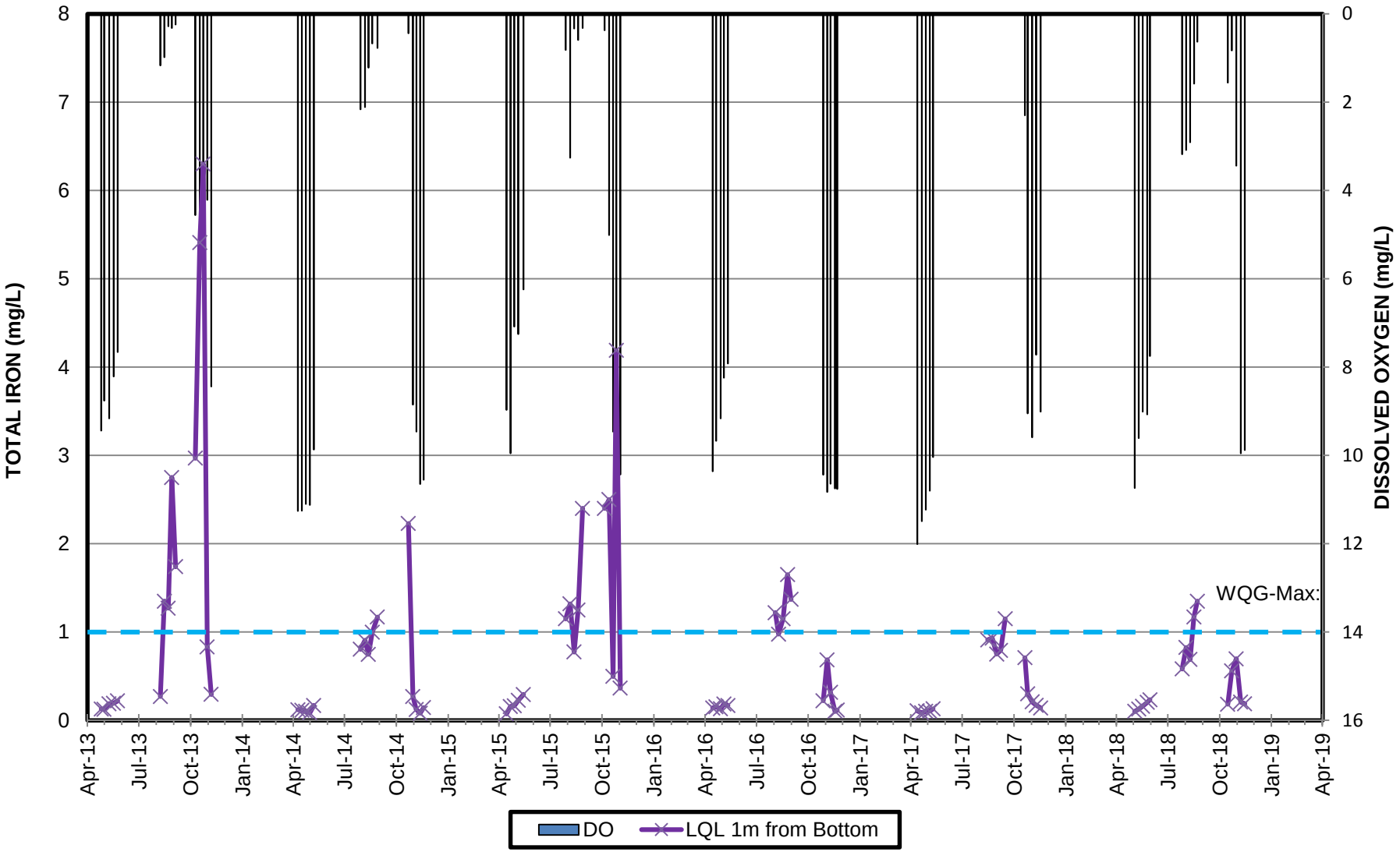
LOWER QUINSAM LAKE 1mb



GRAPH 45

5 in 30 TOTAL IRON VS DISSOLVED OXYGEN

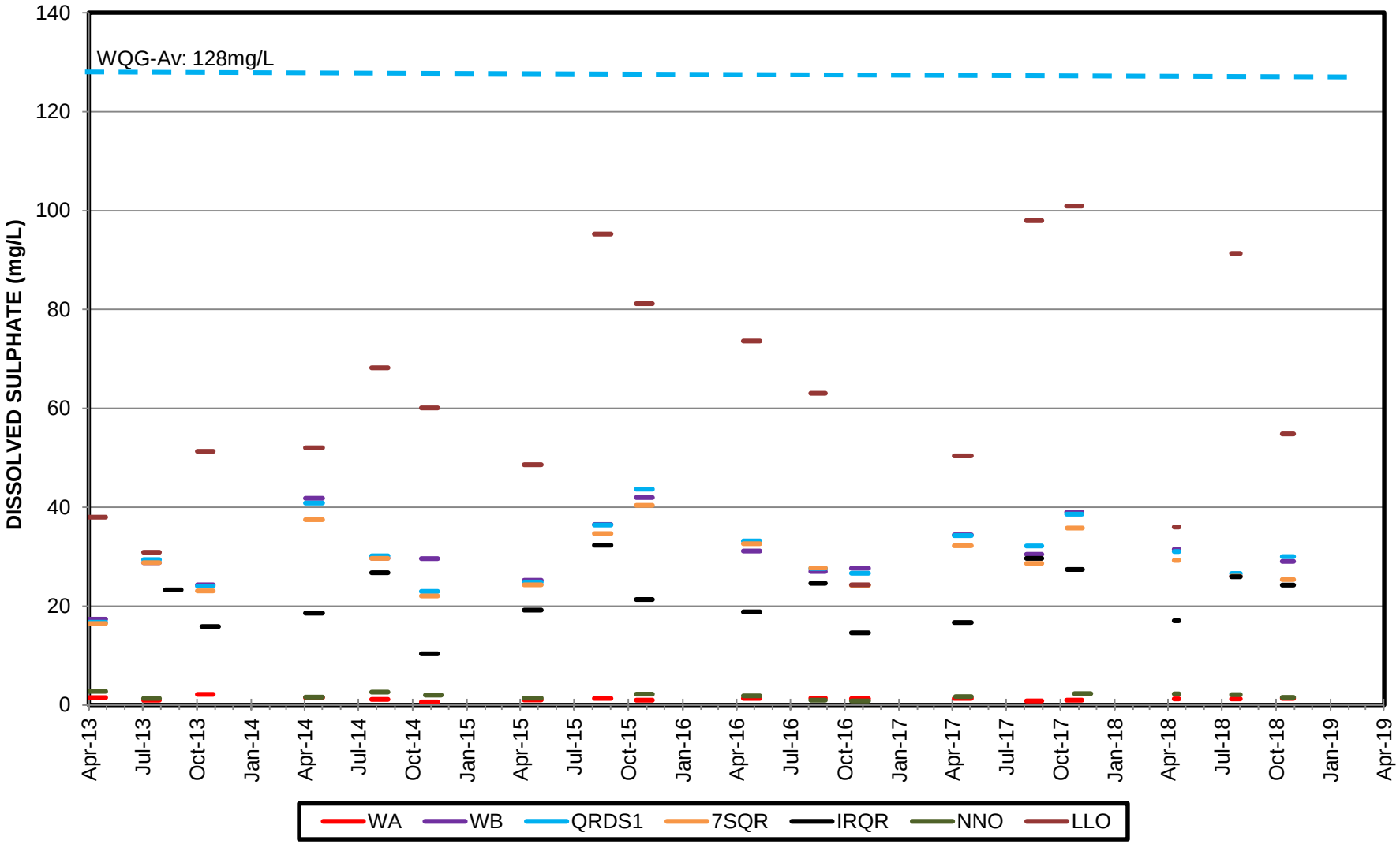
LOWER QUINSAM LAKE 1mb



GRAPH 46

5 IN 30 AVERAGE DISSOLVED SULPHATE

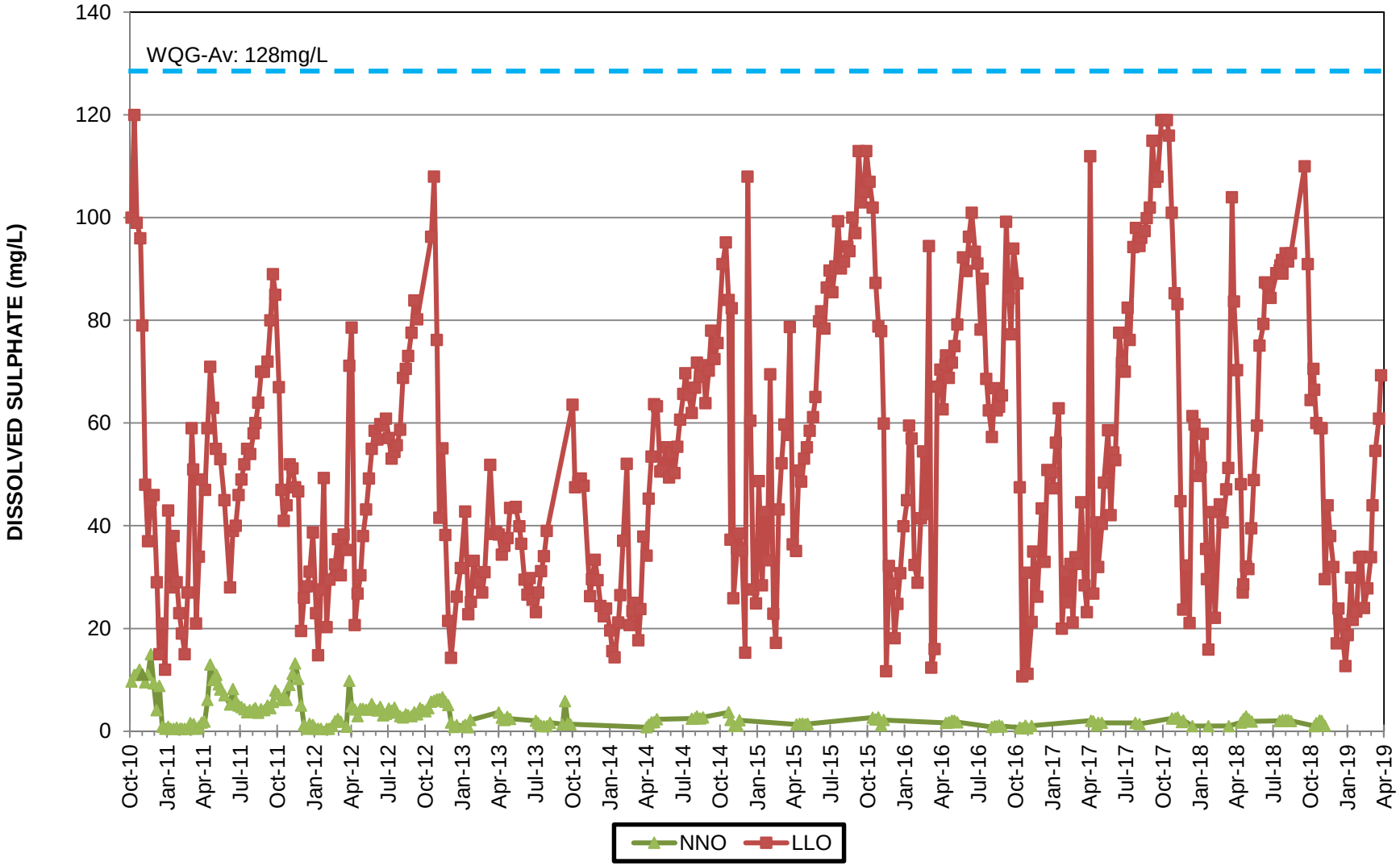
QUINSAM SUB BASIN: RIVERS AND STREAMS



GRAPH 47

DISSOLVED SULPHATE

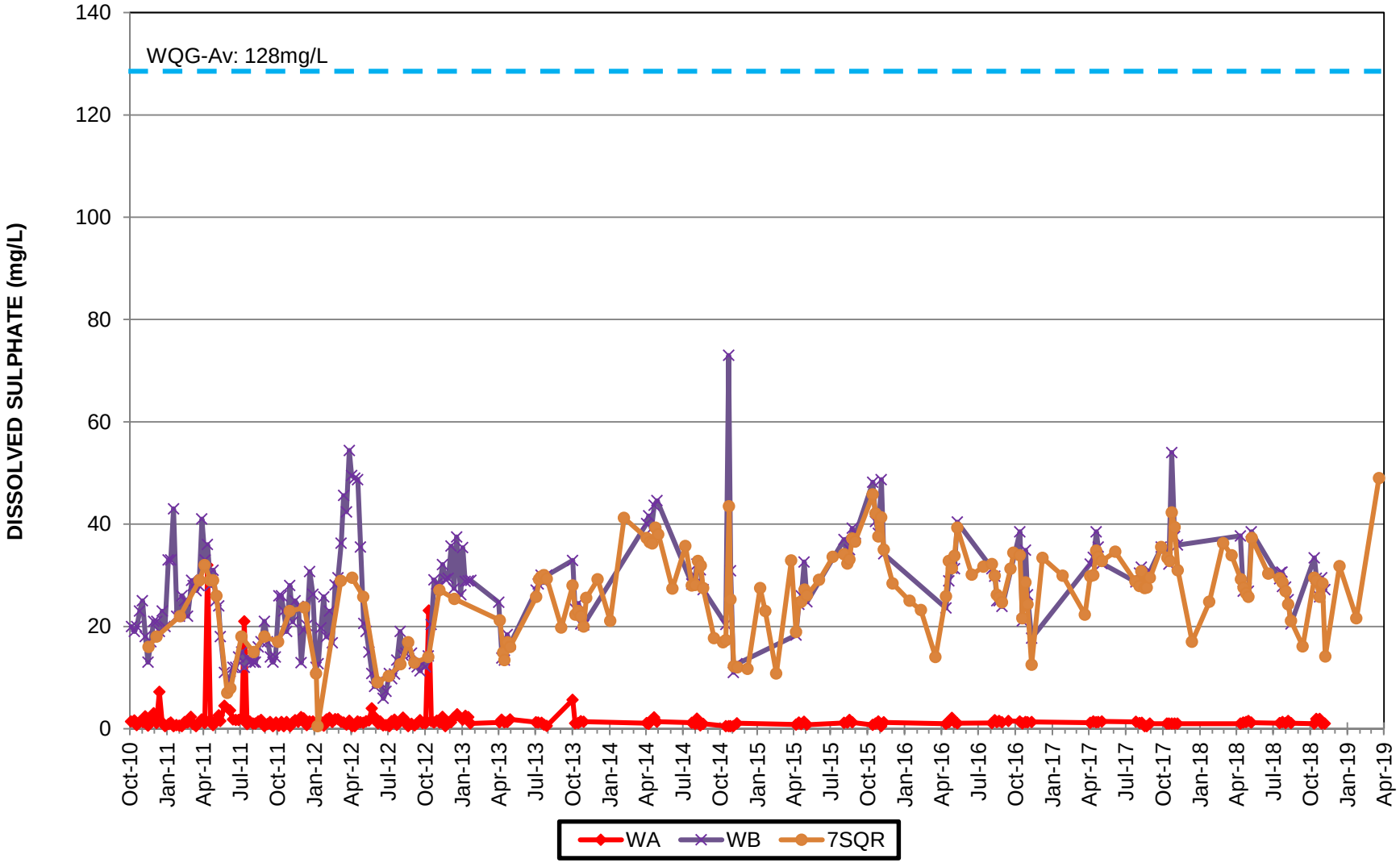
QUINSAM SUB BASIN: RIVERS AND STREAMS



GRAPH 48

DISSOLVED SULPHATE

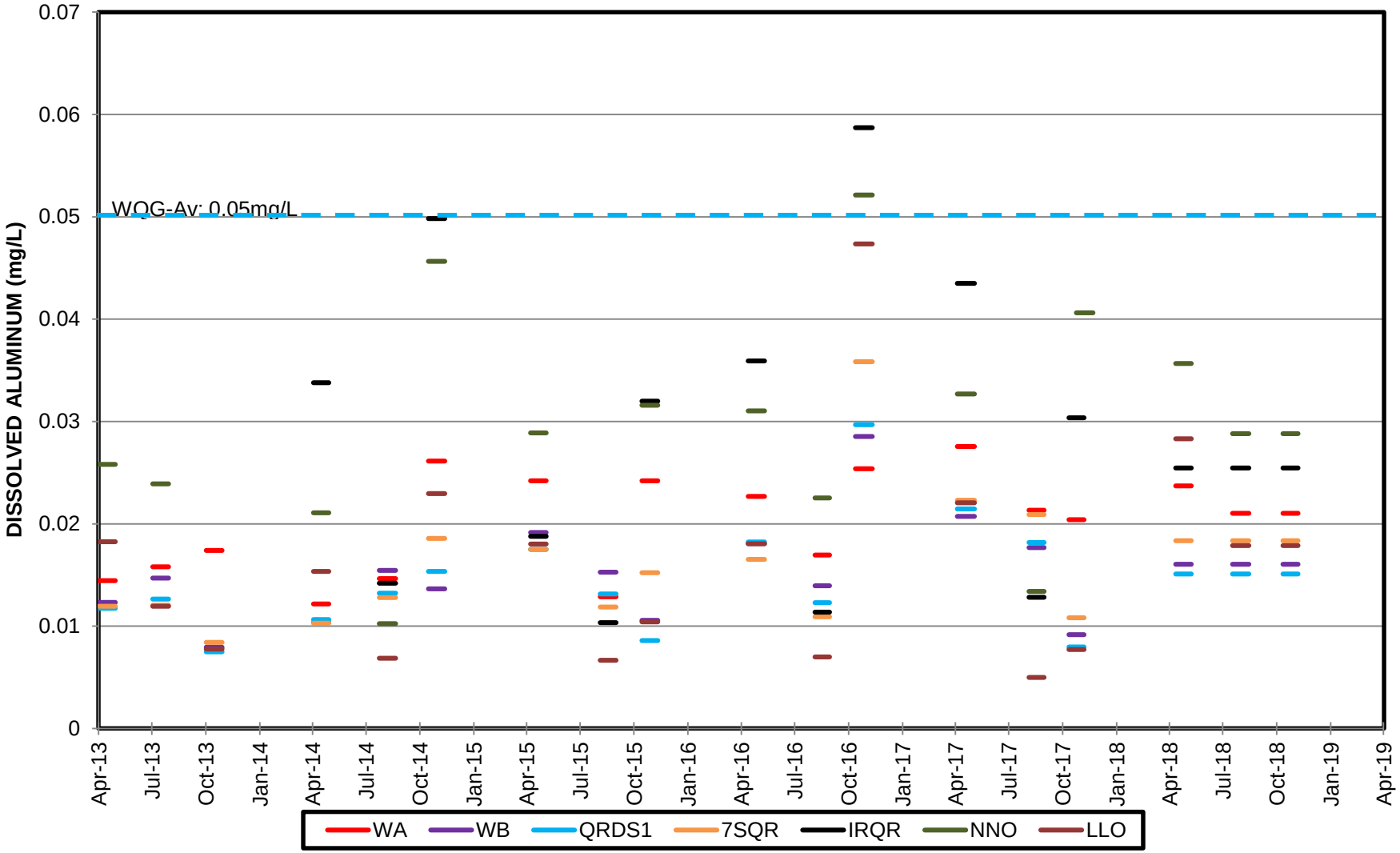
QUINSAM SUB BASIN: RIVERS AND STREAMS



GRAPH 49

5 in 30 AVERAGE DISSOLVED ALUMINUM

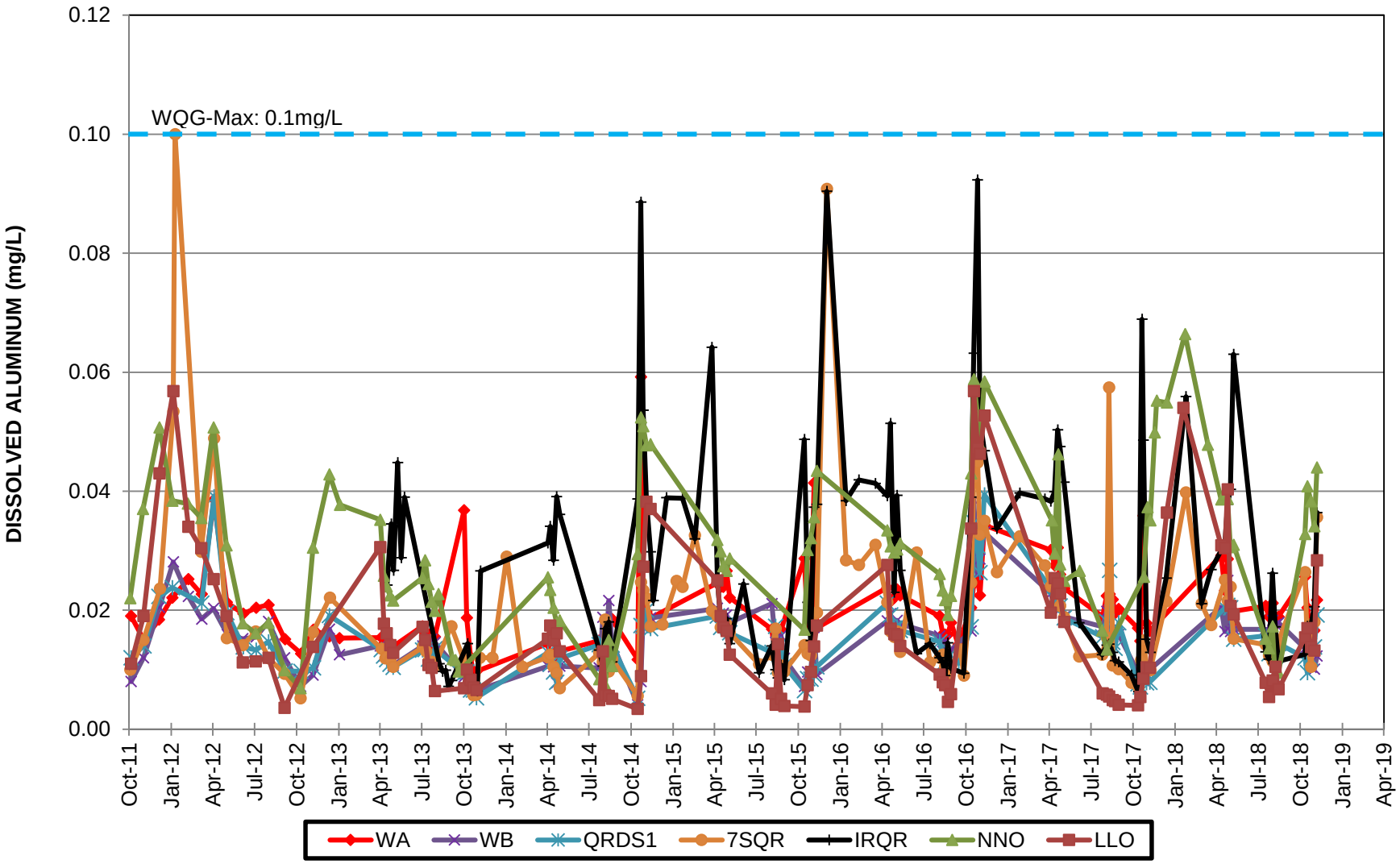
QUINSAM SUB BASIN: RIVERS AND STREAMS



GRAPH 50

5 in 30 DISSOLVED ALUMINUM

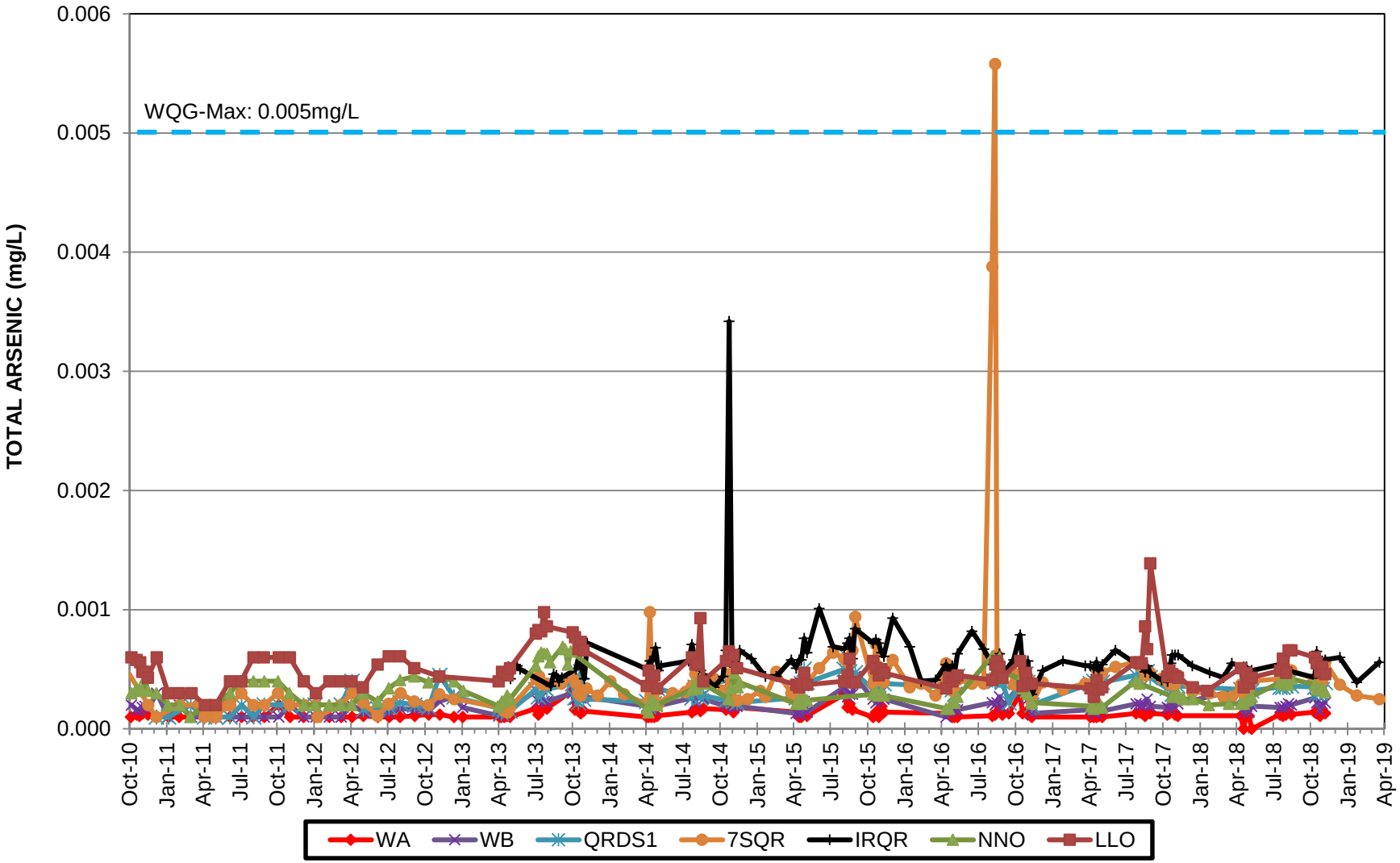
QUINSAM SUB BASIN: RIVERS AND STREAMS



GRAPH 51

TOTAL ARSENIC

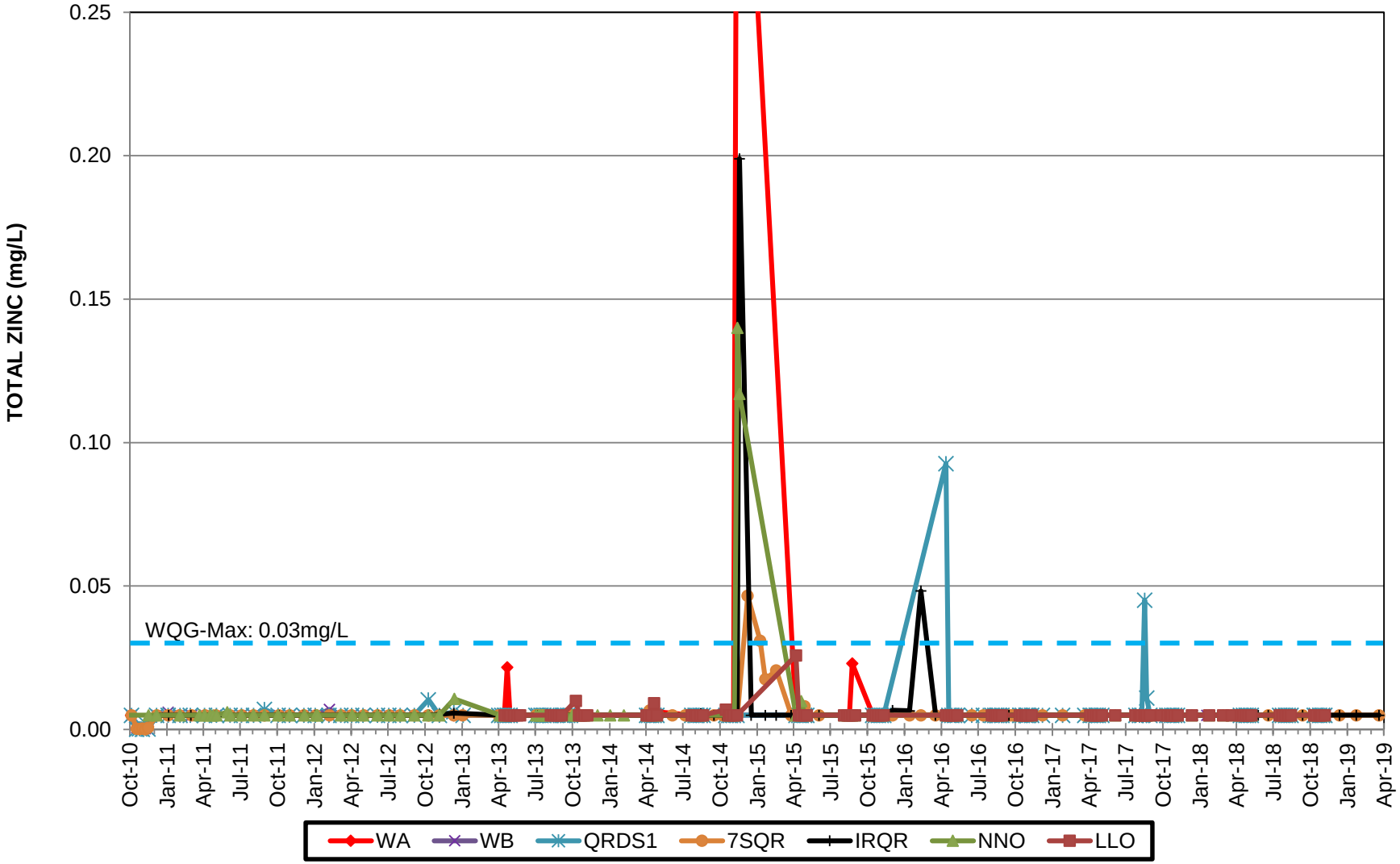
QUINSAM SUB BASIN: RIVERS AND STREAMS



GRAPH 52

TOTAL ZINC

QUINSAM SUB BASIN: RIVERS AND STREAMS

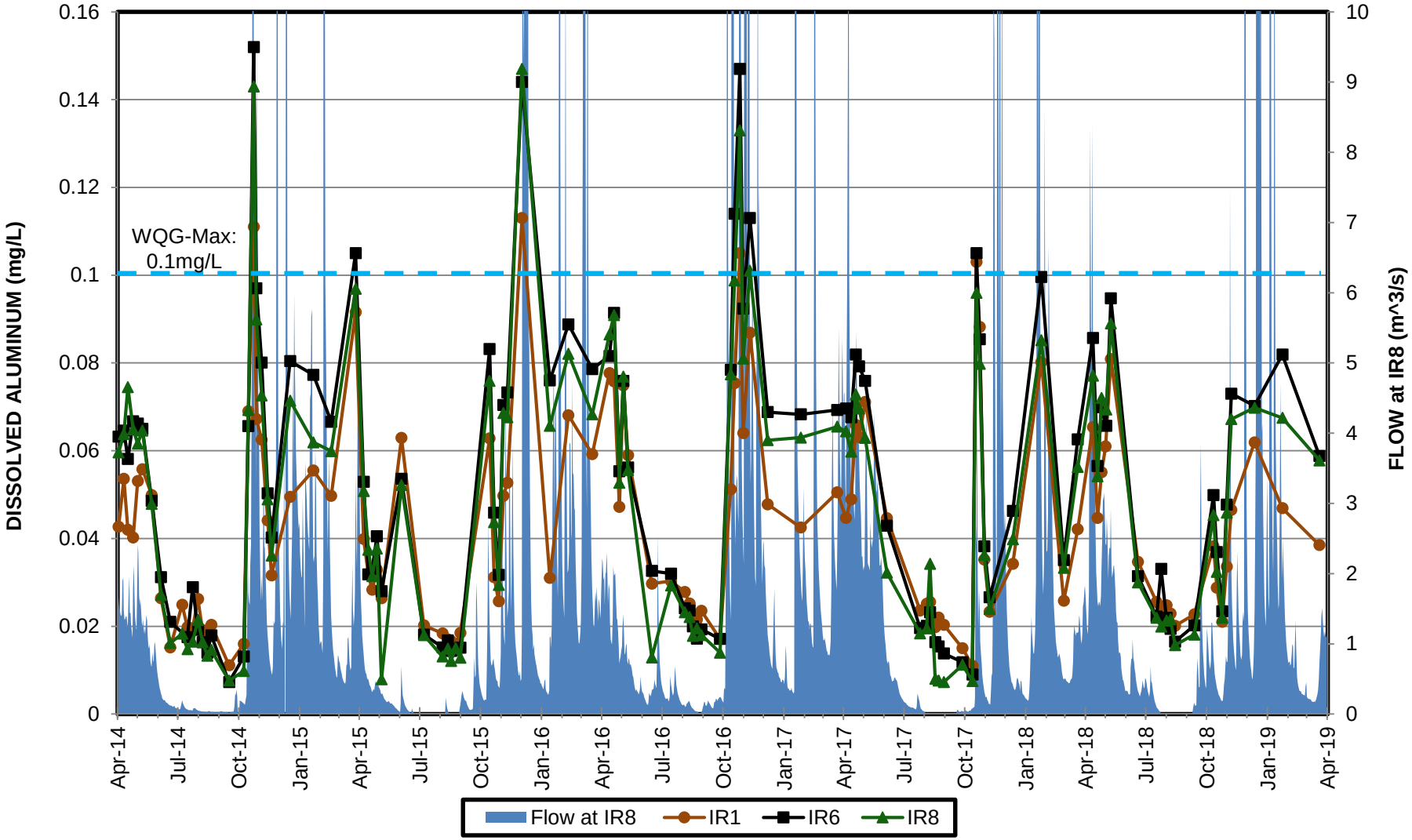


QUINSAM COAL

GRAPH 53

DISSOLVED ALUMINUM vs FLOW

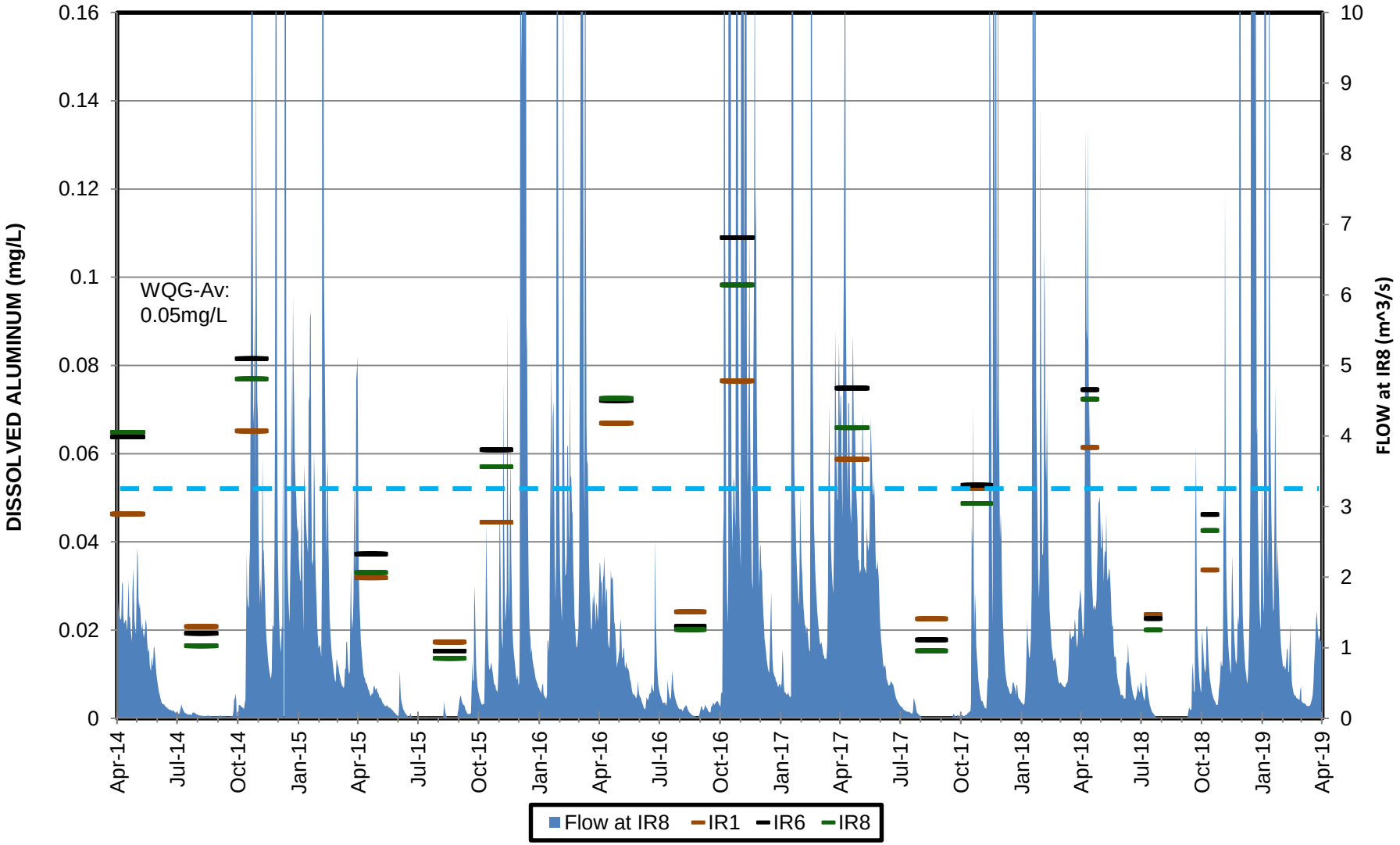
IRON RIVER



GRAPH 54

5 in 30 AVERAGE DISSOLVED ALUMINUM

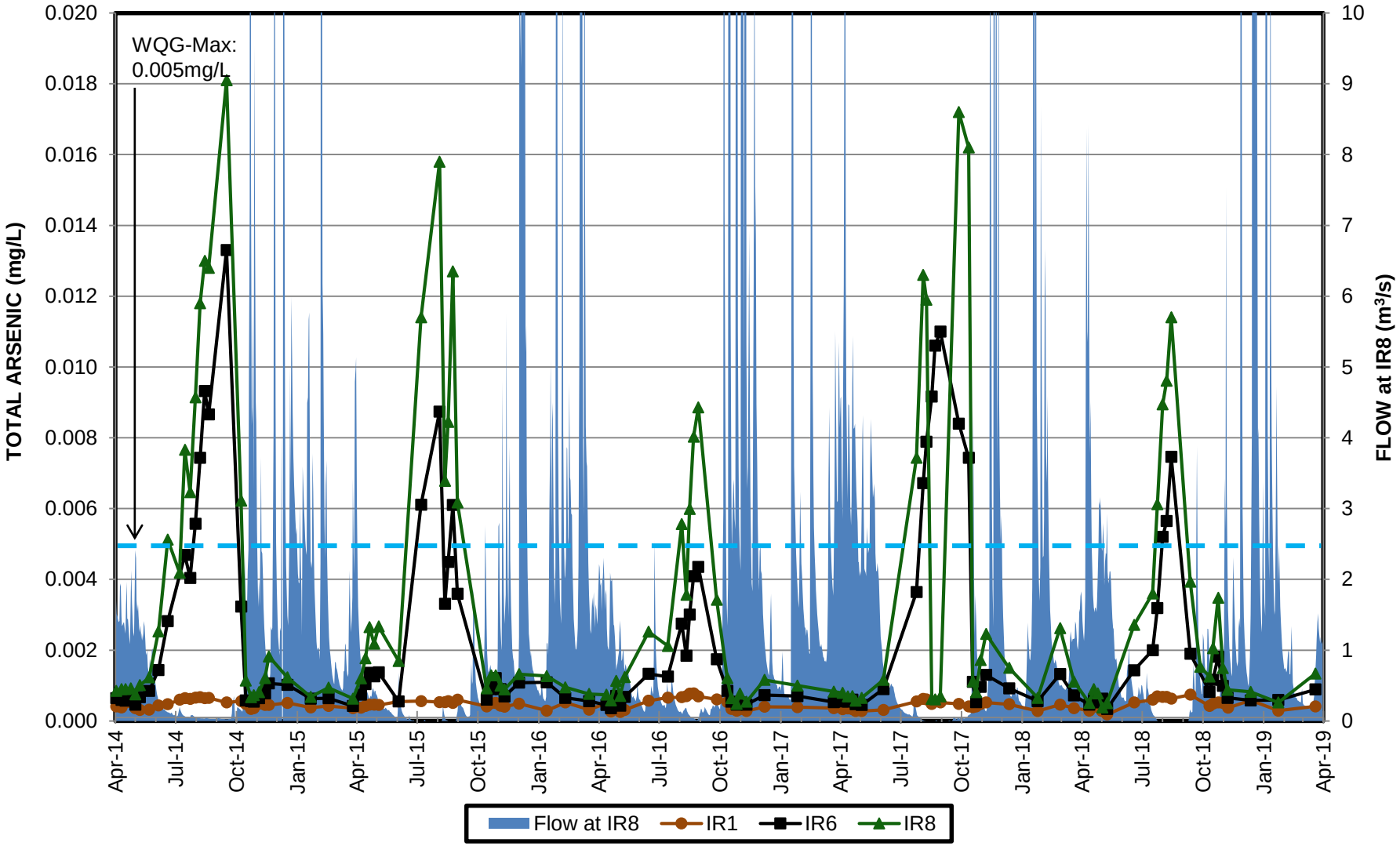
IRON RIVER



GRAPH 55

TOTAL ARSENIC vs FLOW

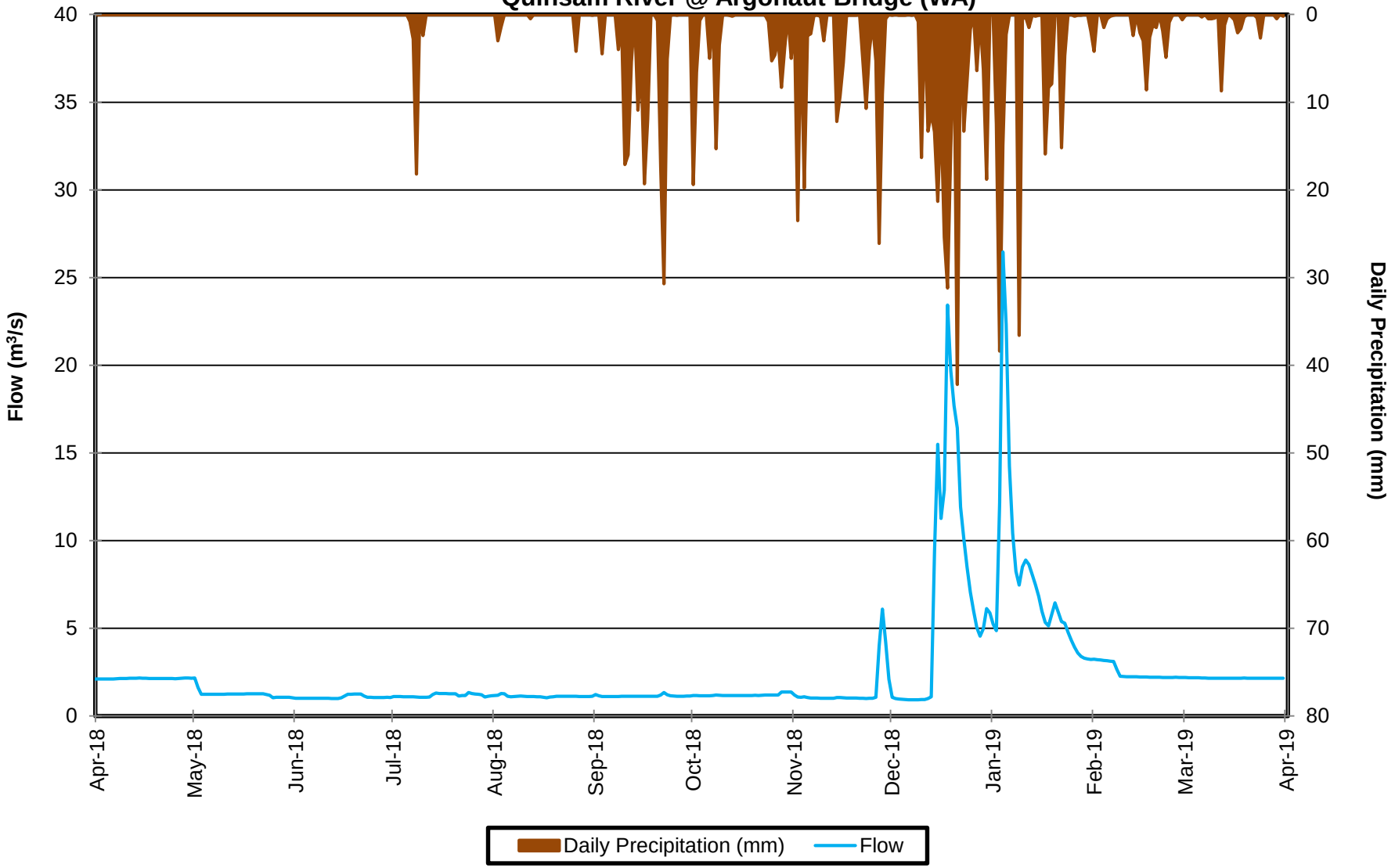
IRON RIVER



GRAPH 56

FLOW & PRECIPITATION

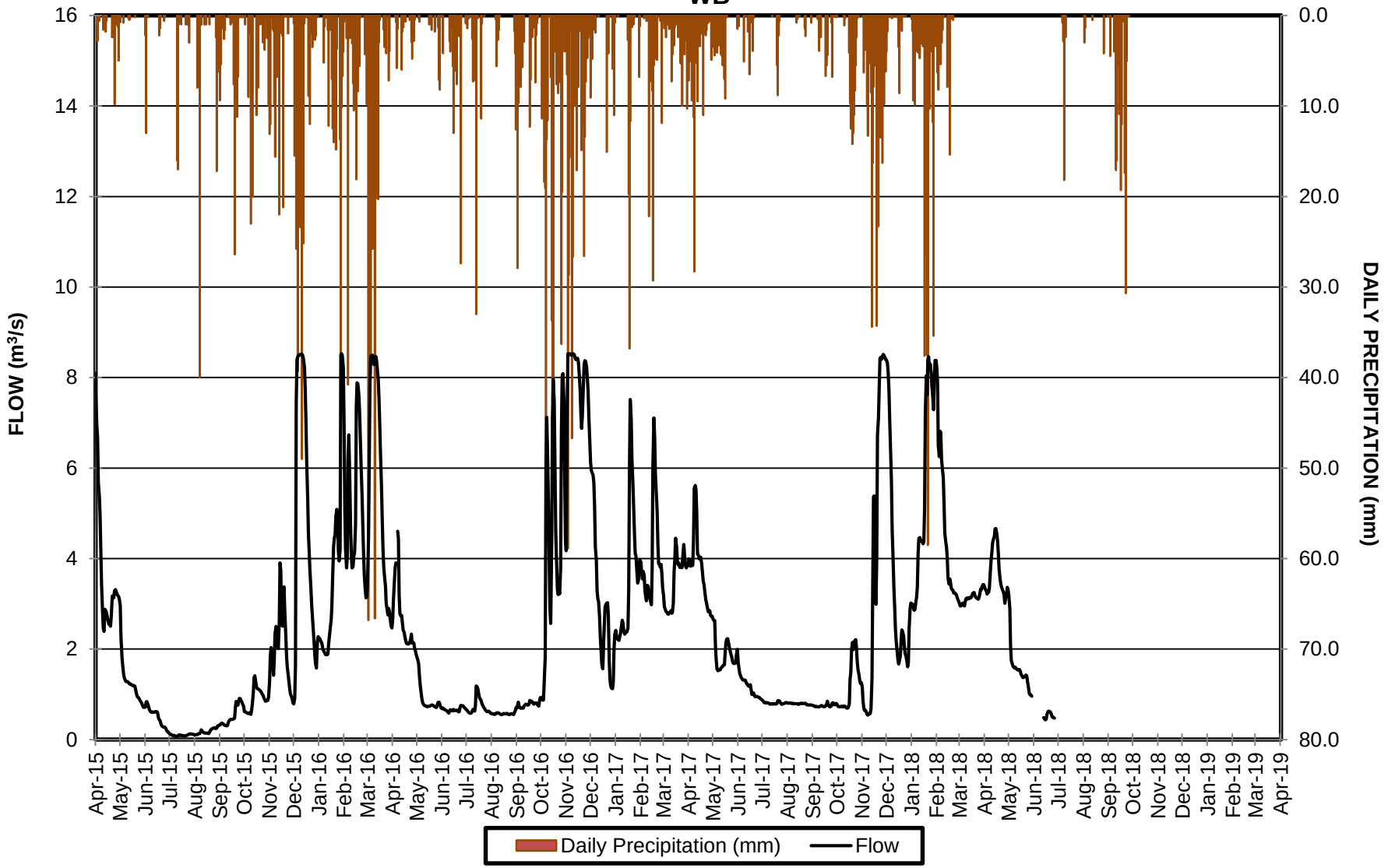
Quinsam River @ Argonaut Bridge (WA)



GRAPH 57

FLOW VS PRECIPITATION

WB

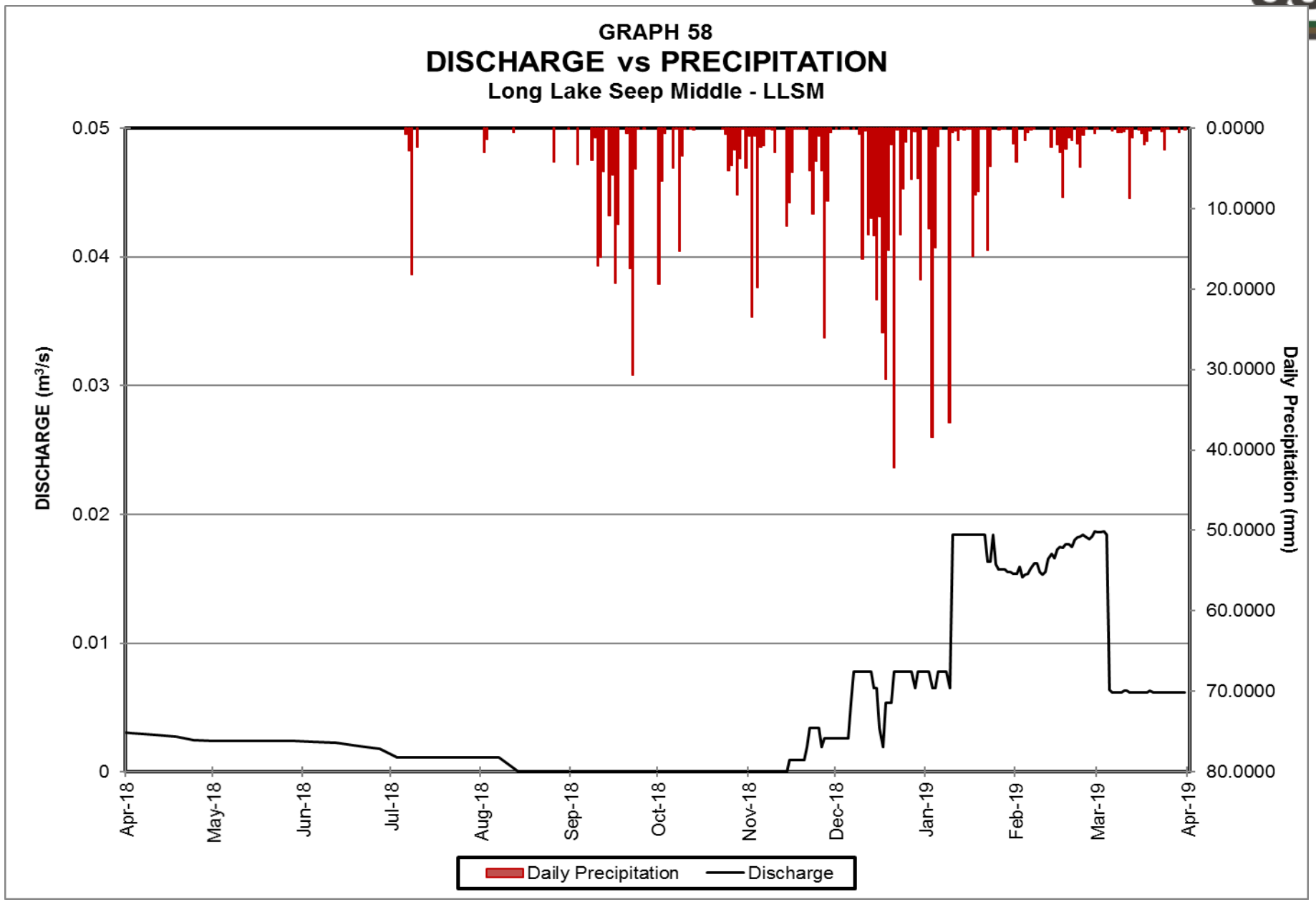


QUINSAM COAL

GRAPH 58

DISCHARGE vs PRECIPITATION

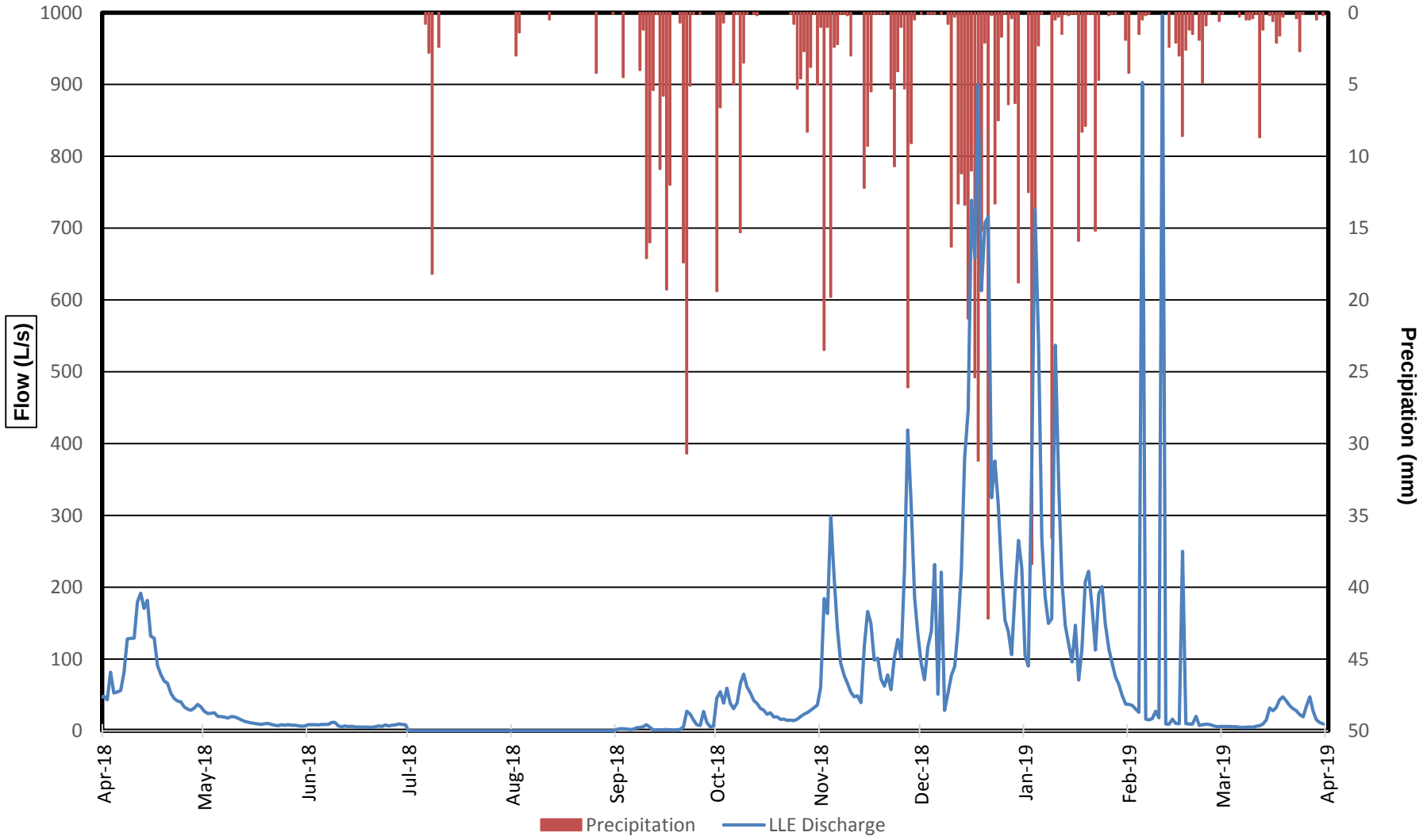
Long Lake Seep Middle - LLSM



GRAPH 59

DISCHARGE vs PRECIPITATION

Long Lake Entry - LLE

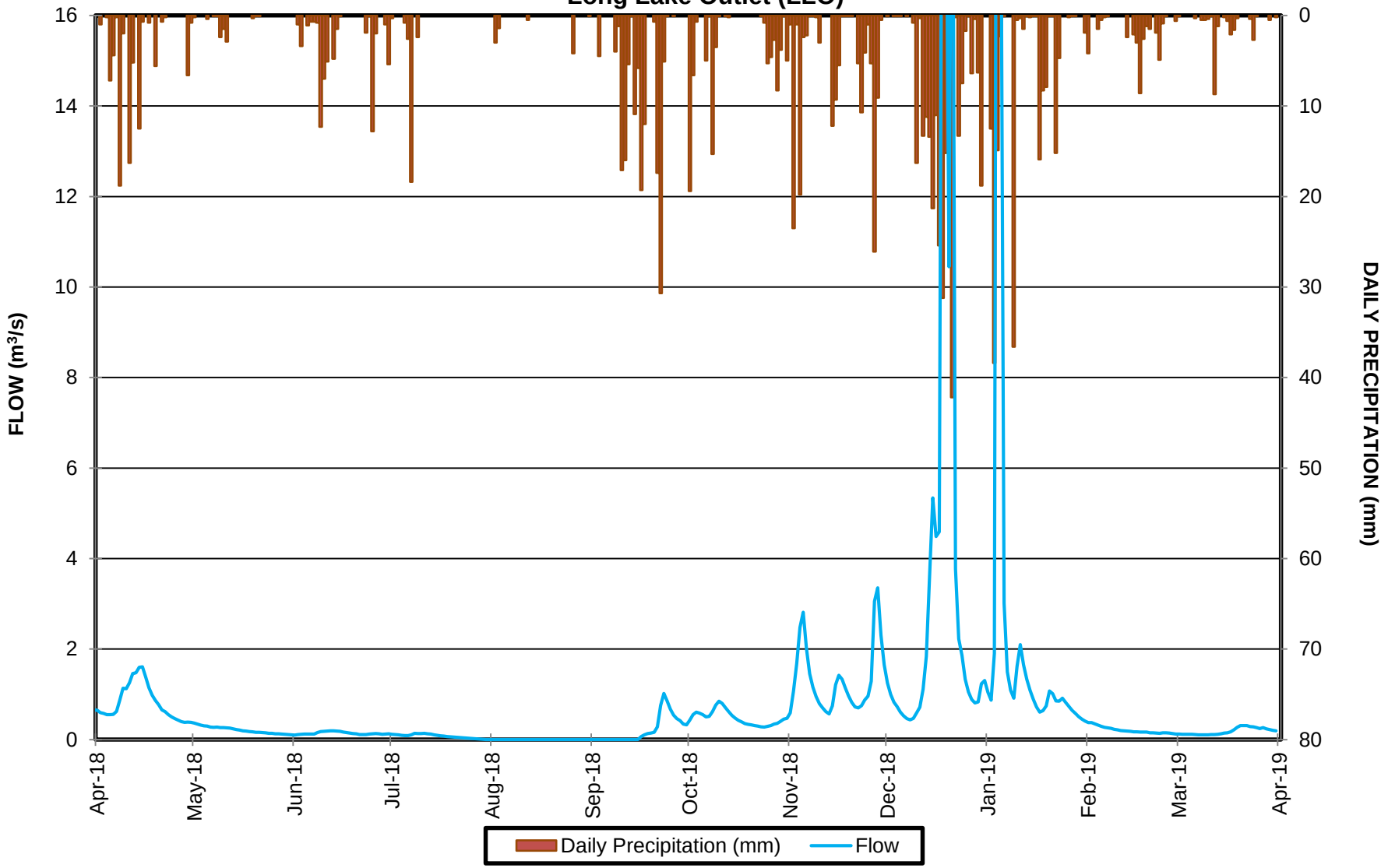


QUINSAM COAL

GRAPH 60

FLOW vs PRECIPITATION

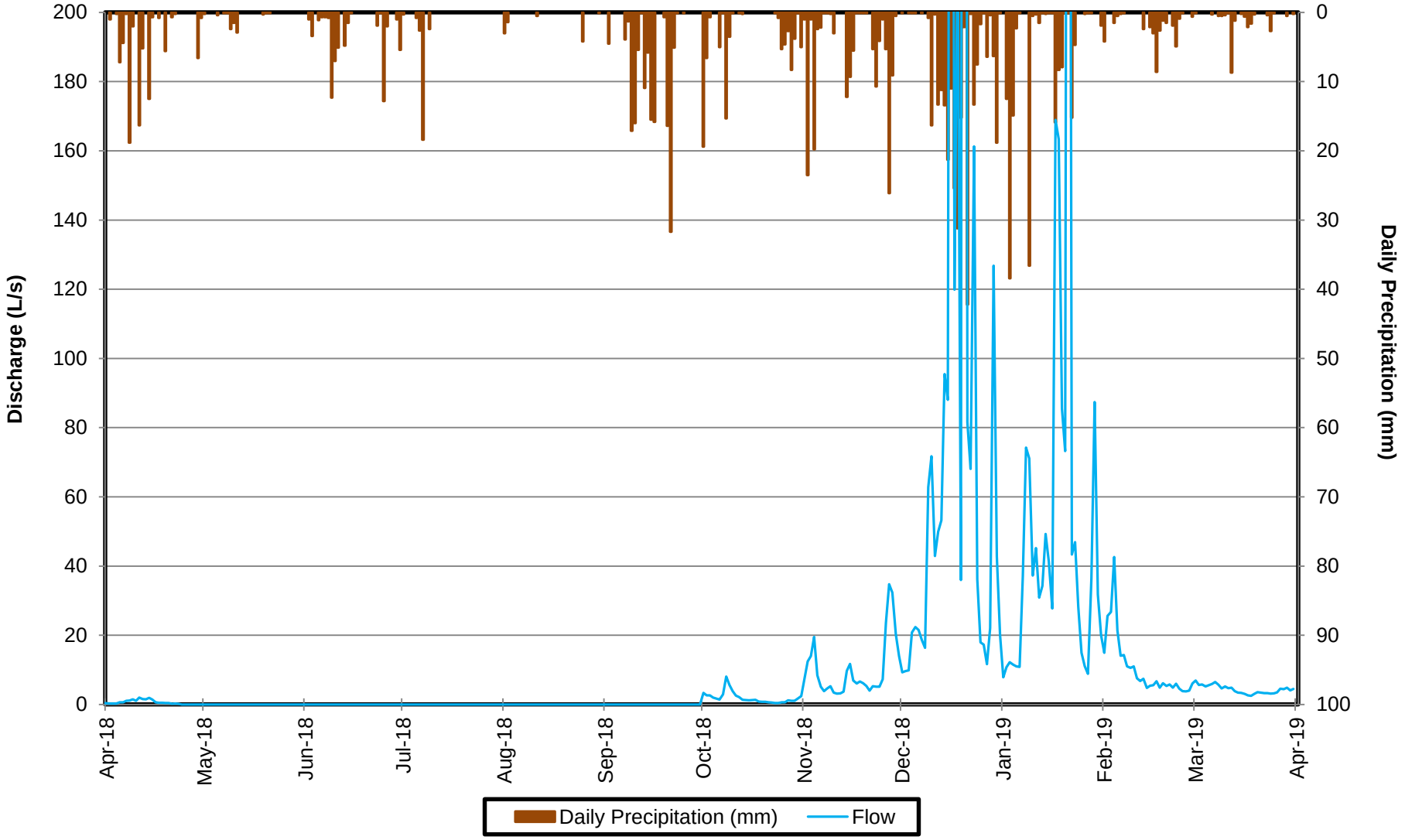
Long Lake Outlet (LLO)



GRAPH 61

FLOW vs PRECIPITATION

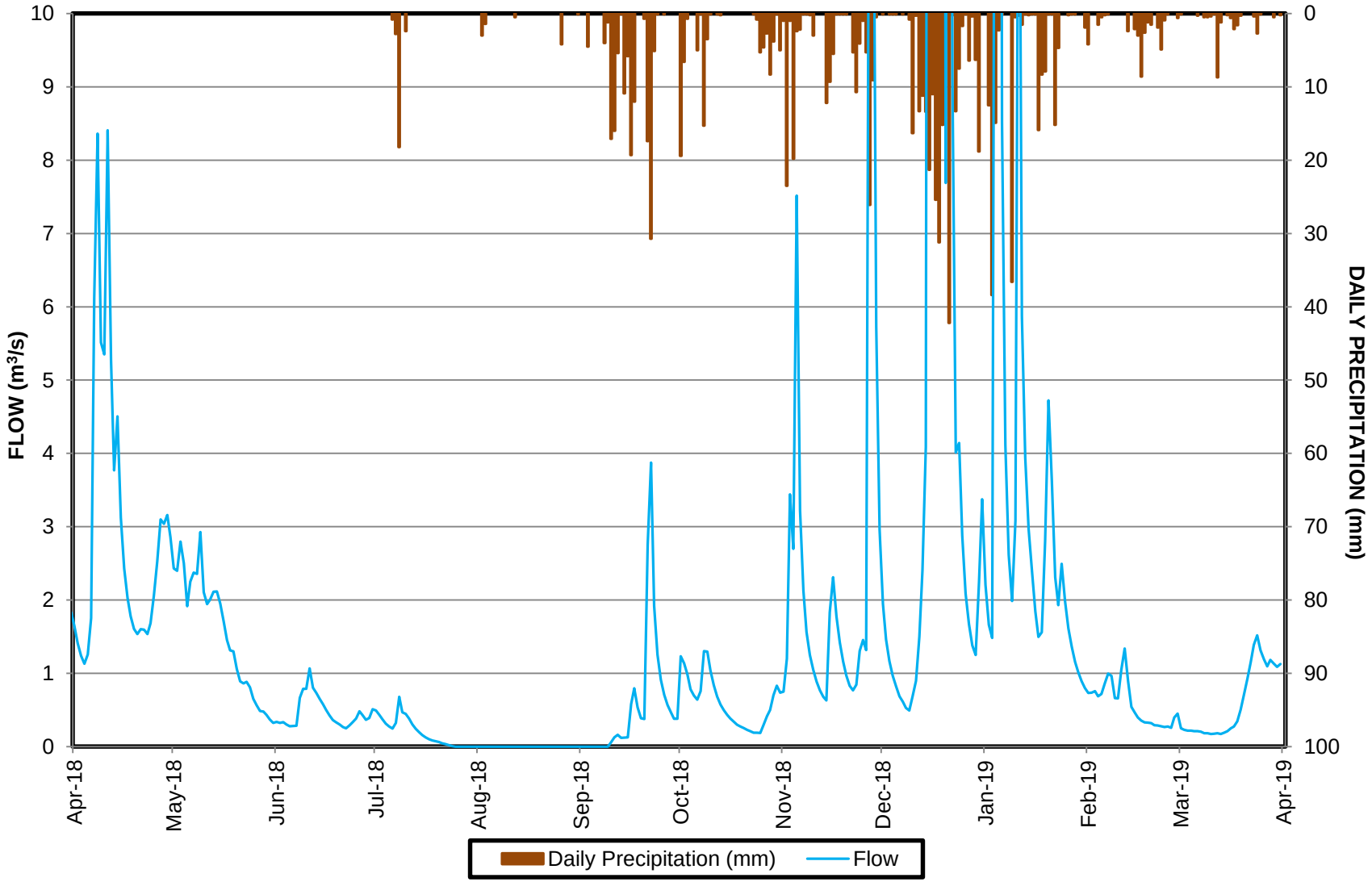
7S Stream 1 (7S)



GRAPH 62

FLOW vs PRECIPITATION

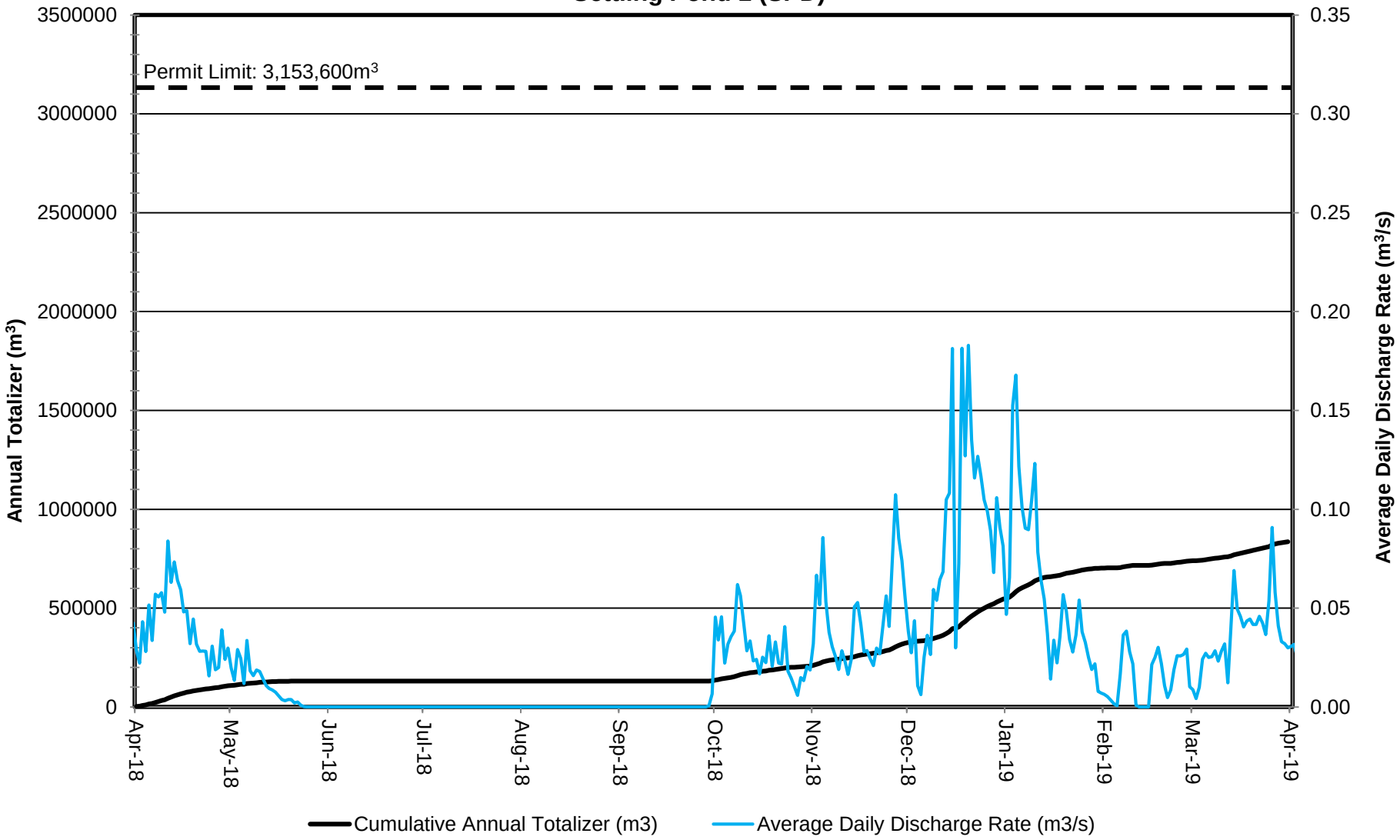
Iron River - IR8



GRAPH 63

Cumulative Discharge & Average Daily Rates

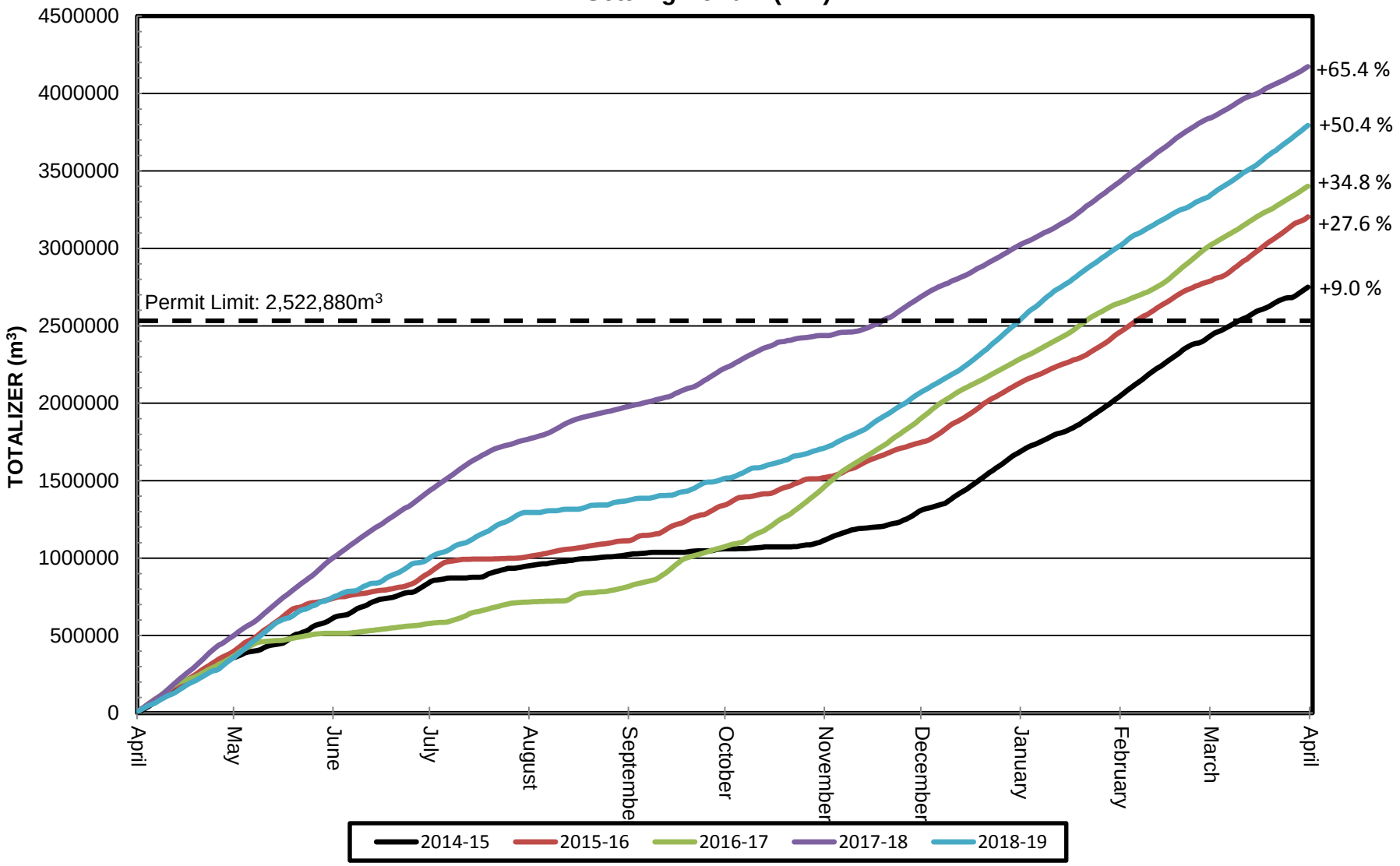
Settling Pond 1 (SPD)



GRAPH 64

Comparison of Cumulative Annual Discharges

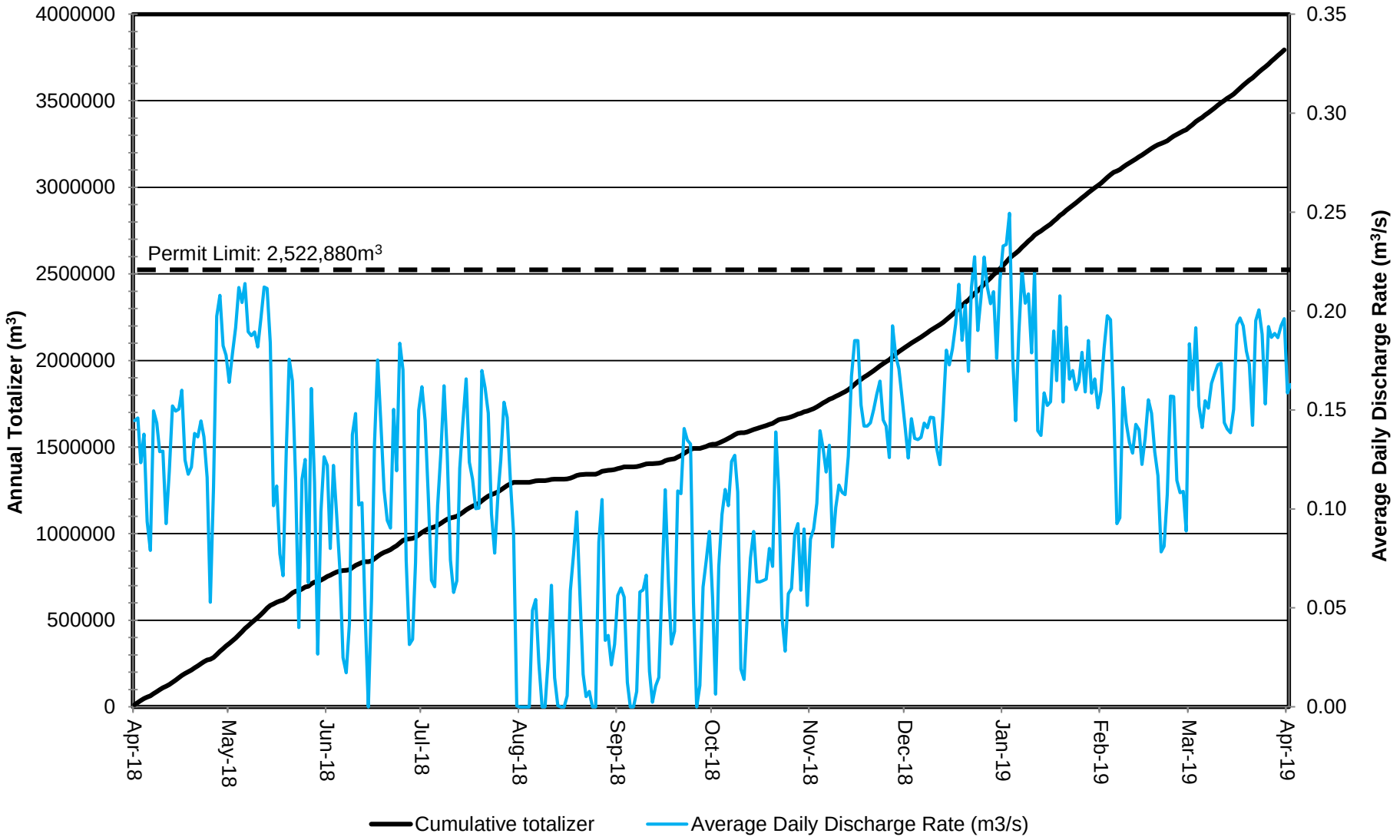
Settling Pond 4 (WD)



GRAPH 65

Discharge & Annual Totalizer

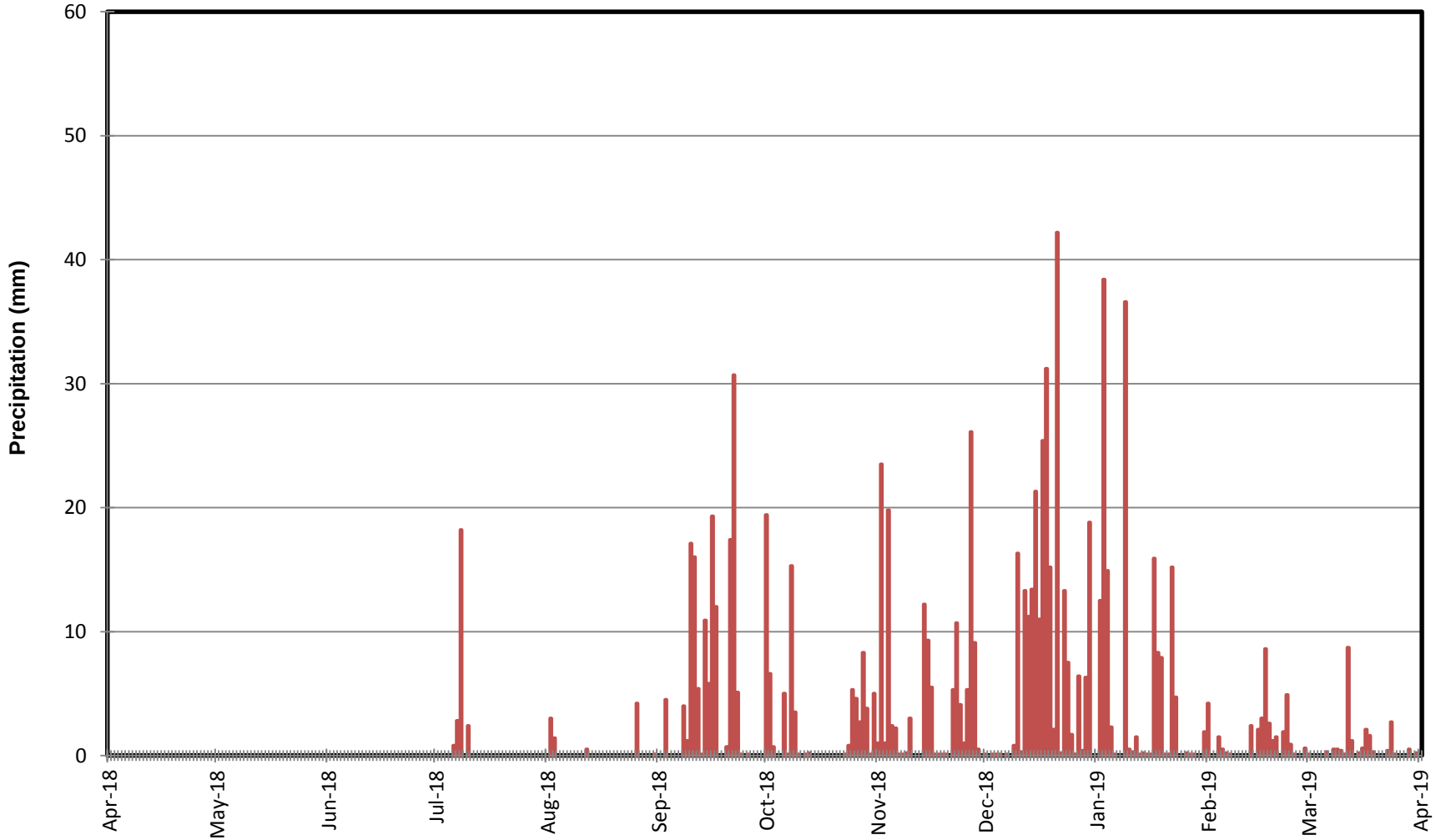
Settling Pond 4 (WD)



GRAPH 66

Daily Precipitation Accumulation (mm)

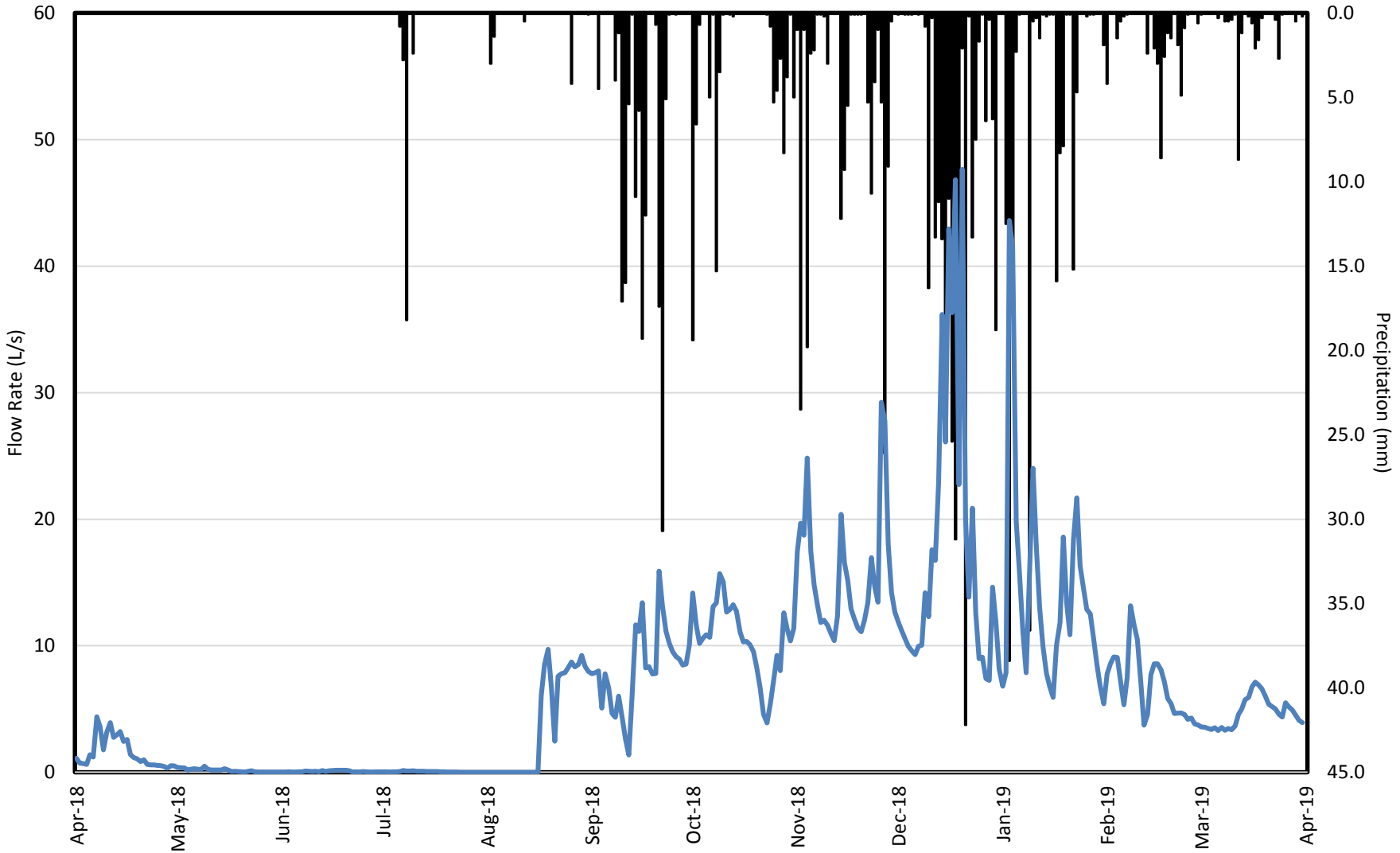
2-South Pit Area



GRAPH 67

Flow Rate (L/s) @ 90º V-notch Weir

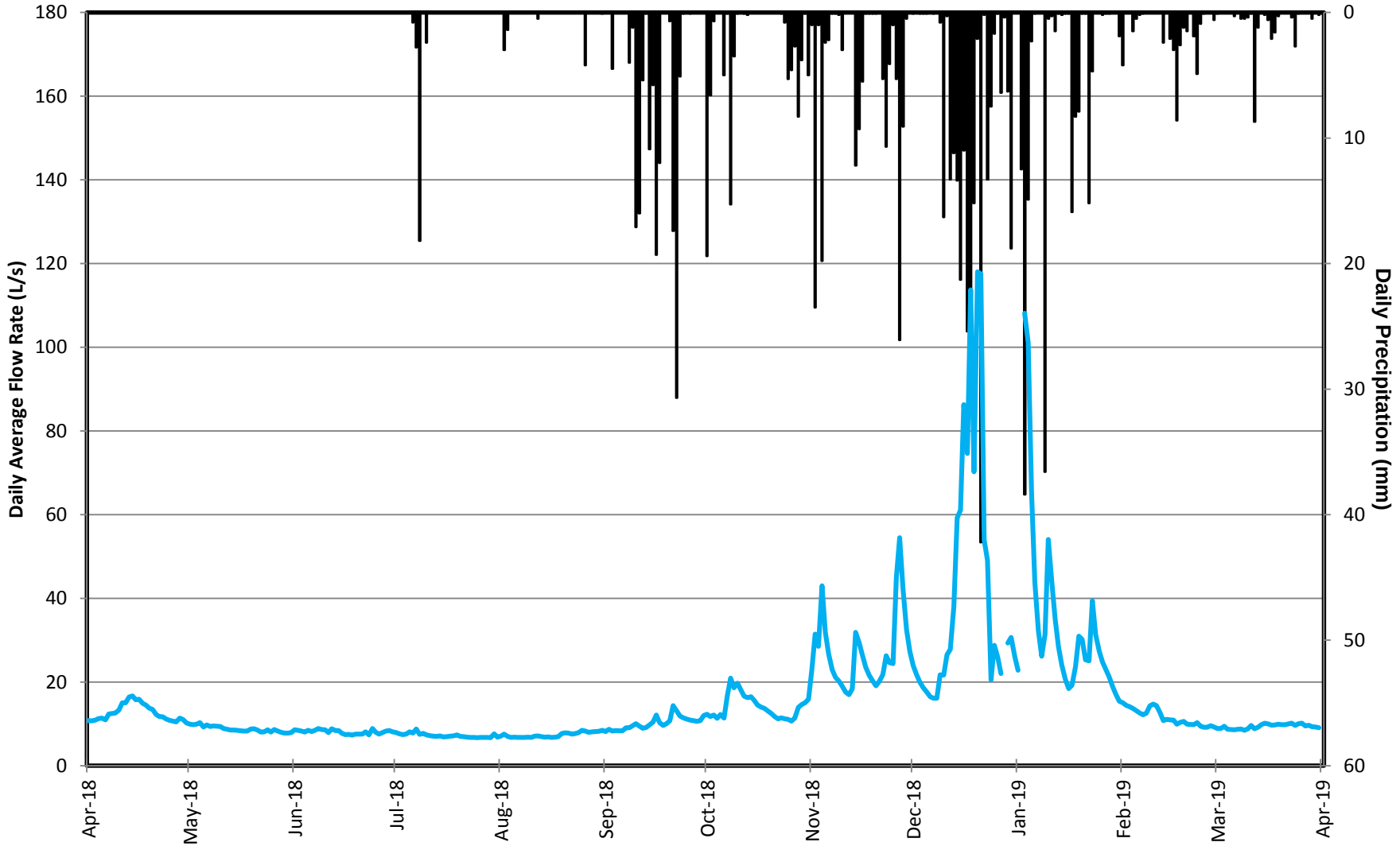
2-South Inflow



GRAPH 68

Flow & Precipitation

Culvert Entering 3-South (2SC)



APPENDIX III

Maxxam
A Bureau Veritas Group Company

RESULTS OF RAINBOW TROUT SINGLE CONCENTRATION-100%

Success Through Science®

Client : 9239 QUINSAM COAL CORPORATION, Campbell River Job Number: B887318

Client Project Name & Number: SPD BIOASSAY

Test Result:

96 hrs Mortality % 0 Statistical Method: Visual

Sample Name : SPD

Description: Yellow, clear Sample Number: UM4852-01

Sample Collected: Oct 04, 2018 04:00 PM Sampling Method : N/A Site Collection: N/A

Sample Collected By: AMANDA LINNEN Volume Received: 20 x 1LP Temp.Upon Arrival: 5 °C Storage: 2-6°C

Sample Received: Oct 05, 2018 12:30 PM pH: 7.3 Dissolved Oxygen: 9.4 mg/L

Analysis Start : Oct 06, 2018 08:45 AM Temperature : 15 °C Sample Conductance: 810 µS/cm

Concentration	Temperature (°C)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	pH	pH	Conductivity (uS/cm)	Mortality (#)	Mortality (%)	Atypical Behaviour (#)
% vol/vol	Initial	96 hrs	Initial	96 hrs	Initial	96 hrs	Initial	96 hrs	96 hrs	96 hrs
0	15	15	9.9	9.6	7.4	7.3	38	0	0	0
100	15	15	9.6	9.3	7.3	7.5	809	0	0	0

Comments : All fish appeared and behaved normally during the test.

Culture/Control/Dilution Water Burnaby Municipal Dechlorinated Water

Hardness: 14 mg/L $CaCO_3$ Other parameters available on request.

Test Conditions Test concentration : 0,100 (% vol/vol)

Organisms per Vessel :	10	Test Temperature :	15 ± 1 °C	Solution Depth :	>15 cm
Total # of Organisms Used :	20	Pre-aeration Time :	30 min.	Rate of Aeration	6.5±1 mL/min/L
Test Volume :	18 L	Vessel Volume :	20L	Test pH Adjusted:	No
Loading Density :	0.4 g/L	Photoperiod :	16:8 (light: dark)		

Test Organism : Rainbow Trout *(Oncorhynchus mykiss)* Source : Lyndon Fish Hatcheries Inc.

Culture Temperature :	15 ± 2 °C	Weight (Mean) +- SD :	0.7 ± 0.1 g	Length (Mean) +- SD :	4.45 ± 0.33 cm
Culture Water Renewal :	≥ 1L/min/kg fish	Weight (Range) :	0.5 – 0.9 g	Length (Range) :	4.00 – 5.00 cm
Culture Photoperiod :	16:8 (light: dark)			% Mortality within 7 days :	0%
Feeding rate and frequency :	daily: 1-5% biomass of trout.			Acclimation Time:	>14 days

Reference chemical: Zinc Test Date: Sep 19, 2018

Test Endpoint 96 hrs LC50 (95% confidence interval) : 0.11 (0.08, 0.16)mg/L Statistical Method : Probit

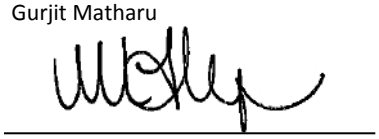
Historical Mean LC50 (warning limits) : 0.09 (0.05, 0.16) mg/L Concentration : 0,0.04,0.08,0.16,0.32,0.64 mg/L

Test Method Maxxam's BBY2SOP-00004 is based on the latest versions of EPS 1/RM/9, EPS 1/RM/13, and EPS 1/RM/50.

Method Deviations : None.

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Gurjit Matharu



Verified By : Melissa Thompson, Scientist Date: Oct 11, 2018 10:48 AM

Maxxam
A Bureau Veritas Group Company

RESULTS OF RAINBOW TROUT SINGLE CONCENTRATION-100%

Success Through Science®

Client : 9239 QUINSAM COAL CORPORATION, Campbell River Job Number: B887321

Client Project Name & Number: WD BIOASSAY

Test Result:

96 hrs Mortality % 0 Statistical Method: Visual

Sample Name : WD

Description: Light yellow, clear Sample Number: UM4879-01

Sample Collected: Oct 04, 2018 04:00 PM Sampling Method : Grab Site Collection: N/A

Sample Collected By: Amanda Linnen Volume Received: 20 x 1LP Temp.Upon Arrival: 7 °C Storage: 2-6°C

Sample Received: Oct 05, 2018 12:30 PM pH: 8.0 Dissolved Oxygen: 10.3 mg/L

Analysis Start : Oct 06, 2018 08:45 AM Temperature : 15 °C Sample Conductance: 1712 µS/cm

Concentration	Temperature (°C)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	pH	pH	Conductivity (uS/cm)	Mortality (#)	Mortality (%)	Atypical Behaviour (#)
% vol/vol	Initial	96 hrs	Initial	96 hrs	Initial	96 hrs	Initial	96 hrs	96 hrs	96 hrs
0	15	15	10.0	9.6	7.4	7.3	38	0	0	0
100	15	15	10.2	9.6	8.0	8.4	1710	0	0	0

Comments : All fish appeared and behaved normally during the test.

Culture/Control/Dilution Water Burnaby Municipal Dechlorinated Water

Hardness: 14 mg/L $CaCO_3$ Other parameters available on request.

Test Conditions Test concentration : 0,100 (% vol/vol)

Organisms per Vessel :	10	Test Temperature :	15 ± 1 °C	Solution Depth :	>15 cm
Total # of Organisms Used :	20	Pre-aeration Time :	30 min.	Rate of Aeration	6.5±1 mL/min/L
Test Volume :	18 L	Vessel Volume :	20L	Test pH Adjusted:	No
Loading Density :	0.4 g/L	Photoperiod :	16:8 (light: dark)		

Test Organism : Rainbow Trout *(Oncorhynchus mykiss)* Source : Lyndon Fish Hatcheries Inc.

Culture Temperature :	15 ± 2 °C	Weight (Mean) +- SD :	0.8 ± 0.2 g	Length (Mean) +- SD :	4.55 ± 0.36 cm
Culture Water Renewal :	≥ 1L/min/kg fish	Weight (Range) :	0.5 – 1.0 g	Length (Range) :	4.00 – 5.10 cm
Culture Photoperiod :	16:8 (light: dark)			% Mortality within 7 days :	0%
Feeding rate and frequency :	daily: 1-5% biomass of trout.			Acclimation Time:	>14 days

Reference chemical: Zinc Test Date: Sep 19, 2018

Test Endpoint 96 hrs LC50 (95% confidence interval) : 0.11 (0.08, 0.16)mg/L Statistical Method : Probit

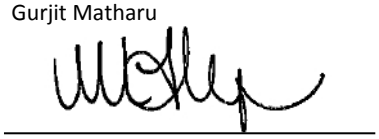
Historical Mean LC50 (warning limits) : 0.09 (0.05, 0.16) mg/L Concentration : 0,0.04,0.08,0.16,0.32,0.64 mg/L

Test Method Maxxam's BBY2SOP-00004 is based on the latest versions of EPS 1/RM/9, EPS 1/RM/13, and EPS 1/RM/50.

Method Deviations : None.

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Gurjit Matharu



Verified By : Melissa Thompson, Scientist Date: Oct 11, 2018 10:50 AM

APPENDIX IV

Stantec Consulting Ltd.
500-4730 Kingsway, Burnaby BC V5H 0C6

September 4, 2018
File: 123210406

Attention: Morgan Melnychuk
Maxxam Analytics Laboratory
4606 Canada Way
Burnaby BC V5G 1K5

Dear Morgan,

Reference: Quinsam Lakes Phytoplankton, May 2018 (Sample Reference TO0504-06, TO0508-02, TN8393, TO0168-02, TO0515-06) (Job Numbers B842781, B842786, B842689, B842145)

INTRODUCTION

Quinsam Coal Ltd. collects water samples from the Quinsam Lakes system during the growing season. Permit requirements were amended for 2014 to include surface water sampling (1.0 m depth) three times a year (spring, late summer, fall overturn). Four lakes are now sampled: Long, Middle Quinsam, No Name, and Lower Quinsam lakes. From 1994 through 2012, the requirement was for sampling at 1, 4 and 9 m in April through September for Long Lake and Middle Quinsam Lake, with No Name Lake added to the program in June 2012 and Lower Quinsam Lake added in 2013. The 2013 program was similar to that for 2014, but with collection of samples at 0.5 m as well as 1 m depth. This long-term record is included in Attachment 1.

Samples are submitted to Stantec Consulting Ltd. for phytoplankton taxonomic analysis, as part of ongoing monitoring requirements of the Ministry of Environment. Some months, an additional sample is taken as a field replicate for quality assurance/quality control. This brief report provides information about samples collected in May 2018.

METHODS

Sub-samples (27 mL) of preserved lake water were settled and examined at 100 X, 400 X and 1,000 X magnifications using a Zeiss inverted microscope. Counting effort is defined as at least 100 organisms of the predominant species at 400 X, up to 200 fields at 1,000 X and a half or whole sub-sample at 100 X.

RESULTS

Abundance

Abundance data for 1993 to 2017 are summarized in Attachment 1 and detailed taxonomic results for May 2018 are presented in Attachment 2.

Reference: Quinsam Lakes Phytoplankton, May 2018 (Sample Reference TO0504-06, TO0508-02, TN8393, TO0168-02, TO0515-06) (Job Numbers B842781, B842786, B842689, B842145)

Total abundance in the May 2018 samples is shown in Table 1. Total abundance was 1,300 cells/mL for Long Lake, 1,000 cells/mL for Middle Quinsam Lake, 1,800 cells/mL for No Name Lake, and 2,700 cells/mL for Lower Quinsam Lake.

Table 1 Phytoplankton Abundance (cells/mL) in Quinsam Lake System, May 2018

Lake	Month	Abundance (cells/mL) at 1 m depth			
		Total	< 5 µm (1,000 X)	5 to 25 µm (400 X)	> 25 µm (100 X)
Long	May	1,500	1,300	150	3.4
Long - duplicate	May	1,300	1,100	140	4.8
Middle Quinsam	May	1,000	920	110	0.4
No Name	May	1,800	1,500	250	0.1
Lower Quinsam	May	2,700	2,400	320	0.5

Species Composition

Species composition data for May 2018 are contained in Attachment 2. The most abundant phytoplankton in all four lakes were the very small (≤ 5 µm) chrysoflagellates (*Ochromonas* spp. and *Chromulina* spp.). Although these ultra-nanoplankton species were very abundant numerically, they usually contribute little to algal biomass.

The most abundant of the larger algae were as follows:

- In Long Lake, larger *Ochromonas* spp. were predominant and the cryptophyte *Rhodomonas minuta* was common
- In Middle Quinsam Lake, larger *Ochromonas* spp. were predominant and *Rhodomonas minuta* and *Cryptomonas* spp. were common
- In No Name Lake, larger *Ochromonas* spp. was predominant and the green algae *Nephrocytium* spp. and Oocystis spp., *Rhodomonas minuta and Cryptomonas* spp. were common

In Lower Quinsam Lake, larger *Ochromonas* spp. were predominant and the cryptophytes *Rhodomonas minuta* and *Cryptomonas* spp. were common.

Comparison of Replicate Samples

Two replicates were collected from 1 m depth in Long Lake. Percent difference in the duplicate samples was calculated. A difference of up to 10% can be expected for a total cell count of 400 organisms, for repeat sampling from the same bottle; higher percent difference can be expected when separate grabs are used for the replicates, as was done here.

Reference: Quinsam Lakes Phytoplankton, May 2018 (Sample Reference TO0504-06, TO0508-02, TN8393, TO0168-02, TO0515-06) (Job Numbers B842781, B842786, B842689, B842145)

For Long Lake, species composition and abundance in the two samples were similar (1,300 cells/mL in one sample and 1,200 cells/mL in the other); this difference of ± 8% indicates good inter-sample reproducibility.

CLOSURE

We trust this information meets your present requirements. Should you have any questions or require additional information, please contact the undersigned.

Regards,

Stantec Consulting Ltd.

Barrie Tuite, M.Sc., R.P.Bio.
Aquatic Scientist
Phone: 604-328-5312
Barrie.Tuite@stantec.com

Karen Munro, M.Sc., R.P.Bio.
Principal
Phone: 604-678-3085
Karen.Munro@stantec.com

Attachment: 1: Historical Abundance Data: Quinsam Lakes System, 1993–2017
2: Species Composition Data: May 2018

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Stantec Consulting Ltd.
500-4730 Kingsway, Burnaby BC V5H 0C6

October 15, 2018
File: 123210406

Attention: Morgan Melnychuk
Maxxam Analytics Laboratory
4606 Canada Way
Burnaby BC V5G 1K5

Dear Morgan,

Reference: Quinsam Lakes Phytoplankton, August 2018 (Sample Reference UD7577, UD7518, UD7556, UD5072, UD5076) (Job Numbers B872066, B8752055, B872063, B871578)

INTRODUCTION

Quinsam Coal Ltd. collects water samples from the Quinsam Lakes system during the growing season. Permit requirements were amended for 2014 to include surface water sampling (1.0 m depth) three times a year (spring, late summer, fall overturn). Four lakes are now sampled at 1 m depth: Long, Middle Quinsam, No Name, and Lower Quinsam lakes. From 1994 through 2012, the requirement was for sampling at 1, 4 and 9 m in April through September for Long Lake and Middle Quinsam Lake, with No Name Lake added to the program in June 2012 and Lower Quinsam Lake added in 2013. The 2013 program was similar to that for 2014, but with collection of samples at 0.5 m as well as 1 m depth. This long-term record is included in Attachment 1.

Samples are submitted to Stantec Consulting Ltd. for phytoplankton taxonomic analysis, as part of ongoing monitoring requirements of the Ministry of Environment. Some months, an additional sample is taken as a field replicate for quality assurance/quality control. This brief report provides information about samples collected in August 2018.

METHODS

Sub-samples (27 mL) of preserved lake water were settled and examined at 100 X, 400 X and 1,000 X magnifications using a Zeiss inverted microscope. Counting effort is defined as at least 100 organisms of the predominant species at 400 X, up to 200 fields at 1,000 X and a half or whole sub-sample at 100 X.

RESULTS

Abundance

Abundance data for 1993 to 2017 are summarized in Attachment 1 and detailed taxonomic results for August 2018 are presented in Attachment 2.

Reference: Quinsam Lakes Phytoplankton, August 2018 (Sample Reference UD7577, UD7518, UD7556, UD5072, UD5076) (Job Numbers B872066, B8752055, B872063, B871578)

Total abundance in the August 2018 samples is shown in Table 1. Total abundance was 1,200 cells/mL for Long Lake, 1,600 cells/mL for Middle Quinsam Lake, 1,400 cells/mL for No Name Lake, and 2,300 cells/mL (3,400 cells/mL in the replicate) for Lower Quinsam Lake.

Table 1 Phytoplankton Abundance (cells/mL) in Quinsam Lake System, 2018

Lake	Month	Abundance (cells/mL) at 1 m depth			
		Total	< 5 µm (1,000 X)	5 to 25 µm (400 X)	> 25 µm (100 X)
Long	May	1,500	1,300	150	3.4
Long - duplicate	May	1,300	1,100	140	4.8
Middle Quinsam	May	1,000	920	110	0.4
No Name	May	1,800	1,500	250	0.1
Lower Quinsam	May	2,700	2,400	320	0.5
Long	August	1,200	1,100	110	1.7
Middle Quinsam	August	1,600	1,500	180	0.2
No Name	August	1,400	1,200	270	2.0
Lower Quinsam	August	2,300	680	1,600	13.0
Lower Quinsam - replicate	August	3,400	1,100	2,300	6.6

Species Composition

Species composition data for August 2018 are contained in Attachment 2. The most abundant phytoplankton species in three of the four lakes were the very small (≤ 5 µm) chrysoflagellates (*Ochromonas* spp. and *Chromulina* spp.). Although these ultra-nanoplankton species were very abundant numerically, they usually contribute little to algal biomass. In Lower Quinsam Lake, the colonial green alga *Gloeocystis* sp. was predominant and notably high in abundance compared to the other lakes and to previous data.

The most abundant of the larger algae were as follows:

- In Long Lake, larger *Ochromonas* spp. were predominant and the cryptophyte *Rhodomonas minuta* was common. The very large dinoflagellate *Ceratium hirudinella*, while not numerically predominant, comprised the bulk of the biomass in the sample. This species is common during summer in Long Lake.
- In Middle Quinsam Lake, larger *Ochromonas* spp. were predominant and *Rhodomonas minuta* and *Cryptomonas* spp. were common.
- In No Name Lake, larger *Ochromonas* spp., an unidentified chrysoflagellate, and *Rhodomonas minuta* were predominant and *Cryptomonas* spp. was common
- In Lower Quinsam Lake, the colonial green alga Gloeocystis sp. was predominant in both samples, with larger *Ochromonas* spp., *Rhodomonas minuta, Cryptomonas* spp., and the diatom *Asterionella formosa* common.

Reference: Quinsam Lakes Phytoplankton, August 2018 (Sample Reference UD7577, UD7518, UD7556, UD5072, UD5076) (Job Numbers B872066, B8752055, B872063, B871578)

The bloom of Gloecystis sp. in Lower Quinsam Lake has not been reported previously. Records from 2013 to 2018 were reviewed. Prior to 2018, the species was present during July or August, but not abundant. The bloom in 2018 may be related to human activities in the Lower Quinsam Lake watershed (e.g., logging, mine expansion), variation in the timing of sampling collection from year to year, or to weather conditions that could affect limnological characteristics. In the other three lakes, phytoplankton community characteristics were similar to previous years.

Comparison of Replicate Samples

Two replicates were collected from 1 m depth in Lower Quinsam Lake. Percent difference in the duplicate samples was calculated. A difference of up to 10% can be expected for a total cell count of 400 organisms, for repeat sampling from the same bottle; higher percent difference can be expected when separate grabs are used for the replicates, as was done here.

For Lower Quinsam Lake, species composition was similar in the two samples; however, the relative percent difference in the two samples was 19% (2,300 cells/mL in one sample and 3,400 cells/mL in the replicate). This 19% difference was associated with high variability in abundance of Gloeocystis sp. (1,100 cells/mL and 1,500 cells/mL), which may be expected for separate grabs taken at the time of a bloom.

CLOSURE

We trust this information meets your present requirements. Should you have any questions or require additional information, please contact the undersigned.

Regards,

Stantec Consulting Ltd.

Barrie Tuite, M.Sc., R.P.Bio.
Aquatic Scientist
Phone: 778-328-1027
Barrie.Tuite@stantec.com

Karen Munro, M.Sc., R.P.Bio.
Principal
Phone: 604-678-3085
Karen.Munro@stantec.com

Attachment: 1: Historical Abundance Data: Quinsam Lakes System, 1993–2017
2: Species Composition Data: August 2018

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Stantec Consulting Ltd.
500-4730 Kingsway, Burnaby BC V5H 0C6

March 18, 2019
File: 123210406

Attention: Morgan Melnychuk
Maxxam Analytics Laboratory
4606 Canada Way
Burnaby BC V5G 1K5

Dear Morgan,

Reference: Quinsam Lakes Phytoplankton, November 2018 (Sample Reference UU1575, UT2236, UT2301, UT23126) (Job Numbers B8A0901, B898980, B898986, B898989)

INTRODUCTION

Quinsam Coal Ltd. collects water samples from the Quinsam Lakes system during the growing season. Permit requirements were amended for 2014 to include surface water sampling (1.0 m depth) three times a year (spring, late summer, fall overturn). Four lakes are now sampled at 1 m depth: Long, Middle Quinsam, No Name, and Lower Quinsam lakes. From 1994 through 2012, the requirement was for sampling at 1, 4 and 9 m in April through September for Long Lake and Middle Quinsam Lake, with No Name Lake added to the program in June 2012 and Lower Quinsam Lake added in 2013. The 2013 program was similar to that for 2014, but with collection of samples at 0.5 m as well as 1 m depth. This long-term record is included in Attachment 1.

Samples are submitted to Stantec Consulting Ltd. for phytoplankton taxonomic analysis, as part of ongoing monitoring requirements of the Ministry of Environment and Climate Change Strategy. Some months, an additional sample is taken as a field replicate for quality assurance/quality control. This brief report provides information about samples collected in November 2018.

METHODS

Sub-samples (27 mL) of preserved lake water were settled and examined at 100 X, 400 X and 1,000 X magnifications using a Zeiss inverted microscope. Counting effort is defined as at least 100 organisms of the predominant species at 400 X, up to 200 fields at 1,000 X and a half or whole sub-sample at 100 X.

RESULTS

Abundance

Abundance data for 1993 to 2017 are summarized in Attachment 1 and detailed taxonomic results for November 2018 are presented in Attachment 2.

Reference: **Quinsam Lakes Phytoplankton, November 2018 (Sample Reference UU1575, UT2236, UT2301, UT23126) (Job Numbers B8A0901, B898980, B898986, B898989)**

Total abundance in the November 2018 samples is shown in Table 1. Total abundance was 9,200 cells/mL for Long Lake, 2,100 cells/mL for Middle Quinsam Lake, 1,600 cells/mL for No Name Lake, and 1,800 cells/mL for Lower Quinsam Lake.

Table 1 Phytoplankton Abundance (cells/mL) in Quinsam Lake System, 2018

Lake	Month	Abundance (cells/mL) at 1 m depth			
		Total	<5 µm (1,000 X)	5 to 25 µm (400 X)	>25 µm (100 X)
Long	May	1,500	1,300	150	3.4
Long - duplicate	May	1,300	1,100	140	4.8
Middle Quinsam	May	1,000	920	110	0.4
No Name	May	1,800	1,500	250	0.1
Lower Quinsam	May	2,700	2,400	320	0.5
Long	August	1,200	1,100	110	1.7
Middle Quinsam	August	1,600	1,500	180	0.2
No Name	August	1,400	1,200	270	2.0
Lower Quinsam	August	2,300	680	1,600	13.0
Lower Quinsam - replicate	August	3,400	1,100	2,300	6.6
Long	November	9,200	2,500	210	6,500
Middle Quinsam	November	2,100	1,700	360	0.04
No Name	November	1,600	1,300	300	0.7
Lower Quinsam	November	1,800	1,500	230	96

Species Composition

Species composition data for November 2018 are contained in Attachment 2. The most abundant phytoplankton species in three of the four lakes were the very small (≤5 µm) chrysoflagellates (*Ochromonas* spp. and *Chromulina* spp.). Although these ultra-nanoplankton species were very abundant numerically, they usually contribute little to algal biomass. In Long Lake, the colonial diatom Aster*ionella formosa* was predominant and notably high in abundance compared to the other lakes and to previous years.

The most abundant of the larger algae were as follows:

- In Long Lake, the colonial diatom *Asterionella formosa* formed a large bloom, larger than previously recorded for the lake; abundance of smaller and larger *Ochromonas* spp. and other flagellates was typical of the time of year.
- In Middle Quinsam Lake, *Rhodomonas minuta* (cryptophyte) was predominant and larger *Ochromonas* spp. were common.
- In No Name Lake, larger *Ochromonas* spp., and *Rhodomonas minuta* were predominant and *Cryptomonas* spp. (cryptophyte) and *Melosira italica* (diatom) were common.

Reference: **Quinsam Lakes Phytoplankton, November 2018 (Sample Reference UU1575, UT2236, UT2301, UT23126) (Job Numbers B8A0901, B898980, B898986, B898989)**

- In Lower Quinsam Lake, larger *Ochromonas* spp. and *Rhodomonas minuta* were predominant and *Melosira italica* was common.

The large *Asterionella formosa* bloom in Long Lake was larger than previously reported; however, this diatom commonly forms a bloom in the lake system and the size of the bloom documented in 2019 may be related to variation in the timing of sampling collection from year to year, or to weather conditions that could affect limnological characteristics.

CLOSURE

We trust this information meets your present requirements. Should you have any questions or require additional information, please contact the undersigned.

Regards,

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Attachment: 1: Historical Abundance Data: Quinsam Lakes System, 1993–2017
2: Species Composition Data: November 2018

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September 4, 2018
Morgan Melnychuk

Reference: Quinsam Lakes Phytoplankton, May 2018 (Sample Reference TO0504-06, TO0508-02, TN8393, TO0168-02, TO0515-06) (Job Numbers B842781, B842786, B842689, B842145)

ATTACHMENT 1

Historical Abundance Data: Quinsam Lakes System, 1993–2017

Table 1-1 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 1993 and 1994**

Date	Sampling Site	Total Abundance	< 5mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
1993 October	LLM1	2,300	1,800	530	
	LLM3	3,000	2,400	550	
	LLMB	610	420	190	
1994 May	LL1R	10,000	8,800	1,200	
	LL3R	5,000	3,800	1,200	
	LL9R	4,000	3,200	800	
1994 June	LL0	1,400	1,200	250	
	LL1	1,000	790	220	
	LL4	1,500	1,200	320	
	LL9	2,500	1,900	580	
	LLB	830	440	390	
1994 July	LL1	2,100	1,900	180	
	LL4	1900	1700	250	
	LL9	1,500	1,100	400	
1994 August	LL1	1,700	1,400	290	
	LL4	1,000	850	200	
	LL9	900	780	150	
1994 September	LL1	900	620	250	
	LL4	2,300	2,000	260	
	LL9	2,100	1,700	350	

Table 1-2 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 1995**

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
1995 April	LL1	3,100	2,700	340	
	LL4	3,300	2,900	350	
	LL9	1,300	1,100	280	
1995 May	LL1	5,400	4,900	570	
	LL4	4,800	4,100	700	
	LL9	1,500	1,000	500	
1995 June	LL1	2,100	1,800	300	
	LL4	2,600	2,100	500	
	LL9	7,400	6,600	850	
1995 July	LL1	2,000	1,700	300	
	LL4	1,900	1,650	350	
	LL9	1,500	1,200	300	
1995 August	LL1	1,100	960	180	
	LL4	1,300	1,100	240	
	LL9	1,900	1,700	210	
1995 September	LL1	2,900	2,800	170	
	LL4	3,400	3,100	330	
	LL9	1,900	1,600	280	

Table 1-3 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 1996**

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
1996 April	LL1	4,600	4,200	340	
	LL4	6,000	5,600	380	
	LL9	1,100	960	160	
1996 May	LL1	2,200	1,600	600	31
	LL4	2,200	1,700	540	16
	LL9	1,700	1,400	290	26
1996 June	LL1	2,100	1,600	440	4
	LL4	1,600	1,300	340	2
	LL9	1,600	1,100	500	9
1996 July	LL1	2,400	2,300	140	1
	LL4	3,200	3,000	200	3
	LL9	No sample			
1996 August	LL1	2,100	1,900	160	1
	LL4	2,200	1,800	390	37
	LL9	1,700	1,500	200	10
1996 September	LL1	1,900	1,600	230	82
	LL4	2,200	1,800	300	145
	LL9	2,100	1,800	220	38
1996 April	MQ1	No sample			
	MQ4	No sample			
	MQ9	No sample			
1996 May	MQ1	2,000	1,700	230	11
	MQ4	1,100	930	180	7
	MQ9	2,200	1,800	430	1
1996 June	MQ1	2,700	2,500	150	3
	MQ4	2,600	2,400	210	7
	MQ9	1,200	1,000	190	1
1996 July	MQ1	2,400	2,100	335	24
	MQ4	1,900	1,400	380	130
	MQ9	1,200	860	320	29
1996 August	MQ1	2,800	2,500	280	17
	MQ4	1,800	1,500	310	18
	MQ9	2,300	1,900	390	21
1996 September	MQ1	1,700	1,300	270	5
	MQ4	900	560	350	0.6
	MQ9	1,200	1,100	190	0.7

Table 1-4 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 1997

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
1997 early May	LL1	3,200	2,800	340	12
	LL4	4,300	4,000	300	32
	LL9	1,700	1,600	140	5
1997 late May[1]	LL1	3,000	2,600	370	61
	LL4	4,900	4,200	620	100
	LL9	4,700	4,000	730	44
1997 June[2]	LL1	1,500	1,100	340	2
	LL4	1,200	1,000	240	1
	LL9	3,900	2,700	1,200	50
1997 July	LL1	2,400	2,300	110	0
	LL4	1,700	1,500	170	0.1
	LL9	480	390	80	2
1997 August	LL1	1,900	1,700	230	0.2
	LL4	880	740	140	0.6
	LL9	1,000	870	93	1.4
1997 September	LL1	1,000	870	140	0.6
	LL4	2,000	1,800	270	0.3
	LL9	700	490	210	0.8
1997 early May	MQ1	1,700	1,400	270	2
	MQ4	1,600	1,400	240	2
	MQ9	2,500	2,300	240	2
1997 late May	MQ1	1,200	1,000	150	0.4
	MQ4	1,600	1,300	280	1
	MQ9	1,200	1,000	190	0.2
1997 June	MQ1	1,900	1,700	140	1
	MQ4	2,500	2,400	130	1
	MQ9	1,400	1,200	200	1
1997 July	MQ1	2,400	2,300	130	0.3
	MQ4	1,500	1,400	110	0.1
	MQ9	890	640	260	0.6
1997 August	MQ1	2,100	1,900	220	0.8
	MQ4	1,500	1,300	190	1.4
	MQ9	1,000	760	240	1.6
1997 September	MQ1	800	640	170	1.3
	MQ4	900	620	280	6.4
	MQ9	650	370	280	1.5

NOTES:

1. Recalculated counting *Synedra radians* at 400X rather than 100X

2. Recalculated counting *Synedra radians* at 400X rather than 100X & *Cyclotella glomerata* at 1,000X rather than 400X

Table 1-5 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 1998

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
1998 April	LL1	2,800	2,600	210	12
	LL4	4,100	3,700	390	12
	LL9	1,600	1,100	500	10
1998 May[1]	LL1	2,000	1,500	430	76
	LL4	1,600	1,100	480	85
	LL9	2,100	1,500	630	20
1998 June	LL1	5,700	5,600	140	0.3
	LL4	7,100	6,900	210	0.3
	LL9	3,300	1,700	1,600	4
1998 July	LL1	1,200	1,100	130	10
	LL4	740	560	170	8
	LL9	760	130	630	5
1998 August	LL1	1,900	1,700	190	2
	LL4	2,200	2,000	230	2
	LL9	1,900	1,600	220	5
1998 September	LL1	5,000	4,900	130	2
	LL4	3,500	3,300	150	2
	LL9	2,200	2,000	220	5
1998 April	MQ1	2,200	1,900	250	3
	MQ4	1,900	1,600	260	3
	MQ9	3,100	2,700	460	2
1998 May	MQ1	2,500	2,300	210	1
	MQ4	2,600	2,400	180	2
	MQ9	2,100	1,700	480	0.4
1998 June	MQ1	1,900	1,700	180	1
	MQ4	1,600	1,400	200	1
	MQ9	1,300	1,000	310	0.4
1998 July	MQ1	1,500	1,400	120	19
	MQ4	1,800	1,600	150	35
	MQ9	1,300	1,100	190	25
1998 August	MQ1	1,900	1,700	250	12
	MQ4	1,300	950	350	10
	MQ9	1,400	890	490	12
1998 September	MQ1	2,000	1,800	200	11
	MQ4	2,700	2,500	220	7
	MQ9	2,100	1,900	230	10

NOTE:
1. Recalculated for counting *Synedra radians* at 400X rather than 100X

Table 1-6 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 1999**

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
1999 April	LL1	3,800	3,500	310	9
	LL4	6,800	6,200	560	17
	LL9	3,000	2,600	410	10
1999 May	LL1	No sample			
	LL4	No sample			
	LL9	No sample			
1999 early July	LL1	1,100	910	150	2
	LL4	1,400	1,200	150	1
	LL9	1,300	1,200	100	1
1999 late July	LL1	1,100	870	200	1
	LL4	2,000	1,800	280	1
	LL9	1,000	860	130	1
1999 August	LL1	2,700	2,500	180	2
	LL4	2,800	2,600	170	6
	LL9	3,000	2,800	170	4
1999 September	LL1	3,700	3,500	230	12
	LL4	5,000	4,700	290	17
	LL9	4,000	3,700	290	3
1999 April	MQ1	2,300	1,600	220	430
	MQ4	2,200	1,800	200	230
	MQ9	2,700	1,900	600	190
1999 May	MQ1	No sample			
	MQ4	No sample			
	MQ9	No sample			
1999 early July	MQ1	790	700	90	0.4
	MQ4	770	620	150	0.5
	MQ9	1,100	1,000	130	0.3
1999 late July	MQ1	2,700	2,600	110	0.2
	MQ4	2,100	1,900	220	0.8
	MQ9	620	420	190	0.3
1999 August	MQ1	2,100	2,000	140	6
	MQ4	1,100	980	110	4
	MQ9	1,100	1,000	120	9
1999 September	MQ1	1,300	1,100	190	14
	MQ4	1,500	1,300	190	9
	MQ9	760	540	210	10

Table 1-7 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2000**

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
2000 April	LL1	2,100	1,600	450	33
	LL4	2,500	1,800	700	68
	LL9	1,300	590	740	6.8
2000 May	LL1	3,300	2,800	530	17
	LL4	3,000	2,600	320	15
	LL9	2,000	1,500	490	15
2000 June	LL1	2,900	2,500	390	9.1
	LL4	2,900	2,400	400	19
	LL9	6,400	5,700	730	19
2000 July	LL1	1,600	1,400	130	2.1
	LL4	1,400	1,200	250	1.6
	LL9	1,200	990	250	3.6
2000 August	LL1	1,800	1,600	170	12
	LL4	1,100	940	190	8.2
	LL9	1,500	1,400	130	1.9
2000 September	LL1	2,200	1,900	360	11
	LL4	2,000	1,800	200	9.2
	LL9	1,300	1,100	200	7.2
2000 April	MQ1	1,800	1,300	450	5.9
	MQ4	1,700	1,300	420	1.6
	MQ9	1,500	1,200	280	1.7
2000 May	MQ1	1,800	1,500	290	3
	MQ4	1,600	1,300	290	4.4
	MQ9	1,900	1,600	270	7.6
2000 June	MQ1	2,100	1,900	250	1.4
	MQ4	2,400	2,200	200	2.1
	MQ9	1,800	1,500	380	1.1
2000 July	MQ1	1,300	1,100	210	7.4
	MQ4	2,100	1,800	250	9.6
	MQ9	2,100	1,300	800	22
2000 August	MQ1	1,500	1,200	290	5.8
	MQ4	2,200	1,900	310	7.2
	MQ9	2,400	1,900	500	7.5
2000 September	MQ1	1,800	1,600	200	14
	MQ4	2,100	1,900	250	14
	MQ9	2,000	1,700	220	28

Table 1-8 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2001**

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
2001 April	LL1	3,300	2,600	670	19
	LL4	4,400	3,900	830	13
	LL9	1,400	860	490	5
2001 May	LL1	7,700	6,200	1,100	310
	LL4	11,000	10,000	980	100
	LL9	4,600	3,600	670	22
2001 June	LL1	7,800	6,600	1,000	170
	LL4	6,800	5,100	1,500	210
	LL9	3,000	2,400	680	25
2001 July	LL1	3,300	3,100	170	1
	LL4	3,200	3,000	180	1
	LL9	1,600	1,400	160	2
2001 August	LL1	1,300	1,100	180	1
	LL4	1,700	1,500	200	2
	LL9	720	540	170	1
2001 September	LL1	8,200	8,000	270	13
	LL4	8,800	8,600	260	13
	LL9	4,800	4,600	190	1
2001 April	MQ1	3,600	3,200	400	10
	MQ4	3,500	3,200	310	11
	MQ9	5,700	4,900	830	24
2001 May	MQ1	1,900	1,500	360	17
	MQ4	1,800	1,400	370	14
	MQ9	3,800	3,200	600	13
2001 June	MQ1	2,200	1,900	240	2
	MQ4	3,700	3,400	310	2
	MQ9	4,000	3,600	390	4
2001 July	MQ1	2,500	2,300	230	8
	MQ4	2,700	2,400	260	6
	MQ9	1,500	1,200	240	8
2001 August	MQ1	1,800	1,600	190	17
	MQ4	1,900	1,700	180	15
	MQ9	1,800	1,600	160	16
2001 September	MQ1	1,900	1,700	180	24
	MQ4	3,200	2,900	230	37
	MQ9	1,800	1,600	190	43

Table 1-9 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2002

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
2002 April	LL1	5,600	5,100	460	57
	LL4	5,600	5,100	490	40
	LL9	1,300	1,100	220	12
2002 May	LL1	2,600	1,900	710	29
	LL4	2,700	2,000	690	41
	LL9	1,800	1,300	460	37
2002 June	LL1	5,800	5,300	340	140
	LL4	9,200	8,600	450	96
	LL9	3,700	3,000	620	27
2002 July	LL1	2,900	2,700	180	0.3
	LL4	2,400	2,200	160	0.6
	LL9	3,900	3,300	560	41.2
2002 August	LL1	2,900	2,800	140	7.2
	LL4	2,300	2,200	150	3.2
	LL9	1,500	1,400	130	0.6
2002 September	LL1	3,900	3,700	220	27
	LL4	3,500	3,200	260	31
	LL9	2,500	2,300	210	2.2
2002 April	MQ1	2,000	1,700	360	8.2
	MQ4	1,900	1,600	300	3.6
	MQ9	1,500	1,200	260	4
2002 May	MQ1	1,400	1,100	270	1.1
	MQ4	1,400	1,200	230	1.7
	MQ9	1,400	1,100	330	1.4
2002 June	MQ1	1,000	940	110	1
	MQ4	800	680	120	0.3
	MQ9	60	50	7	0
2002 July	MQ1	1,700	1,300	330	50
	MQ4	1,500	1,100	360	34
	MQ9	940	700	240	5.5
2002 August[1]	MQ1	1,400	1,200	140	42
	MQ4	1,200	940	180	76
	MQ9	2,600	200	300	275
2002 September	MQ1	1,400	1,200	160	33
	MQ4	2,100	1,900	220	28
	MQ9	1,100	920	160	28

NOTE:
1. Recalculated for counting *Cyclotella bodanica* at 400X rather than 100X

Table 1-10 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2003

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
2003 April	LL1	4,800	4,200	560	36
	LL4	3,600	2,900	640	8.6
	LL9	640	450	190	6.9
2003 May	LL1	4,200	3,500	620	25
	LL4	4,600	3,800	800	23
	LL9	1,400	1,100	280	16
2003 June	LL1	2,300	1,600	630	37
	LL4	6,800	6,100	600	43
	LL9	4,500	3,800	680	42
2003 July	LL1	1,600	1,400	240	1
	LL4	2,400	2,100	270	0.5
	LL9	2,900	2,700	250	9.8
2003 August	LL1	2,000	1,800	240	0.8
	LL4	2,200	1,900	250	0.5
	LL9	1,900	1,600	260	0.6
2003 September	LL1	2,600	2,400	290	0.2
	LL4	3,700	3,400	340	1.8
	LL9	1,900	1,600	250	1.9
2003 April	MQ1	3,500	2,900	570	28
	MQ4	3,000	2,400	510	17
	MQ9	2,000	1,600	310	17
2003 May	MQ1	2,900	2,400	350	99
	MQ4	3,000	2,400	480	43
	MQ9	3,000	2,500	560	16
2003 June	MQ1	1,300	1,100	180	6
	MQ4	1,900	1,500	420	21
	MQ9	3,000	2,700	350	16
2003 July	MQ1	2,700	2,600	170	0.5
	MQ4	2,000	1,600	380	1.5
	MQ9	1,400	1,100	240	79
2003 August	MQ1	1,300	1,000	280	43
	MQ4	1,500	1,200	240	44
	MQ9	3,500	2,500	620	338
2003 September	MQ1	2,100	1,900	260	6.5
	MQ4	2,300	2,000	290	23
	MQ9	Not available			

Table 1-11

Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2004

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
2004	LL1	5,300	4,100	1,200	20
April	LL4	3,500	2,600	860	13
	LL9	3,300	2,600	730	9.1
2004	LL1	8,000	7,100	860	34
May	LL4	6,600	5,300	1,200	36
	LL9	2,800	2,000	770	22
2004	LL1	2,900	2,600	270	3.1
June	LL4	2,900	2,600	310	5
	LL9	4,900	4,100	730	39
2004	LL1	1,600	1,300	280	2.7
July	LL4	1,200	1,100	170	2.2
	LL9	1,700	1,400	270	1
2004	LL1	1,300	960	350	18
August	LL4	1,400	1,000	300	38
	LL9	1,700	1,600	110	27
2004	LL1	3,800	3,400	370	27
September	LL4	4,300	3,900	350	25
	LL4 - duplicate	3,100	2,800	320	19
	LL9	3,000	2,700	280	12
2004	MQ1	1,500	1,120	400	2.2
April	MQ4	1,400	1,030	370	5.2
	MQ9	1,500	1,200	340	4.2
2004	MQ1	2,300	2,000	310	2.4
May	MQ4	1,500	1,200	300	3.6
	MQ9	2,600	2,100	470	2.4
2004	MQ1	1,900	1,700	190	34
June	MQ4	3,000	2,700	250	48
	MQ9	2,200	1,900	210	123
2004	MQ1	1,200	960	260	6.2
July[1]	MQ4	1,700	1,400	260	9.9
	MQ9	1,300	840	340	82
2004	MQ1	2,900	2,600	260	53
August[2]	MQ4	3,800	3,500	250	51
	MQ4 - duplicate	2,500	2,200	210	53
	MQ9	3,900	3,600	260	44
2004	MQ1	2,300	1,700	550	25
September	MQ4	2,100	1,600	420	26
	MQ9	2,500	2,000	520	19

NOTES:

1. MQ9 recalculated for counting *Cyclotella bodanica* at 400X rather than 100X
2. MQ1, MQ4, MQ9 recalculated for counting *Elakatothrix gelatinosa* colonies at 400X rather than 100X

Table 1-12 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2005

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
2005 April	LL1	2,700	2,100	550	24
	LL4	3,500	2,800	610	29
	LL9	670	460	200	8.5
2005 May	LL1	7,200	6,600	670	55
	LL4	5,700	4,900	850	20
	LL9	1,300	850	440	20
2005 June	LL1	2,700	2,400	300	2.4*
	LL4	2,800	2,500	330	8.3*
	LL9	990	850	130	8.9
2005 July	LL1	1,200	800	400	44*
	LL4	1,700	1,200	460	33*
	LL9	692	540	150	3.5*
2005 August	LL1	1,400	1,100	290	26
	LL4	1,100	810	220	64
	LL9	2,400	1,900	360	73
2005 September	LL1	1,400	1,100	170	170
	LL4	2,300	1,900	220	170
	LL9	1,800	1,200	590	31*
2005 April	MQ1	1,400	1,100	370	8.8
	MQ4	1,900	1,500	400	3.6
	MQ9	1,700	1,300	400	6.6
2005 May	MQ1	1,300	1,000	300	3.4
	MQ4	1,500	1,200	330	3.2
	MQ9	1,300	1,000	340	3.7
2005 June	MQ1	1,700	1,600	150	4.6
	MQ4	1,000	710	270	2.1
	MQ9	1,100	900	200	1.1
2005 July[1]	MQ1	1,100	860	220	14.6
	MQ4	1,100	920	200	11.2
	MQ9	1,400	700	170	489
2005 August[2]	MQ1	1,100	950	170	0.5
	MQ4	1,900	1,600	250	7.1
	MQ9	2,100	1,700	330	89*
2005 September	MQ1	870	710	140	10.7
	MQ4	1,200	1,100	170	20.2
	MQ9	1,400	1,100	180	146

NOTE:
* = Cyclotella bodanica counted at 400X rather than 100X

Table 1-13 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2006**

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 mm (100X)
2006 April	LL1	1,800	1,100	610	1.9*
	LL4	3,200	2,700	520	14.7
	LL9	690	550	135	2.2
2006 May	LL1	2,600	2,000	620	19.7
	LL4	4,900	4,200	640	12.9
	LL9	540	380	160	4.8
2006 June	LL1	860	610	200	39.5
	LL4	2,000	1,800	190	22.2
	LL4 (rep)	1,100	940	190	23.2
	LL9	1,700	1,400	220	17.7
2006 July	LL1	1,300	1,100	160	54.8
	LL4	2,700	2,200	370	165
	LL9	1,700	1,300	350	19.1
2006 August	LL1	2,700	2,500	200	14.3
	LL4	2,600	2,300	220	34.6
	LL9	2,800	2,300	470	23.8
2006 September	LL1	3,800	3,600	160	0.4
	LL4	1,300	1,200	120	2
	LL9	1,800	1,700	130	3.6
2006 April	MQ1	2,200	16,00	240	9.4
	MQ4	2,400	1,900	550	8.6
	MQ9	1,600	1,400	180	8.2
2006 May	MQ1	1,700	1,500	240	10.8
	MQ4	1,700	1,400	320	7.4
	MQ4 (rep)	2,100	1,800	310	11.8
	MQ9	1,900	1,600	280	4.1
2006 June	MQ1	1,900	1,800	130	0.9
	MQ4	1,400	1,200	200	4.4
	MQ9	950	840	110	0.6
2006 July	MQ1	1,100	870	220	42.8
	MQ4	2,000	1,700	260	16.6
	MQ9	2,300	2,100	180	18.8*
2006 August	MQ1	1,500	1,200	280	6.5
	MQ4	2,100	1,800	290	13.3
	MQ9	1,300	880	400	17.0*
2006 September	MQ1	2,500	2,300	200	1.9
	MQ4	2,100	1,800	260	11.8
	MQ9	3,400	2,400	970	1.8*

NOTE:
* *Cyclotella bodanica* (diatom) counted at 400X rather than 100X

Table 1-14 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2007

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)
2007 April	LL1	3,100	2,800	240
	LL4	3,000	2,200	620
	LL9	1,200	910	240
2007 May	LL1	2,600	2,000	540
	LL4	3,300	2,600	670
	LL9	1,300	890	430
2007 June	LL1	2,100	1,600	420
	LL4	2,500	2,000	520
	LL9	1,100	750	300
2007 July	LL1	2,300	2,000	240
	LL4	2,400	2,100	270
	LL9	3,100	3,000	180
2007 August	LL1	1,100	900	240
	LL4	2,300	2,100	150
	LL4 (rep)	2,600	2,400	150
	LL9	570	480	90
2007 September	LL1	2,500	2,200	280
	LL4	1,700	1,400	240
	LL9	420	350	68
2007 April	MQ1	1,700	1,500	230
	MQ4	1,900	1,602	300
	MQ9	1,100	900	200
2007 May	MQ1	1,500	1,300	250
	MQ4	1,800	1,500	320
	MQ9	2,600	2,300	310
2007 June	MQ1	1,500	1,200	300
	MQ4	1,800	1,600	200
	MQ9	1,500	1,200	290
2007 July	MQ1	1,500	1,100	220
	MQ4	1,900	1,500	440*
	MQ9	1,000	860	150
	MQ9 (rep)	1,600	1,400	150
2007 August	MQ1	2,300	2,100	200
	MQ4	1,100	970	160
	MQ9	710	590	120
2007 September	MQ1	1,400	1,100	270
	MQ4	1,500	1,200	290
	MQ9	1,000	690	300

Table 1-15 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2008**

Date	Sampling Site	Total Abundance	< 5 mm (1,000X)	5 to 25 mm (400X)	> 25 µm (100X)
2008 April	LL1	2,500	2,070	360	30
	LL4	3,100	2,500	540	50
	LL9	1,300	1,030	240	20
2008 May	LL1	3,100	2,840	220	20
	LL4	5,300	4,820	430	25
	LL9	1,300	1,030	260	20
2008 June	LL1	1,000	880	110	1
	LL4	960	730	220	8
	LL9 (rep)	1,500	1,060	380*	16*
	LL9	1,200	780	380*	7*
2008 July	LL1	1,000	970	80	1
	LL4	1,400	1,300	110	17
	LL9	2,000	1,500	370	110
2008 August	LL1	1,100	1,000	50	1
	LL4	1,400	1,300	50	11
	LL9	1,100	1,060	40	9
2008 September	LL1	2,100	1,730	420**	2**
	LL4	2,300	1,780	490**	3**
	LL9	2,900	2,250	690**	6**
2008 April	MQ1	2,100	1,850	200	1
	MQ4	1,700	1,530	200	3
	MQ9	2,800	2410	400	4
2008 May	MQ1	1,000	870	130	1
	MQ4	1,700	1460	230	2
	MQ9	1,200	1,000	180	2
2008 June	MQ1	840	700	140	0.4
	MQ4	1,300	1,040	240	1
	MQ9	870	580	280	0.5
2008 July	MQ1	620	520	90	8
	MQ4	500	370	130	8
	MQ9	870	680	180	0.5
	MQ9 (rep)	1,000	760	260	9
2008 August	MQ1	750	660	100	1
	MQ4	980	860	110	6
	MQ9	1,300	990	290	5
2008 September	MQ1	1,500	1,310	160	14
	MQ4	1,100	980	150	3
	MQ9	2,800	2,680	130	10

NOTES:
* *Synedra radians* (diatom) counted at 400X rather than 100X, due to high numbers
** *Asterionella formosa* (diatom) counted at 400X rather than 100X, due to high numbers

Table 1-16 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2009

Date	Sampling Site	Total Abundance	< 5 µm (1,000X)	5 to 25 µm (400X)	> 25 µm (100X)
2009 April	LL1	780	480	300	6
	LL4	1,600	1,220	340	4
	LL9	90	60	30	1
2009 May	LL1	6,000	5,150	820	19
	LL4	4,900	4,100	760	10
	LL9	430	290	140	5
2009 June	LL1	1,700	1,370	370	5
	LL4	1,400	1,030	360	12
	LL9	680	340	330	6
2009 July	LL1	2,100	1,900	270	3
	LL4	2,700	2,400	330	4
	LL9	700	340	350	4
2009 August	LL1	3,100	2,900	170	3
	LL4	2,400	2,200	190	15
	LL9	1,700	1,300	370	10
2009 September	LL1	3,700	3,500	220	5
	LL4	2,300	2,100	180	3
	LL9	1,100	950	170	1
2009 April	MQ1	1,400	1,130	250	33
	MQ4	1,300	1,170	160	12
	MQ9	2,300	2,730	520	13
2009 May	MQ1	1,700	1,440	260	3
	MQ4	2,100	1,750	340	5
	MQ9	3,800	3,060	720	18
2009 June	MQ1	1,500	1,360	160	0.1
	MQ4	1,100	990	150	0.2
	MQ9	1,100	940	200	0.8
2009 July	MQ1	1,000	790	190	4
	MQ4	1,300	1,100	220	8
	MQ9	1,200	940	240	5
2009 August	MQ1	610	450	160	0.3
	MQ4	1,300	1,170	170	3
	MQ9	1,600	1,200	390	0.4
2009 September	MQ1	830	670	160	5
	MQ4	1,200	970	170	6
	MQ9	1,400	1,200	240	1

Table 1-17 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2010

Date	Sampling Site	Total Abundance	< 5 µm (1,000X)	5 to 25 µm (400X)	> 25 µm (100X)
2010 April	LL1	630	490	140	1.6
	LL4	1,900	1,500	390	3
	LL9	170	100	70	0.4
2010 May	LL1	1,200	940	270	13.4
	LL4	4,500	3,800	650	17
	LL9	530	390	140	0.9
2010 June	LL1	2,400	1,900	500	5.2
	LL4	3,600	3,000	610	11
	LL9	1,500	1,100	400	10.6
2010 July	LL1	2,100	1,900	170	8.7
	LL1 (rep)	1,900	1,700	180	5
	LL4	3,000	2,800	250	2
	LL9	1,900	1,700	210*	0
2010 August	LL1	1,200	990	180	1.5
	LL4	1,600	1,400	190	1
	LL4 (rep)	1,600	1,400	180	2
	LL9	1,800	1,600	170	0
2010 September	LL1	2,100	1,800	260	15.1
	LL4	4,400	4,200	200	5
	LL9	1,200	1,100	130	0.4
2010 April	MQ1	1,700	1,600	100	0.4
	MQ4	1,200	1,100	120	1
	MQ9	800	710	90	2.4
2010 May	MQ1	1,100	990	120	0.9
	MQ4	1,100	960	150	1
	MQ9	1,600	1,330	240	2.9
2010 June	MQ1	2,000	1,700	270	0.9
	MQ4	1,400	1,100	240	1
	MQ9	1,000	850	200	1.1
2010 July	MQ1	1,800	1,500	250	8.7
	MQ1 (rep)	1,400	1,300	170	6
	MQ4	1,500	1,300	180	10
	MQ9	1,600	1,400	180	4
2010 August	MQ1	1,400	1,200	140	7.2
	MQ4	1,000	870	160	5
	MQ4 (rep)	1,100	900	150	5
	MQ9	1,200	1,000	150	8
2010 September	MQ1	1,300	1,000	260	1.3
	MQ4	1,300	1,040	220	3
	MQ9	1,100	900	190	1.7

Table 1-18 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2011

Date	Sampling Site	Total Abundance	< 5 µm (1,000X)	5 to 25 µm (400X)	> 25 µm (100X)
2011 April	LL1	1,700	1,400	220	52
	LL4	3,900	3,260	540	80
	LL9	2,200	1,820	340	9
2011 May	LL1	3,600	2,880	720	6
	LL1 (rep)	3,500	2,790	690	6
	LL4	4,900	4,160	700	6
	LL9	1,300	900	350	5
2011 June	LL1	2,100	1,750	330	36
	LL4	2,300	2,050	290	3
	LL9	1,500	1,060	450	4
2011 July	LL1	1,400	1,150	270	3
	LL4	1,800	1,440	350	1
	LL4 (rep)	1,900	1,600	300	0.1
	LL9	1,900	1,550	320	2
2011 August	LL1	2,900	2,500	360	15
	LL4	1,800	1,400	320	27
	LL9	1,500	1,200	280	0.9
2011 September	LL1	1,300	940	380	2.2
	LL4	1,800	1,500	380	0.4
	LL9	960	770	190	0.3
2011 April	MQ1	1,600	1,370	270	7
	MQ4	1,400	1,160	270	6
	MQ9	1,900	1,400	490	3
2011 May	MQ1	1,200	1,050	190	2
	MQ1 (rep)	1,200	1,040	170	3
	MQ4	1,800	1,370	410	4
	MQ9	1,600	670	920	4
2011 June	MQ1	2,000	1,840	150	1
	MQ4	1,500	1,300	200	1
	MQ9	1,700	1,200	520	10
2011 July	MQ1	2,200	2,100	110	0.4
	MQ4	1,600	1,330	230	3
	MQ9	1,000	770	200	1
	MQ9(rep)	1,100	860	200	1
2011 August	MQ1	1,400	1,200	210	4
	MQ4	3,300	3,000	280	0.6
	MQ9	1,200	1,000	200	0.1
2011 September	MQ1	2,300	2,100	190	17.2
	MQ4	2,600	2,400	190	0.2
	MQ9	1,600	1,400	240	9.6

Table 1-19 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2012

Date	Sampling Site	Total Abundance	< 5 µm (1,000X)	5 to 25 µm (400X)	> 25 µm (100X)
2012 April	LL1	2,300	1,980	330	5
	LL4	3,200	2,570	590	6
	LL9	1,000	800	190	6
2012 May	LL1	3,000	2,470	470	15
	LL4	2,200	1,640	600	7
	LL9	2,300	2,050	280	7
2012 June	LL1	1,400	1,080	310	3
	LL4	1,700	1,400	320	2
	LL9	980	810	170	2
	LL9 (rep)	1,200	1,020	140	1
2012 July	LL1	1,600	1,390	170	3
	LL4	Sample lost in transit (broken bottle)			
	LL9	880	730	150	2
2012 August	LL1	970	740	210	19
	LL1 (rep)	940	760	170	14
	LL4	1,300	990	250	35
	LL9	380	250	130	0.5
2012 September	LL1	Sample unpreserved – no analysis done			
	LL4	2,800	2,350	480	1
	LL9	Sample unpreserved – no analysis done			
2012 April	MQ1	2,200	2,010	200	3
	MQ4	1,700	1,440	220	3
	MQ9	1,600	1,420	180	5
2012 May	MQ1	1,100	990	140	1
	MQ4	830	680	140	0
	MQ9	1,200	1,000	150	0.2
2012 June	MQ1	2,100	1,920	170	0.4
	MQ4	890	740	150	0.3
	MQ9	1,100	910	200	0.4
	MQ9 (rep)	1,100	920	200	0.5
2012 July	MQ1	1,300	1,210	100	0.4
	MQ4	1,100	1,010	90	10
	MQ9	740	640	100	1
2012 August	MQ1	1,030	860	180	0.8
	MQ1 (rep)	920	720	200	0.2
	MQ4	810	660	140	10
	MQ9	430	340	90	1.6
2012 September	MQ1	900	730	170	0.5
	MQ4	760	650	115	2
	MQ9	580	430	160	0.5
2012 June	NNL1	1,600	1,240	320	0.5
	NNL4	1,000	670	370	0.2
	NNL9	840	700	140	1
	NNL9 (rep)	880	730	160	0.8
2012 July	NNL1	1,300	1,000	260	1.2
	NNL4	1,700	1,390	310	1
	NNL9	820	540	280	0.2
2012 August	NNL1	810	660	150	1.6
	NNL1 (rep)	790	590	200	1
	NNL4	1,800	1,350	440	0.8
	NNL9	730	530	195	0.04
2012 September	NNL1	1,530	1,170	360	1.2
	NNL4	1,260	970	290	2
	NNL9	1,740	1530	220	0.2

Table 1-20 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2013

Sampling Site	Date	Depth	Total Abundance	< 5 µm (1,000X)	5 to 25 µm (400X)	> 25 µm (100X)
Long Lake	April 2013	0.5 m	2,300	1,750	530	10
		1 m	3,000	2,470	570	15
	August 2013	0.5 m	1,300	880	455	2
		1.0 m	1,700	1,170	470	15
	October 2013	0.5 m	1,500	1,150	340	12
		1.0 m	1,900	1440	400	14
Middle Quinsam Lake	April 2013	0.5 m	1,350	1,080	270	2
		1.0 m	1,400	1,150	250	2
	August 2013	0.5 m	1,300	1,045	235	7
		1.0 m	1,300	1,010	325	6
		1.0 m (rep)	1,200	990	230	9
	October 2013	0.5 m	1,800	1,440	350	2
		1.0 m	1,900	1,570	290	2
		1.0 m (rep)	1,600	1,310	300	3
No Name Lake	April 2013	0.5 m	1,300	900	370	45
		1.0 m	1,600	1,150	380	36
	August 2013	0.5 m	1,200	880	440	5
		1.0 m	1,500	1,060	455	6
		1.0 m (rep)	1,700	1,315	470	8
	October 2013	0.5 m	1,800	1,310	460	1
		1.0 m	1,600	1,060	540	1
Lower Quinsam Lake	April 2013	0.5 m	1,800	1,420	406	2
		1 m	950	700	245	2
	August 2013	0.5 m	960	810	150	2
		1.0 m	620	460	160	3
	October 2013	0.5 m	1,300	1,040	200	12
		1.0 m	1,300	1,060	230	4

Table 1-21 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2014**

Sampling Site	Date	Depth	Total Abundance	< 5 µm (1,000X)	5 to 25 µm (400X)	> 25 µm (100X)
Long Lake	April 2014	1 m	3100	2665	330	86.6
	July 2014	1 m	1700	1170	490	0.9
	October 2014	1 m	1500	1200	290	18.6
Middle Quinsam Lake	April 2014	1 m	1000	840	155	11.4
		1 m replicate	590	480	100	11.7
	July 2014	1 m	3200	2950	240	0.5
	October 2014	1 m	1700	1400	310	3.2
No Name Lake	April 2014	1 m	1600	1260	290	83
	July 2014	1 m	1300	970	310	2.5
		1 m replicate	1200	830	250	3.1
	October 2014	1 m	1600	1400	200	1.7
		1 m replicate	1500	1200	230	2.2
Lower Quinsam Lake	April 2014	1 m	1600	1400	225	7.6
	July 2014	1 m	1200	1010	210	1.8
	October 2014	1 m	2400	2000	350	66

Table 1-22 Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2015

Lake	Month	Depth (m)	Total Abundance	< 5 µm (1,000X)	5 to 25 µm (400X)	> 25 µm (100X)
Long	April	1	3700	3300	400	15
	July	1	1300	1030	260	6.6
	October	1	2100	1800	230	14.6
Middle Quinsam	April	1	1600	1300	300	2.4
	July	1	2900	1060	1850	2.8
	October	1	1150	920	230	0.3
No Name	April	1	1200	870	350	1.1
	July	1	880	610	260	6.6
	October	1	1350	1000	300	4.3
	October replicate	1	1200	920	280	4.5
Lower Quinsam	April	1	2200	1800	350	28
	April replicate	1	2300	1800	520	18
	July	1	3200	580	2630	3.3
	October	1	1500	1100	330	71

Table 1-23 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2016**

Lake	Month	Abundance (cells/mL) at 1 m depth			
		Total	< 5 µm (1,000 X)	5 to 25 µm (400 X)	> 25 µm (100 X)
Long	April	1,500	1,300	240	5.5
Middle Quinsam		1,100	882	240	2.8
No Name		1,100	864	240	1.8
No Name (replicate)		970	792	180	1.8
Lower Quinsam		1,500	1,200	260	5.4
Long	August	1,200	990	140	22
Middle Quinsam		930	810	116	1.5
No Name		1,800	1,200	500	42
No Name (replicate)		1,900	1,280	595	46
Lower Quinsam		2,400	1,850	578	1.4
Long	November	780	640	140	0.5
Middle Quinsam		610	520	90	3
No Name		650	600	50	0.4
Lower Quinsam		300	250	50	0

Table 1-24 **Phytoplankton Abundance (cells/mL) in the Quinsam Lakes System, 2017**

Lake	Month	Abundance (cells/mL) at 1 m depth			
		Total	< 5 µm (1,000 X)	5 to 25 µm (400 X)	> 25 µm (100 X)
Long	May	2,700	2,400	340	16.2
Middle Quinsam		1,900	1,500	370	15.4
No Name		1,300	1,000	320	7.9
Lower Quinsam		1,700	1,300	390	1.2
Long	Sept.	1,100	940	200	1.5
Middle Quinsam		980	760	220	0.9
No Name		1,400	860	480	29.8
No Name Replicate		1,500	1,000	450	28.1
Lower Quinsam		1,700	990	600	86.6
Long	Oct.	2,000	1,800	190	0.4
Middle Quinsam		860	770	80	7.5
No Name		1,600	1,370	260	1
No Name Replicate		1,800	1,400	390	4.2
Lower Quinsam		1,300	770	530	14.8

September 4, 2018
Morgan Melnychuk

Reference: Quinsam Lakes Phytoplankton, May 2018 (Sample Reference TO0504-06, TO0508-02, TN8393, TO0168-02, TO0515-06) (Job Numbers B842781, B842786, B842689, B842145)

ATTACHMENT 2

Species Composition Data: May 2018

Quinsam Lake Phytoplankton - 31 May 2018
Long Lake 1 m (TO0504-06, Job B842781)
27 ml sample settled

Total Cells Counted	**421**
Total Cells Per mL	**1,500**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	48	864
Ochromonas/Chromulina spp. (4-5 um)	14	252
Ochromonas/Chromulina spp. (6-7 um)	3	54
unidentified cyst	7	126
Pseudokephyrion sp.	2	36
TOTAL	**74**	**1,332**
400X magnification - 3 strips		
CHRYSOPHYCEAE		
Chrysocapsa paludosa (cells and cols)	3	2
Dinobryon sp. (cyst)	1	1
Mallomonas spp.	2	1
Ochromonas spp. (8-10 um)	112	63
BACILLARIOPHYCEAE		
Cyclotella glomerata (cells + cols)	3	2
Cyclotella ocellata/stelligera	10	6
CHLOROPHYCEAE		
Botryococcus braunii (cells)	1	1
Dictosphaerium pulchellum (cols.)	1	1
Gloeocystis sp. (cells + cols)	11	6
Neprocytium sp. (cells)	12	7
Tetraedron sp.	1	1
DINOPHYCEAE		
Gymnodinium sp.	1	1
Peridinium sp.	1	1
CRYPTOPHYCEAE		
Cryptomonas spp.	24	14
Rhodomonas minuta	77	44
EUGLENOPHYCEAE		
Trachelomonas sp	2	1
CYANOPHYCEAE		
Dactylococcopsis aciciularis (cols)	1	1
TOTAL	**263**	**149**
100X magnification - whole sample		
CHRYSOPHYCEAE		
Dinobryon cylindricum (24 cols, 64 cells)	64	2.6
BACILLARIOPHYCEAE		
Synedra radians	4	0.2
CHLOROPHYCEAE		
Botryococcus braunii (colonies)	3	0.1
Elakatothrix gelatinosa (cols)	8	0.3
Staurastrum sp.	4	0.2
CYANOPHYCEAE		
Oscillatoria sp. (1 fil)	1	0.04
TOTAL	**84**	**3.36**

Quinsam Lake Phytoplankton - 31 May 2018
Long Lake 1 m (TO0508-02, Job B842781)
27 ml sample settled

Total Cells Counted	**425**
Total Cells Per mL	**1,300**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	41	738
Ochromonas/Chromulina spp. (4-5 um)	15	270
Ochromonas/Chromulina spp. (6-7 um)	5	90
Chrysochromulina parva	1	18
Pseudokephyrion sp.	1	18
TOTAL	**63**	**1,134**
400X magnification - 3 strips		
CHRYSOPHYCEAE		
Dinobryon sp. (cyst)	1	1
Ochromonas spp. (8-10 um)	121	69
BACILLARIOPHYCEAE		
Cyclotella ocellata/stelligera	7	4
Cymbella sp. (25 um)	1	1
CHLOROPHYCEAE		
Ankistrodesmus falcatus (cols)	1	1
Crucigenia sp. (cols)	2	1
Gloeocystis sp. (cells + cols)	10	6
Oocystis sp. (cells+cols)	1	1
Neprocytium sp. (cells)	3	2
Scenedesmus sp. (cols)	2	1
DINOPHYCEAE		
Gymnodinium sp.	1	1
Peridinium sp.	2	1
CRYPTOPHYCEAE		
Cryptomonas spp.	22	12
Rhodomonas minuta	67	38
TOTAL	**241**	**137**
100X magnification - whole sample		
CHRYSOPHYCEAE		
Dinobryon cylindricum (22 cols, 107 cells)	107	4.3
BACILLARIOPHYCEAE		
Synedra radians	3	0.1
Synedra ulna	2	0.1
CHLOROPHYCEAE		
Botryococcus braunii (colonies)	1	0.04
Elakatothrix gelatinosa (cols)	8	0.3
TOTAL	**121**	**4.8**

Quinsam Lake Phytoplankton - 31 May 2018
Lower Quinsam Lake 1 m (TN7839-03, Job B842145)
27 ml sample settled

Total Cells Counted	**333**
Total Cells Per mL	**2,700**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	68	1224
Ochromonas/Chromulina spp. (4-5 um)	42	756
Ochromonas/Chromulina spp. (6-7 um)	10	180
Pseduokephyrion sp.	2	36
Chrysochromulina parva	1	18
unidentified cyst	12	216
TOTAL	**135**	**2430**
400X magnification - 1 strip		
CHRYSOPHYCEAE		
Dinobryon sp. (cyst)	1	2
Dinobryon sp. (cells)	4	7
Mallomonas spp.	2	3
Ochromonas spp. (8-10 um)	104	177
BACILLARIOPHYCEAE		
Cyclotella glomerata (cells + cols)	13	22
Cyclotella ocellata/stelligera	6	10
Melosira italica (filaments)	8	14
CHLOROPHYCEAE		
Botryococcus sp. (cells)	3	5
Gloeocystis sp. (cells+cols)	1	2
Nephrocytium sp. (cols + cells)	3	5
Scenedesmus sp.	1	2
Tetraedron sp.	1	2
CRYPTOPHYCEAE		
Cryptomonas spp.	16	27
Rhodomonas minuta	16	27
DINOPHYCEAE		
Gymnodinium sp.	5	9
CYANOPHYCEAE		
Merismopedia sp. (cols)	1	2
TOTAL	**185**	**315**
100X magnification - whole sample		
CHRYSOPHYCEAE		
Dinobryon cylindricum (2 cols, 2 cells)	2	0.1
BACILLARIOPHYCEAE		
CHLOROPHYCEAE	10	0.4
Botryococcus braunii (cols)	1	0.04
TOTAL	**13**	**0.5**

Quinsam Lake Phytoplankton - 31 May 2018
No Name Lake 1 m (TO0168-02, Job B842689)
27 ml sample settled

Total Cells Counted	**381**
Total Cells Per mL	**1,800**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	28	504
Ochromonas/Chromulina spp. (4-5 um)	16	288
Ochromonas/Chromulina spp. (6-7 um)	2	36
Chrysochromulina parva	1	18
CHLOROPHYCEAE		
Oocystis sp. (cells, 5 x 3 um)	37	666
TOTAL	**84**	**1,512**
400X magnification - 2 strips		
CHRYSOPHYCEAE		
Chrysocapsa paludosa (cols+cells)	4	3
Mallomonas sp.	4	3
Ochromonas spp. (8-10 um)	114	97
BACILLARIOPHYCEAE		
Cyclotella ocellata/stelligera	1	1
Melosira italica (cells + fils)	16	14
CHLOROPHYCEAE		
Crucigenia sp. (cols)	5	4
Dictosphaerium pulchellum (cols.)	2	2
Gloeocystis sp. (cells + cols)	3	3
Nephrocytium sp. (cells+cols)	83	71
Oocystis sp. (cells+cols)	2	2
DiNOPHYCEAE		
Gymnodinium sp.	2	2
Peridinium sp.	1	1
CRYPTOPHYCEAE		
Cryptomonas spp.	22	19
Rhodomonas minuta	30	26
CYANOPHYCEAE		
Dactylococcopsis acicularis (cols)	5	4
TOTAL	**294**	**250**
100X magnification - whole sample		
BACILLARIOPHYCEAE		
Synedra radians	2	0.1
CHLOROPHYCEAE		
Botryococcus braunii (cols)	1	0.04
TOTAL	**3**	**0.1**

Quinsam Lake Phytoplankton - 31 May 2018
Middle Quinsam Lake 1 m (TO0515-06, Job B842786)
27 ml sample settled

Total Cells Counted	**319**
Total Cells Per mL	**1,000**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	26	468
Ochromonas/Chromulina spp. (4-5 um)	19	342
Ochromonas/Chromulina spp. (6-7 um)	3	54
Pseudokephyrion sp.	3	54
TOTAL	**51**	**918**
400X magnification - 4 strips		
CHRYSOPHYCEAE		
Chrysocapsa paludosa (cols)	4	2
Mallomonas sp.	5	2
Ochromonas spp. (8-10 um)	106	45
BACILLARIOPHYCEAE		
Cyclotella ocellata/stelligera	2	1
Melosira italica (fil)	4	2
CHLOROPHYCEAE		
Crucigenia sp. (cols)	2	1
Gloeocystis sp. (cells+cols)	4	2
Tetraedron minimum	1	0.4
CRYPTOPHYCEAE		
Cryptomonas spp.	72	31
Rhodomonas minuta	50	21
CYANOPHYCEAE		
Dactylococcopsis acicularis (cols)	8	3
TOTAL	**258**	**110**
100X magnification - whole sample		
BACILLARIOPHYCEAE		
Synedra radians	5	0.2
CHLOROPHYCEA		
Botryococcus braunii (cols)	1	0.04
Elakatothrix gelatinosa (cols)	2	0.1
DINOPHYCEAE		
Ceratium hirudinella	2	0.1
TOTAL	**10**	**0.4**

October 15, 2018
Morgan Melnychuk

Reference: Quinsam Lakes Phytoplankton, August 2018 (Sample Reference UD7577, UD7518, UD7556, UD5072, UD5076) (Job Numbers B872066, B8752055, B872063, B871578)

ATTACHMENT 2

Species Composition Data: August 2018

Quinsam Lake Phytoplankton - 23 August 2018
Long Lake 1 m (UD7518-07, Job B872055)
27 ml sample settled

Total Cells Counted	**362**
Total Cells Per mL	**1,200**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	30	540
Ochromonas/Chromulina spp. (4-5 um)	17	306
Ochromonas/Chromulina spp. (6-7 um)	4	72
Chrysochromulina parva	9	162
Pseudokephyrion sp.	1	18
TOTAL	**61**	**1,098**
400X magnification - 4 strips		
CHRYSOPHYCEAE		
Dinobryon sp. (cells)	3	1
Diceras chodatii	13	6
Mallomonas spp.	1	0.4
Ochromonas spp. (8-10 um)	102	43
unidentified cyst	2	1
BACILLARIOPHYCEAE		
Melosira italica (fil)	1	0.4
CHLOROPHYCEAE		
Gloeocystis sp. (cells + cols)	23	10
Neprocytium sp. (cells)	13	6
Oocystis sp. (cells + cols)	6	3
Scenedesmus sp. (cols)	3	1
DINOPHYCEAE		
Gymnodinium sp.	3	1
Peridinium sp.	5	2
CRYPTOPHYCEAE		
Cryptomonas spp.	29	12
Rhodomonas minuta	52	22
CYANOPHYCEAE		
Chroococcus sp. (cols)	2	1
Dactylococcopsis aciciularis (cols)	1	0.4
TOTAL	**259**	**110**
100X magnification - whole sample		
CHRYSOPHYCEAE		
Dinobryon cylindricum (1 col, 4 cells)	4	0.2
BACILLARIOPHYCEAE		
Synedra ulna	2	0.1
DINOPHYCEAE		
Ceratium hirudinella	36	1.4
TOTAL	**42**	**1.7**

Quinsam Lake Phytoplankton - 23 August 2018
Middle Quinsam Lake 1 m (UD7577-07, Job B872066)
27 ml sample settled

Total Cells Counted	**301**
Total Cells Per mL	**1,600**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	20	360
Ochromonas/Chromulina spp. (4-5 um)	12	216
Ochromonas/Chromulina spp. (6-7 um)	2	36
CHLOROPHYCEAE		
Oocystis sp. (cells, 5 x 3 um)	47	846
TOTAL	**81**	**1,458**
400X magnification - 2 strips		
CHRYSOPHYCEAE		
Diceras chodatii	2	2
Mallomonas sp.	15	13
Ochromonas spp. (8-10 um)	110	94
BACILLARIOPHYCEAE		
Cyclotella ocellata/stelligera	1	1
CHLOROPHYCEAE		
Crucigenia sp. (cols)	2	2
Gloeocystis sp. (cells+cols)	2	2
Nephrocytium sp. (cells)	5	4
Oocystis sp. (cells + cols)	3	3
Scenedesmus sp. (cols)	3	3
CRYPTOPHYCEAE		
Cryptomonas spp.	41	35
Rhodomonas minuta	29	25
CYANOPHYCEAE		
Dactylococcopsis acicularis (cols)	1	1
TOTAL	**214**	**182**
100X magnification - whole sample		
CHLOROPHYCEA		
Elakatothrix gelatinosa (cols)	1	0.04
CYANOPHYCEAE		
Aphanothece sp. (cols)	5	0.2
TOTAL	**6**	**0.2**

Quinsam Lake Phytoplankton - 23 August 2018
No Name Lake 1 m (UD7556-07, Job B872063)
27 ml sample settled

Total Cells Counted	**562**
Total Cells Per mL	**1,400**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	31	558
Ochromonas/Chromulina spp. (4-5 um)	17	306
Ochromonas/Chromulina spp. (6-7 um)	4	72
Pseudokephyrion sp.	5	90
CHLOROPHYCEAE		
Oocystis sp. (cells, 5 x 3 um)	8	144
TOTAL	**65**	**1,170**
400X magnification - 3 strips		
CHRYSOPHYCEAE		
Diceras chodatii	3	2
Dinobryon sp. (cells)	5	3
Mallomonas sp.	6	3
Ochromonas spp. (8-10 um)	126	71
unidentified flagellate (8 x 4 um)	98	56
BACILLARIOPHYCEAE		0
Melosira italica (cells + fils)	19	11
CHLOROPHYCEAE		
Crucigenia sp. (cols)	2	1
Gloeocystis sp. (cells + cols)	2	1
Nephrocytium sp. (cells+cols)	3	2
Oocystis sp. (cells+cols)	2	1
Quadrigula chodatii (cols)	1	1
Schroederia setigera	2	1
DINOPHYCEAE		
Gymnodinium sp.	8	5
CRYPTOPHYCEAE		0
Cryptomonas spp.	44	25
Rhodomonas minuta	126	71
CYANOPHYCEAE		
Dactylococcopsis acicularis (cols)	7	4
Merismopedia sp. (cols)	18	10
TOTAL	**472**	**267**
100X magnification - half sample		
CHLOROPHYCEAE		
Botryococcus braunii (cols)	1	0.1
Closterium sp.	1	0.1
Elakatothrix gelatinosa (cols)	2	0.2
CYANOPHYCEAE		
Anabaena flos-aquae (fils)	16	1.3
Aphanothece sp. (cols)	5	0.4
TOTAL	**25**	**2.0**

Quinsam Lake Phytoplankton - 22 August 2018
Lower Quinsam Lake 1 m (UD5072-07, B871578)
27 ml sample settled

Total Cells Counted	**668**
Total Cells Per mL	**2,300**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	15	270
Ochromonas/Chromulina spp. (4-5 um)	9	162
Ochromonas/Chromulina spp. (6-7 um)	2	36
Chrysochromulina parva	1	18
CHLOROPHYCEAE		
Oocystis sp. (5 x 2.5 um) (cells)	11	198
TOTAL	**38**	**684**
400X magnification - half strip		
CHRYSOPHYCEAE		
Diceras chodatii	1	3
Dinobryon sp. (cells)	1	3
Mallomonas spp.	2	7
Ochromonas spp. (8-10 um)	41	139
BACILLARIOPHYCEAE		
Melosira italica (filaments)	15	51
CHLOROPHYCEAE		
Crucigenia sp. (cols)	4	14
Gloeocystis sp. (cells+cols)	333	1132
Nephrocytium sp. (cols + cells)	12	41
Oocystis sp. (cells + cols)	1	3
Scenedesmus sp.	16	54
Tetraedron sp.	1	3
CRYPTOPHYCEAE		
Cryptomonas spp.	19	65
Rhodomonas minuta	14	48
CYANOPHYCEAE		
Chroococcus sp. (cols)	1	3
Dactylococcopsis acicularis (cols)	2	7
unidentified blue-green (cols)	5	17
TOTAL	**468**	**1591**
100X magnification - half sample		
CHRYSOPHYCEAE		
Dinobryon cylindricum (6 cols, 21 cells)	21	1.7
Dinobryon sociale (2 cols, 9 cells)	9	0.7
BACILLARIOPHYCEAE		
Asterionella formosa (19 fil, 123 cells)	123	9.8
Synedra radians	7	0.6
Synedra ulna	1	0.1
CHLOROPHYCEAE		
Botryococcus braunii (cols)	1	0.1
TOTAL	**162**	**13.0**

Quinsam Lake Phytoplankton - 22 August 2018
Lower Quinsam Lake 1 m (UD5076-01, B871578)
27 ml sample settled

Total Cells Counted	**822**
Total Cells Per mL	**3,400**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	17	306
Ochromonas/Chromulina spp. (4-5 um)	20	360
Ochromonas/Chromulina spp. (6-7 um)	4	72
Chrysochromulina parva	2	36
CHLOROPHYCEAE		
Oocystis sp. (5 x 2.5 um) (cells)	20	360
TOTAL	**63**	**1134**
400X magnification - half strip		
CHRYSOPHYCEAE		
Dinobryon sp. (cells)	6	20
Mallomonas spp.	3	10
Ochromonas spp. (8-10 um)	43	146
BACILLARIOPHYCEAE		
Melosira italica (filaments)	32	109
CHLOROPHYCEAE		
Crucigenia sp. (cols)	7	24
Gloeocystis sp. (cells+cols)	449	1527
Nephrocytium sp. (cols + cells)	26	88
Quadrigula chodatii (cols)	1	3
Scenedesmus sp.	28	95
DINOPHYCEAE		
Gymnodinium sp.	1	3
Peridinium sp.	6	20
CRYPTOPHYCEAE		
Cryptomonas spp.	23	78
Rhodomonas minuta	38	129
CYANOPHYCEAE		
Chroococcus sp. (cols)	1	3
Dactylococcopsis acicularis (cols)	7	24
unidentified blue-green (cols)	5	17
TOTAL	**676**	**2298**
100X magnification - half sample		
CHRYSOPHYCEAE		
Dinobryon cylindricum (7 cols, 18 cells)	18	1.4
BACILLARIOPHYCEAE		
Asterionella formosa (8 fil, 56 cells)	56	4.5
Synedra radians	4	0.3
CHLOROPHYCEAE		
Botryococcus braunii (cols)	1	0.1
Elakatothrix gelatinosa (cols)	1	0.1
CYANOPHYCEAE		
Anabaena flos-aquae (fils)	3	0.2
TOTAL	**83**	**6.6**

March 18, 2019
Morgan Melnychuk

Reference: **Quinsam Lakes Phytoplankton, November 2018 (Sample Reference UU1575, UT2236, UT2301, UT23126) (Job Numbers B8A0901, B898980, B898986, B898989)**

ATTACHMENT 2

Species Composition Data: November 2018

Quinsam Lake Phytoplankton - 8 November 2018
Long Lake 1 m (UT2236-07, Job B898980)
27 ml sample settled

Total Cells Counted	**969**
Total Cells Per mL	**9,200**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	42	756
Ochromonas/Chromulina spp. (4-5 um)	38	684
Ochromonas/Chromulina spp. (6-7 um)	58	1044
Pseudokephyrion sp.	1	18
TOTAL	**139**	**2,502**
400X magnification - 2 strips		
CHRYSOPHYCEAE		
Mallomonas spp.	1	1
Ochromonas spp. (8-10 um)	165	140
unidentified cyst	3	3
BACILLARIOPHYCEAE		
Cyclotella glomerata (cells + cols)	4	3
CHLOROPHYCEAE		
Neprocytium sp. (cells)	3	3
Oocystis sp. (cells + cols)	1	1
Scenedesmus sp. (cols)	1	1
Tetraedron minimum	1	1
CRYPTOPHYCEAE		
Cryptomonas spp.	12	10
Rhodomonas minuta	56	48
CYANOPHYCEAE		
Dactylococcopsis aciciularis (cols)	2	2
TOTAL	**249**	**212**
100X magnification - half sample		
CHRYSOPHYCEAE		
Dinobryon cylindricum (4 col, 4 cells)	4	0.3
BACILLARIOPHYCEAE		
Synedra radians	4	0.3
DINOPHYCEAE		
Peridinium cinctum	1	0.1
TOTAL	**9**	**0.7**
also at 100X (1 strip)		
Asterionella formosa (160 cols/572 cells = 1 strip at 100X	**572**	**6521**

(calibration = 1.72 mm dia X 25 mm long, area of chamber = 491

Quinsam Lake Phytoplankton - 8 November 2018
Middle Quinsam Lake 1 m (UT2301-07, Job B898986)
27 ml sample settled

Total Cells Counted	**311**
Total Cells Per mL	**2,100**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	44	792
Ochromonas/Chromulina spp. (4-5 um)	40	720
Ochromonas/Chromulina spp. (6-7 um)	13	234
Pseudokephyrion sp.	2	
TOTAL	**99**	**1,746**
400X magnification - 1 strip		
CHRYSOPHYCEAE		
Dinobryon sp. (cells)	2	3
Mallomonas sp.	1	2
Ochromonas spp. (8-10 um)	51	87
BACILLARIOPHYCEAE		
Melosira italica (fil)	19	32
CHLOROPHYCEAE		
Crucigenia sp. (cols)	1	2
Gloeocystis sp. (cells+cols)	1	2
Oocystis sp. (cells + cols)	1	2
CRYPTOPHYCEAE		
Cryptomonas spp.	27	46
Rhodomonas minuta	104	177
CYANOPHYCEAE		
Dactylococcopsis acicularis (cols)	4	7
TOTAL	**211**	**359**
100X magnification - whole sample		
CHLOROPHYCEA		
Botryococcus braunii (cols)	1	0.04
TOTAL	**1**	**0.04**

Quinsam Lake Phytoplankton - 8 November 2018
No Name Lake 1 m (UT23126-07, Job B898989)
27 ml sample settled

Total Cells Counted	**447**
Total Cells Per mL	**1,600**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	44	792
Ochromonas/Chromulina spp. (4-5 um)	22	396
Ochromonas/Chromulina spp. (6-7 um)	4	72
TOTAL	**70**	**1,260**
400X magnification - 2 strips		
CHRYSOPHYCEAE		
Dinobryon sp. (cells)	3	3
Mallomonas sp.	5	4
Ochromonas spp. (8-10 um)	101	86
BACILLARIOPHYCEAE		
Cyclotella glomerata (cells+cols)	3	3
Melosira italica (cells + fils)	63	54
CHLOROPHYCEAE		
Crucigenia sp. (cols)	4	3
Gloeocystis sp. (cells + cols)	2	2
Nephrocytium sp. (cells+cols)	8	7
Oocystis sp. (cells+cols)	6	5
CRYPTOPHYCEAE		
Cryptomonas spp.	62	53
Rhodomonas minuta	93	79
CYANOPHYCEAE		
Dactylococcopsis acicularis (cols)	9	8
TOTAL	**359**	**305**
100X magnification - whole sample		
BACILLARIOPHYCEAE		
Synedra radians	1	0.04
Tabellaria fenestrata (3 cols, 16 cells)	16	0.6
CYANOPHYCEAE		
Chroococcus sp. (col)	1	0.04
TOTAL	**18**	**0.7**

Quinsam Lake Phytoplankton - 14 November 2018
Lower Quinsam Lake 1 m (UU1575-07, B8A0901)
27 ml sample settled

Total Cells Counted	**1547**
Total Cells Per mL	**1,800**

	Number Counted	Cells per mL
1000X magnification - 50 fields		
CHRYSOPHYCEAE		
Ochromonas/Chromulina spp. (2-3 um)	34	612
Ochromonas/Chromulina spp. (4-5 um)	36	648
Ochromonas/Chromulina spp. (6-7 um)	11	198
TOTAL	**81**	**1458**
400X magnification - 2 strips		
CHRYSOPHYCEAE		
Diceras chodatii	1	1
Mallomonas spp.	3	3
Ochromonas spp. (8-10 um)	107	91
BACILLARIOPHYCEAE		
Cyclotella stelligera/ocellata	1	1
Melosira italica (filaments)	46	39
CHLOROPHYCEAE		
Crucigenia sp. (cols)	1	1
Gloeocystis sp. (cells+cols)	1	1
Nephrocytium sp. (cols + cells)	1	1
CRYPTOPHYCEAE		
Cryptomonas spp.	23	20
Rhodomonas minuta	81	69
TOTAL	**265**	**225**
100X magnification - half sample		
CHRYSOPHYCEAE		
Dinobryon cylindricum (5 cols, 72 cells)	72	5.8
Dinobryon sociale (33 cols, 1090 cells)	1090	87.2
BACILLARIOPHYCEAE		
Asterionella formosa (13 col, 31 cells)	31	2.5
Synedra radians	8	0.6
TOTAL	**1201**	**96**

APPENDIX V

Report Date:November 05, 2018 File:7008

Report Number:106411

QUINSAM COAL CORPORATION

950-1090 West Georgia Street
Vancouver BC V6E 3V7

Dear QUINSAM COAL CORPORATION

Re: Non-compliance Advisory Letter, Permit 7008, 5800 Argonaut Main, near Campbell River, BC, Effluent

On October 11, 2018, Ministry of Environment and Climate Change Strategy, Environmental Protection Division staff conducted an inspection of your facility, QUINSAM COAL CORPORATION located at 5800 Argonaut Main, near Campbell River, BC with authorization number 7008 under the *Environmental Management Act*. Ministry staff were accompanied on site by Kathleen Russell, Quinsam Coal Corporation.

This Advisory, the alleged violations and the circumstances to which it refers will form part of the compliance history of QUINSAM COAL CORPORATION, and will be taken into account in the event of future non-compliance.

Please note that this authorization is considered to be out of compliance until such a time as it can be confirmed to meet the authorization requirements.

Inspection Details:

Requirement Description:	**1. AUTHORISED DISCHARGES, 1.1, 1.1.1** 1.1.1: This subsection applies to the discharge of effluent from the NORTH COAL MINING OPERATION AND COAL PREPARATION PLANT as shown on attached Site Plan A. The site reference number for this discharge is E207409. 1.1.1 The maximum and average authorised rates of discharge are 0.32 m3/s and 0.08 m3/s respectively. The authorised discharge period is 365 d/a.

Ministry of Environment and Climate Change Strategy

Compliance
Environmental Protection Division

Mailing Address:
2080-A
Labieux Rd
Nanaimo BC V9E 6J9

Telephone: 250 751 3100
Facsimile: 250 751 3103
Website: www.gov.bc.ca/env

Details/Findings:	On October 11, 2018, Ministry of Environment and Climate Change Strategy (Ministry) Officer Darren Stewart (Officer Stewart) conducted an on-site inspection of the Quinsam Coal Corporation (Site) coal mine located outside Campbell River, BC to verify compliance with Permit 7008 (Permit). The Permit authorizes the discharge effluent from a coal mining operation and coal preparation plant to the land with overland flows draining to Middle Quinsam Lake, Long Lake, Iron River and Quinsam River. The Permit was issued on December 23, 1987 and last amended on June 23, 2015 and has current permit amendment requests submitted to the Ministry. Present during the inspection was Kathleen Russell (Environmental Coordinator, Quinsam Coal Corporation). The inspection period for this report is from September 20, 2017 to October 11, 2018 and included a review of the following documents; - Quinsam Coal Annual Water Quality Monitoring Report 2017-2018 (April 2017 - March 2018) - Long Lake Seep Treatment System Supplemental Evaluation report, submitted June 06, 2018 - 2018 ENVIRONMENTAL PROCEDURES MANUAL, submitted March 30, 3018 There were no exceedances of the maximum authorized rate of discharge during the data review period of April 2017 - March 2018 for this location, known internally as "Settling Pond #4". However, the reported annual average rate of discharge was 0.1326 m3/s for the date range April 1, 2017 through March 31, 2018, in exceedance of the authorized rate of 0.08 m3/s.
Compliance:	Out
Actions to be taken:	Comply with the average rate of discharge or amend this section of the permit to reflect an accurate discharge flow rate.
Requirement Description:	**1. AUTHORISED DISCHARGES, 1.1, 1.1.2** 1.1.2: This subsection applies to the discharge of effluent from the NORTH COAL MINING OPERATION AND COAL PREPARATION PLANT as shown on attached Site Plan A. The site reference number for this discharge is E207409. 1.1.2 The characteristics of the discharge shall not exceed: Parameters: Total Suspended Solids (daily composite), Limit: 25, Unit: mg/L; Total Suspended Solids (hourly composite), Limit: 35, Unit: mg/L; pH, Limit: 6.0 - 8.5, Unit: - ; Ammonia (as N) , Limit: 1.0, Unit: mg/L; Phosphorus (as P) (asterisk - see NOTE 1), Limit: 0.03, Unit: mg/L; NOTE 1: Dissolved; Oil and Grease (total), Limit: 5, Unit: mg/L; Aluminum (asterisk - see NOTE 1), Limit: 0.5, Unit: mg/L; NOTE 1: Dissolved; Copper (asterisk - see NOTE 1), Limit: 0.02, Unit: mg/L; NOTE 1: Dissolved; Iron (asterisk - see NOTE 1), Limit: 0.3, Unit: mg/L; NOTE 1: Dissolved; Lead (asterisk - see NOTE 1), Limit: 0.05, Unit: mg/L; NOTE 1: Dissolved; Zinc (asterisk - see NOTE 1), Limit: 0.1, Unit: mg/L; NOTE 1: Dissolved; Rainbow Trout Bioassay (Oncorhynchus mykiss), Limit: (double asterisk - see NOTE 2), Unit: - ; NOTE 2: No mortalities at 100 percent effluent concentration after 96 hours.

Details/Findings:	The 2017-2018 Annual Report, tables 4 and 25 contained in Appendix 1 show no exceedances of the parameters listed in this section. All rainbow trout bioassays and the Cedriodaphnia dubia / Daphnia Magna bioassays had 100% survival, with no mortalities at 100 percent effluent concentration after 96 hours for the Rainbow Trout Bioassay (Oncorhynchus mykiss). Toxicity results were contained in Appendix III of the Annual Report.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**1. AUTHORISED DISCHARGES, 1.1, 1.1.4** 1.1.4: This subsection applies to the discharge of effluent from the NORTH COAL MINING OPERATION AND COAL PREPARATION PLANT as shown on attached Site Plan A. The site reference number for this discharge is E207409. 1.1.4 The authorised works must be complete and in operation on and from the date of this amended permit.
Details/Findings:	Officer Stewart observed the authorized works on location as described in this section 1.1.3. of the permit, except for flocculation facilities that were not complete and in operation. This was also a non-compliance noted in the previous Inspection Report from November, 2017. Ms. Russell confirmed with Officer Stewart that Quinsam is currently undergoing the permit amendment process and has requested the removal of the flocculation requirements.
Compliance:	Out
Actions to be taken:	Complete the authorized works as specified in the permit or request a permit amendment to remove said works, providing rationale as to why they are deemed unnecessary.
Requirement Description:	**1. AUTHORISED DISCHARGES, 1.2, 1.2.1** 1.2.1: This subsection applies to the discharge of effluent from the SOUTH COAL MINING OPERATION as shown on attached Site Plan B. The site reference number for this discharge is E218582. 1.2.1 The maximum and average authorised rates of discharge are 0.46 m3/s and 0.10 m3/s respectively. The authorised discharge period is 365 d/a.

Details/Findings:	The rates of discharge for the South Coal Mining Operation (known internally as Settling Pond #1) included in the 2017/2018 Annual Report were below the permitted maximum and average rates as follows: Annual Maximum flow = 0.339 m3/s (instantaneous) Annual Average Flow = 0.0243 m3/s
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**1. AUTHORISED DISCHARGES, 1.2, 1.2.2** 1.2.2: This subsection applies to the discharge of effluent from the SOUTH COAL MINING OPERATION as shown on attached Site Plan B. The site reference number for this discharge is E218582. 1.2.2 The characteristics of the discharge shall not exceed: Parameters: Total Suspended Solids (daily composite), Limit: 25, Unit: mg/L; Total Suspended Solids (hourly composite), Limit: 35, Unit: mg/L ; pH, Limit: 6.0 - 8.5, Unit: - ; Ammonia (as N) , Limit: 1.0, Unit: mg/L; Phosphorus (as P) (asterisk - see NOTE 1), Limit: 0.03, Unit: mg/L; NOTE 1: Dissolved; Oil and Grease (total), Limit: less than DL (3 asterisk - See NOTE 3), Unit: mg/L; NOTE 3: less than Detection Limit; Aluminum (asterisk - see NOTE 1), Limit: 0.5, Unit: mg/L; NOTE 1: Dissolved; Copper (asterisk - see NOTE 1), Limit: 0.02, Unit: mg/L; NOTE 1: Dissolved; Iron (asterisk - see NOTE 1), Limit: 0.5, Unit: mg/L; NOTE 1: Dissolved; Lead (asterisk - see NOTE 1), Limit: 0.05, Unit: mg/L; NOTE 1: Dissolved; Zinc (asterisk - see NOTE 1), Limit: 0.2, Unit: mg/L; NOTE 1: Dissolved; Rainbow Trout Bioassay (Oncorhynchus mykiss), Limit: (double asterisk - see NOTE 2), Unit: - ; NOTE 2: No mortalities at 100 percent effluent concentration after 96 hours.
Details/Findings:	The characteristics of the discharge in this section were exceeded on the following date: Dissolved; Iron: January 08, 2018 - 0.641 mg/L. The remaining discharge characteristics were reported as compliant for the remainder of the period covered the annual report.
Compliance:	Out
Actions to be taken:	N/A

Requirement Description:	**1. AUTHORISED DISCHARGES, 1.2, 1.2.4** 1.2.4: This subsection applies to the discharge of effluent from the SOUTH COAL MINING OPERATION as shown on attached Site Plan B. The site reference number for this discharge is E218582. 1.2.4 The authorised works must be complete and in operation on and from the date of this amended permit.
Details/Findings:	Officer Stewart observed no flocculation facilities present at Quinsam, as specified in the authorized works required under section 1.2.3., thus the authorized works are incomplete. Ms. Russell confirmed with Officer Stewart that Quinsam is currently undergoing the permit amendment process and has requested the removal of the flocculation requirements.
Compliance:	Out
Actions to be taken:	Complete the authorized works as specified in the permit or request a permit amendment to remove said works, providing rationale as to why they are deemed unnecessary.
Requirement Description:	**1. AUTHORISED DISCHARGES, 1.3, 1.3.1** 1.3.1: This subsection applies to the discharge of effluent from the BLOCK 242 COAL MINING OPERATION as shown on attached Site Plan C. The site reference number for this discharge is E225796. 1.3.1 Subject to Subsection 4.4.3 the maximum authorised rate of discharge is 0.0082 m3/s. The authorised discharge period is 365 d/a.
Details/Findings:	Ms. Russell informed Officer Stewart that there is no mine activity in this area, the authorized works are removed and the mine portal has been filled in and closed off, and that flow rates are not being collected from this area. Officer Stewart previously observed in 2017 that the area referenced by this section of the permit (Block 242) to be fully overgrown and wooded with no discharge occurring related to mine activity, therefore compliance with this section is not applicable. The only visible remnants of mine activity in this area are what used to be the settling ponds which occasionally collect rainwater. Ms. Russell confirmed with Officer Stewart that Quinsam has submitted a permit amendment request to remove permit requirements for the reclaimed mine area formerly known as Block 242.
Compliance:	Not Applicable
Actions to be taken:	N/A

Requirement Description:	**1. AUTHORISED DISCHARGES, 1.4, 1.4.1** 1.4.1: This subsection applies to the discharge of effluent from the 7 SOUTH MINING OPERATION as shown on attached Site Plan D and E. The site reference number for this discharge is E292069. 1.4.1 The maximum authorized rate of discharge is 0.005 m3/s. The authorized discharge period is 365 d/a.
Details/Findings:	The Annual Report stated that discharge occurred from this authorized location, known as 7-South Settling Pond or "7SSD" internally, for one 24-hour period on January 18th through 19th, 2018. The flow during this time was measured at an average discharge rate of 2.5 L/s, or 0.0025 m3/s.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**1. AUTHORISED DISCHARGES, 1.4, 1.4.2** 1.4.2: This subsection applies to the discharge of effluent from the 7 SOUTH MINING OPERATION as shown on attached Site Plan D and E. The site reference number for this discharge is E292069. 1.4.2 The characteristics of the discharge shall not exceed: Parameter: Total Suspended Solids (daily composite), Limit: 25, Unit: mg/L; Total Suspended Solids (hourly composite), Limit: 35, Unit: mg/L; pH, Limit: 6.0 - 8.0, Unit: - ; Sulphate (asterisk - see NOTE 1) , Limit: 500, Unit: mg/L; NOTE 1: Dissolved; Aluminum (asterisk - see NOTE 1), Limit: 0.1, Unit: mg/L; NOTE 1: Dissolved; Cadmium (asterisk - see NOTE 1), Limit: 0.000045, Unit: mg/L; NOTE 1: Dissolved; Copper (asterisk - see NOTE 1), Limit: 0.014, Unit: mg/L; NOTE 1: Dissolved; Iron (asterisk - see NOTE 1), Limit: 0.35, Unit: mg/L; NOTE 1: Dissolved; Selenium (asterisk - see NOTE 1), Limit: 0.016, Unit: mg/L; NOTE 1: Dissolved; Rainbow Trout Bioassay (Oncorhynchus mykiss), Limit: (double asterisk - see NOTE 2), Unit: - ; NOTE 2: No mortalities at 100 percent effluent concentration after 96 hours.
Details/Findings:	Samples taken during the two days of discharge from 7SSD were all below permit limits for all parameters as defined in this section, as included in the Annual Report.
Compliance:	In

Actions to be taken:	N/A
Requirement Description:	**1. AUTHORISED DISCHARGES, 1.4, 1.4.3** 1.4.3: This subsection applies to the discharge of effluent from the 7 SOUTH MINING OPERATION as shown on attached Site Plan D and E. The site reference number for this discharge is E292069. 1.4.3 The authorized works are surface runoff collection and diversion ditches, flocculation facilities, one surface settling pond, an adit sump (7S Adit), pumping facilities and related appurtenances approximately located as shown on attached Site Plan D.
Details/Findings:	Officer Stewart observed the authorized works on location as described in this section of the permit, except for flocculation facilities that were not present. Ms. Russell confirmed that Quinsam is in the process of permit amendment that will be asking for the removal of the flocculation facilities from the list of authorized works.
Compliance:	Out
Actions to be taken:	Complete the authorized works as specified in the permit or request a permit amendment to remove said works, providing rationale as to why they are deemed unnecessary.
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.1 North Coal Mining and Coal Preparation Plant Operation (Settling Pond #4), 2.1.1 Rate of Discharge** 2.1.1: The maximum flow of 0.32 m3/s is the peak routed outflow from the settling pond resulting from the following inputs: a) The assumed response of the gravity fed catchment area defined in Subsection 2.1.3 up to a 1 in 10 year return period rainfall of 24 hour duration; and b) The maximum combined pumping rate from the 2-North portal sump, 2-North underground workings, and the tailings facility, as specified in Subsection 2.1.2. The Director may from time to time redefine the maximum outflow based upon actual on-site measurements.
Details/Findings:	The Annual Report confirmed the peak routed outflow from the settling pond did not exceed the maximum flow of 0.32 m3/s.
Compliance:	In

Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.1 North Coal Mining and Coal Preparation Plant Operation (Settling Pond #4), 2.1.2 Pumping Rate** 2.1.2: The combined rate at which effluent may be pumped from the 2-North portal sump, 2-North underground workings and the tailings facility to the settling pond shall not exceed 0.32 m3/s unless authorisation has been obtained from the Director. Pumping rates shall be decreased as necessary to accommodate flows as defined in Subsection 2.1.1(a).
Details/Findings:	Ms. Russell confirmed with Officer Stewart that the pumping rate has not exceeded 0.32 m3/s and that no specific authorisation was requested from the Director during the inspection period to do so.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.1 North Coal Mining and Coal Preparation Plant Operation (Settling Pond #4), 2.1.4 Wash Plant Effluent** 2.1.4: Wash plant effluent shall not be conveyed to the 2-North pit sump via the wash plant ditch. The Permittee shall keep records of the date, duration and estimated volume of any overflow of the wash plant effluent sump. Subject to review of this data, the Director may request changes to the works.
Details/Findings:	Ms. Russell confirmed with Officer Stewart the wash plant effluent goes to the 2-North mine pool and that there has been no overflow of the wash plant effluent sump, therefore recordkeeping requirements and compliance with this section were not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A

Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.1 North Coal Mining and Coal Preparation Plant Operation (Settling Pond #4), 2.1.5 Settling Pond Solids and Storage Volume** 2.1.5: Settled solids which have accumulated in the settling pond shall be removed as required to maintain a minimum water depth below the pond decant of 1.0 m and a minimum water storage volume of 2 300 m3. The removed solids shall be disposed of in a manner approved by the Director.
Details/Findings:	Ms. Russell informed Officer Stewart that the settling pond has never been dredged and the Annual Report confirms that "settled solids have not accumulated to a point that requires them to be removed at this time".
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.1 North Coal Mining and Coal Preparation Plant Operation (Settling Pond #4), 2.1.6 Discharge Routing** 2.1.6: The discharge from the settling pond shall be conveyed to Middle Quinsam Lake in a manner acceptable to the Director.
Details/Findings:	Mr. Russell confirmed with Officer Stewart, whom also observed, that the discharge from the settling pond is conveyed to Middle Quinsam Lake via the wetland area.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.1 North Coal Mining and Coal Preparation Plant Operation (Settling Pond #4), 2.1.7 Effluent Characteristics (for Total Suspended Solids)** 2.1.7: The characteristics of the effluent with respect to total suspended solids shall be equivalent to or less than the levels specified in Subsection 1.1.2 for discharge rates up to 0.32 m3/s (or as may be redefined by the Director according to Subsection 2.1.1). Variances may be allowed by the Director for higher discharge rates. The Director may as well, in the future, establish a maximum level for total suspended solids during extreme storm events.

Details/Findings:	There have been no variances by the Director for higher discharge rates nor a maximum level for total suspended solids during extreme storm events for the inspection period covered by this report, therefore compliance with this requirement was not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.2 South Coal Mining Operation (Settling Pond #1), 2.2.1 Rate of Discharge** 2.2.1: The maximum flow of 0.46 m3/s is the peak routed outflow from the settling pond resulting from an assumed response of the maximum equivalent catchment area as defined in Subsection 2.2.2 to a design 1 in 10 year return period rainfall of 24 hour duration. The Director may from time to time redefine the maximum routed outflow based upon actual on-site measurements.
Details/Findings:	The rate of discharge for the South Coal Mining Operation (known internally as Settling Pond #1) included in the 2017/2018 Annual Report was below the permmitted maximum of 0.46 m3/s. The Director has not redefined the maximum routed outflow based upon actual on-site measurements during the inspection period covered by this report.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.2 South Coal Mining Operation (Settling Pond #1), 2.2.2 Catchment Area** 2.2.2: The maximum equivalent settling pond catchment area shall not exceed 68.4 hectares as defined in South Pit Water Management, Settling Pond 1, Quinsam Coal Project, Ker, Priestman and Associates Limited, March 1990 unless authorisation has been obtained from the Director.

Details/Findings:	Mr. Russell confirmed with Officer Stewart the settling pond catchment area does not exceed 68.4 hectares, therefore compliance with the requirement of obtaining authorization from the Director was not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.2 South Coal Mining Operation (Settling Pond #1), 2.2.3 Settling Pond Solids and Storage Volume** 2.2.3: Settled solids which have accumulated in the settling pond shall be removed as required to maintain a minimum water depth below the pond decant of 1.0 m and a minimum water storage volume of 1400 m3. The removed solids shall be disposed of in a manner approved by the Director.
Details/Findings:	Ms. Russell informed Officer Stewart that this settling pond actually goes dry during the summer months between approximately May - September. The Annual Report confirms that "settled solids have not accumulated to a point that requires them to be removed at this time".
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.2 South Coal Mining Operation (Settling Pond #1), 2.2.4 Discharge Routing** 2.2.4: The discharge from the settling pond shall be conveyed to Long Lake through the adjacent wetlands as specified in Figure 1, South Pit Water Management, Settling Pond 1, Quinsam Coal Project, Ker, Priestman and Associates Limited, March 1990.
Details/Findings:	Officer Stewart observed the discharge from the settling pond conveyed to Long Lake through the adjacent wetlands as specified.

Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.2 South Coal Mining Operation (Settling Pond #1), 2.2.5 Effluent Characteristics (for Total Suspended Solids** 2.2.5: The characteristics of the effluent with respect to total suspended solids shall be equivalent to or less than the levels specified in Subsection 1.2.2 for discharge rates up to 0.46 m3/s (or as may be redefined by the Director according to Section 2.2.1). Variances may be allowed by the Director for higher discharge rates. The Director may as well, in the future, establish a maximum level for total suspended solids during extreme storm events.
Details/Findings:	There were no variances allowed by the Director for higher discharge rates nor an established maximum level for total suspended solids during extreme storm events, therefore compliance with this requirement was not applicable at the time of this report.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.3 Block 242 Coal Mining Operation, 2.3.1 Pumping Rate** 2.3.1: Subject to Subsection 4.4.3 the rate at which effluent may be pumped from the underground sump(s) to the primary settling pond and from the primary settling pond to the secondary settling pond shall not exceed 0.043 m3/s (up to a maximum of 400 m3/d) and 0.0082 m3/s respectively.
Details/Findings:	Ms. Russell informed Officer Stewart that there are no underground sump(s) and no pumping of effluent to the ponds. The remnants of the overgrown settling ponds now only collect precipitation therefore compliance with this requirement is not applicable. During the previous inspection in 2017 Officer Stewart observed a reclaimed/overgrown area that was described as the previous Block 242 coal mining operation, which had ceased production many years prior. Ms. Russell confirmed that Quinsam has submitted a permit amendment to remove this outdated and reclaimed section from the permit.

Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.4 7 South Mining Operation Settling Pond, 2.4.1 Rate of Discharge** 2.4.1: The maximum flow of 0.005 m3/s is the peak routed outflow from the settling pond resulting from an assumed response of the maximum equivalent catchment area as defined in subsection 2.4.3 to a design 1 in 10 year return period of 24 hour duration. Additional flow from the 7S adit sump pump must not cause the settling pond to overflow or exceed the maximum flow. The Director may from time to time redefine the maximum routed outflow based upon actual on-site measurements.
Details/Findings:	Discharge occurred from 7SSD for 24 hours during January 18-19, 2018 within the inspection period covered by this report. The reported flow rate, 0.0025 m3/s, did not exceed the authorized peak routed outflow from the settling pond. Ms. Russell informed Officer Stewart that the pumping of water from the 7 South Adit Sump (7S-Sump) to 7SSD has never occurred. In addition, the Director has not redefined the maximum routed outflow based upon actual on-site measurements.
Compliance:	In
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.4 7 South Mining Operation Settling Pond, 2.4.2 Pumping Rate** 2.4.2: The Permittee shall keep records of the date, duration and estimated volume when water from the 7 South Adit Sump (7S-Sump) is pumped to the settling pond and submit the records to the Regional Waste Manager upon request.
Details/Findings:	Ms. Russell conformed with Officer Stewart that the pumping of water from 7S-Sump to 7SSD has never happened, therefore compliance with the requirement of keeping records for this activity is currently not applicable.
Compliance:	Not Applicable

Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.4 7 South Mining Operation Settling Pond, 2.4.3 Catchment Area** 2.4.3: The maximum settling pond catchment area shall not exceed 3.14 hectares as defined in the Surface Water Management Plan - 7 South Development Quinsam Mine, Golder Associates, April 12, 2012 (Appendix B) unless authorisation has been obtained from the Director.
Details/Findings:	The Annual Report confirms that the settling pond catchment area does not exceed 3.14 hectares, therefore obtaining authorisation from the Director to do so, is currently not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.4 7 South Mining Operation Settling Pond, 2.4.4 Settling Pond Solids and Storage Volume** 2.4.4: Settled solids which have accumulated in the settling pond shall be removed as required to maintain a minimum water depth below the pond decant of 1.0 m and a minimum water storage volume of 340 m3. The removed solids shall be disposed of in a manner approved by the Director.
Details/Findings:	Officer Stewart observed minimal water maintained in the 7SSD settling pond and minimal accumulated solids that would require removal at this time. Ms. Russell informed Officer Stewart that current practice at Quinsam is to pump down 7SSD and allocate the water elsewhere in mine processes and not discharge from this small settling pond. As stated in the Annual Report, this location only discharged for 2 days in 2017/2018. Due to the original intent of removing settled solids and maintaining water depth in order to minimize total suspended solids discharge exceedances, the current practice of minimizing use of the pond itself makes compliance with a contradictory practice not determined at this time. The Annual Report further states that "a minimum water cover of 1.0m is not sustained at all times as water management practices have changed to have minimal water discharged from the pond. Based on experience, it is difficult to maintain a 1.0m cover and discharge at appropriate levels. There has been far less TSS exceedances with the new practice".

Compliance:	Not Determined
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.4 7 South Mining Operation Settling Pond, 2.4.5 Discharge Routing** 2.4.5: The discharge from the settling pond shall be conveyed to the Quinsam River via an ephemeral stream (Stream 1) and a wetland (Lower Wetland) adjacent the Quinsam River in a manner acceptable to the Director.
Details/Findings:	Officer Stewart observed the discharge location conveyance to be as described in this section. The ephemeral stream was dry during the inspection.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.4 7 South Mining Operation Settling Pond, 2.4.6 Settling Pond Discharge Dilution Rate** 2.4.6: The 7-South settling pond must not discharge unless a minimum flow is measured in Stream 1 (7S monitoring site). The minimum Stream 1 to discharge ratio shall be documented to the satisfaction of the Director in the Environmental Procedures Manual required in Section 3.2.
Details/Findings:	The Annual Report contains flow measurements and dilution rations (if applicable) in Tables 33 and 34 of Appendix 1. The dilution ratios on the only two discharge days on January 18 and 19, 2018 were 17.07:1 and 10.082:1 respectively. Part 5.3, 7-South Water Management System of the Environmental Procedures Manual required in Section 3.2. states in part that, "water quality results and interpreting models indicate that an 8:1 ratio (7S:7SSD) is suitable to protect the receiving environment" and Part 7.6.1 titled 7-South Stream 1, states that "To facilitate determination of the appropriate discharge level at 7SSD, a flow rating curve was developed for monitoring station 7S. This rating curve allows for instantaneous flow levels at 7S by reading the installed staff gauge".

Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.4 7 South Mining Operation Settling Pond, 2.4.7 Settling Pond Discharge Effluent Quality Model Validation** 2.4.7: The Permittee shall report on the settling pond performance in the annual report. The purpose of the report is to validate the effluent water quality prediction model using actual flow and water quality data. The Director may amend the permit, if required, or request an amendment of the permit for environmental protection based on the report findings.
Details/Findings:	Quinsam reports on the settling pond performance in Section 7.3.1: 7-SOUTH SETTLING POND (7SSD) EMS #E292069 in the annual report. The section validates the effluent water quality prediction model using actual flow and water quality data as required.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.4 7 South Mining Operation Settling Pond, 2.4.8 Contingency Measures** 2.4.8: In the event of a 7-South settling pond discharge permit limit exceedance, the settling pond discharge valve must be closed immediately and the effluent must temporarily be diverted to the 5S mine or 7S mine underground workings, or to another area acceptable to the Director. Details of the contingency measures shall be documented in the Environmental Procedures Manual required under Section 3.2. Additionally, the Permittee shall follow Section 3.9 requirements.
Details/Findings:	There were no events of a 7-South settling pond discharge permit limit exceedance during the inspection period covered by this report, therefore compliance with this requirement was not applicable. The Environmental Procedures Manual contains a contingency plan for 7SSD and is included under section 5.5 : Contingency Measures.

Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**2. SPECIFIC REQUIREMENTS, 2.4 7 South Mining Operation Settling Pond, 2.4.9 Toxicity Failure Monitoring and Reporting Procedures** 2.4.9.i: In the event of a toxicity test failure, the Permittee must implement the following in addition to the requirements stated in Subsection 3.9.2: i) Failure of the Rainbow Trout Bioassay: the settling pond discharge shall be immediately diverted to the underground workings until such time as a dilution series is completed to determine the dilution ratio which will reduce mortality to less than 50 percent of the test organisms. Upon the determination of an acceptable dilution ratio, the discharge rate may be appropriately adjusted. Failure is defined as the mortality of a minimum of one test organism compared to the test control.
Details/Findings:	There have been no reports of toxicity test failures during the inspection period, therefore compliance with this requirmenet was not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**3. GENERAL REQUIREMENTS, 3.1 Flocculation** 3.1: In order to meet the levels specified for total suspended solids in Subsections 1.1, 1.2, 1.3 and 1.4, it may be necessary to use chemical flocculating agents. The Permittee is required to carry out laboratory testing of the flocculants proposed for toxicity and effectiveness for removing suspended matter. The methodology and details of the testing program are subject to the approval of the Director. Based on the results of laboratory testing the Director may approve a flocculant for use under actual operating conditions. At least one alternate flocculant shall be tested and, if approved by the Director, an adequate supply shall be located within 6 hours travel time from the mine site.
Details/Findings:	Ms. Russell informed Officer Stewart that Quinsam does not currently use any chemical flocculating agents and Officer Stewart did not observe any flocculation facilities on site during the inspection. Officer Stewart was unable to ascertain if the Permittee carried out the required laboratory testing of the flocculants proposed or if a flocculant had been approved by the Director, therefore compliance with this requirement was not determined.

Compliance:	Not Determined
Actions to be taken:	N/A
Requirement Description:	**3. GENERAL REQUIREMENTS, 3.2 Environmental Procedures Manual** 3.2: An Environmental Procedures Manual shall be maintained by the Permittee as a working document for use by supervisory personnel and a guide to field staff during various stages of the project. The manual should cover all aspects of onsite environmental management applicable to mine construction and operation including but not limited to, the following items: 1) Land clearing, topsoil stripping and road construction; 2) Construction of water diversion and water collection ditches; 3) Flocculation; 4) Macrophyte growth and harvesting in the ponds, drainage ditches and discharge channels; 5) Acid-base accounting and materials handling; 6) Reclamation activities; 7) Construction of waste dumps; 8) Contingency planning for effluent liming, lake aeration and forest fertilization. 9) Settling pond operation under various flow/discharge conditions for the Block 242 coal mining operation as detailed in the Block 242 Mine Water Management Quinsam Coal Mine, AGRA Earth and Environmental Limited, February 1997; 10) Underground pump operation during extreme rainfall events; 11) Settling pond operation for the 7-South mining operation, including details on the contingency measures. The Permittee shall review the Environmental Procedures Manual at least on an annual basis to determine if any changes are required and submit any revisions to the Director for approval. Annual reviews and submission of revisions are due on March 31 of each year.
Details/Findings:	The most recent submission of the updated Environmental Procedures Manual was sent to the Ministry on March 30, 2018 and included the applicable sections and information.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**3. GENERAL REQUIREMENTS, 3.3 Acid Generation Control** 3.3: In order to prevent generation of acid rock drainage and associated environmental problems it is necessary that potentially acid generating materials be identified and be subject to special handling techniques. The frequency of sampling and analysis shall be according to procedures outlined in Mines Act Permit C-172 and the Environmental Procedures Manual. If in the opinion of the Director acid rock generation is developing, the Permittee shall undertake corrective action as outlined in the appropriate section of the Environmental Procedures Manual or take any additional steps which are considered necessary to resolve the problem.

Details/Findings:	Ms. Russell confirmed with Officer Stewart that acid rock drainage and acid generating materials are controlled through a variety of methods including subaqueous disposal on the surface and underground and other preventative measures to limit acid rock drainage potential. 7-South coal tailings are placed into the 2-N mine pool and 7-S-2-Main coarse coal refuse and potentially acid generating materials are placed underground and the areas flooded (subaqueous underground disposal). Section 9.0: Prevention, Prediction and Treatment of ARD of the 2018 Environmental Procedures Manual describes the monitoring, prevention, disposal and contingency treatment plans for potentially acid generating rock at Quinsam.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**3. GENERAL REQUIREMENTS, 3.4 Water Quality Objectives** 3.4: Specific Water Quality Objectives have been developed by the Ministry of Environment for the Middle Quinsam Lake area and are contained in the report Campbell River Area, Middle Quinsam Lake Sub-Basin Water Quality Assessment and Objectives, November 1989. The 1989 objectives, or updated versions, may be used by the Director to assess the need for further works or controls. Presently there is no site-specific objective for sulphate in the Quinsam River watershed therefore the provincial sulphate water quality guideline for receiving waters applies. An objective for sulphate in the Middle Quinsam Lake Sub-Basin may be established in the future. The permittee shall recommend updates to the objectives, as and when requested by the Director.
Details/Findings:	To date, the Director has not assessed the need for further works or controls and has not established a site-specific objective for sulphate in the Quinsam River watershed, therefore compliance with this requirement is not applicable at this time.
Compliance:	Not Applicable
Actions to be taken:	N/A

Requirement Description:	**3. GENERAL REQUIREMENTS, 3.5 Nutrient Control** 3.5: The mine and coal preparation plant shall be operated such that the discharge of nutrients will not result in excessive algal growth or biomass accumulation which, in turn, could have a negative impact on water quality, fish production, and aesthetic values of Quinsam and Iron River systems. If in the opinion of the Director there is evidence of deterioration in the water quality, which can be attributed to the significant discharge of nutrients from the mine operation, the Permittee may be required to implement any of the mitigative measures outlined in the Environmental Procedures Manual (lake aeration/forest fertilization) or other methods as approved by the Director.
Details/Findings:	Ms. Russell informed Officer Stewart that nutrient discharges from Quinsam have not resulted in excessive algal growth or biomass accumulation. The 2018 Environmental Procedures Manual also states that "Since 1992, nutrient concentrations have remained at low levels, often below detection limits" due to the cessation of open pit mining and explosives use and soil disturbances were greatly reduced. To date, the Permittee has not been required to implement any of the mitigative measures related to the significant discharge of nutrients from the mine operation, therefore compliance with this requirement is not applicable at the time of this report.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**3. GENERAL REQUIREMENTS, 3.6 Chemical Storage Contaminant Works** 3.6: Approved containment works shall be placed around the chemical storage areas to prevent spills to the environment. This includes, but is not necessarily limited to, storage areas for petroleum products and flocculating agents.
Details/Findings:	Officer Stewart addressed storage areas for waste petroleum products in a separate Inspection Report #105066 where the site was evaluated for compliance with the Hazardous Waste Regulation (HWR). The facility produces and stores waste oil in a manner deemed compliant with the HWR.
Compliance:	In
Actions to be taken:	N/A

Requirement Description:	**3. GENERAL REQUIREMENTS, 3.7 Spill Reporting** 3.7: All spills to the environment (as defined in the Spill Reporting Regulation) shall be reported immediately in accordance with the Spill Reporting Regulation. Notification shall be via the Provincial Emergency Program at 1-800-663-3456.
Details/Findings:	Mr. Russell confirmed with Officer Stewart that there were no spills to the environment (as defined in the Spill Reporting Regulation) during the inspection period, therefore compliance with this reporting requirement was not applicable. There was one discharge of effluent that bypassed the authorized works (see section 3.10) that was reported in accordance with the Spill Reporting Regulation.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**3. GENERAL REQUIREMENTS, 3.8 Additional Works** 3.8: Based on the results of the monitoring program and/or other information obtained in connection with these discharges, the Permittee may be required to install additional treatment works or take other measures considered necessary. This may include, but is not necessarily limited to, facilities for the removal of nutrients and metals from the effluent or the provision of additional settling pond capacity.
Details/Findings:	The Permittee has not been required to install additional treatment works or take other measures considered necessary as described in this section during the inspection period covered by this report, therefore compliance with this requirement is currently not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A

Requirement Description:	**3. GENERAL REQUIREMENTS, 3.9 Maintenance of Works, Non-Compliances and Emergency Procedures** 3.9.1: The Permittee shall inspect the authorized works regularly and maintain them in good working order. In the event of an emergency or condition beyond the control of the Permittee which prevents continuing effective operation of the authorized works, the Permittee shall take appropriate remedial action and immediately notify the Regional Waste Manager or a designated Officer.
Details/Findings:	Ms. Russell confirmed with Officer Stewart that a technician goes to all authorized works three times per week and during sample collections all meters, samplers and ponds are inspected for effective operation and working order. On January 21-22, 2018 when a discharge from the 3-South Pit into the No Name Lake connector channel occurred due to a condition beyond the control of the Permittee which prevented continuing effective operation and led to a bypass of the authorized works, Quinsam took appropriate remedial action by installing pumps and immediately notified the Ministry.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**3. GENERAL REQUIREMENTS, 3.9 Maintenance of Works, Non-Compliances and Emergency Procedures, 3.9.2** 3.9.2: In the event of commissioning of the works, operational system modifications, equipment failure, operator error, spill, permit non-compliances or any other condition which may affect the quantity or quality of the discharge such that permit limits may be exceeded, the Permittee shall: take appropriate action to prevent or mitigate pollution, immediately notify the Provincial Emergency Program (PEP) 1-800-663-3456, as soon as possible, conduct sampling and analysis of discharges which may cause non-compliance with the characteristics of the discharge as specified in Section 1 of this permit and provide the results to the Regional Waste Manager or a designated Officer, as soon as practicable (but not later than 30-days after the Permittee became aware of the event), investigate the event and provide a report including results of sampling and analysis, permit non-compliance, corrections to the operational system, root cause of the event and decisions for corrective and preventive action.
Details/Findings:	In the event of any permit non-compliance, Quinsam is adhering to the mitigation, notification, sampling/analysis and reporting requirements specified in this section of the permit.

Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**3. GENERAL REQUIREMENTS, 3.10 Bypasses** 3.10: The Permittee shall ensure that no effluent is discharged without being processed through the authorised works unless prior written approval is received from the Director.
Details/Findings:	On January 21 and 22, 2018 water from the 3-South Pit bypassed (DGIR 173610) the authorized works (Settling pond #1) where it was supposed to be pumped to and discharged from. Instead, water crested the retention weir and discharged into the No Name Lake connector channel (EMS #: E217015) which flows into the inlet of Long Lake. The cause was described as excessive rainfall that exceed 5 year and 10 year precipitation events. Quinsam is currently in the process of amending their permit to include this location as an authorized discharge channel for the overflow water from the 2-South and 3-South areas to enter the No Name Lake connector channel.
Compliance:	Out
Actions to be taken:	Continue with the permit amendment process to authorize and update discharge locations.
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.1 North Coal Mining and Coal Preparation Plant Operation (i) Decent - WD (EMS # E207409)** 4.1.1 (i): See Attached Document for Section 4.1.1 (i) Table
Details/Findings:	This table describes the required sampling schedule for Settling Pond #4. Three required daily composite samples for total suspended solids (TSS) were missed on December 24, January 1, and January 2, 2018. Quinsam's non-compliance reporting stated that below freezing temperatures caused the lines of composite sampler to freeze on these dates making the machine unable to obtain the required samples.

Compliance:	Out
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.1 North Coal Mining and Coal Preparation Plant Operation (ii) Culvert, at Middle Quinsam Lake Road - WC (EMS # E207411)** 4.1.1 (ii): See Attached Document for Section 4.1.1 (ii) Table
Details/Findings:	Table 7 in the Annual Report EMS ID E207411 includes sample results from the Culvert at Middle Quinsam Lake Road. One of 12 monthly required sulphate sample was not obtained on January 05, 2018 as required by the specifications of this section. The Annual Report states that due to a quality control error, this parameter was not specified on the sample requisition form, therefore results for sulphate were not obtained.
Compliance:	Out
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.1 North Coal Mining and Coal Preparation Plant Operation (iii) 2-North Portal Sump Effluent - SN-P-Sump (EMS # E283433)** 4.1.1 (iii): See Attached Document for Section 4.1.1 (iii) Table
Details/Findings:	Table 6 in the Annual Report, EMS ID E283433 included all required sample results for 2-North Portal Sump Effluent.
Compliance:	In

Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.1 North Coal Mining and Coal Preparation Plant Operation (iv) Additional Sites Monitoring Schedule** 4.1.1 (iv): See Attached Document for Section 4.1.1 (iv) Table
Details/Findings:	Table 38 of the Annual Report contains pH and Conductivity for E207412: 2-North Pit Sump (WP) CCR Water Cover and E292126: South Dyke Sump. Table 5 contains all other required parameter samples for 2-North Pit Sump (WP) CCR Water Cover. Table 8 contains all other required parameter samples for the South Dyke Sump that collects seepage from tailings dam.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.2 South Coal Mining Operation (i) Decant - SPD (EMS # E218582)** 4.1.2 (i): See Attached Document for Section 4.1.2 (i) Table
Details/Findings:	This table contains the sampling requirements for the decant discharge from Settling Pond #1. Three required daily composite samples for total suspended solids (TSS) were missed on December 22, December 23 and January 1, 2018. Quinsam's non-compliance reporting stated that below freezing temperatures caused the lines of composite sampler to freeze on these dates making the machine unable to obtain the required samples at EMS E218582, Discharge from Settling Pond # 1 (SPD).
Compliance:	Out
Actions to be taken:	N/A

Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.2 South Coal Mining Operation (ii) Culvert, Downstream End at Access Road - SPC (EMS #E217014)** 4.1.2 (ii): See Attached Document for Section 4.1.2 (ii) Table
Details/Findings:	Hardness, metals, alkalinity, acidity and sulphate sample results from EMS ID E217014, location South Pit Culvert- Culvert, downstream of Settling Pond #1 discharge, are contained in Table 18 of the Annual Report while Table 27 contains TSS results and Table 39 contains pH and conductivity.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.2 South Coal Mining Operation (iii) South Pit Main Sump Water - 3S (EMS # E217015)** 4.1.2 (iii): See Attached Document for Section 4.1.2 (iii) Table
Details/Findings:	Sample data for location E217015, the 3 South Pit CCR Water Cover was collected as required by this section and is contained in Tables 15 and 39.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.2 South Coal Mining Operation (iv) Additional Monitoring Sites Schedule (2S, 3S77, 4S-Lo)** 4.1.2 (iv): See Attached Document for Section 4.1.2 (iv) Table

Details/Findings:	The required continuous (inflow and outflow) flow measurement for E292127: 2 South Pit CCR Water Cover was not obtained during the 2017/2018 inspection period covered by this report. Quinsam reported that due to a drifting level logger installed at the hydrometric station at the 2S inflow channel, incorrect data was obtained and could not be used. Quinsam subsequently installed a new water level logger. All required sample parameters for E292127, 2 South Pit in Pit Water Cover (CCR Water Cover) are contained in Table 14 of the Annual Report. All required sample parameters for E292128, South 77 Adit Pit- Exploration pit from 1977 are contained in Table 16 of the Annual Report. All required sample parameters for E292127, 4 South Lower- Culvert Downstream of Access Road are contained in Table 17 of the Annual Report.
Compliance:	Out
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.3 Block 242 Coal Mining Operation (i) Decant (EMS # E225796)** 4.1.3 (i): See Attached Document for Section 4.1.3 (i) Table
Details/Findings:	Ms. Russell confirmed with Officer Stewart there remains no mine-influenced discharge from the Block 242 secondary settling pond, therefore sampling and compliance with this requirement is not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.4 7 South Mining Operation (i) Decant - 7SSD (EMS # E292069)** 4.1.4 (i): See Attached Document for Section 4.1.4 (i) Table

Details/Findings:	All required sample results are contained within Table 22 of the Annual Report while discharge/flow rates are contained in Table 32. This location only discharged during two days in January 2018. EMS E292069, Settling Pond at 7S - Permitted discharge location for the 7-South Mining Operation (7SSD) has differing sampling requirements depending if the location is discharging or if there is no decant flow.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.1 Effluent and In-Mine Releases, 4.1.4 7 South Mining Operation (ii) 7 South Adit Sump - 7S-Sump (EMS # E292110)** 4.1.4 (ii): See Attached Document for Section 4.1.4 (ii) Table
Details/Findings:	Ms. Russell confirmed with Officer Stewart that water from the E292110 7-South Adit Sump is never pumped to 7S Settling Pond (7SSD), which this section requires sampling of when doing so. As such, compliance with this requirement is not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.2 Receiving Environment Monitoring Sites and Monitoring Requirements, 4.2.1 Initial Dilution Zone Monitoring Sites (i) Long Lake Entrance - LLE** 4.2.1 (i): See Attached Document for Section 4.2.1 (i) Table

Details/Findings:	This section references multiple parameter Initial Dilution Zone receiving environment monitoring to be conducted Monthly at E292130: Long Lake Entrance (LLE). On the March 07, 2018 sampling event, results for the parameter Phosphorous (total) were not obtained due to an error on the chain of custody sample requisition form which did not specify this parameter to be analyzed for. The remained of the sample events and all parameter results are contained in Table 3 of the Annual Report.
Compliance:	Out
Actions to be taken:	Maintain adequate quality control procedures to ensure correct sample requisition forms match the desired parameters.
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.2 Receiving Environment Monitoring Sites and Monitoring Requirements, 4.2.1 Initial Dilution Zone Monitoring Sites (ii) Road Crossing-etc.** 4.2.1 (ii): See Attached Document for Section 4.2.1 (ii) Table
Details/Findings:	This section references multiple parameter receiving environment monitoring to be conducted at E292109: Stream 1 - Downstream of the 7SSD discharge, prior to entering the Lower Wetland Outlet, which is an Initial Dilution Zone monitoring site. The Annual Report states that one monthly dissolved organic carbon sample was missed due to Quinsam not checking it off on the sample requisition form. One monthly sample set for all parameters was also missing due to laboratory error. The Annual Report states these samples were obtained and shipped to the laboratory, but said samples were not analyzed as requested. All other required sample parameters and results are contained in Table 23 of the Annual Report.
Compliance:	Out
Actions to be taken:	Please review and adhere to internal quality assurance and quality control procedures to ensure all required sample analyses are specified on the requisition forms.

Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.2 Receiving Environment Monitoring Sites and Monitoring Requirements, 4.2.2 Seep Monitoring Sites (i) Long Lake Seeps (LLS)** 4.2.2 (i): See Attached Document for Section 4.2.2 (i) Table
Details/Findings:	Data from monitoring sites E292131: Long Lake Seeps (LLS and LLSM) is contained in Tables 20 and 21 of the Annual Report. Weekly required flow measurements are included in Appendix II, Graph 65 of the Annual Report.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.2 Receiving Environment Monitoring Sites and Monitoring Requirements, 4.2.5 Stream Monitoring Requirements** 4.2.5: See Attached Document for Section 4.2.5
Details/Findings:	This section specifies 5 in 30 (3 times/year) stream monitoring requirements for all sites defined under Section 4.2.3 (which lists multiple locations). No results were obtained at E292112- Lower Wetland Outlet (LWO) for Metals (T) & (D), Alkalinity, Acidity, TSS and SO4-D for one week of the required 5 weekly samples during the fall 5 in 30 sample program conducted ion October 24, 2017. Quinsam reported that the sample was obtained in accordance with this section and sent to the laboratory for analysis, but the sample was not analyzed as requested and deemed a lab error. It should be noted there are 16 distinct stream sampling locations referenced in this section. All other parameters at all other locations were obtained in compliance with this section of the permit.
Compliance:	Out
Actions to be taken:	N/A

Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.2 Receiving Environment Monitoring Sites and Monitoring Requirements, 4.2.6 Lake Monitoring Requirements** 4.2.6: See Attached Document for Section 4.2.6 Table
Details/Findings:	The requirements of this table specify the 5 in 30 Lake Monitoring Requirements of the receiving monitoring program that are to occur 3 times/year: spring turnover, stratification period and fall turnover. Mr. Russell informed Officer Stewart that one sample analysis for Zooplankton was not obtained in accordance with this section. The Annual Report confirms that due to an Quinsam Environmental Department error, spring zooplankton samples were not collected from E217018 (NNL), E206619 (LLM), E206618 (MQL) and E292118 (LQL). All other sample parameters and dates specified in this section were collected and analyzed as required.
Compliance:	Out
Actions to be taken:	Follow established sample protocols described in the Permit and appropriate Quinsam QA/QC procedures to ensure samples are obtained for all required parameters.
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.2 Receiving Environment Monitoring Sites and Monitoring Requirements, 4.2.7 Sediment and Benthic Monitoring** 4.2.7: See Attached Document for Section 4.2.7
Details/Findings:	The requirements of this table specify the Sediment and Benthic Monitoring Requirements of the receiving environment monitoring program. This program was carried out in 2016/2017 and not scheduled to be conducted again until 2020, therefore compliance with this requirement is currently not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A

Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.3 Additional Monitoring Requirements, 4.3.1 Composite Sampling** 4.3.1: The Permittee shall install suitable sampling facilities and obtain 24 hour composite samples of effluent for total suspended solids. Each daily composite sample shall consist of 8 samples taken at three hour intervals. Sampling shall be performed at frequencies specified in Subsections 4.1.1, 4.1.2., 4.1.3 and 4.1.4. The Permittee may also be required to collect hourly composite samples in order to verify compliance with the total suspended solids criteria of 35 mg/l specified in Subsections 1.1.2, 1.2.2, 1.3.2 and 1.4.2. Each hourly composite sample shall consist of 4 samples taken at 15 minute intervals. Proper care should be taken in sampling, storing, and transporting the samples to adequately control temperature and avoid contamination or breakage. The Permittee shall collect a grab sample instead of a composite sample when weather conditions result in freezing conditions, rendering collection of composite samples not feasible.
Details/Findings:	Composite samples were not collected on 6 of 490 instances when composite samples were required from Settling Pond #1 and #4. All missed composite samples were due to freezing of the sample line during winter conditions on December 22, 23, 24, 2017 and January 1, 2, 2018. There is an allowance for grab samples instead of a composite sample to be collected when weather conditions result in freezing conditions, however no sample results were contained in the TSS data tables for freezing days when the collection of composite samples was not feasible.
Compliance:	Out
Actions to be taken:	Collect grab samples during freezing conditions when the collection of composite samples are not feasible and include the results in data tables submitted to the Ministry.
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.3 Additional Monitoring Requirements, 4.3.2 Continuous Flow Recording** 4.3.2: The Permittee shall provide and maintain suitable flow measuring devices and maintain a continuous record of the rate at which the effluent is discharged from the settling ponds authorised in Subsections 1.1.3, 1.2.3, 1.4.3 and from the secondary settling pond authorised in Subsection 1.3.3.
Details/Findings:	Discharge rates from Settling Pond #4 (section 1.1.3) are contained in Table 28 and 28 of the Annual Report. Discharge rates from Settling Pond #1 (section 1.2.3) are contained in Table 30 and 31 of the Annual Report. Discharge rates from 7-South Surface Decant (section 1.4.3) are contained in Table 32 of the Annual Report. There was no discharge from the secondary settling pond authorised in Subsection 1.3.3 (the reclaimed Block 242).

Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.3 Additional Monitoring Requirements, 4.3.3 Iron River Flow Monitoring** 4.3.3: The Permittee shall conduct a study to establish a flow calibration curve on the Iron River at a point selected by Environment Canada. The flow calibration curve shall be completed prior to the re-commencement of mining. Based on the results of this study and/or other information obtained in connection with this discharge the Director may increase the flow monitoring frequency in Iron River specified in Subsection 4.3.2 and/or limit the rate of discharge from the Block 242 mining operation during periods of low flow in Iron River.
Details/Findings:	During the previous inspection, Ms. Russell confirmed with Officer Stewart that the flow calibration curve had been established by Lorax Environmental in 2012. The point selected is defined in the Annual Report and monitoring documents as site "I8". Iron River flow rates versus precipitation amounts are contained in Graph 70 of the Annual Report.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.3 Additional Monitoring Requirements, 4.3.4 pH and Conductivity Monitoring** 4.3.4: All pH and conductivity probes used for field measurements shall be maintained according to manufacturer's requirements. Maintenance and calibration logs and instrument manuals shall be kept up to date and made available upon inspection. Any instance where pH results are deemed unreliable due to low conductance will be noted along with the corresponding conductance, and these results shall be included in quarterly and annual reports described in section 4.5.
Details/Findings:	Mr. Russell confirmed with Officer Stewart that pH and conductivity probes used for field measurements are maintained according to manufacturer's requirements and maintenance/calibration logs are kept up to date.

Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.3 Additional Monitoring Requirements, 4.3.5 Monitoring of Seeps** 4.3.5: The Permittee is required to sample in-pit, out-of-pit, underground mine, coal, and waste rock seeps. The location and frequency of sampling will be determined by the Director. Analyses will be obtained for pH, sulphate (d), and metals (t+d). Sediment sampling may also be required at seeps, as and when requested by the Director.
Details/Findings:	Contained in the Annual Report, Table 9: "Seep Near Plant", Table 10: "Groundwater / Surface Water from 2N Area at Road", Table 20: "Seep into Long Lake" and Table 21 "Middle Seep into Long Lake", include sample results for monitoring seeps as described in this section.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.3 Additional Monitoring Requirements, 4.3.6 Groundwater Observation Wells** 4.3.6: The Permittee may be required to install groundwater observation wells in the vicinity of pits 2N, 1S, 2S, 3S, 4S, 5S, Block 242 and 7S. The number, location and structural details of these wells will be subject to the approval of the Director. As an alternative to the 2N, 1S, 2S, 3S, 4S, 5S and 7S wells, the Permittee may establish monitoring sites at the underground sumps subject to the approval of the Director.
Details/Findings:	Appendix IX of the Annual Report contains the "2017-2018 Annual Groundwater Monitoring Report" that includes sample results and interpretations of both in-situ (within the mine disturbance footprint) and ex-situ (outside the mine disturbance footprint) groundwater wells. Table 1 of the Groundwater Monitoring Report identifies all wells and sumps monitored in 2017-2018 and consists of 2 in-situ sumps, 9 in-site wells and 24 ex-situ wells located in the vicinity of the pits described in this section.

Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.3 Additional Monitoring Requirements, 4.3.7 Monitoring of Drainage Ditches and Water Channels** 4.3.7: Visual inspection of drainage ditches and water channels within the mining operational areas shall be carried out by Environmental Protection staff as part of the regular inspections for the entire mine operation. Based on these monitoring results the Permittee may be required to take measures to minimize soil erosion.
Details/Findings:	Officer Stewart conducted a visual inspection of drainage ditches and water channels within the mining operational areas during the inspections Quinsam. Drainage ditches and water channels appeared to be well maintained and acting as intended. Officer Stewart observed no soil erosion that would necessitate extra measures at this time.
Compliance:	In
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.3 Additional Monitoring Requirements, 4.3.8 Precipitation Monitoring** 4.3.8: The Permittee shall maintain a suitable rain gauge at a location approved by the Director and measure and record the daily accumulated precipitation.
Details/Findings:	Ms. Russell confirmed with Officer Stewart that the required rain gauge is located at the 2-South weather station.
Compliance:	In
Actions to be taken:	N/A

Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.3 Additional Monitoring Requirements, 4.3.9 Block 242 Monitoring** 4.3.9: Monitoring relating to the Block 242 Mining Operation required by Subsections 4.1.3 and 4.2.3 shall commence at the start of mine-influenced discharge from the Block 242 secondary settling pond.
Details/Findings:	Ms. Russell confirmed with Officer Stewart that there remains no mine-influenced discharge from the Block 242 secondary settling pond, therefore compliance with this requirement is not applicable.
Compliance:	Not Applicable
Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.4 Monitoring Procedures, 4.4.1 Sampling and Analytical Procedures** 4.4.1: Sampling shall be carried out in accordance with the procedures described in the latest version of "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples (Permittee)", or by suitable alternative procedures as authorised by the Director. Analyses are to be carried out in accordance with procedures described in the latest version of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", or by suitable alternative procedures as authorised by the Director. Copies of the above manuals may be purchased from Queen's Printer Publications Centre, P.O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or 250 387-6409 or via the internet at www.crownpub.bc.ca. The manuals are also available for review at all Environmental Protection offices.
Details/Findings:	Ms. Russell confirmed with Officer Stewart that all sampling is carried out in accordance with this sections requirements. The Annual Report includes analysis results from Nautilus Environmental (lab #3525) in Burnaby, BC which is qualified for Daphnia and Rainbow Trout toxicity tests as defined by the BC Environmental Data Quality Assurance Regulation (EDQA). Maxxam Laboratories (lab #2168) in Burnaby, BC is qualified for multiple various metals, organics/inorganics, nutrients, toxicity, etc, in both soil and water testing as defined by the BC Environmental Data Quality Assurance Regulation (EDQA). .
Compliance:	In

Actions to be taken:	N/A
Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.5 Reporting** 4.5.1 (i): The Permittee shall submit the results of the monitoring program to the Director on a quarterly basis within thirty days following the previous quarter of monitoring. Based on these results, the monitoring program may be increased or decreased at the discretion of the Director. The format and content of the quarterly report is subject to the approval the Director. An annual review and interpretative report shall be prepared and submitted by the Permittee by June 30 of each year. The report will include, but is not necessarily limited to, the following items: 1) A summary of monitoring results for the previous twelve months. 2) Spills or other unusual events. 3) Changes in the environment resulting from mining activity. 4) Summary of completed, in progress activities or studies relevant to the permitted discharges, associated authorized works and the receiving environment relevant to the reporting period. 5) Projected activities for the coming year which may have an impact on the environment. The format and content of the annual report is subject to the approval of the Environmental Technical Review Committee and the Director. 4.5.1 Through the duration of mining in 7-South Area 5, quarterly and annual reports shall include a summary of: i. Quality and quantity of water pumped from the 7-South Area 5 development with potential to reach Settling Pond 4.
Details/Findings:	Quinsam's submitted quarterly reports and Annual Report contain all sample data, analytical results and interpretative review required by this section. However, all submissions were slightly past due based on the submission deadlines specified in this section. Quarterly report submissions during the inspection period covered by this report: Q1 2017 (April, May, June 2017) Report and Data, submitted August 02, 2017. Q2 2017 (July, August, September 2017) Report and Data, submitted November 02, 2017. Q3 2017 WQ (October, November, December 2017) Report and Data, submitted February 06, 2018 Q4 2018 WQ (January, February, March 2018) Report and Data, submitted May 11, 2018 The 2017/2018 Annual Review and interpretative report was first submitted on July 03, 2018 along with 11 appendicies. Subsequent Annual Report copies were submitted July 04 as a combined copy and again on July 09 to correct an error.
Compliance:	Out
Actions to be taken:	Please adhere to report submission dates specified in this section.

Requirement Description:	**4. MONITORING AND REPORTING REQUIREMENTS, 4.5 Reporting** 4.5.1 (i): The Permittee shall submit the results of the monitoring program to the Director on a quarterly basis within thirty days following the previous quarter of monitoring. Based on these results, the monitoring program may be increased or decreased at the discretion of the Director. The format and content of the quarterly report is subject to the approval the Director. An annual review and interpretative report shall be prepared and submitted by the Permittee by June 30 of each year. The report will include, but is not necessarily limited to, the following items: 1) A summary of monitoring results for the previous twelve months. 2) Spills or other unusual events. 3) Changes in the environment resulting from mining activity. 4) Summary of completed, in progress activities or studies relevant to the permitted discharges, associated authorized works and the receiving environment relevant to the reporting period. 5) Projected activities for the coming year which may have an impact on the environment. The format and content of the annual report is subject to the approval of the Environmental Technical Review Committee and the Director. 4.5.1 Through the duration of mining in 7-South Area 5, quarterly and annual reports shall include a summary of: i. Quality and quantity of water pumped from the 7-South Area 5 development with potential to reach Settling Pond 4.
Details/Findings:	Ms, Russell confirmed with Officer Stewart that there is currently no mining in the 7-South Area 5, therefore compliance with Section 4.5.1 and the requirement for quarterly and annual reports regarding that area are currently not applicable.
Compliance:	Not Applicable
Actions to be taken:	Once mining starts in the 7-South Area 5 development, the entirety of Section 4.5.1 will become applicable.

Compliance History:
2017-09-19 - IR70993 - Warning for flow and parameter exceedances, missing authorized works, and missing data.

Please submit all annual/quarterly/monthly reports and data submissions to the Ministry's Routine Environmental Reporting Submission Mailbox at EnvAuthorizationsReporting@gov.bc.ca.

More information about the reporting requirements may be found at http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/routine-environmental-reporting-submission-mailbox

Please be advised that this inspection report may be published on the provincial government website within 7 days.

Below are attachments related to this inspection.

If you have any questions about this letter, please contact the undersigned.

Yours truly,

Darren Stewart
Environmental Protection Officer

cc:

Attachments:
1) 2015 06 23 Tables PE 7008 - Section 4.1.1, 4.1.2, 4.1.3, 4.1.4.pdf 2015 06 23 Tables PE 7008 - Section 4.1.1, 4.1.2, 4.1.3, 4.1.4
2) 2015 06 23 Tables PE 7008 - Section 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.2.5, 4.2.6.pdf 2015 06 23 Tables PE 7008 - Section 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.2.5, 4.2.6
3) IR106411 Photo Record 2018-10-11.pdf IR106411 Photo Record 2018-10-11

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DISCLAIMER:
Please note that sections of the permit, regulation or code of practice referenced in this inspection record are for guidance and are not the official version. Please refer to the original permit, regulation or code of practice.

To see the most up to date version of the regulations and codes of practices please visit http://www.bclaws.ca

If you require a copy of the original permit, please contact the inspector noted on this inspection record.

It is also important to note that this inspection record does not necessarily reflect each requirement or condition of the authorization therefore compliance is noted only for the requirements or conditions listed in the inspection record.

4. MONITORING AND REPORTING REQUIREMENTS

4.1 Effluent and In-Mine Releases

4.1.1 North Coal Mining and Coal Preparation Plant Operation

i) Decant – WD (EMS # E207409)

Parameters	No Decant Flow	Decant Flow <0.054 m^3/s	Decant Flow >0.054 m^3/s
Flow	continuous	continuous	continuous
Total Suspended Solids (TSS) (24 Hour Composite Sample, See 4.3.1)	monthly	weekly	daily
Hardness, metals (t) and (d)	every 2 months	every 2 months	every 2 months
Conductivity, pH	weekly	weekly	weekly
Alkalinity and acidity	monthly	monthly	monthly
Sulphate (d)	monthly	weekly	weekly
Oil and grease	every 2 months	every 2 months	every 2 months
Ammonia (t), nitrate/nitrite, phosphorus (t)	-	every 3 years (conducted during low flow period (August to early September)	
Rainbow Trout Bioassay (Oncorhynchus mykiss)	-	1 time/year (conducted during fall first flush event)	

ii) Culvert, at Middle Quinsam Lake Road – WC (EMS # E207411)

Parameters	No Decant Flow	WD Decant Flow <0.054 m^3/s	WD Decant Flow >0.054 m^3/s
TSS	monthly (when culvert flowing)	monthly (when culvert flowing)	every 2 weeks (when culvert flowing)
Conductivity, pH	weekly	weekly	weekly
Hardness, metals (t) and (d)	-	every 2 months	every 2 months
Sulphate (d)	monthly	monthly	monthly

iii) 2-North Portal Sump Effluent – 2N-P-Sump (EMS # E283433)

Parameters	No Decant Flow	WD Decant Flow <0.054 m^3/s	WD Decant Flow >0.054 m^3/s
Conductivity, pH	weekly	weekly	weekly
Alkalinity and acidity	-	monthly	monthly
Hardness, metals (t) and (d), sulphate, (d)	monthly	monthly	monthly

iv) Additional Sites Monitoring Schedule

Parameters	2-North Pit Sump CCR Cover (WP)	South Dyke Sump (SDS)
EMS #	E207412	E292126
TSS	monthly	-
Conductivity, pH	weekly	weekly
Alkalinity and acidity	monthly	quarterly
Hardness, metals (t) and (d)	monthly	quarterly
Sulphate (d)	monthly	quarterly

Date issued: December 23, 1987
Date amended: June 23, 2015
(most recent)

Luc Lachance, P.Eng.
for Director, *Environmental Management Act*
Permit Number: 7008

4.1.2 South Coal Mining Operation

i) Decant – SPD (EMS # E218582)

Parameters	No Decant Flow	Decant SPC Flow <0.046 m^3/s	Decant SPC Flow >0.046 m^3/s
Flow	continuous	continuous	continuous
TSS (24 Hour Composite Sample, See 4.3.1)	monthly	weekly	daily
Conductivity, pH	weekly	weekly	weekly
Hardness, metals (t) and (d), alkalinity and acidity, oil and grease	every 2 months	every 2 months	every 2 months
Sulphate (d)	monthly	weekly	weekly
Ammonia (t), nitrate/nitrite, phosphorus (t)	-	every 3 years (conducted during low flow period (August to early September)	
Rainbow Trout Bioassay (Oncorhynchus mykiss)	-	1 time/year (conducted during fall first flush event)	

ii) Culvert, Downstream End at Access Road – SPC (EMS #E217014)

Parameters	No Decant Flow	SPD Decant Flow <0.046 m^3/s	SPD Decant Flow >0.046 m^3/s
TSS	monthly (when culvert flowing)	monthly (when culvert flowing)	every 2 weeks (when culvert flowing)
Hardness, metals (t) and (d)	every 2 months	every 2 months	every 2 months
Conductivity, pH	weekly	weekly	weekly
Alkalinity and acidity, sulphate (d)	monthly	monthly	monthly

Date issued: December 23, 1987
Date amended: June 23, 2015
(most recent)

Luc Lachance, P.Eng.
for Director, *Environmental Management Act*
Permit Number: 7008

iii) South Pit Main Sump Water – 3S (EMS # E217015)

Parameters	No Decant Flow	SPD Decant Flow $<0.046\ m^3/s$	SPD Decant Flow $>0.046\ m^3/s$
Hardness, metals (t) and (d)	every 2 months	every 2 months	every 2 months
Conductivity, pH	weekly	weekly	weekly
Alkalinity and acidity, sulphate (d)	monthly	monthly	monthly

iv) Additional Monitoring Sites Schedule (2S, 3S77, 4S-Lo)

Parameters	2 South Pit In Pit Water Cover (2S)	1977 Bulk Sample Pit (3S77)	Culvert Downstream of 4 South Access Road (4S-Lo)
EMS #	E292127	E292128	E292129
Flow	Continuous (inflow and outflow)	-	-
TSS	-	-	-
Conductivity, pH	weekly	weekly	weekly
Alkalinity and acidity	monthly	quarterly	monthly
Hardness, metals (t) and (d), sulphate (d)	monthly	quarterly	monthly (when flowing)

4.1.3 Block 242 Coal Mining Operation

i) Decant (EMS # E225796)

Parameters	No Decant Flow	Decant Flow
TSS (24 Hour Composite Sample, See 4.3.1),	monthly	weekly
Alkalinity and acidity, hardness, metals (t) and (d), Oil and Grease	every 2 months	monthly
Sulphate (d), pH, conductivity	monthly	monthly
Ammonia (t), nitrate/nitrite, phosphorus (t)	-	every 3 years (conducted during low flow period (August to early September)
Rainbow Trout Bioassay (Oncorhynchus mykiss)	-	1 time/year (conducted during fall first flush event)

ii) Underground Settling Pond Effluent (EMS # E225797)

Parameters	No Decant Flow	Decant Flow
pH	monthly	weekly
Alkalinity and acidity, metals (t) and (d), sulphate (d)	monthly	monthly
Ammonia (t), nitrate/nitrite, phosphorus (t)	every 2 months	every 2 months

4.1.4 7 South Mining Operation

i) Decant – 7SSD (EMS # E292069)

Parameters	No Decant Flow	Decant Flow
Flow	Continuous	Continuous
TSS	monthly – from the ponded water	daily
Hardness, metals (t) and (d)	monthly – from the ponded water	weekly
pH, conductivity, alkalinity and acidity, sulphate (d), organic carbon (d)	monthly – from the ponded water	weekly
Ammonia (t), nitrate/nitrite, phosphorus (t)	-	every 3 years (conducted during low flow period (August to early September)
Rainbow Trout Bioassay (Oncorhynchus mykiss)	-	2 time/year (conducted during fall first flush event and in the spring freshet)

ii) 7 South Adit Sump – 7S-Sump (EMS # E292110)

Parameters	7 South Adit Sump (7S-Sump)
TSS	daily when pumping to 7S Settling Pond
Conductivity, pH, alkalinity and acidity	weekly when pumping to 7S Settling Pond
Hardness, metals (t) and (d)	weekly when pumping to 7S Settling Pond
Sulphate (d)	weekly when pumping to 7S Settling Pond

Legend:

(t) = total
(d) = dissolved

Note 1: For monitoring tied to decant flow, the decant flow referenced at the column heading must

be established for a minimum of 15 minutes before the corresponding monitoring regime is required. All samples are grab samples unless specified otherwise within the matrices.

Note 2: When the flows referenced at the column heading are established according to Note 1 the corresponding monitoring regime will be required, as specified in the matrices, and be continued for at least one specified period following the recession of the flow below the tabled level.

Note 3: Decant samples required under Subsections 4.1.1 i), 4.2.1 i), 4.3.1 i) and Subsection 4.4.1 i) during periods of no decant flow shall be taken at a point in each settling pond adjacent to the decant.

4.2 Receiving Environment Monitoring Sites and Monitoring Requirements

4.2.1 Initial Dilution Zone Monitoring Sites

i) Long Lake Entrance – LLE

Parameters	Long Lake Entrance (LLE)
EMS #	E292130
Flow	weekly
TSS	monthly
Conductivity, pH, alkalinity and acidity	monthly
Hardness, metals (t) and (d)	monthly
Ammonia (t), nitrate/nitrite, phosphorus (t)	monthly
Sulphate (d)	weekly

Document : 2015 06 23 Tables PE 7008 - Section 4.1.1, 4.1.2, 4.1.3, 4.1.4.pdf
Document comment: 2015 06 23 Tables PE 7008 - Section 4.1.1, 4.1.2, 4.1.3, 4.1.4

be established for a minimum of 15 minutes before the corresponding monitoring regime is required. All samples are grab samples unless specified otherwise within the matrices.

Note 2: When the flows referenced at the column heading are established according to Note 1 the corresponding monitoring regime will be required, as specified in the matrices, and be continued for at least one specified period following the recession of the flow below the tabled level.

Note 3: Decant samples required under Subsections 4.1.1 i), 4.2.1 i), 4.3.1 i) and Subsection 4.4.1 i) during periods of no decant flow shall be taken at a point in each settling pond adjacent to the decant.

4.2 Receiving Environment Monitoring Sites and Monitoring Requirements

4.2.1 Initial Dilution Zone Monitoring Sites

i) Long Lake Entrance – LLE

Parameters	Long Lake Entrance (LLE)
EMS #	E292130
Flow	weekly
TSS	monthly
Conductivity, pH, alkalinity and acidity	monthly
Hardness, metals (t) and (d)	monthly
Ammonia (t), nitrate/nitrite, phosphorus (t)	monthly
Sulphate (d)	weekly

ii) Road Crossing bridge on Stream 1 above the Lower Wetland – 7S (EMS # E292109)*

Parameters	No Decant Flow	Decant Flow
Flow	Continuous	Continuous
TSS	monthly – when there is flow at surface	weekly – when there is flow at surface
Hardness, metals (t) and (d)	monthly – when there is flow at surface	weekly – when there is flow at surface
Conductivity, pH	monthly	weekly
Alkalinity and acidity, sulphate (d), organic carbon (d)	monthly	monthly
7 day *Ceriodaphnia dubia* chronic toxicity test	-	2 time/year (conducted during fall first flush event and in the spring freshet)

*Sampling at 7SSD and 7S is to be conducted concurrently to allow for data interpretation and mass balance calculations.

4.2.2 Seep Monitoring Sites

i) Long Lake Seeps (LLS)

Parameters	Long Lake Seep (LLS)
EMS #	E292131
Flow	weekly
TSS	monthly
Conductivity, pH, alkalinity and acidity	monthly
Hardness, metals (t) and (d)	monthly
Sulphate (d)	monthly

4.2.3 Receiving Water (Streams and Lakes) Monitoring Sites

Streams	Lakes
North Mining Operation	
Quinsam River at Argonaut Road (WA) (EMS # 0126402) Outflow from Middle Quinsam Lake (WB) (EMS # 0900504)	Middle Quinsam Lake Centre (EMS # E206618)
South Mining Operation	
Long Lake Outlet (LLO) (EMS # E219412) No Name Lake Outlet (NNO) (EMS # E217017)	Long Lake at Centre (LLM) (EMS # E206619) No Name Lake (NNL) (EMS # E217018)
Block 242 Mining Operation	
Iron River upstream of 242 influence (EMS #E225798) Iron River downstream of 242 influence (EMS # E225808)	Lower Quinsam Lake (LQL) (EMS # E292118)
7-South Mining Operation (Areas 1 to 4)	
Quinsam River upstream of 7 South Mining Operation (QRDS1) (EMS # E286930) Quinsam River downstream of 7 South Mining Operation (7SQR) (EMS # E292113) Lower Wetland Outlet at the confluence of Quinsam River (LWO) (EMS # E292112)	Lower Quinsam Lake (LQL) (EMS # E292118)
7-South Area 5 Mining Operation	
Iron River upstream of mining operations (IR1) (EMS #E297230) Iron River upstream of 7SA5 (IR6) (EMS # E297231) Iron River downstream of 7SA5 and 242 inputs (IR8) (EMS # E297232) Quinsam River downstream of confluence with Iron River (IRQR) (EMS # E299256)	Lower Quinsam Lake (LQL) (EMS # E292118)

4.2.4 Sediment and Benthic Monitoring Sites

Lake and Wetland Monitoring Sites	
No Name Lake (NNL)	No Name Lake Inlet, NNLI (EMS # E224246) No Name Lake Deep, NNLD (EMS # E217018) No Name Lake Near Seep (EMS # E292114) No Name Lake Outlet (EMS # E217017)
Middle Quinsam Lake (MQL)	Middle Quinsam Lake Inlet (EMS # E206901) Middle Quinsam Lake Deep (EMS # E292115) Middle Quinsam Lake Near Seep (EMS # E292116) Middle Quinsam Lake Outlet (EMS # 0900504)
Lower Quinsam Lake (LQL)	Lower Quinsam Lake Inlet (EMS # E292117) Lower Quinsam Lake Deep 1 (EMS # E29118) Lower Quinsam Lake Deep 2 (EMS # E292119) Lower Quinsam Lake Outlet (EMS # E292120)
Long Lake (LL)	Long Lake Inlet (EMS # E292121) Long Lake Deep (EMS # E292122) Long Lake Near Seep (EMS # E292123) Long Lake Outlet (EMS # E219412)
Gooseneck Lake (GNL)	Middle Gooseneck Lake (EMS # 1132502)
Lower Wetland	Lower Wetland Inlet (EMS # E292124) Lower Wetland Middle (EMS # E292125) Lower Wetland Outlet (EMS # E292112)
Stream Monitoring Sites	
Quinsam River at Argonaut Road (WA)	(EMS # 0126402)
Quinsam River upstream of 7 South Mining Operation (QRDS1)	(EMS # E286930)
Quinsam River downstream of 7 South Mining Operation (7SQR)	(EMS # E292113)

i) The permittee shall submit proposed sediment monitoring locations in the 7-South Area 5 receiving environment to the Director by October 1, 2014 for approval.

ii) Near seep sediment monitoring applicable to No Name Lake and Middle Quinsam Lake seeps sites consist of a set of three samples equally spaced on a 5 m triangular grid. Long Lake near seep sediment monitoring sites consist of a set of six samples equally spaced on a 5 m triangular grid.

4.2.5 Stream Monitoring Requirements

i) General Requirements Applicable to All Sites Defined Under Section 4.2.3

Parameters	Schedule
Flow, total suspended solids (TSS), hardness, total and dissolved metals, conductivity, pH, alkalinity and acidity, sulphate (d)	5 in 30 (3 times/year)*
Ammonia (t), nitrate/nitrite, phosphorus (t)	every 3 years (conducted during low flow period (August to early September)

Legend:
(t) = total
(d) = dissolved
*5 in 30 refers to 5 weekly samples collected within a 30 day period

ii) Long Lake Outlet sampling requirement for dissolved sulphate is weekly until Long Lake Seep Treatment plant is authorized.

iii) Quinsam River upstream of 7 South Mining Operation (QRDS1) sampling requirements for sulphate (d) is weekly for a period approved by the Director following commissioning of the 7-South mining operation discharge.

iv) Flow is only required at WB, LLO, WA and IR8.

v) Iron River monitoring shall include monthly sampling to supplement the 5 in 30 sampling. The Director may allow cessation of monthly sampling (retaining 5 in 30 sampling), if the permittee can identify the yearly periods of worst-case water quality to the satisfaction of the Director. The earliest that monthly sampling shall be considered for cessation is 2016.

4.2.6 Lake Monitoring Requirements

i) General Requirements Applicable to All Sites Defined Under Section 4.2.3

Parameters	Annual Schedule
(1) Temperature, conductivity, pH, dissolved Oxygen (DO), saturation, oxidation reduction potential (ORP)	5 in 30* (3 times/year, spring turnover, stratification period and fall turnover)
(2) Turbidity	5 in 30* (3 times/year, spring turnover, stratification period and fall turnover)
(2) Phosphorus (t), alkalinity	One sampling event concurrent to a 5 in 30* event (3 times/year, spring turnover, stratification period and fall turnover)
(2) Hardness, total and dissolved metals, sulphate (d)	5 in 30* (3 times/year, spring turnover, stratification period and fall turnover)
BIOLOGICAL MONITORING	
(3) chlorophyll "a" (4) Phytoplankton (5) Zooplankton	One sampling event concurrent to a 5 in 30* event (3 times/year, spring turnover, stratification period and fall turnover)

Legend:

(t) = total
(d) = dissolved
*5 in 30 refers to 5 weekly samples collected within a 30 day period

(1) Profile at 1 metre intervals from surface to bottom
(2) Four depths: 1 metre, 4 metres, 9 metres, and 1 metre from bottom
(3) One depth: 1 metre below surface
(4) One depth: 1 metre below surface; analyzed for count and identification
(5) 10 metre vertical tow; analyzed for count and identification

ii) Lower Quinsam Lake monitoring shall be done according to Subsection 4.2.6 for a period approved by the Director following commissioning of the 7-

South mining operation discharge.

4.2.7 Sediment and Benthic Monitoring Requirements

i) General requirements applicable to all sites defined under section 4.2.4

Parameters
LAKE WATER CHEMISTRY PROFILE
Temp, DO, specific conductivity, pH, ORP
WATER CHEMISTRY
Hardness, turbidity, sulphate (d), metals (t) and (d), polycyclic aromatic hydrocarbons Mid lake sites – grab samples at two depths: near bottom and surface of lake for all sites except for deep sites where an additional sample will be collected at 5 m below surface Stream sites, wetlands and lake inlet/outlets – grab samples just below surface
SEDIMENT CHEMISTRY
moisture, pH, particle size, total organic carbon (TOC), total metals, polycyclic aromatic hydrocarbons
BIOLOGICAL MONITORING
Benthic invertebrates at all stream monitoring sites listed in subsection 4.2.4, as per Canadian Aquatic Biomonitoring Network (CABIN) methodology
Benthic community taxonomy and count for all lake and wetland monitoring sites listed in subsection 4.2.4

ii) The monitoring program described in 4.2.7 may be conducted over two consecutive years, with upper and lower watershed sites sampled in respective years. Under this program, monitoring site WB (EMS # 0900504) shall serve as the lowest site in the upper watershed.

iii) Sediment and benthic monitoring cycles are required every 3 to 5 years. The first assessment will be completed in 2015-2016. Following the first monitoring cycle, the sediment and biological monitoring program will be revised based on the outcomes of previous years' assessments. The permittee will submit the results of the sediment and biological monitoring program along with recommendations for the subsequent monitoring cycle by an appropriately qualified professional. Recommendations will be reviewed and approved and/or modified by the director.

Document : 2015 06 23 Tables PE 7008 - Section 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.2.5, 4.2.6.pdf
Document comment: 2015 06 23 Tables PE 7008 - Section 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.2.5, 4.2.6

Authorization: 7008	Client Name: Quinsam Coal Corporation
NRIS IR #: 106411	Site Inspection Date: October 11, 2018

Photo 1 Settling Pond #4	
Photo 2 Settling Pond #4 discharge routing into Middle Quinsam Lake via wetlands	

Authorization: 7008	Client Name: Quinsam Coal Corporation
NRIS IR #: 106411	Site Inspection Date: October 11, 2018

Photo 3 Composite sampler and flow meter readout at Settling Pond #4	 
Photo 4. Settling Pond #1	

Authorization: 7008	Client Name: Quinsam Coal Corporation
NRIS IR #: 106411	Site Inspection Date: October 11, 2018

Photo 5 7SSD Settling pond	
Photo 6 Decant pipe and composite sampler (background). Discharged for 2 days during the inspection period.	

Authorization: 7008	Client Name: Quinsam Coal Corporation
NRIS IR #: 106411	Site Inspection Date: October 11, 2018

Photo 7 3-south pit and site of overflow due to excessive rainfall which led to the bypass of authorized works. Water crested the high point and flowed into the constructed No Name Lake channel.	
Photo 8 Water retention barrier (black) and the No Name Lake connector channel. Sheet flow topped the barrier and entered the channel for a 24-hour period. Quinsam is amending Permit 7008 to authorize this discharge	

Document : IR106411 Photo Record 2018-10-11.pdf
Document comment: IR106411 Photo Record 2018-10-11

Permit 7008 Environmental Technical Review Committee Action Item & Outcome Tracking Table - November 22, 2018									
Items	Meeting Type (Agency, Stakeholder)	ETRC Member or Stakeholder Responsible	Type	Context	Description	Date of Advice	Target Completion Date	Description of Follow -up	Status
1	Agency	QCC	Action Item	Agenda Item 3.1 - An update to the terms of reference was completed in 2017.	Terms of reference will be included in future meeting invites.	November 23, 2017	November 21, 2018	Sent out with agenda	**Closed**
2	Agency	QCC	Action Item	Agenda 3.2- Data site update and report format	New website where reports will be posted : http://www.quinsamcoalenvironmentalreports.com	November 23, 2017	Annually	Annual Reports are available online from 2012 to present.	**Closed**
3	Agency	QCC	Action Item	Agenda Item 3.2 - Report Format Discussion around making the electronic version of the report easier to navigate.	Future Annual Reports will have separated appendices. PDF version will include bookmarks and thumbnails.	November 23, 2017	June 30, 2019	All requests were completed in 2017-2018.	**Closed**
4	Agency	QCC	Action Item	Agenda Item 3.2 - Report distribution to Agencies & Library	Future hard copies and electronic copies of the Annual Report will be sent to City of Campbell River (CoCR) and EMPR. Electronic versions will be submitted to ENV. Once reviewed by CoCR, QCC will deliver the Annual Report hard copy to the Vancouver Island Regional library.	November 23, 2017	December 31, 2018	Hard copy delivered to CoCR and EMPR November 2018. Delivered to library on December 17th, 2018.	**Closed**
5	Agency	QCC	Action item	Agenda Item 3.3 - Public Notice The public notice will be posted in the Campbell River Mirror.	Tear sheet from newspaper will be sent to ENV.	November 23, 2017	November 27, 2018	Content and format reviewed at the both Agency and Stakeholder meetings.	**On-going**
6	Agency	QCC	Action Item	Agenda Item 4.1 - Tracking Table Updates Discussion around items that did not get closed from the 2017 tracking table.	Each year, include on-going action items from previous year for follow-up. Tracking table will be updated in Annual report and finalized at that year's ETRC meeting.	November 23, 2017	June 30, 2019	On-going issues were discussed and some items closed. See below, Agenda Items 4.2.	**On-going**
7	Agency	ENV	On-going action items from 2017 meeting addressed at 2018 meeting and closed	Agenda Items 4.2 - Iron River borehole update	An assessment of the Iron River borehole issue is underway by ENV Compliance. ENV to keep the ETRC and CREC updated on progress on the Iron River borehole.	November 23, 2017	December 31, 2018	ENV updated the attendants on the progress of the Iron River Borehole. The progress of mitigation for the borehole remains on-going with the ENV compliance team.	**Closed**
8	Agency	QCC		Agenda Item 4.2 - Summary of benthic invertebrate and sediment program results and recommendations from **2017** tracking table.	Action item from 2017 (timeline of sampling, locations, plan etc. in Iron river). QCC to submit potential sampling locations to ENV for discussion. Iron River baseline sediment & benthic monitoring was not completed in 2018. Sediment & benthic sampling was postponed due to previous closure, it was not completed in 2018 due to time constraints. Will be completed in late summer 2019 prior to any expected impacts from mining in 7S Area 5.	November 23, 2017	Summer 2019	The sites proposed for sediment and benthic monitoring were presented at the Agency meeting. It was agreed that IR6 and IR8 would be representative of all potential inputs to the Iron River related to 242 and 7-South, Area 5. Site IR6 suffices as reference prior to mining impacts and has similar geology to the downstream location IR8.	**Closed**
9	Agency	QCC		Agenda Item 4.2 - Summary of benthic invertebrate and sediment program results and recommendations from **2017** tracking table.	Recommendations for future monitoring will be included in the upcoming permit amendment application. These results were submitted to ENV for discussion and review on November 22, 2018.	November 23, 2017	November 22, 2018	Permit amendment application has been submitted. Draft version of recommendations from Stantec submitted to QCC and is currently being reviewed by ENV. Finalization will occur with minor permit amendment.	**Closed**
10	Agency	QCC	Recommendation from 2017 meeting that was closed.	Agenda Item 4.2 - Summary of benthic invertebrate and sediment program results and recommendations.	Review when logging was performed within the vicinity of No Name Lake, provide a time line.	November 23, 2017	December 31, 2017	Logging commenced within the vicinity of the lake during 2011 when comparing images using Google Earth.	**Closed**
11	Agency	QCC	Action Items from 2017 meeting addressed at 2018 meeting.	Action item 4.2 - Ongoing from 2017, evaluation of TSS, mitigation techniques, installation of curtain and discharge rates.	Follow-up with ENV compliance regarding a mitigation strategy for Total Suspended Solids (TSS) at Settling Pond # 4. TSS levels were in excess of permit limits during extreme storm events in 2016. A mitigation strategy was recommended. Response to compliance inspection was submitted with a mitigation strategy for TSS exceedances. This includes submitting a TSS management report and plans for installing a sediment curtain during 2018. The use of flock soaks will be evaluated if TSS levels increase.	December 5th, 2017	Report on for the 2018-2019 Annual Report	Memo was sent out March 2018. 2017 - 2018 no TSS exceedances occurred. June - Roto Rooter was called to site to clean out the decant riser at Settling Pond 4 (SP4). September was removed from the Treatment system, for installation in Brinco Brook. In late March the turbidity/ sediment curtain was installed in Brinco Brook. The intention is to reduce suspended solids entering WD. Evalutaion is ongoing.	**On-going**
12	Agency	QCC	Action Item	Agenda Item 7.1 - Highlights from the Annual Report	Review elevated copper and zinc results in the receiving environment. Follow up with analytical laboratory with respect to glue on the supplied bottles. Review quality control and quality assurance records for the site. Review mine site point source discharges to ensure it does not exhibit elevated concentrations of these metals. **ENV** to review gloves used for sampling are not associated with elevated copper and zinc.	November 22, 2018	4-Dec-18	The sites proposed for sediment and benthic monitoring were presented at the Agency meeting. It was agreed that IR6 and IR8 would be representative of all potential inputs to the Iron River related to 242 and 7-South, Area 5. Site IR6 suffices as referenc	**Closed**

Permit 7008 Environmental Technical Review Committee Action Item & Outcome Tracking Table - November 22, 2018								
Items	Meeting Type (Agency, Stakeholder)	ETRC Member or Stakeholder Responsible	Type	Context	Description	Date of Advice	Target Completion Date	Description of Follow -up	Status
	Stakeholder	QCC	Action Item	Agenda Item 2: Overview of status and activities over the preceding year and plans for the coming year (QCC). Purchased in June 2017, Oct 2017 mining commenced in 2-North and January for 7-South. • To date - 218, 132 Clean Coal Produced from 7-South and 2-North • Currently blasting through the Long Lake fault zone to access 7-South Area 5 • CCR- PAG disposal in 2-Mains, 7-South with continued development and mining progressing. In 2-North depillaring and retreat mining continues.	Original mining plan for Area 5 has been re-evaluated. Mining in Area 5 will not pass the 100, 280 Northing (see attached plan). Reducing potential impacts and seepage rates from the mine on the Iron river. QCC to send CREC a map of mining limits in Area 5.	December 4th, 2018	December 31st, 2018	Sent out Area 5 plan with Actions items.	**Closed**
	Stakeholder	QCC	Outcome	Agenda Item 2.3: Permitting update - Brief explanation of the two ENV permit amendments currently in the works **Minor Amendment** QCC would like to reduce monitoring. Goal is to eliminate sites that seem to be redundant. Minor amendment is more so administration not related to mining Requires Quinsam to present scientific rational, data compilation and established trends with statistics. CREC and the city will have an opportunity to review the proposal. **Major Amendment** Applying to authorize the discharge from 2/3 South pits into No Name Lake Connector stream and LLS discharge into Long Lake. Significant amount of field work / data compilation required to fulfill the obligations outlined in the Information Requirements Table (IRT). Continuous pumping from 2-south underground into 2-south pit during times of limited precipitation in order to maintain a 1.5 M water cover of PAG material / LLS discharge is not acutely toxic / beyond a certain distance it cannot be chronically toxic – done through monitoring / ultimately, acutely toxic explanation is located within the permit.	Minor Amendment expected completion date - May 2019 Major Amendment expected draft submission date - November - December 2019	December 4th, 2018	May 2019 and December 2019		N/A
	Stakeholder	ENV	Action Item	Agenda Item 7: Highlights from the Annual Monitoring Report (QCC) 7.1 Lakes Water Quality Summary Trip blanks included two anomalies on September 7, 2017 for zinc and copper. Currently, the lab is investigating this to determine when they changed their bottles due to possible contamination with the glue used for lids. Efforts are continuous at QCC to ensure proper QA/QC programs are carried out.	ENV will send methods used by ENV to QCC with respect to composite lake sampling.	December 4th, 2018	February 8th, 2019	ENV sent methods to QCC for reference and information purpose only.	**Closed**
	Stakeholder	QCC	Action Item	Agenda Item 7: Highlights from the Annual Monitoring Report (QCC) 7.1 Lakes Water Quality Summary Trip blanks included two anomalies on September 7, 2017 for zinc and copper. Currently, the lab is investigating this to determine when they changed their bottles due to possible contamination with the glue used for lids. Efforts are continuous at QCC to ensure proper QA/QC programs are carried out.	Laboratory investigation will be included in the Annual Water Quality Monitoring Report.	December 4th, 2018	June 30th, 2019 Results will be submitted in the Annual Report	Memo from Maxxam is attached. QCC now collects separate bottles for total metals reducing the risk of contamination at the laboratory, when pour offs are performed.	**Closed**
	Stakeholder	ENV	Action Item	Agenda Item 8.1: Using the CCME Water Quality Index for the Quinsam River (ENV) • CREC requested an Environmental report card for Quinsam River from ENV • 8 to 20 parameters and comparing to 'score' • 5 sites selected for Quinsam Coal and 11 parameters • Would be a more useful tool for a number of site rather than just one river example more useful for BC rather than just Quinsam River. • Cons: Outliers will skew the data, requires a large amount of consistent data with each parameter is weighted equally. • Pros: Could be an effective tool, very broad report, need to have an understanding of water quality science, need to understand data management • How to access this tool: Download at the Canadian council of environment	ENV to Circulate information (Website) on how to access to CCME Water Quality Index (ENV)	December 4th, 2018	March 31st, 2019		**Closed**
	Stakeholder	CREC	Action Item	Agenda Item 8.0: Additional discussion topics (all) Stakeholder's interested in Quinsam South, Oyster river exploration update. Request to be informed on any drilling and exploration planned for Oyster river. QCC only has historical data and no current information. Presently there are no plans to proceed with exploration in Quinsam South.	CREC will send Watershed report and other information to QCC.	December 4th, 2018	January, 2019	Nuspar Information received from Leona Adams on January 2nd, 2019. E-mail included three attachments.	**Closed**
	Stakeholder	QCC	Action Item	Agenda Item 8.0: Additional discussion topics (all) Stakeholder's interested in Quinsam South, Oyster river exploration update.	QCC will inform stakeholders of future exploration plans in Quinsam South.	December 4th, 2018	N/A	QCC is not currently planning on any further exploration in Quinsam South.	**Closed**
	Stakeholder	QCC	Action Item	Agenda Item 8.0: Additional discussion topics (all). Iron River Borehole update.	Compliance team continues to work on this issue.	December 4th, 2018	N/A	ENV to update CREC on the status on the Iron River Borehole. ENV does not hold QCC ultimately responsible for Iron River Borehole – Letter will be provided.	**Closed**
	Stakeholder	QCC	Action Item	Agenda Item 8.0: Additional discussion topics (all) - Iron River Borehole	Discussion around QCC taking on the mitigation of the sump.	December 4th, 2018	N/A	QCC discussed the remediation of the site internally and currently the decision is that QCC will not be held responsible for the remediation of this sump or invest	**Closed**
	Stakeholder	ETRC	Outcome	Agenda Item 8.0: Additional discussion topics (all) -Terms of reference (TOR)	ETRC will review TOR and provide updates where necessary.	December 4th, 2018	N/A		**Closed**
	Stakeholder	CREC	Outcome	Agenda Item 8.0: Additional discussion topics (all) -Request	CREC would appreciate the opportunity to build a relationship with the General Manager.	December 4th, 2018	N/A	This information has been relayed to the General Manager and is noted. He regrets he could not attend the meeting due to a conflicting schedule.	**N/A**
	Stakeholder	ETRC	Outcome	Agenda Item 8.0: Additional discussion topics (all) - 2017/2018 Annual report consensus	The general consensus with respect to the Annual report content and results was found to be of good quality. There were was one permit limit exceedance and water quality remained in good standing.	December 4th, 2018	N/A		**N/A**

2019/02/06

To: Kathleen Russell (Quinsam Coal Corporation)

Re: Parameters of Concern

We have taken this opportunity to review our lab processes and implement improvements.
As an accredited lab, we recognize the importance of quality data and we are focused on sample integrity.

We are confident that there is no systemic error in our process and that the past historical data over eight years is reliable. In looking at the data table that we have received from you, the elevated results appear to be limited to October and November, 2018. During this time period, there were no changes in our laboratory processes from prior months.

In order to evaluate repeat analyses, Maxxam employs the laboratory duplicate acceptance criteria specified by the BC Ministry of Environment and Climate Change Strategy (BCMOE), 20% RPD or an absolute difference of ≤2x RDL. (Copper RDL is 0.0005 mg/L, 2xRDL = 0.001 mg/L). The 2x RDL criterion reflects the increased analytical variability near the RDL.

As part of our investigation, we repeated 17 samples from the Oct. and Nov. submissions. All but 3 met the duplicate acceptance criteria. (MQL1-01Nov18-M, WB-29Oct18-M and MQL1-15Oct18-M) These 3 were repeated a third time and the third result confirmed the second. A revised report reflecting these changes has been issued.

The root cause for these changes is under investigation and the results will be communicated to you once complete. Copper is ubiquitous, and we are aware minimizing sample manipulations is important to minimizing background levels. For these reasons, as a continuous improvement opportunity, we would recommend going forward that:

1. Total metal samples be collected in separate containers containing preservative. (These containers are subsampled directly into instrument analysis tubes in a clean room environment, minimizing manipulations).
2. A trip blank and equipment blank be included with each submission. These will immediately identify any lab or field contamination issues.

If for some reason you are not able to use the recommended protocol above and Maxxam receives raw sample, we now have an internal process and a built in tool within our Laboratory Information Management System (LIMS) that will notify staff to redirect the samples appropriately.

On behalf of Maxxam, I would like to apologize for any concern this incident has caused. The above summarizes our investigations and actions to date. If a more formal response or anything further is required, please advise, it will be provided promptly.

Thank you,



Veronica de Guzman
Project Manager, Mining
Maxxam Analytics

APPENDIX VI

2018-2019 Annual Groundwater Monitoring Report

Pertaining to the Mines Act Permit C-172 & Effluent Permit PE: 7008

Submitted to: Ministry of Energy and Mines & Ministry of Environment

Prepared by:
Quinsam Coal Corporation
Kathleen Russell BSc. Environmental Coordinator

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Appendix A: Borehole Development Logs

1 Introduction

Quinsam Coal Corporation, as part of the requirements under Mines Act Permit C-172 (administered by the Ministry of Energy and Mines) and Effluent Permit PE-7008 (administered by the Ministry of Environment), conducts a comprehensive groundwater monitoring program to characterize water quality associated with mining development. This edition covers a 12-month period and interprets the results from April 1, 2018 to March 31 2019 to synchronize with the surface water monitoring report and relate to the effluent permit.

Prior to 2012, the groundwater monitoring program was executed by external consultants. In 2012, in an effort to reduce costs and improve the logistics of the program, Quinsam Coal internalized the groundwater monitoring program. Methodology of sampling followed the procedures developed in the Lorax Hydrogeological Assessment and the *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emissions, Water, Wastewater, Soil Sediment, and Biological Field Sampling 2013 Edition.* The groundwater program has been defined through work performed by Quinsam Coal and Lorax Environmental on the hydrogeology of the respective mining areas, which governs the sampling locations, methods and frequency with consideration of their relationship to mining.

As in previous reports, groundwater wells have been categorized as either ‘in-situ’ or ‘ex-situ’; the definition for each is as follows:

- In-situ: groundwater wells located within the mine workings (disturbance footprint) and therefore represent water accumulated within the mining void. In the absence of groundwater well samples, underground sump samples are used for comparison.
- Ex-situ: groundwater wells located outside the mine workings (disturbance footprint) which reflect water quality flowing from the mine void towards the receiving environment. This also includes baseline and background (up-gradient of workings) groundwater wells.

The groundwater wells outside the mine footprint (ex-situ) are compared to the British Columbia Contaminated Site Regulation (CSR) (BC reg.37/96. O.C. 1480/96), including the amendments (343/2008 January 1, 2009) describing water quality standards for fresh water Aquatic Life (AW). The aquatic life standard assumes that a minimum 1:10 dilution is available for groundwater discharged to a freshwater system; together, they are referred to as CSR-AW.

The parameters of interest (POI) captured under the CSR-AW and applied to Quinsam include: arsenic (As), cobalt (Co), copper (Cu), fluoride (F), iron (Fe), sulphate (SO_4), sulphide (as H_2S) and zinc (Zn). Section 4.1 compares sampling results performed during this program to the CSR-AW standards (by development area).

Derived from numerous studies, POI source terms have been developed by Lorax Environmental for various areas, including: geochemical characterization of the 4-South mine pool, laboratory kinetic testing conducted on the 7-South coarse coal reject, 7-South formation water and 2-North, 3-North and 5-South mine water and formation water samples collected from underground mine dewatering. It is therefore important to consider water captured and stored within the mine workings (in-situ) to ascertain potential discharge (through existing water management structures) and seepage water quality. Accordingly, groundwater wells that are located within a mine void are sampled as part of the monitoring program with results being compared to source terms developed for each respective area.

2 Groundwater Monitoring Regime

Throughout the 2018-2019 monitoring period, Quinsam Coal monitored 38 groundwater sites within the vicinity of the mine footprint. These sites consisted of 26 ex-situ wells, 10 in-situ wells and 2 in-situ underground sumps as illustrated in Table 1 below.

Table 1: Groundwater Wells & Sumps Monitored in 2018-2019

Area	In-Situ Sumps	In-Situ Wells	Ex-Situ Wells	
2-North		1M2N 5M#2 QU10-13 D	QU08-21G S QU10-10 S QU10-11 S	QU08-21G D QU10-10 D QU10-11 D
River Barrier Pillar		QU11-09 M	QU11-05 S QU11-09 S	QU11-05 D
2-North Plant			MW00-1 S MW00-6 S	MW00-1 D MW00-6 D
7-South	1M7S	QU14-10	QU08-13 A	QU08-13 B QU08-10 D
7-South Area 5 / 242	7SA5	242MW	QU11-36 S QU12-06 S QU11-18 S	QU11-36 D QU11-28 QU11-18 D
4-South		QU11-01	QU10-09 S	QU10-09 D QU10-08 D
5-South		5SMW		
2/3 South		QU11-11 MW00-4	MW00-2	

The groundwater areas and wells description are listed in Appendix I, Table 171. Appendix IX, Site Plan, Groundwater Monitoring Locations, presents a map of the groundwater sampling sites with respect to underground workings, groundwater and pumped mine water flow paths and disturbed areas. These wells are regularly evaluated and modified in order to best monitor groundwater and potential impacts from mining. The areas encompassed in this monitoring program include: 2-North, the River Barrier Pillar (RBP), 2-South, 3-South, 4-South, 5-South, 7-South; and 7-South Area 5/242 area.

The monitoring wells have been selected as they relate to:

- hydrogeology of the area
- groundwater regime
- stratigraphy and geologic structure
- formation groundwater
- mine pool water
- past and present mining conditions
- underground PAG–CCR storage
- fine tailings storage

Appendix I, Tables 171 to 267 display the groundwater chemistry results for the 2018-19 monitoring year. Completion logs for the well installations listed in Table 1 can be found in Appendix A, and a further discussion of these wells can be found in Mine Permit (C-172) Amendment: 7-South Development Volume 3: Appendix I through J and Volume 4: Appendix K. Lorax Environmental Services was retained by Quinsam Coal to perform a hydrogeological investigation in these areas. The wells are a combination of nested wells, single wells and boreholes. The nested wells include a deep well and a shallow well that are screened in zones of interest. The deeper wells are generally drilled into the lowest coal seam and the shallower wells represent other zones of interest which may include shallower coal seams, or areas of increased permeability (Lorax, 2011).

With a change of ownership and recommencement of mining at Quinsam Coal in 2017, mining in 7-South Area 5 commenced in February 2019 after blasting through the Long lake fault zone from July through mid-January. These plans have triggered the need to resume monitoring of groundwater in the area prior to mining to ensure baseline data has been collected. Monitoring of these wells will continue following mining operations to determine any impacts on in/ex-situ groundwater.

2.1 Hydrogeological Setting

Groundwater wells relating to mining voids or defined as ‘down gradient’ from mine development zones have been established to characterize water quality for each respective area. The water chemistry is compared to source terms for parameters of interest established through:

- Sulphur distribution in the proposed workings
- Solid phase and leaching characteristics of CCR and tailings from the 7-South areas and disposed in mined out workings
- Geochemical characterization of the hanging wall strata over the mine area
- Formation groundwater characteristics

The information pertaining to column leach testing and derivation of source terms can be found in the application for 7-South Development Mine Permit Amendment (C-172) Volume 3: Appendix J and Volume 4, Appendix K (Lorax[(1)], 2011).

Figure 1 below displays the stratigraphic column at the Quinsam mine.

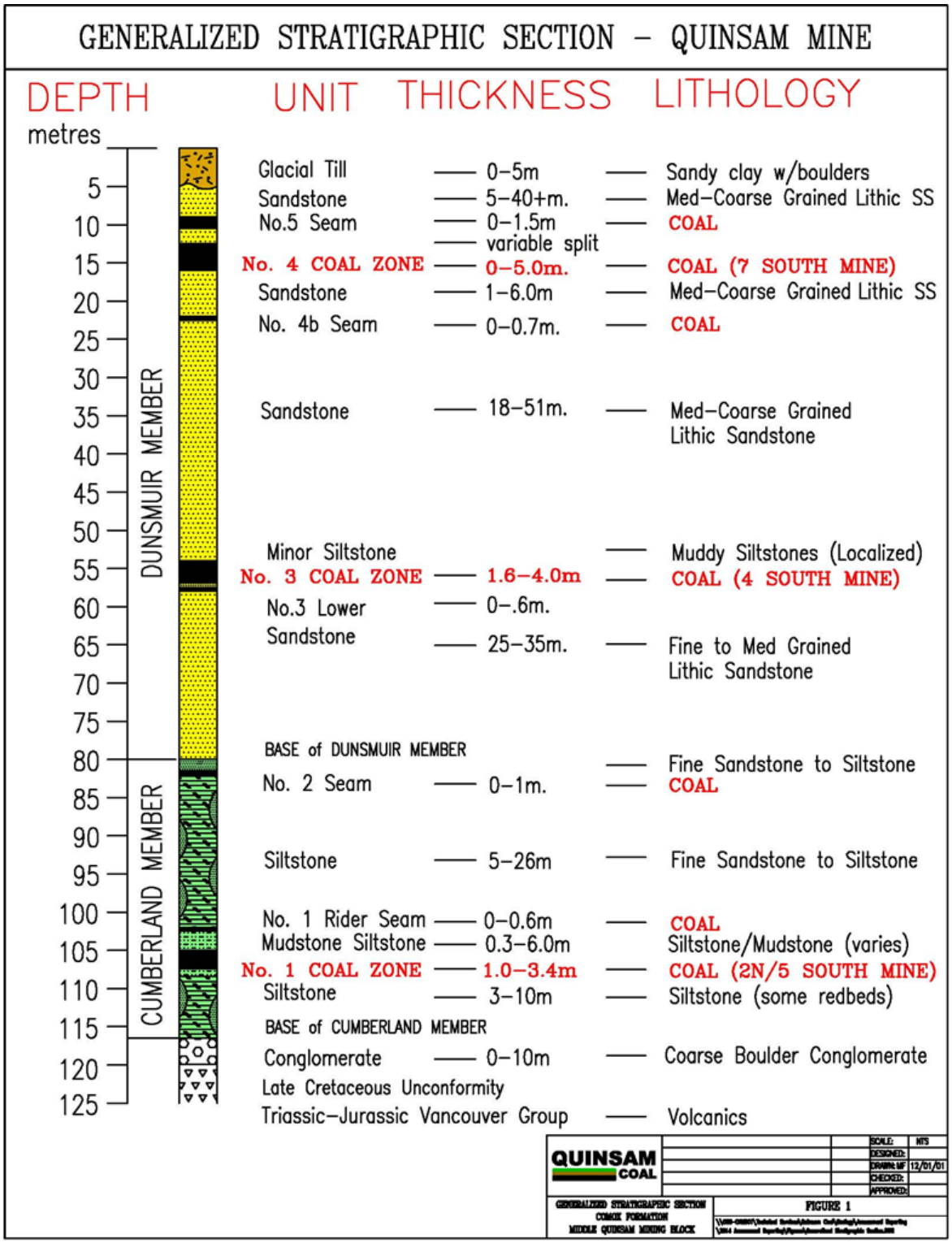


Figure 1: General Stratigraphic Column - Quinsam Mine

2.1.1 Underground PAG-CCR Storage in the River Barrier Pillar

Coarse coal reject (CCR) material produced from the processing of raw No. 1 seam coal is defined as potentially acid generating material (PAG) when the sulphur content exceeds 1.3 %. As development of the 5-South mine progressed, inherent sulphur levels found in the #1 coal zone progressively increased above 1.3% sulphur. The run of mine coal processed through the Coal Preparation Plant and the resultant waste materials (fine tailings and CCR) were therefore classified as PAG. To mitigate potential metal leaching/acid rock drainage, Quinsam Coal established a sub-aqueous PAG-CCR disposal facility within the mine workings known as 87 Panel River Barrier Pillar (RBP). This disposal method was used as a pilot project for future PAG-CCR storage of material from the then proposed 7-South mine. Accordingly, groundwater monitoring at this facility has been a crucial part of Quinsam's past and current groundwater monitoring program. Wells used to monitor the seepage of groundwater are QU11-05 (S and D) and QU11-09 S while in-situ waters are monitored using well QU11-09 M.

2.1.2 Down Gradient of Subaqueous Disposal of Fine Tailings in 2-North and 3-North

The 2-North mine has been a subaqueous disposal site of fine tailings from processing of the 7-South coal since 2012. Fine tailings were pumped underground into 2-North 1 Mains until early 2015 when the line was relocated due to retreating underground operations. Pumping was redirected into the 5 Mains mining void of the 2-North mine. The wells installed in these areas initially supported a hydrogeological investigation performed by Lorax. The 2-North, 3-North and 5-South mine waters and formation waters have been defined as: mine water, #1 coal seam groundwater, and Dunsmuir sandstone groundwater. In these areas, the mine water is classified as circum-neutral with a distinct sulphate geochemical signature that can be used to trace the flow paths of mine water (Lorax [(1)], 2011).

Groundwater wells QU10-10 (S and D), and QU10-11 (D) have been installed down gradient of the 2-North subaqueous disposal areas and measure formation water quality and hydraulic head downstream of the 2-North mine workings. Quinsam originally drilled QU08-21G in the 2-North area as a geotechnical hole but was later converted into monitoring wells QU08-21G S and QU08-

21G D. These wells were used to characterize water quality on the opposite side of the Forjan Fault in both the No. 1 coal zone (deep well) and the overlying Dunsmuir Sandstones in the No. 4 coal zone (shallow well). QU10-13 D measures the hydraulic head above the 2-North mine (1 Mains) and fine tailings disposal. QU10-11 S monitors groundwater in the overlying Dunsmuir sandstones in a fracture zone. The in-situ waters in the 2-North mine pool are monitored at well locations 1Mains 2-North (1M2N), 5Mains #2 (5M#2) and QU10-13 D.

2.1.3 2-North Coal Processing Plant and Coal Pad

The coal processing plant is located east of Middle Quinsam Lake and lies at an elevation approximately 40 metres above the lake surface. Two nested groundwater wells MW00-6 (S and D) and MW00-1 (S and D) have been installed at the peripheries of a surface collection ditch to intercept groundwater and surface runoff from the coal processing plant and coal stockpile pad. The depth of the shallow wells MW00-1 S and MW00-6 S are 8.1 and 8.7 metres respectively, while the deeper wells MW00-1 D and MW00-6 D measure 29.8 and 18.0 metres respectively. These wells monitor groundwater quality at different depths in the glacial till overburden layered overtop of the bedrock.

2.1.4 4-South Water Chemistry

The 4-South mine is developed in the #3 coal zone. The #3 coal zone lies within the Dunsmuir Member of the Comox Formation. The Dunsmuir Member consists of thick-bedded medium to coarse grained arkosic sandstones containing localized silty interbeds. Lorax classified the groundwater in this area into two groups; formation groundwater with lower overall dissolved ion concentrations and mine pool water with higher dissolved ion levels. The mine pool water is elevated in sulphate and iron; this signature is used to assess the mine pool seepage rates and groundwater flow path.

Lorax's assessment of the area found that formation groundwater wells had water quality with a geochemical signature that suggested mine pool influence in the down gradient wells of the flooded 4–South Mine. In Volume 3, Appendix I, Section 4 of the 4-South Mine Groundwater Evaluation, Lorax concludes that "*The component of seepage from the shallow westernmost portion of the 4-South mine inferred to flow to Long Lake represent about 10% (0.14 m^3/day) of*

the 1.4 m^3/day, estimated to represent the total seepage from 4-South. All seepage is ultimately directed to the Quinsam River" (Lorax[(2)], 2011).

The monitoring wells established in this area were situated to intercept any groundwater transport that may occur from the 4-South mine pool. These wells include QU10-09 (S and D), QU10-08 D and QU10-07 D (Lorax. 2011). This reporting year, QCC has monitored all of these wells except QU10-07 as it has displayed a minimal influence from the mine waters geochemical signature. QU10-08 is located up gradient of the 4-South mine and displays minimal influence from the 4-South mine pool.

The monitoring wells dedicated to monitoring in-situ water of the flooded workings are wells QU11-01 and QU78-161. QU11-01 is situated in the depillared area of the mine while QU78-161 is located in open mine workings east of a large fault. In past monitoring years, both of these wells were sampled due to their distance apart. It has been deemed that only one of these wells are necessary to determine mine-pool water chemistry as they have both exhibited similar characteristics when assessing historic data. Monitoring at QU78-161 has been ceased until further notice.

2.1.5 2-South – 3-South Area

The 2-South – 3-South area consists of naturally flooded mine workings, the 2-South subaqueous PAG-CCR storage pit, the 3-South subaqueous PAG-CCR storage pit and other surface disturbances. Wells established in this location are used to determine if parameters of interest are emanating from the mine workings or the PAG-CCR storage pits towards the receiving environment.

The 2-South open pit area was engineered to contain PAG-CCR material and included a sand-bentonite liner to minimize seepage and to retain water necessary for cover. Backfilling of PAG-CCR was completed in summer 2015 and water cover has been maintained since late 2015 (subaqueous disposal). It was projected that approximately $50m^3$ of water will seep from the facility daily with 10% of the water reporting to No Name Lake. The wells MW12-23 and MW12-24 were intended to intercept any water transporting from the 2-South PAG-CCR storage towards

the lake. However, these two wells have been extremely difficult to monitor due to refill rates. As a result, not monitored in 2018-19. The 3-South open pit development has been backfilled with PAG-CCR and was flooded to provide a full water cover; similar to the requirements of 2-South. Groundwater well MW00-2 was installed down gradient of this facility in shallow bedrock approximately 15 metres from the northeast corner to characterize seepage from 3-South. It is inferred that MW00-2 is hydraulically connected with the 3-South pit based on proximity and reported water quality (Golder Associates, 2006).

Groundwater wells MW00-4 and QU11-11 are used to monitor the 2-South mine pool and depillared areas. MW00-4 is located on the north-eastern margin of the 2-South mine in the depillared workings near Long Lake. QU11-11 is located at the deepest portion of the 2-South as it draws water from the underground mine pool for treatment in the Long Lake Seep Passive Treatment System (LLSPTS). This well is monitored monthly to assess mine pool chemistry and to assess the performance of sulphate reduction through the LLSPTS. Historically, MW00-3 and MW00-5 were also monitored in this location but are presently only used to monitor the water elevation in the mine pool. The underground workings in the 3-South pit area were developed and accessed by two portals located in the 2-South pit, with the 3-South Pit separated from the underground workings by intact bedrock. It is expected that the hydraulic connection between the flooded 3-South pit and the former 2-South underground workings are a result of bedrock fractures within the intact bedrock (Golder Associates. 2007).

2.1.6 7-South Down Gradient of Subaqueous Disposal of PAG-CCR in 7-South

The nested groundwater well QU08-13 (A & B) is situated topographically down gradient of the 7-South mine workings to intercept groundwater flow from the workings towards the Quinsam River. The well is located to monitor water quality and detect any seepage from the 7-South PAG-CCR underground disposal area in the 7-South mine at the stratigraphic level of the No. 4 coal zone (QU08-13 A) or as it rises through the stratigraphic column towards the Quinsam River (QU08-13 B). Source terms derived specifically for this development will be used as a comparison of water quality. Other groundwater wells within the 7-South area are used to monitor groundwater quality in relation to the seepage from the run of mine stockpile (QU08-10). At present, monitoring well QU14-10 is being used to measure water quality of the in-situ underground PAG-CCR

subaqueous disposal. When the storage of PAG-CCR, drillholes QU08-07 and / or QU09-01 will be developed into monitoring wells to measure in-situ underground water quality within the PAG-CCR storage facility.

2.1.7 Baseline/Background

Groundwater monitoring wells within areas without mine related impact or up gradient of the perceived flow path are established to identify baseline/background information on water quality for modeling purposes and when comparing/identifying sites encountering mining influence. Two primary areas of focus for collecting baseline groundwater quality in the near future are 7-South Area 5 and the 4-South / 6-South areas. 7South Area 5 areas were monitored in the past and additional monitoring was performed and will be required now that mining operations are expected.

2.1.8 Mine Pools, Underground Sumps and Mine Water Pumped to Surface

A mine pool is a flooded mine void or previously mined out area which may or may not be backfilled with waste material. Mine pools often exhibit elevated concentrations of metals and sulphate associated with developed coal seams. Concentrations become increasingly elevated if mine pools have waste deposits present as constituents tend to dissolve and accumulate at depth. A chemical stratification occurs when there is limited mixing of the mine water and the heavily mineralized waters settle on the bottom of the water column while the lighter, less mineralized waters, concentrate in the upper portion.

In-situ mine pool monitoring locations include: 1M2N, 5M#2, and QU10-13 D in 2-North; 5SMW in 5-South; QU11-09 M in the RBP; QU14-10 in 7-South; QU11-01 in 4-South; MW00-4 and QU11-11 in 2-South; and 242MW for the 242 mine. In addition to mine pool monitoring sites that are not accessible to monitoring personnel, underground sumps are used to characterize in-situ locations including: 1 Mains 7-South (1M7S) and 7-South Area 5 (7SA5).

3 Methods and Procedures for Monitoring Groundwater

During groundwater sampling, water is directed through a flow cell connected to a water quality sonde to instantaneously measure parameters such as pH, conductivity, temperature, oxidation

reduction potential and dissolved oxygen. These parameters are used to identify when intercepted groundwater entering the column is steady and representative of the targeted water based on the well design. Water samples are obtained for laboratory analysis when the appropriate volume of water has been purged, water levels have stabilized, and the physical parameters listed above stabilize. Ultimately, the objective is to collect a sample that represents the 'active' groundwater in an area as opposed to stagnant water within a well.

3.1 Sampling Techniques

Generally, four methods/systems (dependent on groundwater setting) are employed for monitoring groundwater. These methods include:

- Inertial lift
- Peristaltic pumping
- Portable bladder pump
- Dedicated bladder pump

The most suitable sampling device is selected based on:

- Parameters being monitored
- Maximum efficiency
- Purging rate compared to well yield
- Well diameter
- Depth of well
- Sample collection point
- Ease of use of the sampling device

3.1.1 Inertial Lift Sampling

This method of sampling uses HDPE tubing fitted with an inert foot valve placed down the well casing at the desired depth. Oscillation of this tubing forces water up to surface while the foot valve prevents backflow on the downswing. This constant oscillation is achieved using a mechanical actuator known as a hydrolift. The hydrolift is attached to the tubing end on surface and cycles up and down to provide the motion needed to lift water. Flow rate is directly

proportional to the speed of oscillation, well design and water level. Inertial lift sampling is appropriate in wells in which a high purge rate is required as flow rates can range from 0.5 to over 4 L/min.

3.1.2 Peristaltic Sampling

This method employs a peristaltic pump connected to tubing that is placed within the well casing at a desired depth. Peristalsis is a cyclic compression and decompression on the tubing to create a negative pressure point in which the water is drawn up the tubing. This method is employed at very shallow wells that can potentially have poor recharge rates.

3.1.3 Bladder Pumps

Bladder pumps are submerged to an appropriate level and operate by filling and discharging a bladder system inside a housing unit. Compressed gas (N_2) is supplied at surface and is pumped down the tubing to provide the compression and release of water within the bladder housing. Flow rate is controlled via timing cycles of recharge and discharge, air pressure and depth of water. Bladder pumps are used in deeper wells in which inertial lift and peristaltic pumping capabilities and efficiencies are not possible.

3.2 Parameters Monitored

The total metals suite was removed from the analytical requests in 2014 to eliminate the potential artifacts (associated with higher total suspended sediment) in sampling results. Since then, analytical results have included dissolved metals, total suspended solids (TSS), dissolved anions (i.e. bromide (Br^-), chloride (Cl^-), fluoride (F^-), sulphide (S^{2-}), sulphide as (H_2S), sulphate (SO_4), total dissolved nitrogen (TDN), dissolved organic carbon (DOC), total-alkalinity (Alk) and acidity. Furthermore, field measurements for pH, temperature, conductivity, oxidation reduction potential and dissolved oxygen continue to be part of the monitoring program.

Results for hydrogen sulphide are calculated using a gravimetric conversion factor (sulphide result multiplied by 1.063) as the laboratory only provides results as sulphide. This calculation is

necessary to compare results to the CSR-AW standards as the standard is measured as H_2S (0.02 mg/L). In the past, sulphide results that were expressed as <MDL were calculated using the MDL value which was often 0.02 mg/L. For all previous results and results included in this reporting year that were <MDL, a value of half the MDL was used for calculation. This may eliminate past issues of false positive bias when the gravimetric conversion factor is applied.

In 2013 the Ambient Water Quality Guideline for dissolved sulphate was updated from an acute guideline of 100 mg/L to a chronic guideline based on a 30-day average. The new guideline is relative to background water hardness concentrations. As a result, sulphate water quality guidelines for the protection of aquatic life were developed for different categories of water hardness as displayed in Table 2 below.

Table 2: Sulphate Water Quality Guideline (mg/L) - Based on Water Hardness (mg/L) Categories

Water Hardness* (mg/L)	Sulphate Guideline (mg/L)
Very Soft (0-30)	128
Soft to moderately soft (31-75)	218
Moderately soft/hard to hard (76-180)	309
Very hard (181-250)	429

*Water hardness categories adapted from the CCME.

** Toxicity tests on the early stage rainbow trout were only conducted up to a water hardness of 250 mg/L.

The BC Land Remediation Section develops the Contaminated Sites Regulations standards. As it is a regulation, standards do not change when a water quality guideline changes. As a result, the CSR-AW for sulphate was not updated when the BC Water Quality Guideline was revised.
Currently, the CSR-AW standards are subject to revision, with the first step of the process being to review the policy (e.g. developing a CSR standard) and the second step applying the newly derived standard. These new guidelines derived from the Water Quality Guidelines are often a factor of the guideline (e.g. 10 times higher). The CSR-AW standard for dissolved sulphate of 1000 mg/L has been applied but this may change in the future.

Starting March 2015, in an effort to reduce costs, all water samples were analyzed by Maxxam Analytics in favour of ALS Environmental (ALS). While both labs provided analyses of water

with similar detection limits, not all analysis methods were the same. Results have been consistent for all parameters except Sulphide as H_2S at low ranges.

3.3 Quality Assurance/Quality Control

Quality Assurance / Quality Control (QA/QC) for the Quinsam groundwater sampling program is conducted in accordance with *"The British Columbia Field Sampling Manual, For Continuous Monitoring and Collection of Air, Air-Emissions, Water, Wastewater, Soil, Sediment, and Biological Samples, 2013 Edition"* (MOE, 2013). During this reporting period, 34 replicate samples were collected across 20 sites. Sites where replicate samples were obtained included: MW00-1 D, MW00-2, MW00-4, QU08-13 A, QU08-21 GD, QU10-10 S, QU10-11 S, QU10-09 D, QU10-09 S, QU10-13 D, QU11-09 S, QU11-09 M, QU11-05 S, QU11-05 D, QU14-10, 5SMW, 5M#2, 242MW, QU11-01 and QU11-36 D.

Relative Percent Difference (RPD) values were calculated for the analytical results from the sample and its respective replicate. In accordance with the British Columbia Field-Sampling Manual, the calculation was applied as stated below:

$$RPD = Absolute \frac{(Sample\ Concentration - Replicate\ Concentration)}{\left(\frac{Sample\ Concentration + Replicate\ Concentration}{2}\right)}\ x\ 100\%$$

RPD calculations were only practical for results where concentrations were found at or greater than five times the reported detection limit (RDL) as there is considerable uncertainty at low levels. In addition, mathematical calculations for RPD appear exaggerated with low values where absolute differences may be relatively low.

3.3.1 Results of Field Replicates

It is expected to see variation between a sample and its respective field replicate for a number of reasons. Some considerations include: inconsistent sample stream at sampling locations; heterogeneity of water at sampling location; the possibility of minor contaminations; laboratory sample preparation and accuracy of analytical instrument to name a few. Taking these possibilities into consideration, RPD values less than 20% are deemed "acceptable" and indicate proper

sampling methodology with representative results. It has been acknowledged that RPD values greater than 20% indicate a potential problem with sampling integrity whereas values greater than 50% indicate a definite problem. When taking a groundwater replicate during a sampling event, approximately 60 parameters are analyzed from the same set of samples. It is common to have one or a select few of these parameters exceed an acceptable RPD threshold while the rest do not. Concerns over sampling integrity or methodology are raised when numerous results have high RPD values within the same sample or if certain parameters have repeated failures throughout the year. The following table displays failures observed in this year's monitoring period.

Table 3: Replicates & Relative Percent Difference Greater than 20%

Station	Date	Parameter	Detection Limit	Detection Limit X5	Result1	Result2	RPD
MW004	5-Jul-2018	N-D	0.02	0.1	0.09	0.152	51
QU1136D	27-Feb-2019	H2S	0.002	0.01	0.018	0.031	53
QU1410	19-Apr-2018	N-D	0.02	0.1	0.138	0.238	53
QU1013D	14-Mar-2019	Carb	1	5	4.6	8.1	55
QU1013D	14-Mar-2019	Alk-PP	1	5	3.8	6.8	57
5M#2	9-Oct-2018	Fe-T	0.01	0.05	0.863	0.408	72
MW004	5-Jul-2018	Turb	0.1	0.5	0.75	0.35	73
QU1009D	19-Mar-2019	P-D	0.002	0.01	0.01	0.0254	87
5M#2	9-Oct-2018	H2S	0.0053	0.0265	0.011	0.029	90
QU1105D	11-Dec-2018	N-D	0.02	0.1	0.18	0.476	90
QU1105D	11-Dec-2018	H2S	0.4	2	15	5.6	91
MW001D	20-Aug-2018	Mg-D	0.05	0.25	0.108	0.291	92
5M#2	9-Oct-2018	Turb	0.1	0.5	5.48	1.74	104
5SMW	30-Aug-2018	Acidity83	1	5	2.9	9.3	105
5M#2	9-Oct-2018	Carb	1	5	2.6	8.9	110
QU1105D	11-Dec-2018	Se-D	0.0001	0.0025	0.00172	0.0005	110
5M#2	9-Oct-2018	Alk-PP	1	5	2.1	7.4	112
QU1410	15-May-2018	DOC	0.5	2.5	2.65	0.73	114
QU0813A	5-Jun-2018	H2S	0.0053	0.0265	0.18	0.047	117
QU1410	26-Feb-2019	Cd-D	0.00001	0.00005	0.000084	0.000018	129
MW004	5-Jul-2018	P-D	0.002	0.01	0.0023	0.0139	143
QU1136D	27-Feb-2019	Pb-T	0.0004	0.002	0.00054	0.00397	152
QU1410	15-May-2018	Ba-D	0.005	0.025	0.192	0.0206	161
5M#2	9-Oct-2018	Pb-T	0.0002	0.001	0.00555	0.00056	163
QU1136D	27-Feb-2019	Cu-T	0.001	0.005	0.0045	0.0503	167
QU1009D	19-Mar-2019	Turb	0.1	0.5	5.23	290	193
QU1009S	20-Dec-2018	Turb	0.1	0.5	0.23	38.2	198

QU0813A	5-Jun-2018	Ca-D	0.05	0.25	32.8	40.4	21
MW001D	20-Aug-2018	Sr-D	0.001	0.005	0.0318	0.0393	21
QU0813A	25-Mar-2019	Turb	0.1	0.5	5.33	4.29	22
5SMW	30-Aug-2018	H2S	0.005	0.025	0.035	0.044	23
QU1109M	30-Jul-2018	Turb	0.1	0.5	150	118	24
QU1410	19-Apr-2018	Acidity83	1	5	15.5	19.8	24
QU1105S	12-Mar-2019	As-D	0.0005	0.0025	0.00778	0.00609	24
QU1101	19-Mar-2019	Acidity83	1	5	140	108	26
QU1101	19-Mar-2019	Turb	0.1	0.5	232	302	26
MW001D	20-Aug-2018	DOC	0.5	2.5	2.19	2.89	28
242MW	12-Dec-2018	N-D	0.02	0.1	0.096	0.127	28
QU1410	19-Apr-2018	P-D	0.002	0.01	0.0157	0.0118	28
QU1109S	18-Mar-2019	N-D	0.02	0.1	0.388	0.518	29
QU0813A	13-Dec-2018	N-D	0.02	0.1	0.155	0.207	29
QU1105S	11-Dec-2018	H2S	0.002	0.01	0.081	0.11	30
QU1136D	27-Feb-2019	N-D	0.02	0.1	0.237	0.322	30
QU0813A	25-Mar-2019	Se-D	0.0001	0.0005	0.00048	0.00066	32
MW001D	21-Feb-2019	DOC	0.5	2.5	2.1	2.9	32
5M#2	9-Oct-2018	Fe-D	0.005	0.025	0.216	0.299	32
QU1109M	18-Mar-2019	Se-D	0.0001	0.0005	0.00366	0.00263	33
QU1105S	12-Mar-2019	Se-D	0.0005	0.0025	0.0636	0.045	34
QU1101	19-Mar-2019	P-D	0.002	0.01	0.0153	0.0107	35
QU1410	26-Feb-2019	Acidity83	1	5	5.7	8.2	36
QU1105D	11-Dec-2018	As-D	0.0001	0.0005	0.0202	0.0139	37
QU1105D	12-Mar-2019	N-D	0.02	0.1	0.123	0.18	38
QU1105S	18-Sep-2018	P-D	0.002	0.01	0.0351	0.0237	39
QU0813A	25-Mar-2019	H2S	0.0019	0.0095	0.15	0.1	40
QU0813A	13-Dec-2018	H2S	0.002	0.01	0.10	0.16	46
MW002	4-Jul-2018	P-D	0.002	0.01	0.0106	0.0064	49

Within the 34 replicate samples and 1827 measurement pairs analyzed, 56 parameters had an RPD greater than 20% and of the 56 parameters, 27 had an RPD greater than 50%.

When assessing the parameters for replicate failures, it was noted that the parameters total sulphide and hydrogen sulphide lead with the amount of RPD exceedances this monitoring year. Sulphide replicate failures have been observed in other monitoring locations in past monitoring periods and prompted investigation. The expected reason for these parameters to see high variation between replicate and parent samples is in the reactive nature of sulphide when sampling. This parameter can change chemical state easily as it is sensitive to redox conditions in the sample matrix. For

example, sulphide concentrations are higher is some anoxic waters typically found in deep groundwater. When brought to surface, this water can become oxygenated and influence speciation changes that affect the analytical results. To limit false readings, preservation of sulphide must occur immediately by placing preservative in sample bottle prior to the deposition of sample water.

Another quality control measure to be applied next monitoring period is increased attention to cleanliness of sampling equipment and tubing installed in groundwater wells. Tubing assemblies installed within the wells are re-used as it is unfeasible to replace tubing assemblies wells every sampling event. An in-depth review of the integrity of the assemblies will occur immediately to evaluate the need for replacement. For tubing assemblies not installed in the well (portable bladder pump and surface sampling tubing), increased cleaning and proper storage methods will be applied.

4 Results and Discussion

4.1 References for Water Quality Data

Geochemical source terms have been developed by Lorax as a conceptual model that represents the progression of mine pool geochemistry for all mine pool areas on the Quinsam Mine Site. This model is explained in detail in the 7-South Development Mine Permit Amendment Volume 3, Appendix I and Volume 4, Appendix K.

Geochemical source terms were developed for the anticipated mine plan in 2-North, 3-North and 5-South mine areas where 7-South tailings will be stored, as well as 2/3North, 4-South and 5-South flooded mine voids without PAG-CCR or fine tailings. Source terms provide an overview developed for each respective mine area compared to the measured water quality.

The source terms have been developed using a set of empirical data including the following:

- Water chemistry collected from underground mine dewatering and mine void,
- Kinetic saturated column leach tests performed on 7-South CCR and tailings,
- Sulphur distribution in the proposed workings.

Comparison of water quality data to source terms can be found in tables within each respective area in the discussion of results.

All water quality results for groundwater wells located between mine working(s) and the receiving environment have been compared to Contaminated Sites Regulations for Aquatic Life (CSR-AW). Numerical standards used for CSR-AW are described in Table 4 below. A groundwater map displaying the location of each well in relationship to the underground mine area can be found in Appendix IX, Site Plan Groundwater Monitoring. Appendix I, Tables 172 to 267 display the analytical water quality results for 2018-2019.

Table 4: CSR-AW Standards Lowest Level for Dissolved Metals and Total Sulphide

Parameter	CSR-AW (mg/L)	Parameter	CRS-AW (mg/L)
Dissolved Sulphate	1280	Dissolved Lead	0.04*
Dissolved Chloride	1500	Dissolved Mercury	0.00025
Dissolved Fluoride	2*	Dissolved Molybdenum	10
Dissolved Silver	0.0005*	Dissolved Nickel	0.25*
Dissolved Arsenic	0.05	Dissolved Antimony	0.09
Dissolved Barium	10	Dissolved Selenium	0.02
Dissolved Boron	12	Dissolved Thallium	0.003
Dissolved Beryllium	0.0015	Dissolved Titanium	1
Dissolved Cadmium	0.0005*	Dissolved Uranium	0.085
Dissolved Chromium	0.01	Dissolved Zinc	0.075*
Dissolved Cobalt	0.04	Sulphide as H_2S	0.02
Dissolved Copper	0.02*		
***Indicates the Standard is hardness dependent**			

Table 5 below and Appendix I, Tables 172 to 173 display a summary of exceedances noted during the 2018-19 sampling program at the ex-situ wells compared to the CSR-AW.

Table 5: Parameters Above the CSR-AW Standards found in Ex-Situ Groundwater Wells

Parameter	Site with Failures	CSR-AW	Results Program
As-D	QU0810, QU08-13 (A and B) QU08-21G (S and D), QU10-08D, QU10-09 (S and D), QU10-10S, QU11-05S, QU11-09S, QU11-28 and QU11-36 (S and D)	0.05	0.0512 - 0.903
Cl-D	QU10-10D	1500	1600 - 3400
F-D	QU10-08D	2.00	2.4
H2S	QU08-21G (S and D), QU11-05 (S and D), QU11-05D, QU11-09S, QU08-13A, QU08-10, QU10-09S, QU10-10S, QU11-36 (S and D), QU11-18D and QU11-28	0.02	0.024 - 18
Se-D	QU11-05S	0.02	0.045 - 0.0636
SO4-D	MW002	1280 @ Hardness 30 mg/L	1290 - 1380

4.2 Key Observations and Conclusions

4.2.1 North Mining Area

The North mining area represents the largest operation on the mine-site and has been the longest project at Quinsam Coal spanning nearly 30 years of mining. The North mining area is divided into 3 sections based on source terms: 2/3 North Mine Void, 2 North Mine Water with 7-South tailings, and North Mining Area Ex-Situ groundwater.

4.2.1.1 2/3 North Mine Void

Much of the mined out 2/3-North mine is allowed to naturally flood and mine pool water has been found to be circum-neutral with a unique sulphate geochemical characteristic. Water is found to be oxic to strongly reducing in various locations in the mine. The source terms as established by Lorax (2011) are displayed in Table 7. Due to retreat and depillaring mining occurring in the 2-North mine the 6-Mains 2N pump was removed so there is no comparison to the area that does not contain tailings storage and has no influence from tailings storage in other areas of the mine. Previous monitoring years used samples from a well named QU11-03 in the 3-North mine (10 Panel) to represent the 2/3-North mine void. Sampling at this well was discontinued as water samples were difficult to obtain and a local fault was thought to influence water in this area and give potentially unrepresentative results.

As a result of the pump being removed in 2018/2019 no samples were collected from 6M2N as the pump was removed. Table 6 compares the expected and worst-case scenarios with previous results from 2017/2018. This table is used for reference only, representing 2017/2018 results. Within that monitoring period three samples were obtained at 6M2N with results averaged to compare to source terms. All parameters were below the expected value with many results well below. This is in contrast to the 2015 reported results where alkalinity, fluoride and boron were above expected values. Further monitoring on a frequent basis is required to accurately represent this location to ensure consistency and overall representation of this area.

Table 6: Source Terms Comparison for 2/3 North Mine Void from 2017/2018

2N Mine Void - 6M2N				
Parameters	**Expected**	**Worst Case**	**Annual Average**	**Comparison to Source Terms**
Alkalinity (CaCO3)	450	-	448	Below Expected
Fluoride (F)	0.29	0.3	0.056	Below Expected
Sulphate (SO4)	278	1280	183.3	Below Expected
Dissolved Metals				
Aluminum (Al)	0.013	0.027	0.006	Below Expected
Arsenic (As)	0.036	0.04	0.00153	Below Expected
Boron (B)	1.1	1.2	0.842	Below Expected
Cadmium (Cd)	0.00002	0.00008	0.000005	Below Expected
Cobalt (Co)	0.001	0.0035	0.0005	Below Expected
Copper (Cu)	0.001	0.004	0.00048	Below Expected
Iron (Fe)	0.49	2.45	0.0189	Below Expected
Manganese (Mn)	0.36	0.95	0.0584	Below Expected
Nickel (Ni)	0.001	0.008	0.001	Below Expected
Selenium (Se)	0.0002	0.001	0.00011	Below Expected
Zinc (Zn)	0.006	0.007	0.0056	Below Expected

All units in mg/L

*Pump was removed, no samples were collected in 2018/2019. This table is used for a reference.

4.2.1.2 2-North Mine Water with 7-South Tailings

1Mains 2-North (1M2N) is an area within the 2-North Mine that was mined, depillared and subsequently used as a sub-aqueous storage facility for fine tailings from the processing of 7-South coal. Prior to the injection of tailings into this area, this part of the naturally flooded workings was dewatered. The fine tailings were then pumped into the in-situ mine water, allowing for the tailings to settle out throughout 1 Mains until it was necessary to relocate the tailings line in early 2015 to accommodate underground operations. The 7-South fine tailings were then pumped into another area of the 2-North Mine, called 5 Mains. At the end of 2018 (December) the tailings line was redirected back to 1M2N. For the purpose of this monitoring program, both 1M2N and 5M#2 were compared to geochemical source terms and are expected to reflect those terms very closely. During this reporting period, analysis for the metals occurred on five events and dissolved sulphate and alkalinity two events and fluoride on one event for both 1M2N and 5M#2. Normally all

parameters would have the same number of events but there was an issue with the chain of custody sent to the laboratory where sulphate, alkalinity and fluoride were not requested.

The POI results from sampling events were averaged using half the detection limits to an annual average, and are displayed in Table 7 and 8, below. As shown, the majority of the parameters average to below the expected values, with the exceptions of alkalinity, fluoride, sulphate, iron, nickel and zinc. Iron concentrations in 1M2N reported much higher than expected due to improved sampling technique and field filtering/preservation introduced in 2016, after Lorax derived the source terms. Certain anoxic metals were observed to be suspiciously low in past monitoring and field filtering/preservation was implemented to improve representation. Water quality at 5M#2 is normally lower in most parameters compared to 1M2N due to this location being higher in elevation with less accumulated tailings stored here.

Table 7: Source Terms Comparison for 2-North Mine Water with 7-South Tailings

2N with 7S Tailings - 1M2N				
Parameters	**Expected**	**Worst Case**	**Annual Average**	**Comparison to Source Terms**
Alkalinity (CaCO3)	450	-	395.5	Below Expected
Fluoride (F)	1.1	1.2	0.180	**Above Expected**
Sulfate (SO4)	278	1280	541	**Above Expected**
Dissolved Metals				
Aluminum (Al)	0.013	0.027	0.00510	Below Expected
Arsenic (As)	0.113	0.125	0.00841	Below Expected
Boron (B)	1.1	1.2	0.999	Below Expected
Cadmium (Cd)	0.00002	0.00008	0.00000850	Below Expected
Cobalt (Co)	0.001	0.023	0.000340	Below Expected
Copper (Cu)	0.001	0.004	0.000340	Below Expected
Iron (Fe)	0.49	2.902	3.22	**Above Worst Case**
Manganese (Mn)	0.36	0.95	0.330	Below Expected
Nickel (Ni)	0.001	0.033	0.00170	**Above Expected**
Selenium (Se)	0.0002	0.007	0.000170	Below Expected
Zinc (Zn)	0.006	0.019	0.00850	**Above Expected**

All units are in mg/L

Table 8: Source Terms Comparison for 2-North Mine Water with 7-South Tailings

2N with 7S Tailings – 5M#2				
Parameters	**Expected**	**Worst Case**	**Annual Average**	**Comparison to Source Terms**
Alkalinity (CaCO3)	450	-	485	**Above Expected**
Fluoride (F)	1.1	1.2	0.094	Below Expected
Sulfate (SO4)	278	1280	181	Below Expected
Dissolved Metals				
Aluminum (Al)	0.013	0.027	0.0039	Below Expected
Arsenic (As)	0.113	0.125	0.00559	Below Expected
Boron (B)	1.1	1.2	0.864	Below Expected
Cadmium (Cd)	0.00002	0.00008	0.0000065	Below Expected
Cobalt (Co)	0.001	0.023	0.00026	Below Expected
Copper (Cu)	0.001	0.004	0.000306	Below Expected
Iron (Fe)	0.49	2.902	0.319	Below Expected
Manganese (Mn)	0.36	0.95	0.0573	Below Expected
Nickel (Ni)	0.001	0.033	0.0013	**At Expected**
Selenium (Se)	0.0002	0.007	0.00013	Below Expected
Zinc (Zn)	0.006	0.019	0.0102	**Above Expected**

All units are in mg/L

Figure 2 below displays sulphate concentrations in the 2-North mine pool compared to those developed as the expected and worst-case scenarios predictions derived by Lorax. The results display that 1M2N is above the expected case and nearing the worst-case scenarios, but 5M#2 remains below the expected case most of the time. QU10-13D seems to follow the same trend as 1M2N; this is related to the water elevation in the mine pool fluctuating based on pumping rates and groundwater infiltration.

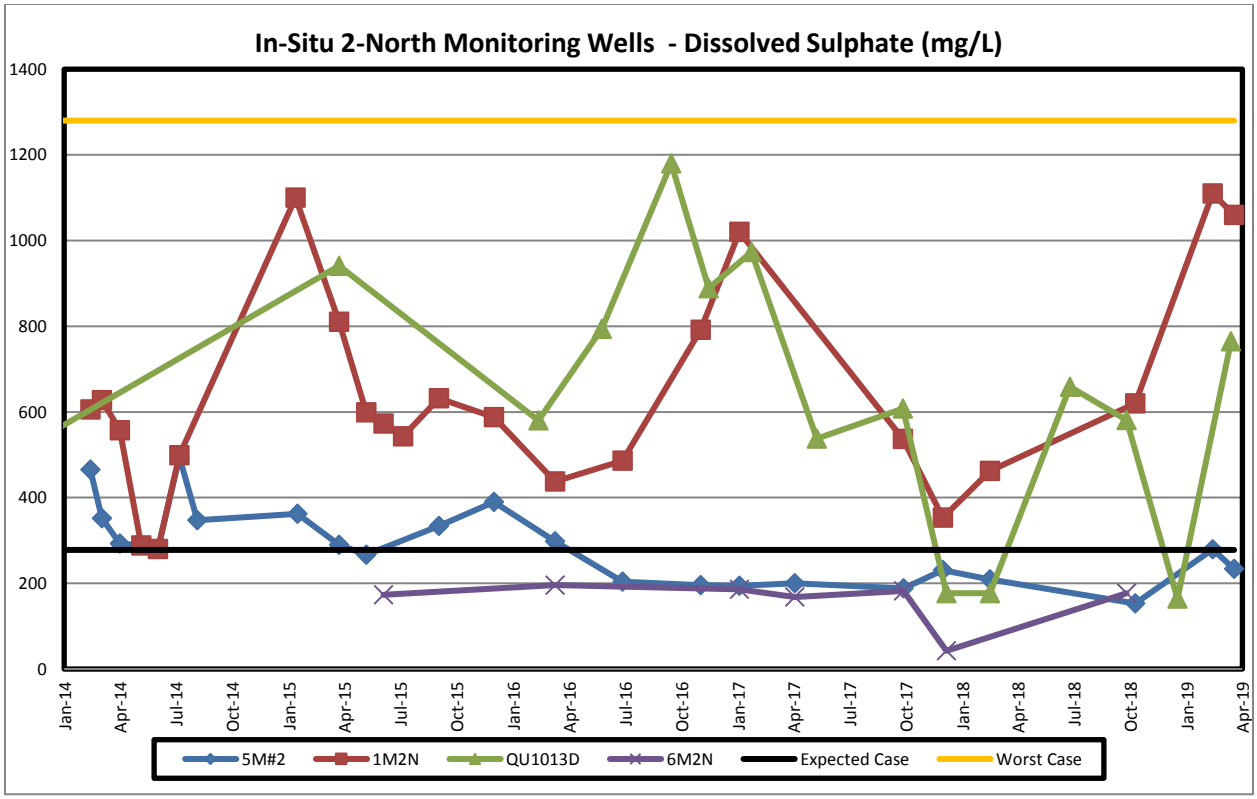


Figure 2: In-Situ 2N Monitoring Wells - Dissolved Sulphate

4.2.1.3 North Mining Area Ex-Situ Groundwater

The parameters of interest in the in-situ 2-North mining area were previously identified by Lorax in the 2-North/3-North and 5-South groundwater evaluation and include: fluoride, sulphate, aluminum, arsenic, boron, cadmium, cobalt, copper, iron, manganese, nickel, selenium, and zinc (Lorax 2011). It is conceivable that these parameters may be found within ex-situ wells as water from the 2-North area transports outside the mine void through the geological features surrounding and encompassing the 2-North mine.

Parameters that were observed to be trending high in 2-North / 3-North include sodium and dissolved iron. Those parameters that displayed exceedances against the CSR-AW were graphed along with sodium and dissolved iron. Parameters above the CSR-AW included arsenic, chloride, and sulphide (as H_2S). Arsenic and sulphide (as H_2S) were observed elevated in groundwater wells

QU10-10 S, QU08-21G (S and D) with chloride elevated in QU10-10 D. Appendix I, Tables 172 and 173, and Figures 3 through 5 below, represent the water quality results for these areas.

Notable observations for this area include:

- Most parameters remained consistent with previous monitoring years with no major changes
- All POI were below the CSR-AW standards except dissolved arsenic, sulphide and chloride
- Dissolved arsenic concentrations exceeded the CSR-AW standard (0.05 mg/L) in all sampling events at Q08-21G (S and D) and QU10-10 S,
- H_2S concentrations at QU08-21G (S and D) were found in excess of the CSR-AW standards (0.02 mg/L) on three sampling events and one event at QU10-10 S
- Dissolved iron was found in highest concentration in the No. 1 coal seam (QU10-10 D) with a max concentration of 8.82 mg/L for 2018-2019, consistent with previous years however, both May and November sampling results were exactly the same (8.82 mg/L)
- Chloride has been elevated above the CSR-AW in all sampling events since 2014 at QU10-10 D and has shown moderate concentrations with fluctuations at both QU08-21G (S and D)
- Sodium concentrations found within the Ex-Situ wells have shown similar profiles to that of chloride evolving to sodium chloride type water as it ages in the formation flow path
- An increased sulphate concentration was observed in the well QU10-10 S in fall 2016 did not persist through this monitoring period

Throughout the 2-North, 3-North, and RBP areas, wells located in the ‘deep’ Cumberland Member of the stratigraphic column, particularly #1 coal seam, have consistently reported low dissolved arsenic during all sampling events. Wells in ‘shallower’ Dunsmuir Member sandstones, particularly nested in the area of the #4 coal zone, reported arsenic values that were consistently elevated. The Dunsmuir sandstone member contains higher levels of arsenic and has been verified during drilling programs conducted by Quinsam Coal. These observations are consistent with the findings of Lorax (Lorax[(2)], 2011), who determined that elevated arsenic concentrations are found in formation waters of the Dunsmuir Formation including sandstone and the #3 and #4 coal zones. These results are in contrast of those found from formation waters of the #1 coal zone of the Cumberland Member. An exception to this observation is the monitoring well QU08-21G S and

D. QU08-21G is fault separated from the other 2 North and 5 South wells in the No. 1 coal seam (Lorax[(2)], 2011) This well is nested within the Cumberland Member on the Eastern side of the Forjan Fault, and while lower than those found in the Dunsmuir Member Sandstones and coal measures, all three sampling events during this reporting period exceeded the CSR-AW standards. The groundwater in this location follows a different flow path than other No. 1 coal seam wells in 2-North (Lorax[(2)], 2011). Figure 3 displays arsenic concentrations in the 2-North area.

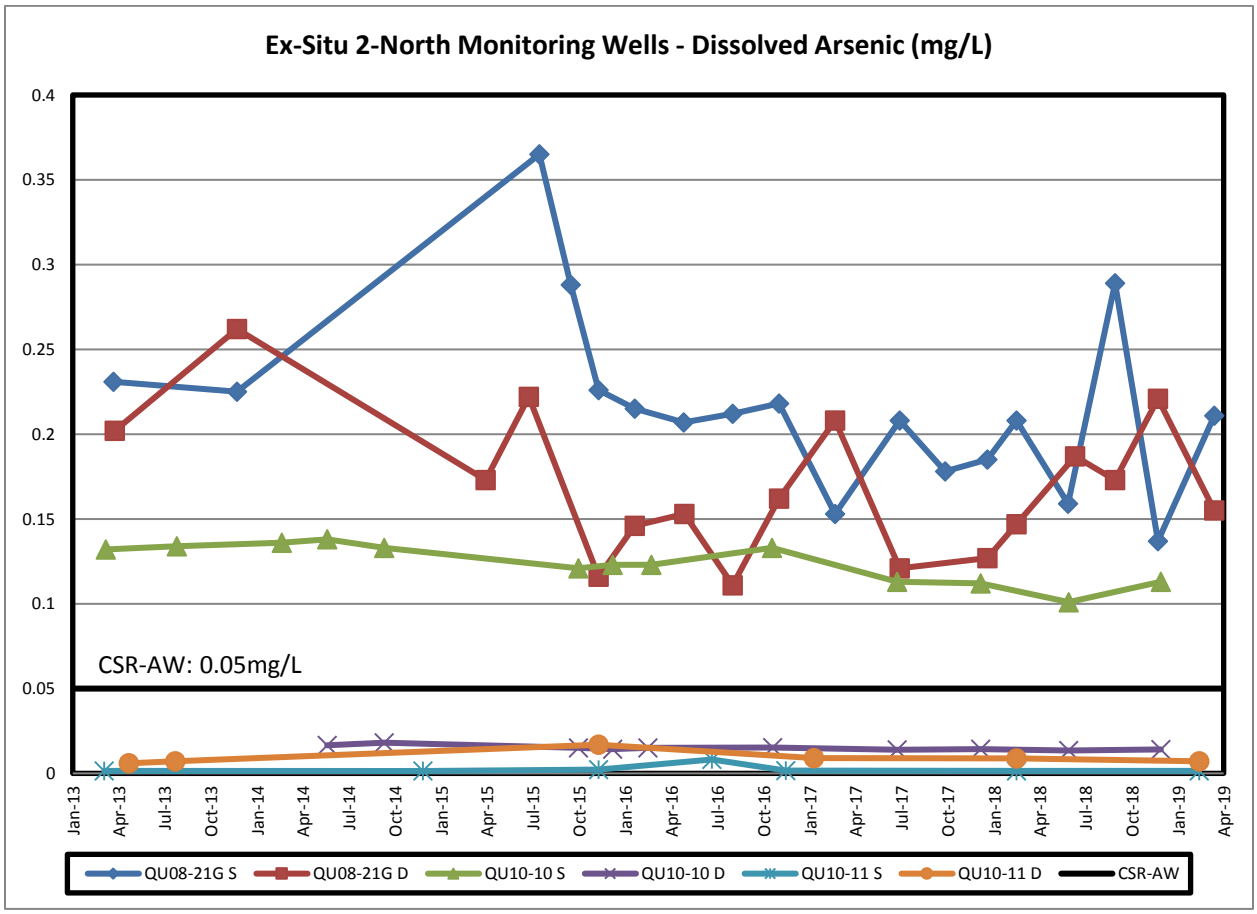


Figure 3: Ex Situ 2-North Monitoring Wells - Dissolved Arsenic

Concentrations of dissolved sulphate in the 2-North mine area outside of mine workings are low and frequently below detection levels (0.5 mg/L). A notably higher sulphate result was reported at the well QU 10-10S during heavy precipitation in October while water levels in the 2-North mine increased considerably. Additional sampling information has not shown a persisting trend with dissolved sulphate to date but will be monitored closely in the future with relation to water levels

in the mine pool. There is little trending or concerns with sulphate for the remainder of the 2-North ex-situ wells.

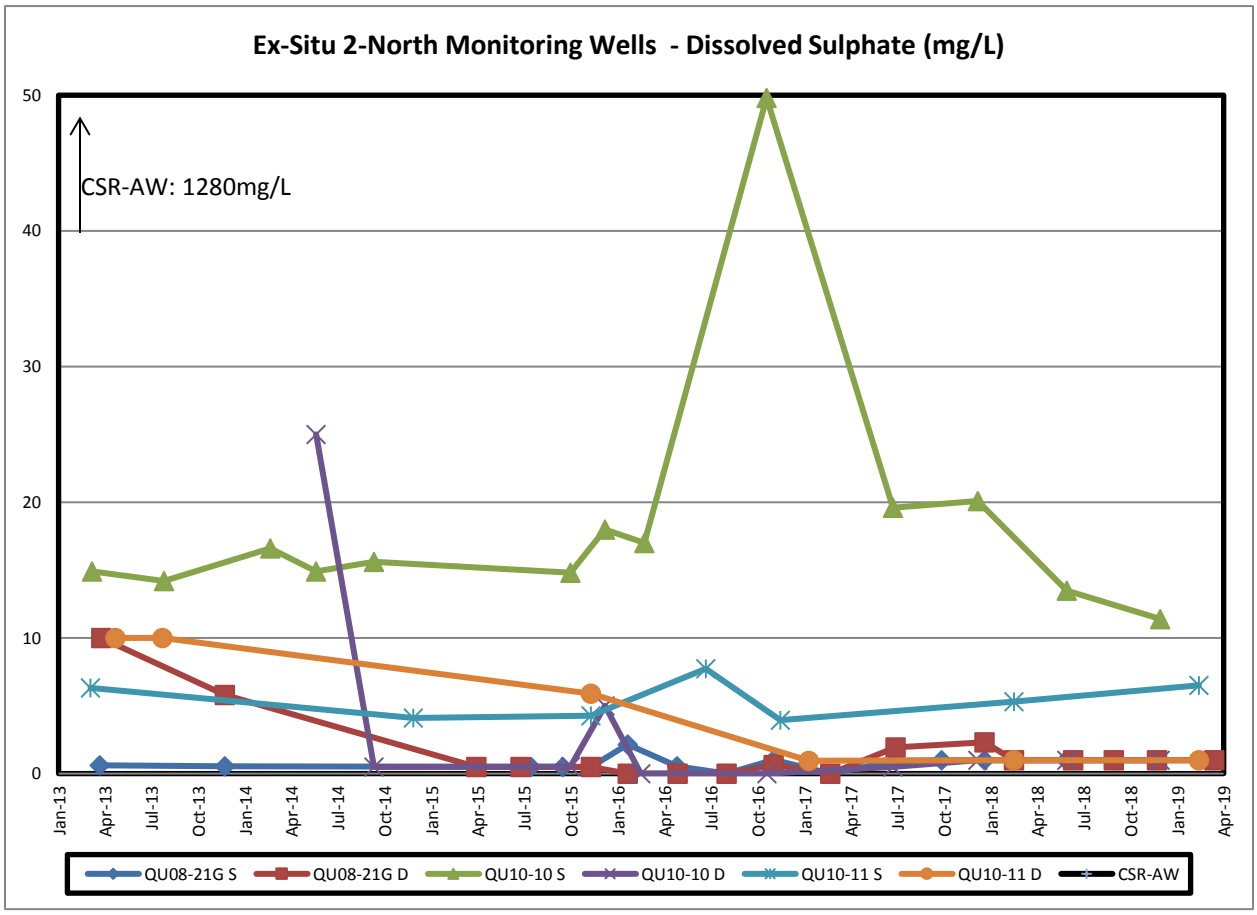


Figure 4: Ex-Situ 2N Monitoring Wells – Dissolved Sulphate

Sulphide has been found in elevated concentrations in many monitoring wells near the mine site. Sulphur is present in local geologic formations (particularly coal seams) and has been extensively documented by Quinsam Coal. As water interacts with sulphur bearing rock, leaching of the sulphur occurs and it can take many different forms dissolved into the water. Sulphide (as H_2S) occurs in groundwater with low dissolved oxygen and negative redox potentials. In the presence of oxygen, sulphur typical takes the form of a much less toxic sulphate. Figure 5 displays sulphide concentrations found with ex-situ 2-North wells. Sulphide is present in elevated concentrations in wells QU08-21 G (D & S). These wells intercept groundwater from the #1 and #4 coal seams, respectively and have been found to have low dissolved oxygen and negative redox potentials. Of note was an elevated sulphide in QU10-10 S occurring in May 2018 further monitoring displayed reduced results.

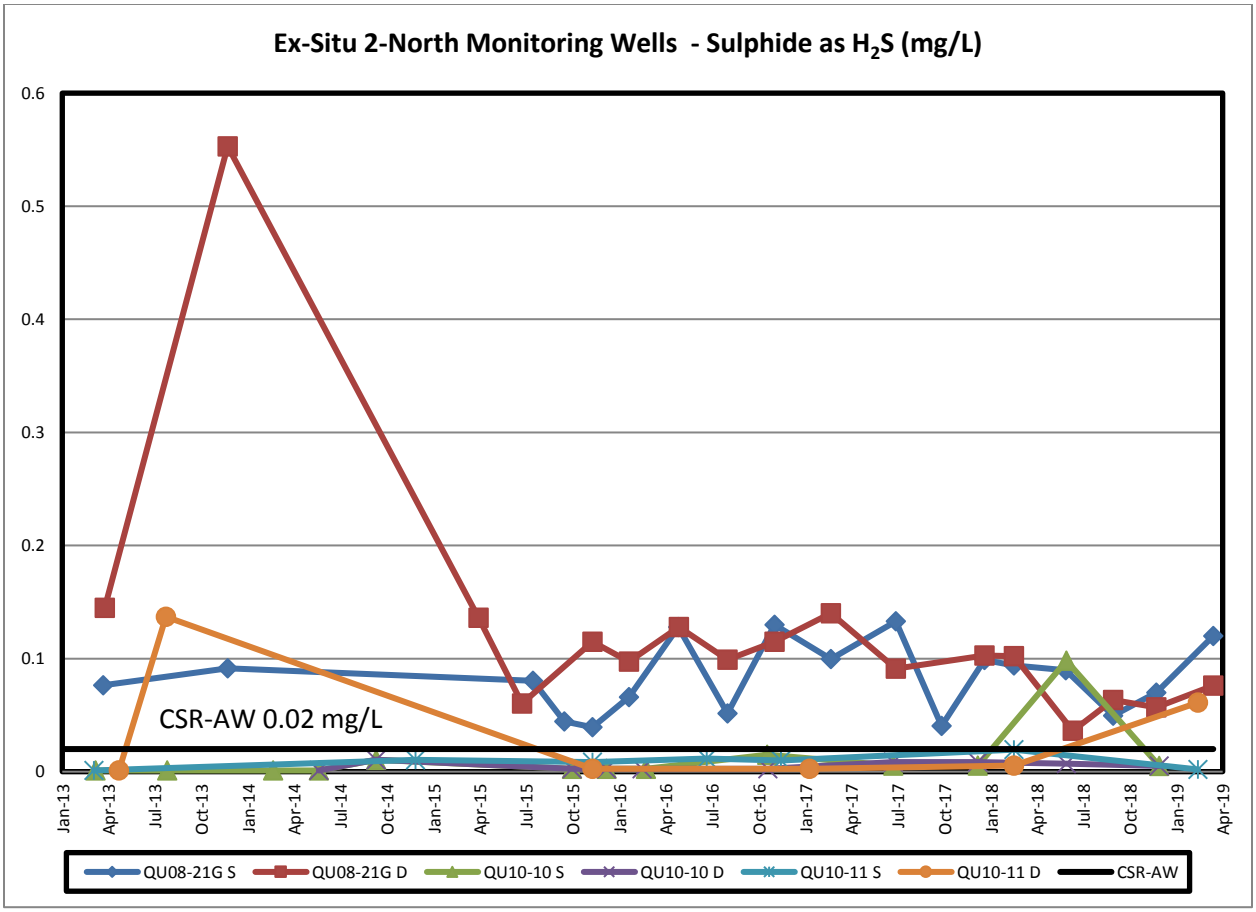


Figure 5: Ex-Situ 2N Monitoring Wells - Sulphide as H_2S

4.2.2 River Barrier Pillar Area

4.2.2.1 River Barrier Pillar with 5-South CCR

Groundwater well QU11-09 M represents water in the underground PAG-CCR disposal location at 87 Panel RBP. Disposing of PAG-CCR was completed in the RBP in September of 2012 with the PAG-CCR elevation at 153.5 m. The water level in QU11-09 M increased since 2012 from 145 m to 180 - 210 m dependent on groundwater influx and dewatering efforts in 2-North. Groundwater elevations will continue to be monitored to better understand the dynamics within the RBP with respect to historic mining operations.

Source terms for the River Barrier Pillar (RBP) with PAG-CCR were originally developed using 7-South CCR quality data. As mining operations progressed, a storage area for the existing 5-South PAG-CCR was needed prior to mining 7-South. The RBP location was deemed suitable and excess

5-South PAG-CCR was backfilled in that location. In previous reports, the generated source terms (using 7-South PAG-CCR) were used for comparing and evaluating water quality results. As these source terms aren't necessarily applicable for water quality in this storage area, additional information including annual averages were used to help evaluate water quality.

As displayed in Table 9, source terms derived from 7-South PAG-CCR along with annual and cumulative averages have been calculated. Observations for each parameter in QU11-09 M are as follows:

- Alkalinity has shown a steady increase since initial flooding of the PAG-CCR
- Fluoride saw an increase after initial flooding in 2014 but has since declined
- Sulphate saw its highest concentrations during initial flooding and saw a steep decline in 2014 after water levels increased
- Sulphate concentrations have since stabilized within a predictable range and seem to vary with water levels
- Arsenic has remained in moderate concentrations with an annual average increase this year
- Boron remained relatively stable after initial flooding
- Cadmium has been observed in low levels throughout monitoring
- Cobalt saw an increase after initial flooding and has since declined
- Iron and manganese have stabilized and have started to decline in concentration
- Nickel has remained in low concentrations
- Selenium has displayed the greatest increase of all parameters this year with an annual average of 0.000768 mg/L above worst case source terms of 0.0004 mg/
- Zinc has slight fluctuations but remains stable

Table 9: Source Terms Comparison for RBP with 7-South CCR and Averages

RBP (QU-11-09 M) w / 7S CCR			2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-19	Average of all years
Parameter	Expected Case	Worst Case								
Alk-T	282			387.8	412.9	508	508.6	513	488	470
F-D	0.71	1	0.2	0.248	0.35	0.118	0.114	0.108	0.238	0.20
SO4-D	396	1990	2210	1540	1031	1220	1206	915	638	1251
Al-D	0.02	0.05	0.0075	0.001	0.0059	0.00847	0.00631	0.00676	0.00702	0.006
As-D	0.128	0.19	0.00335	0.00332	0.00479	0.00709	0.00523	0.00258	0.04058	0.0096
B-D	0.71	1.88	1.9	1.51	1.114	1.34	1.09	1.074	1.39	1.35
Cd-D	0.000017	0.000175	0.000025	0.00001	0.0000089	0.00000417	0.00002224	0.00001038	0.00000833	0.0000127
Co-D	0.005	0.148	0.0129	0.00496	0.01237	0.000485	0.000274	0.0004	0.000333	0.0045
Cu-D	0.001	0.0001	0.00125	0.0002	0.000471	0.002193	0.000183	0.0004	0.000333	0.0007
Fe-D	0.805	33.5	0.499	7.72	16.19	16.6	19.3	13.7042	6.943	11.565
Mn-D	0.14	2.89	0.424	0.314	0.5	0.4	0.427	0.2955	0.1681	0.361
Ni-D	0.007	0.213	0.0299	0.007	0.0141	0.0006	0.00058	0.002	0.00167	0.0080
Se-D	0.0002	0.0004	0.00025	0.0001	0.000093	0.00005	0.000055	0.0002	0.000768	0.00022
Zn-D	0.008	0.088	0.0075	0.001	0.00186	0.00755	0.00279	0.01	0.00833	0.0056

4.2.2.2 RBP Ex-Situ Groundwater

Concentrations of dissolved sulphate measured in the ex-situ wells of the River Barrier Pillar area are low but are elevated enough to assist with analysis of the groundwater paths exiting from the in-situ mine waters (Figure 6). Storage of the PAG-CCR and subsequent flooding of the workings are thought to contribute to these elevated sulphate concentrations.

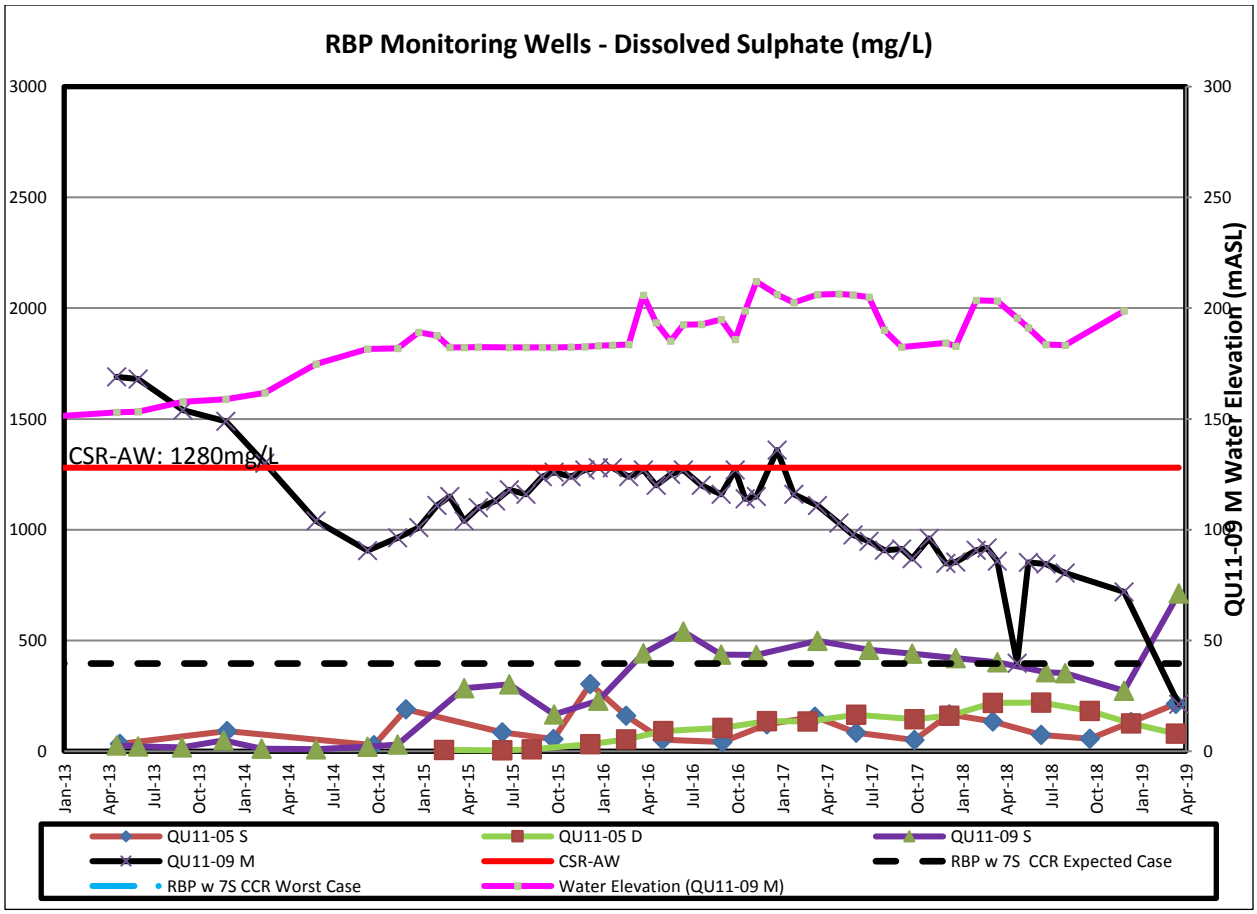


Figure 6: Ex-Situ River Barrier Pillar Monitoring Wells – Dissolved Sulphate vs. Water Elevation

QU11-05 D is nested down dip/gradient from the RBP PAG-CCR storage facility in the #1 coal seam and contains dissolved sulphate levels that have steadily increased from 6 mg/L in June 2015, to 219 mg/L in March 2018 with a slight declining trend since then. These steadily increasing levels indicate water transport from either the RBP, 2 North workings, 5-South workings or a combination of all three. Another parameter that has shown a steep increase concurrent with sulphate from June 2015 to June 2018 is sulphide as H_2S. The high depth of this well along with low dissolved oxygen indicates a favourable location to have high sulphide concentrations. This trend for high sulphide decreased considerably since June 2018 from 13.7 mg/L to 0.361 mg/L in March 2019 as displayed in Figure 7 below.

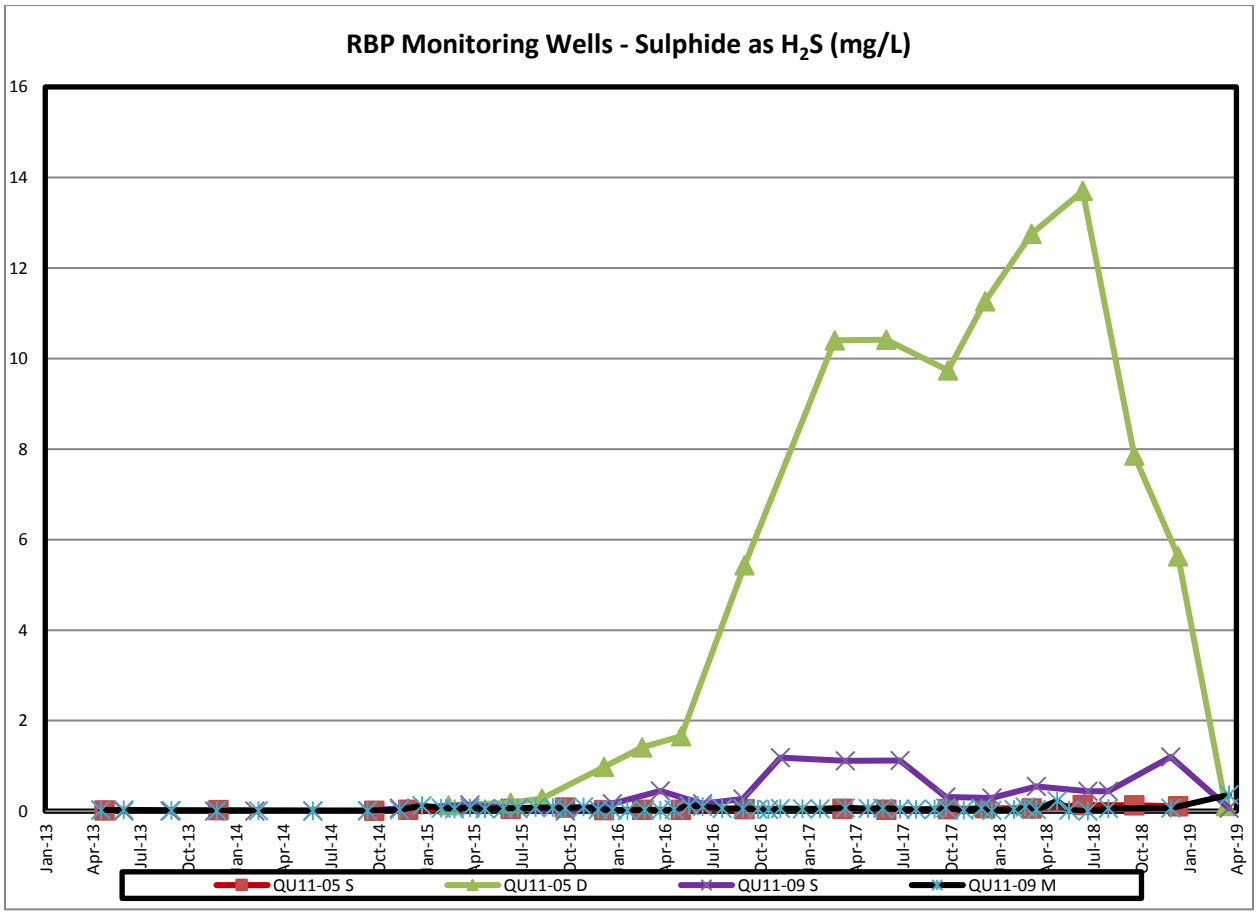


Figure 7: Sulphide as H_2S in RBP

QU11-05 S, nested stratigraphically above, but down gradient/dip from the RBP, report sulphate concentrations that are elevated compared to other 2-North wells. The increase in sulphate concentrations occur as autumn precipitation bring large quantities of water to the mine site and water levels underground rise. The fluctuations aren't completely proportionate to underground water levels in either the RBP or 2-North mine pool; however, they provide some evidence that there is hydraulic conductivity or migration of groundwater across the stratigraphy.

QU11-09 S is a well nested in the stratigraphy directly above the RBP in-situ monitoring well, QU1109-M. Prior to 2015, sulphate concentrations at this well have ranged from approximately 20-50 mg/L when water levels were low in the PAG-CCR storage area below. Since early 2015, sulphate concentrations have fluctuated but have generally increased at this location ranging from 166-540 mg/L. As displayed in Figure 6, sulphate concentrations at QU11-09 S appear to be directly correlated to groundwater elevations in the PAG-CCR storage area. This increase indicates

migrating in-situ waters up vertically, likely via the natural hydraulic conductivity of the geology, as well as structural conduits (fault and joint planes) encountered during mining. Based on observations, these increases occur when groundwater elevation in the well below rise above 181-185 MASL, the elevation at which the lithology transitions into the sandstone that hosts QU11-09 S. It can also be inferred that water migrating to this well is sourced from above the 5-South mine. See Figure 8 for groundwater migration paths (Lorax, 2011).

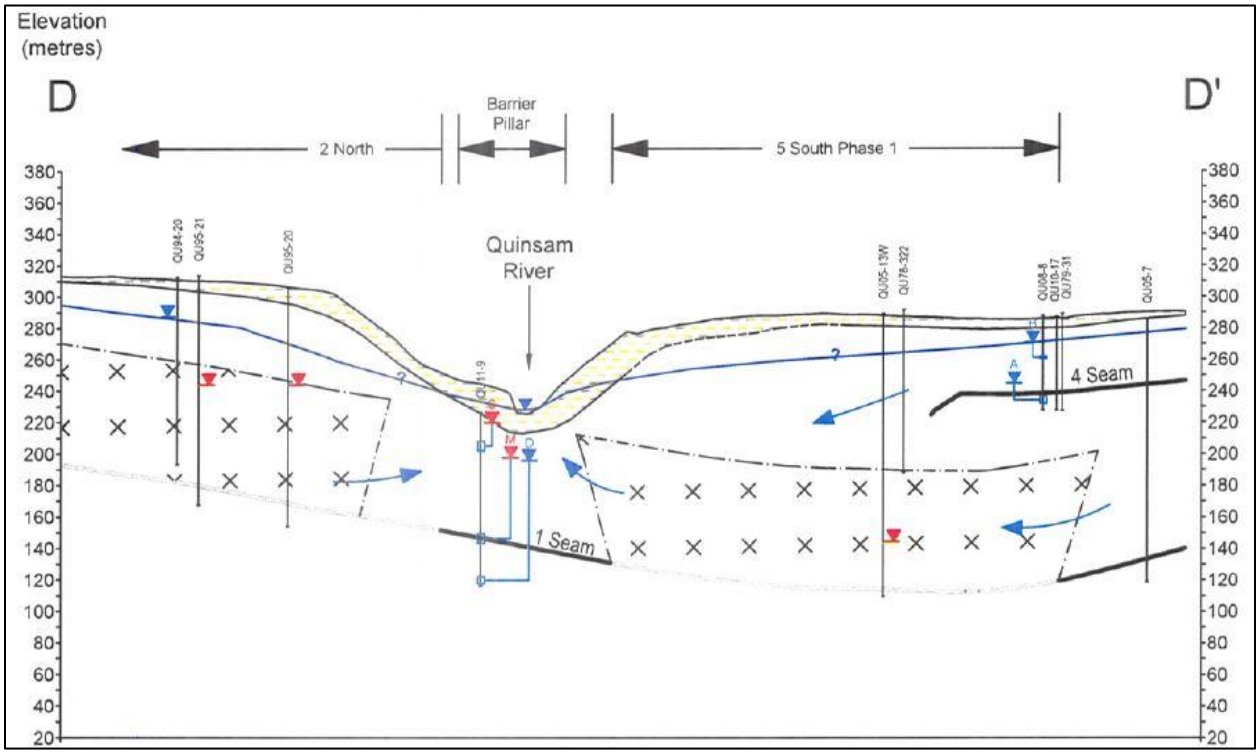


Figure 8: Groundwater Transport in RBP and Vicinity

Following the completion of the 8-Mains plugs (engineering control established to eliminate unnatural mixing of groundwater accumulated in the 5-South side of the mine, and the 2-North side of the mine) in February of 2014, the water levels in 5-South began to rise, increasing the hydraulic head pressure on the groundwater stored in 5-South and RBP. It is assumed that as the water level rose, the pressure on the groundwater flow path was increased, as shown by the increase of sulphate levels in QU11-09 S.

4.2.3 North Mining Area Plant Monitoring Wells

Two nested monitoring wells (MW00-6 and MW00-1) are in the peripheries of a catchment drainage ditch located below the coal processing plant (CPP) and the clean coal pad. Both wells contain a "shallow" and "deep" groundwater intercept nested at different depths of the overburden till layer as shown in Appendix C.

Noted in the well installation completion log for MW00-1 (D&S), the 'Shallow' well was nested in a layer of the till that contained a larger percentage of cobbles and coarse gravels compared to the finer grained gravelly sands and clay materials noted surrounding the 'Deep' well. This is important to note, as observations made in the shallow groundwater wells compared to the deep wells include more conductive water that is higher in alkalinity and exhibits elevated concentrations of dissolved sulphate. This leads to the assumption that the shallow wells are getting direct communication from the CPP and clean coal pad via the catchment drainage ditch while the deeper wells are isolated from that groundwater due to some other control, possibly based on grain size differences in the till. However, while the differences between the groundwater results from the shallow and deep wells are obvious, any difference between the host till of the shallow and deep well located at MW00-6 were not noted in the completion log and therefore cannot be easily explained by geologic control. MW00-1 D is nested significantly deeper in the till at 28 metres than MW00-6 D at 14 metres. Interestingly, MW00-6 is geographically closer (while only 15 metres) to the plant ditch and coal pad where iron and sulphate should be observed in higher concentrations.

Historically, MW00-1 S displayed slightly acidic conditions, with the pH falling just below 6.4 on most occasions, while MW00-6 S was generally neutral. The deeper wells are more alkaline with pH ranging from 8.3-9.5. MW00-1 S displayed the highest concentrations of dissolved sulphate, hardness, iron, manganese and other constituents. The deeper wells (MW00-1 D and MW00-6 D) have low concentrations of metals and sulphate with alkaline pH and low conductivity. Since January of 2013, regardless of the variation of precipitation throughout the year, the groundwater maintains its natural path through the clean coal pad and its surroundings, into the ditch, and through the till substrates.

Consistent with past years, dissolved arsenic (Figure 9), aluminum and zinc are found in greater concentrations in the deeper wells than the shallow wells but remain at moderate concentrations and below CSR-AW standards. The main concern and objective of these wells is to intercept plant stockpile water to trace effects the coal pad may have near Middle Quinsam Lake.

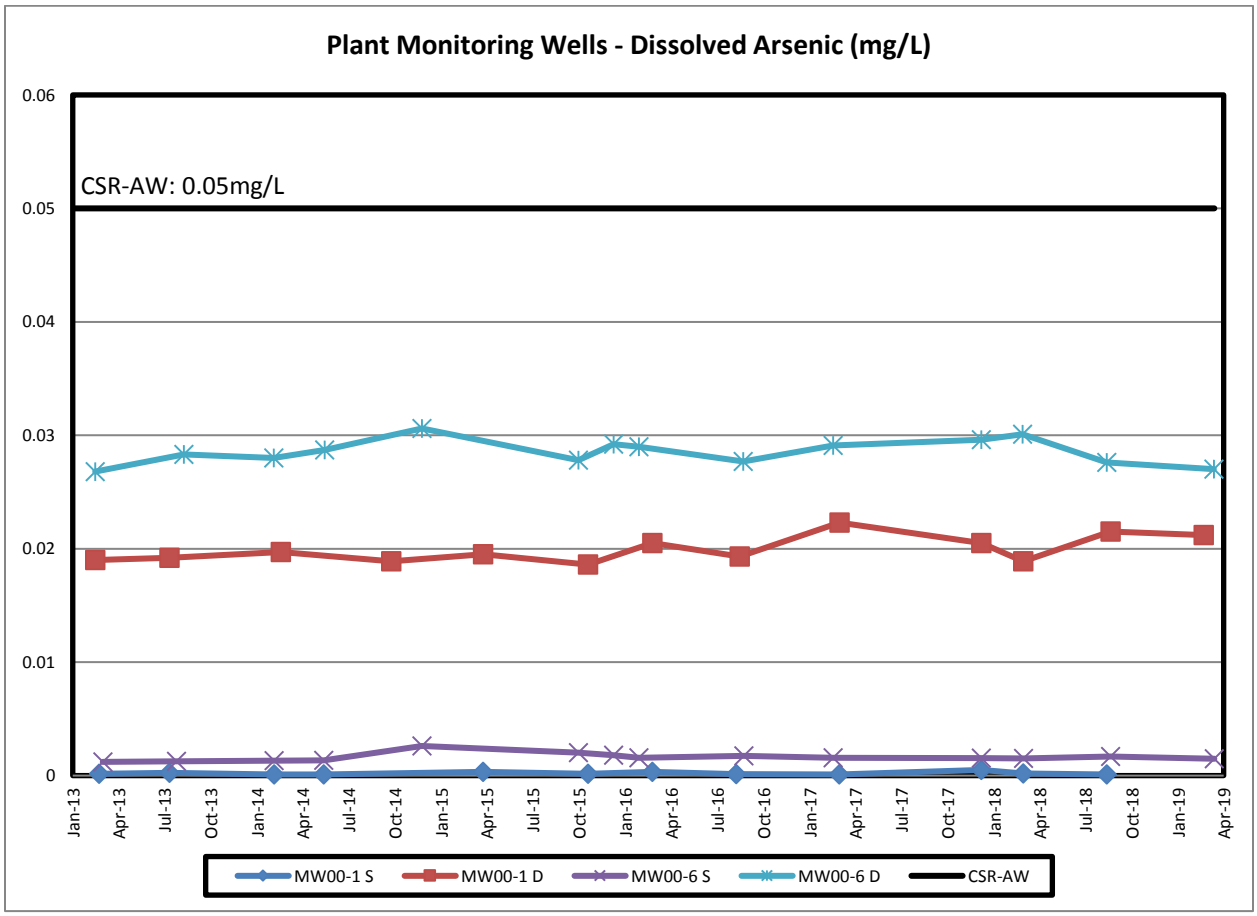


Figure 9: Plant Monitoring Wells – Dissolved Arsenic

Dissolved sulphate levels (Figure 10) in MW00-1 S exhibit a decreasing trend since mid-2013 with some apparent seasonal variation showing higher concentrations of sulphate throughout the drier season and lower concentrations through the rainy season. Dissolved sulphate concentrations at MW00-6 S have shown an obvious decrease over the last four years with little seasonal variation. This decrease indicates that the improved water management practices implemented have had positive effects on local groundwater as seepage from tailings have not been transported across the plant ditch into the 2N PAG-CCR storage facility.

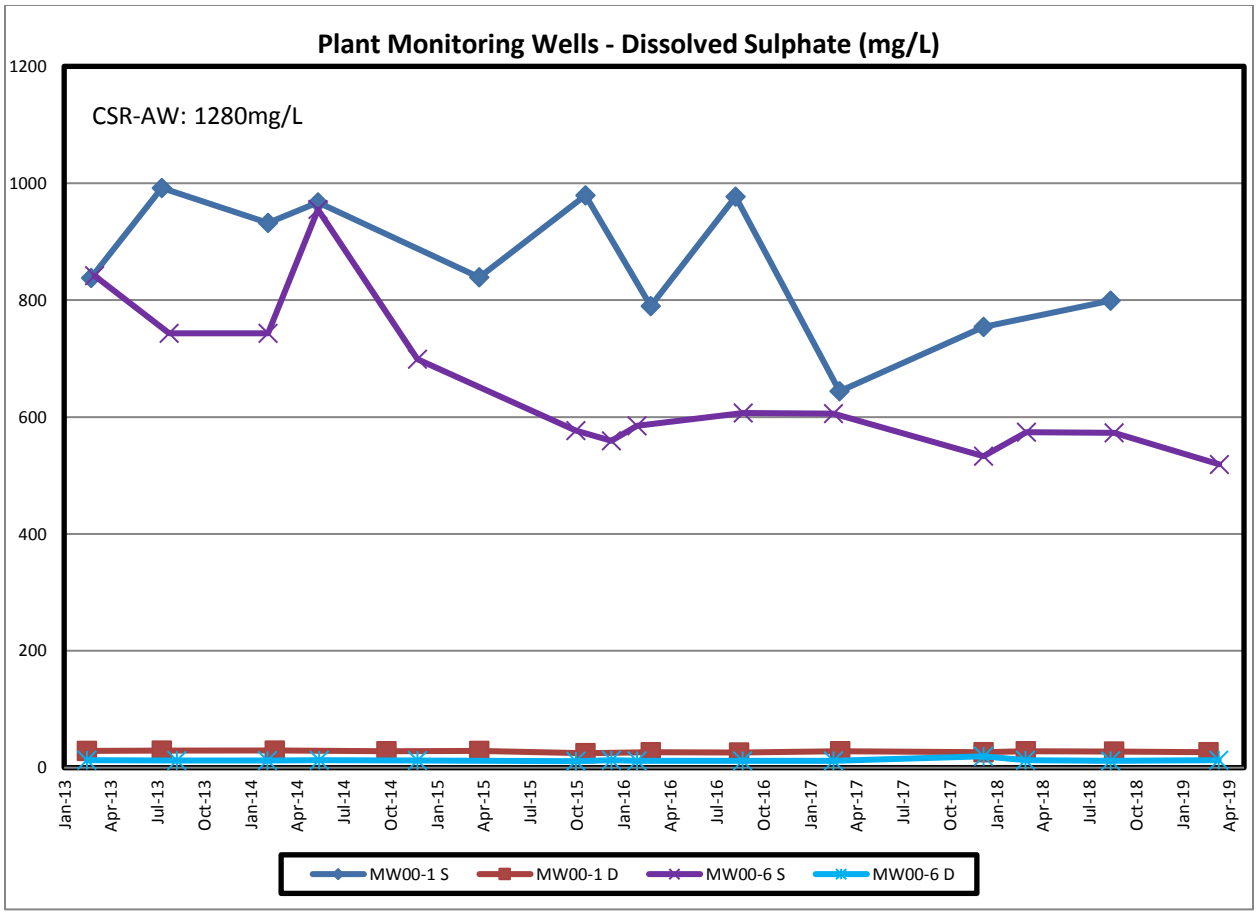


Figure 10: Plant Monitoring Wells – Dissolved Sulphate

The Quinsam Coal Environmental Department is currently assessing this area of groundwater monitoring, considering the possibility of eliminating one of these monitoring wells (due to similar parameter trends) and re-establishing a groundwater monitoring site closer to the southern drainage of the CPP and the clean coal pad.

4.2.4 7-South

4.2.4.1 7-South Mine with PAG-CCR

Area 2 of the 7-South mine is being used as a sub-aqueous PAG-CCR storage facility for waste material produced by the mechanical processing (crushing and floatation) of the 7-South raw coal product. Storage of this PAG-CCR commenced March 12, 2015 and has subsequently flooded due to natural groundwater infiltration. The in-situ flooded water in this area has been monitored using

well QU14-10, with 10 sampling events taking place during this monitoring period. The 7-South mine void water will continue to be monitored following completion of mining and subsequent subaqueous disposal of PAG-CCR.

Lorax predicted Source Term concentrations, which are provided in Mine Permit (C-172) Amendment; 7-South Development Volume 3 Appendix J. Lorax outlined three scenarios in which results would vary, which are, in summary:

> Scenario 1: Water quality based on the CCR that is being stored, having been given enough time on surface (greater than 2 years) to become acidic, prior to being flooded.
> Scenario 2: Water quality based on the CCR being stored less than 2 years since being produced, which would not be acidic.
> Scenario 3: Expected long term water quality concentrations following the complete dissolution of stored oxidation products and the influenced mine water being completely discharged from the mine, or re-stabilized as metal sulphides within the flooded workings.

Table 10 displays the Source Term expectations for Scenario 2 and 3 (omitting Scenario 1 as PAG-CCR was stored and flooded in less than the predicted two years for the PAG-CCR to become acidic), as well as the average results for the sampling events of 2018-19 using half the detection limits for those results reported as less than detection limits. Average concentrations calculated are then compared to scenario 2 as they are most applicable to what is expected at this point in time. It is noted that sulphate, arsenic, copper, iron, manganese and nickel have increased since monitoring began. As reported in past monitoring years, dissolved boron and sulphate exceed expected results while copper and aluminum have not exceeded expected results through this monitoring period as they had last year. Although not a parameter of interest, the water in the flooded 7-South workings is very hard, higher than any other well on site. Hardness levels averaged 20 mg/L, indicating a strong influence from calcium and magnesium carbonates, likely found interstitially in the sandstone that is a large constituent in the 7-South coarse coal reject.

Table 10: Source Terms Comparison for 7-South with PAG-CCR

Parameters	Scenario 2 (CCR not acidic) Expected Values	Scenario 3 (Long term chemistry)	2018/19 Average Results from Q14-10	Results obtained- compared to Scen. 2
Fluoride (F)	0.6	0.1	0.224	Below Expected
Sulphate (SO4)	1260	22	1882	**Above Expected**
Aluminum (Al)	0.009	0.005	0.00776	Below Expected
Arsenic (As)	0.19	0.099	0.0838	Below Expected
Boron (B)	0.98	0.13	1.21	**Above Expected**
Cadmium (Cd)	0.0002	0.000012	0.0000189	Below Expected
Cobalt (Co)	0.062	0.0003	0.00062	Below Expected
Copper (Cu)	0.001	0.0002	0.000576	Below Expected
Iron (Fe)	6.705	0.015	1.538	Below Expected
Manganese (Mn)	2.885	0.08	1.49	Below Expected
Nickel (Ni)	0.122	0.0009	0.00411	Below Expected
Selenium (Se)	0.004	0.0001	0.00022	Below Expected
Zinc (Zn)	0.088	0.004	0.011	Below Expected

All units are in mg/L

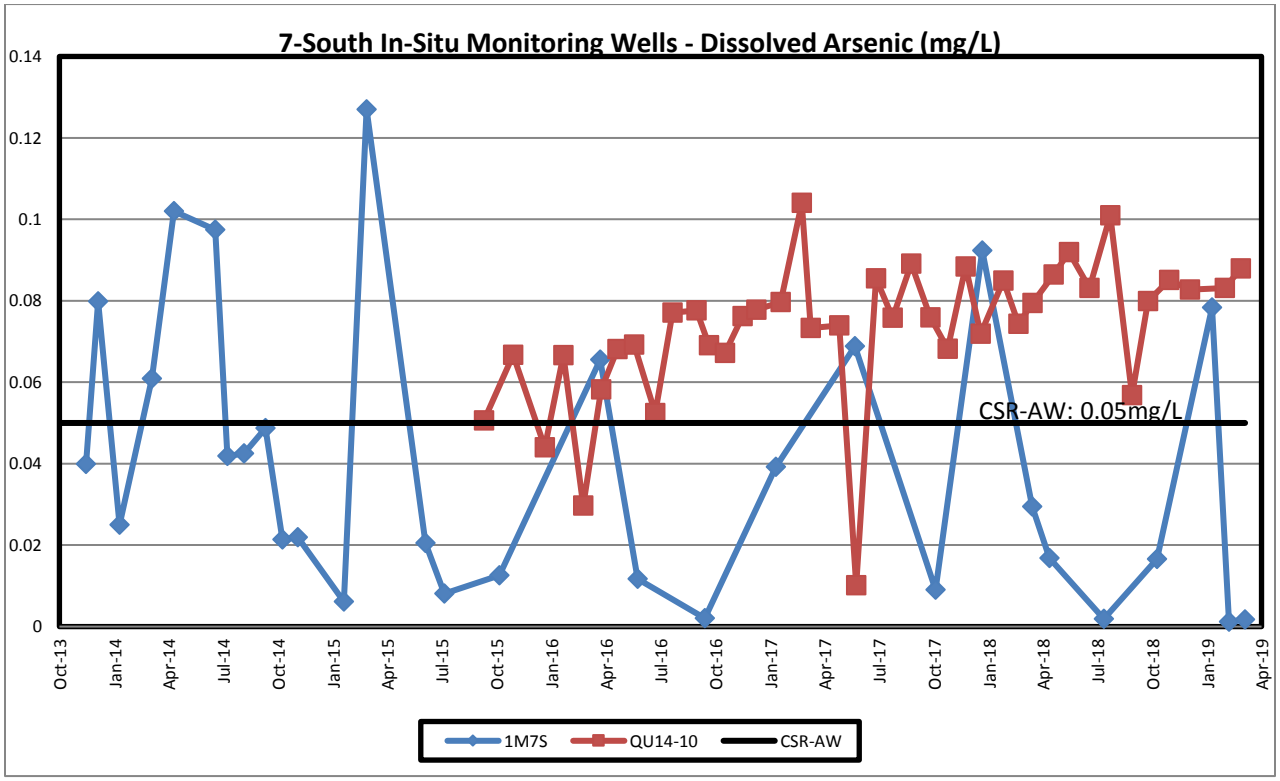


Figure 11: 7-South In-Situ Monitoring Wells - Dissolved Arsenic

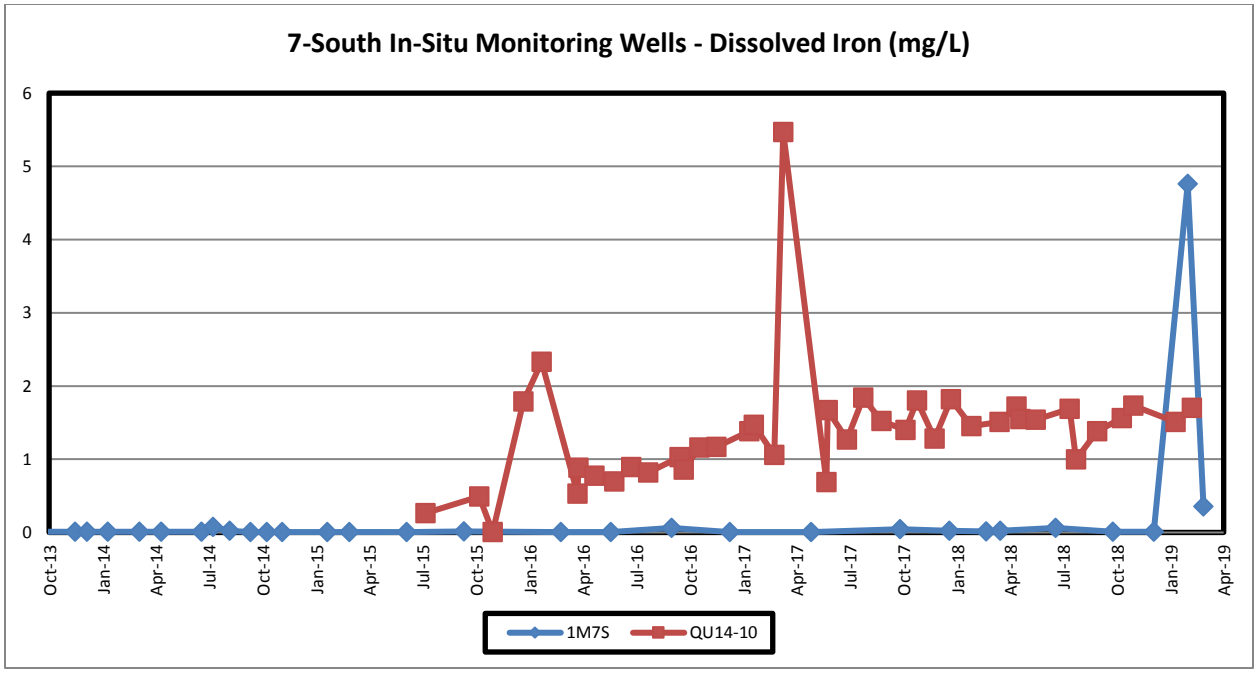


Figure 12: 7-South In-Situ Monitoring Wells - Dissolved Iron

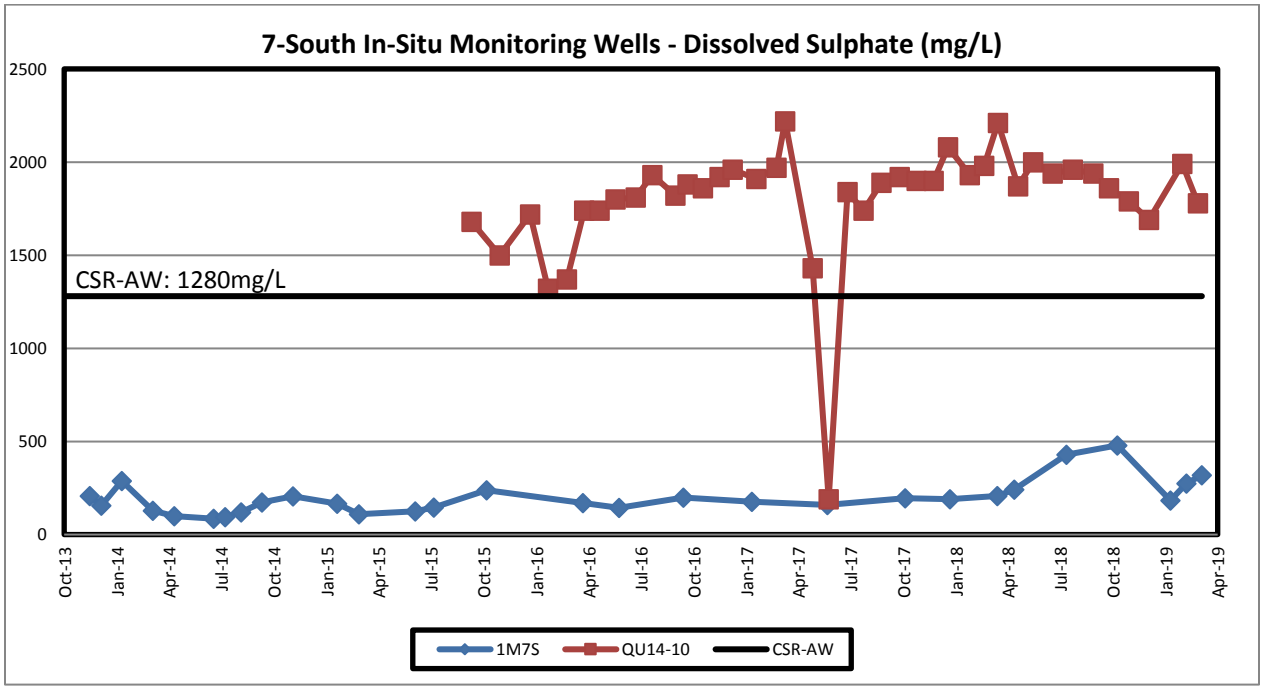


Figure 13: 7-South In-Situ Monitoring Wells - Dissolved Sulphate

4.2.4.2 7-South Underground Sump

Water chemistry in the 7-South mine pool was monitored via sump sampling in 1 Mains (1M7S). Samples from 1M7S exhibit low and consistent levels of dissolved sulphate and dissolved iron with average values of 321 mg/L and 0.8704 mg/L respectively during this monitoring period. Dissolved arsenic, however, has shown fluctuations since monitoring has been established, with the higher concentrations observed throughout the winter, likely attributed to high groundwater infiltration through sandstone. These inconsistent arsenic values may be attributed to variable amounts of water either pumped into or out of this sump for mining purposes. There was one dissolved As and Fe result that was elevated above all other results collected in January. These result are suspicious and do seem to fall outside of the normal range of water quality observed for 1M7S.

4.2.4.3 7-South Ex-Situ

The primary focus of the 7-South ex-situ groundwater monitoring is to evaluate water flowing from Area 2 (permanent PAG CCR storage location) towards the Quinsam River; monitoring wells QU08-13 A and B satisfy this consideration. In addition to monitoring seepages from Area 2, monitoring well QU08-10 is situated to monitor groundwater transport from permitted mining reserves in 7-South (areas 4 & 5) towards the Iron river. This well is located adjacent to the Area 4 development on the North side of the Long Lake fault and is nested in the #4 coal zone.

The No. 4 coal zone at 7-South is hosted within the Dunsmuir Member sandstones of the Comox Formation, which is naturally elevated in arsenic and fluoride. On average, the highest concentration of arsenic in the current Quinsam Coal monitoring regime is found in the 7-South area. The northern limit of the 7-South underground mine workings is limited by the location of a normal fault called the Overlook Fault, which displaces the #4 coal zone vertically by 14 metres. The Overlook Fault defines the groundwater flow path between the 7-South mine, and the monitoring wells QU08-13 A and B. Well QU08-13 A monitor's groundwater traveling down-gradient from the 7-South workings within the #4 coal zone at 52 metres deep. QU08-13 B monitors groundwater higher up in the stratigraphic column at the glacial till overburden/sandstone contact at 26 metres deep, effectively monitoring groundwater that would be migrating up through the stratigraphy towards the Quinsam River. This groundwater is suspected to follow a different

flow path at the down gradient northern extent of the 7-South mine than other groundwater in the area (Lorax, 2011). Lorax has described this well as significantly sodium enriched with circum-neutral pH. The groundwater is anoxic with mild to moderate reducing conditions.

Starting March 2015 PAG-CCR from the processing of 7-South raw coal was transported from the Quinsam Coal Preparation Plant to the 7-South Disposal Bin, which delivers PAG-CCR directly onto the underground belt structure for transport into Area 2. Since that date, material has been backfilled, and allowed to naturally flood. The in-situ flooded water in this area has been monitored using well QU14-10, while the ex-situ groundwater has been monitored using QU08-13 A&B. Data acquired prior to March 2015 has provided information about baseline conditions and will be used for comparison when analyzing future monitoring.

The most notable and relevant observation was the low, stable sulphate concentrations throughout the years with a distinctive increase in dissolved iron and sulphate in February 2018. This increase was concurrent with advance mining in the northern extent of 3-Mains. With expansion of mining boundaries in this area, it is believed that mobilization of materials and "shrinkage" of the effective barrier between the mine and monitoring well has contributed to the increase in these parameters. Future monitoring has displayed a decreasing trend in these parameters where they have not persisted at elevated levels.

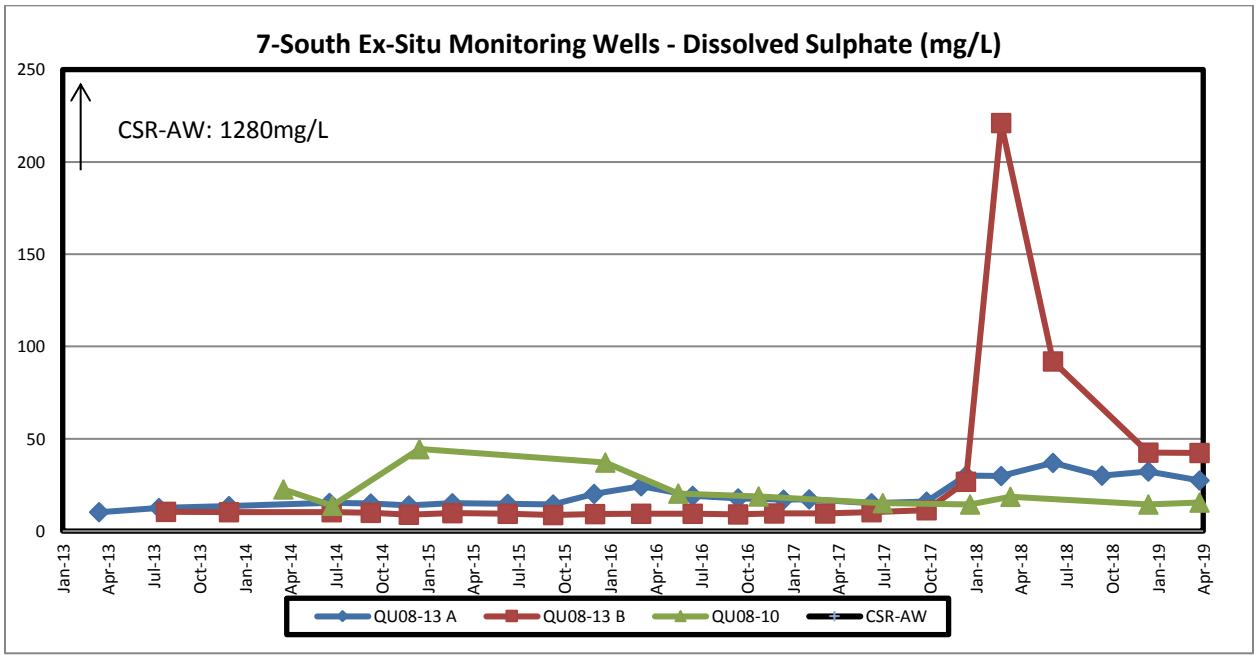


Figure 14: 7-South Ex-Situ Monitoring Wells - Dissolved Sulphate

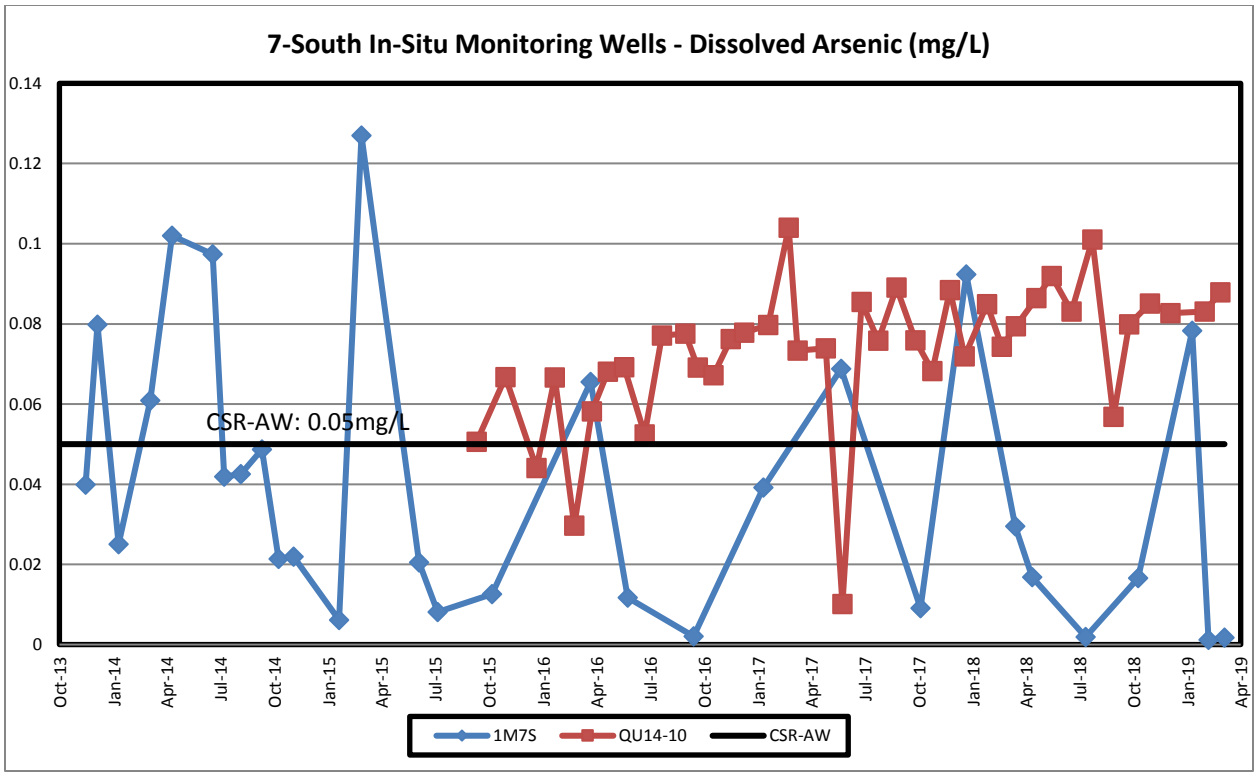


Figure 15: 7S Ex-Situ Monitoring Wells - Dissolved Arsenic

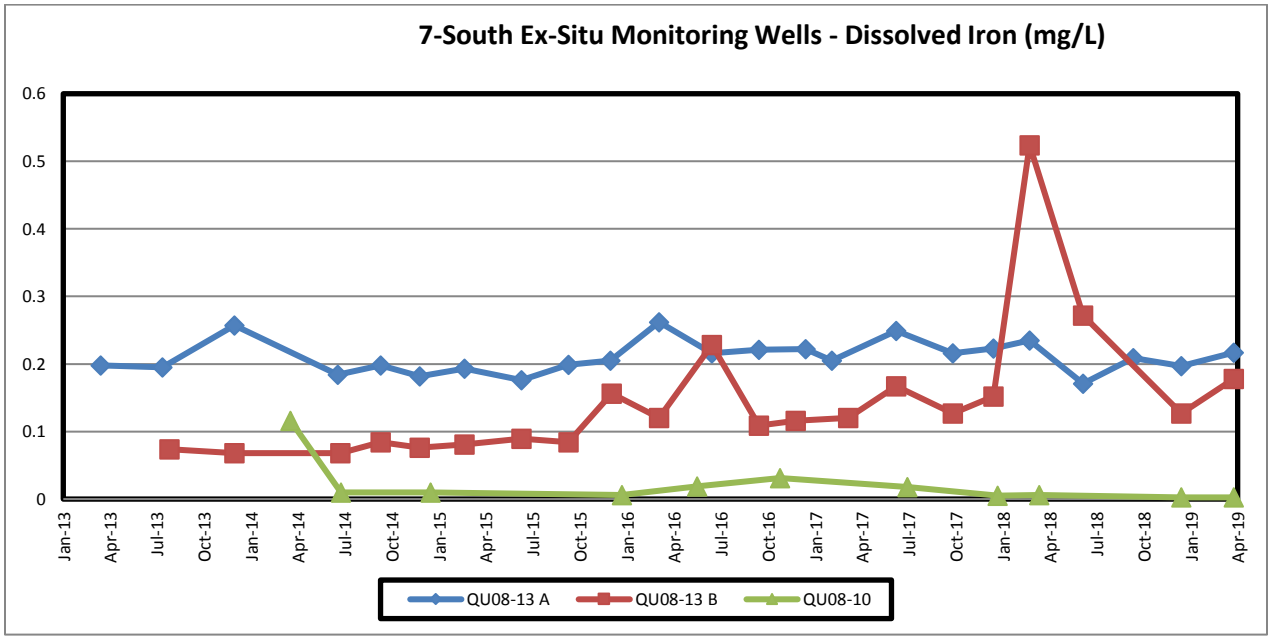


Figure 16: 7S Ex-Situ Monitoring Wells – Dissolved Iron

4.2.5 2/3 South Monitoring Wells

4.2.5.1 2/3 South Mine Pool

Monitoring wells MW00-4 and QU11-11 were established for monitoring the 2-South mine pool water quality while QU11-11 is also used for reference for the treatment system influent. 2-South mine pool water enters Long Lake via the Long Lake Seep and discharges are closely related to water levels monitored at MW00-4. These wells exhibit moderate concentrations of sulphate averaging 310 mg/L (MW00-4) and 510 mg/L (QU11-11) in this monitoring period. It is noted that both wells are relatively stable for sulphate concentrations although QU11-11 declined slightly since late 2016. Concentrations of dissolved metals are relatively low in these wells and exhibit neutral pH. Dissolved iron concentrations do show periodic spikes in well QU11-11 and are typically related to rising mine pool water elevations as flushing of the mine walls encourages a gradational increase in dissolved metals. The distinct increase of dissolved iron in mid-2017 at QU11-11 is a direct result of changing to field filtering and preservation on site.

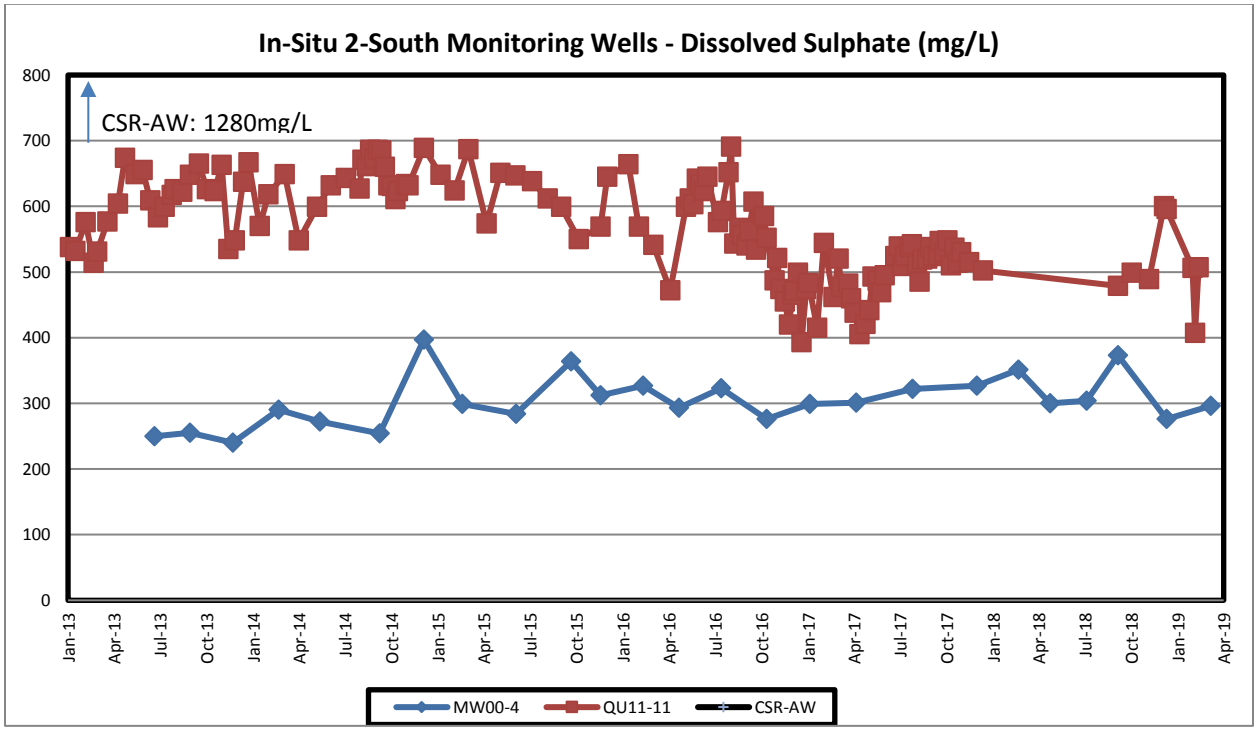


Figure 17: In-Situ 2S Monitoring Wells - Dissolved Sulphate

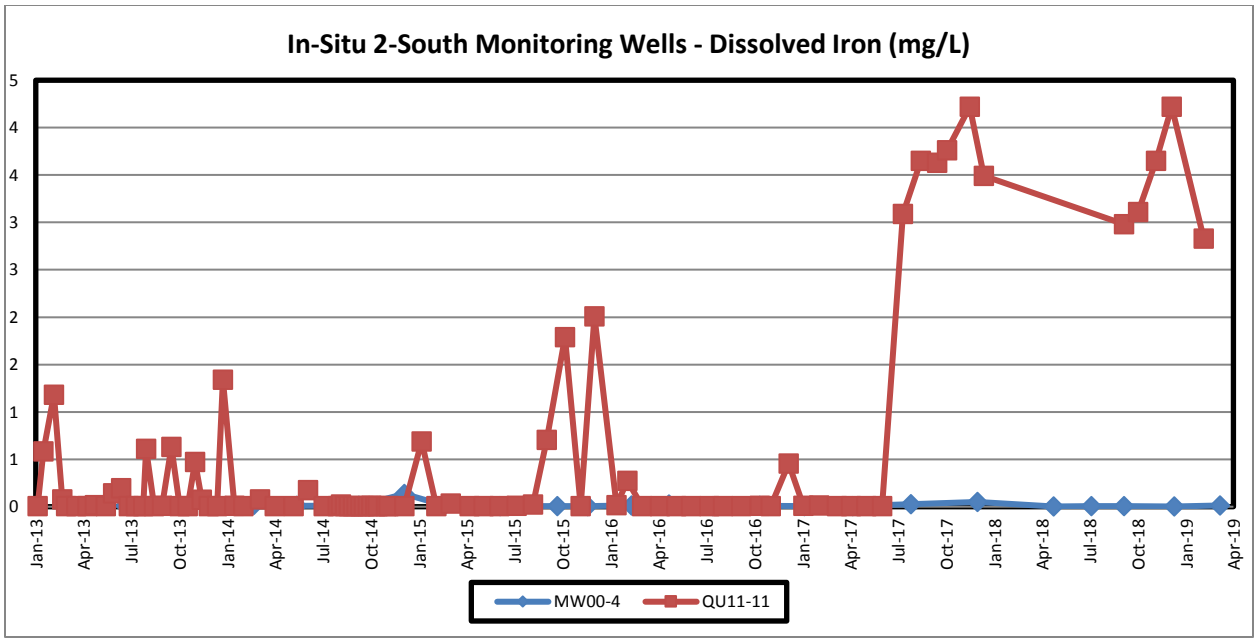


Figure 18: In-situ 2-South Monitoring Wells - Dissolved Iron

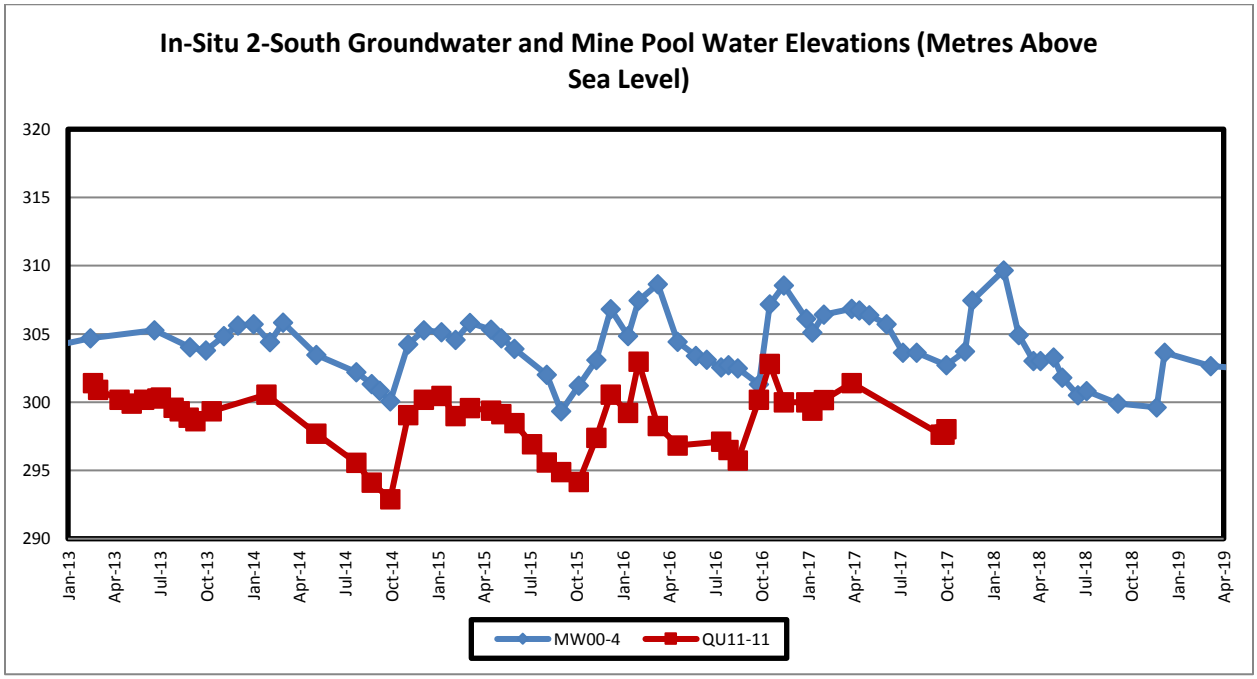


Figure 19: 2-South Groundwater and Mine Pool Water Elevations

In January 2018 the underground dewatering pump at QU11-11 required replacement. Once installed in August of 2018 the water level on the VFD sensor was not reading accurately making it difficult to establish a relationship with the mine pool water elevation at this location. This relationship is currently being determined with increased data collection.

4.2.5.2 2/3 South Ex-Situ Wells

Monitoring wells in the 2 and 3-South areas exhibit elevated concentrations of sulphate and some metals based on their proximity to the 2-South and 3-South PAG-CCR storage facilities and past surface disturbances; both open pit and underground mining activities. These wells include MW00-2 located next to the 3-South flooded PAG-CCR Storage Facility as well as MW12-23 and MW12-24 established as wells between the 2-South flooded PAG-CCR Storage Facility and No Name Lake. Dissolved iron, manganese and other dissolved materials are elevated at MW00-2 as it is situated about 5 metres from the 3-South PAG-CCR pond and intercepts the water that flows through the hydraulically conductive till.

While MW00-2 is located to monitor the drainage from the 3-South pit, MW12-23 and 24 are designed to intercept seepage from the reclaimed 1-South pit, the 1-South sump, and the 2-South pit. As evidenced by the dissolved sulphate levels found in these wells, the shallower well MW12-24, intercepts a perched water table, potentially attributed to the reclaimed 1-South pit up gradient, but independent of 2-South groundwater, whereas the deeper well MW12-23, intercepts 2-South seepage groundwater at an elevation approximately 3 metres below the surface water elevation in No Name Lake. Lorax suggests that No Name Lake is a ‘losing’ lake (i.e., recharging the aquifer at its downstream end). According to initial drill logs during the installation of these monitoring wells, the siltstone bedrock appears very tight in this area with no water bearing features intercepted

Monitoring wells MW12-23 and MW12-24 (particularly MW12-23) have slow recharging rates, making proper sampling very difficult and often, not feasible. Sampling at MW12-23 occurs over two days; day one involves purging the well and day two involves a low flow sampling technique to obtain water that has formed over a 24-hour period using a portable bladder. While quarterly sampling is required, MW 12-23 is often found to be dry, (especially during the summer) and sampling is not possible. These wells were not monitored in 2018-19 as the water in the wells has been found to oxidize and remain stagnant rather than have any freshwater infiltration.

Notable observations in for MW002 include:

- Dissolved sulphate concentrations exceeded the CSR-AW guideline of 1280 mg/L at MW-002 in (3/6) sampling events, averaging 1295 mg/L, as shown in Figure 20. Year over year averages have been on the rise since 2014.
- Conductivity was found to be very high in MW00-2 related to the 3-South PAG-CCR
- Dissolved arsenic is found in low concentrations in the 3-South ex-situ well with a slightly increasing trend observed this period.
- Dissolved manganese is elevated in MW00-2 indicating influence from PAG-CCR storage with levels are declining.
- Dissolved iron concentrations are increasing at MW00-2 and have nearly tripled in the past four years (Figure 21). It's possible that the increase is a result of dissolution from the 2S PAG-CCR storage area and transport to 3S PAG CCR storage area.

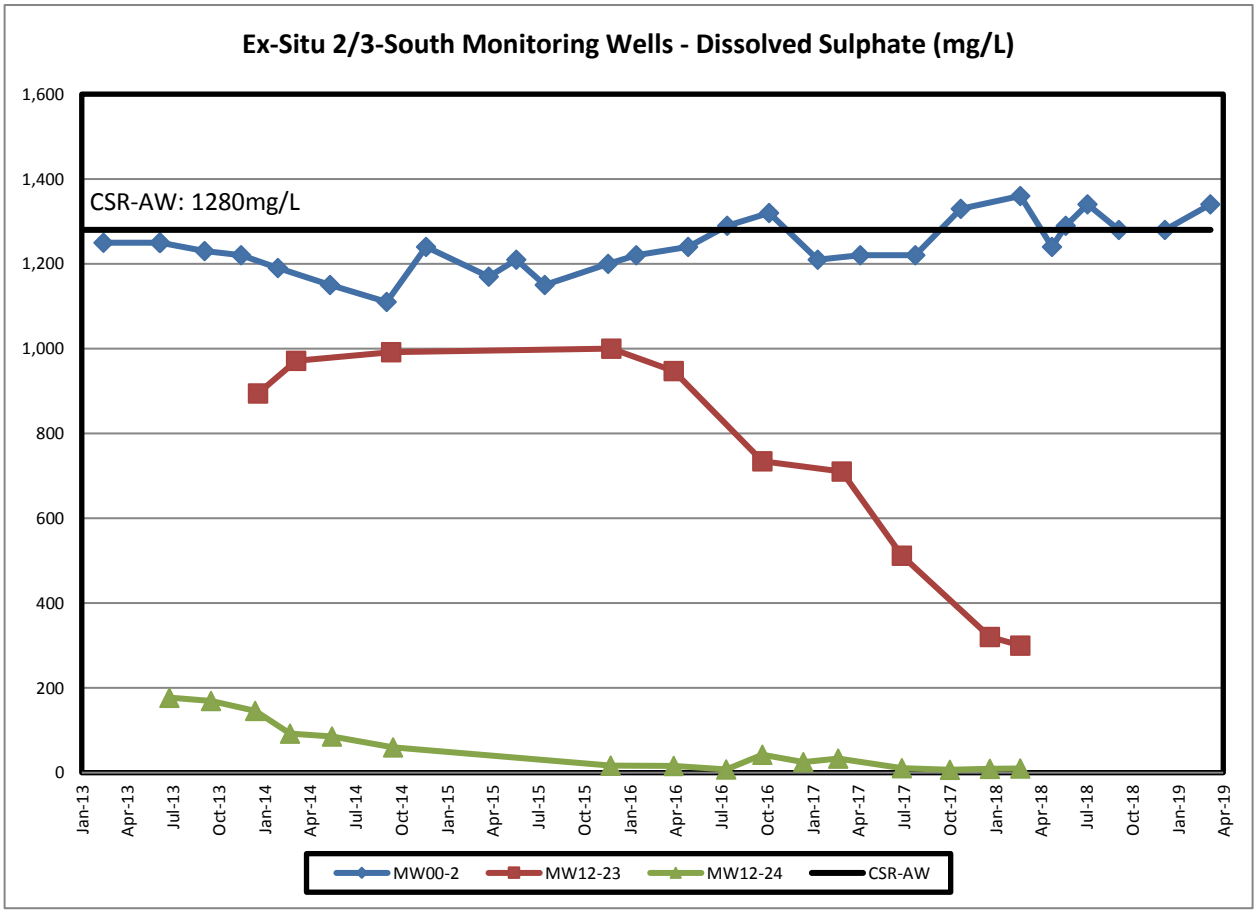


Figure 20: Ex-Situ 2/3 South Monitoring Wells - Dissolved Sulphate

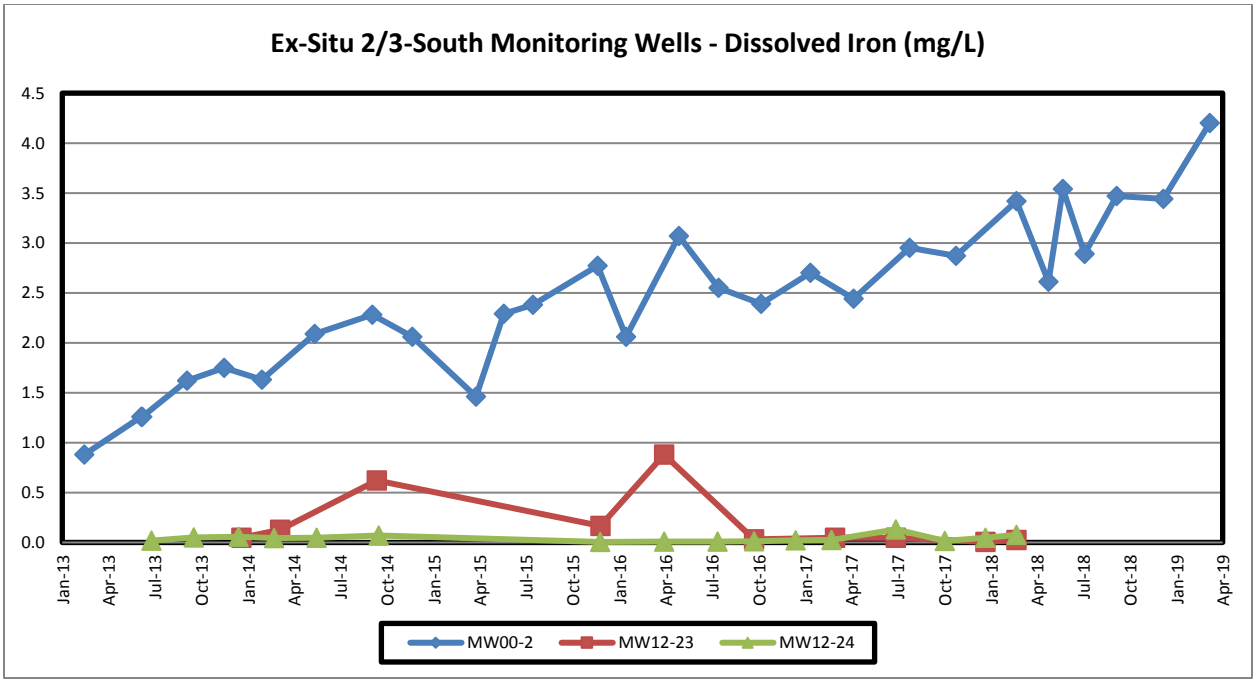


Figure 21: Ex-Situ 2/3 South Monitoring Wells – Dissolved Iron

4.2.6 4-South Mine Area

4.2.6.1 4-South Mine Pool

Predicted mature mine pool source terms were developed for the flooded 4-South mine and are quantified using maximum concentrations measured in QU78-161 and QU11-01. The 4-South mine pool chemistry indicates that the mine water has evolved into a mature state and can be used to estimate long term water chemistry. The mine water is expected to be anoxic and contain elevated sulphate, reduced iron and traces of dissolved sulphide, although eventually the mine waters are predicted to display higher pH, alkalinity and lower metal concentrations as iron and other metals are sequestered into sulphide minerals. The monitoring well 78-161 was dropped this monitoring period due to difficult access and chemical similarities to QU11-01. POI concentrations seen this monitoring period are lower to previous monitoring years and continue to demonstrate a decline in iron, manganese and sulphate.

Table 11 below displays the comparison between predicted water quality to observed water quality during this monitoring period. The values used were the maximum values found for QU11-01 from

the only sampling event completed in 2018-19. The only parameters that were above the predicted concentration levels were arsenic, boron.

Table 11: Source Terms Comparison of Flooded 4-South Mine Void Mature Mine Pool

Parameters	Predicted Max. Values	2018-19 QU11 -01 (N=1)	Results obtained
Alkalinity (as $CaCO_3$)	450	3.3	Below Predicted
Aluminum (Al)	0.024	0.0075	Below Predicted
Arsenic (As)	0.0924	0.105	**Above Predicted**
Boron (B)	0.637	1.07	**Above Predicted**
Cadmium (Cd)	0.000085	0.0000125	Below Predicted
Cobalt (Co)	0.063	0.0005	Below Predicted
Copper (Cu)	0.0564	0.0005	Below Predicted
Fluoride (F)	1	0.35	Below Predicted
Iron (Fe)	257	198	Below Predicted
Manganese (Mn)	5.97	3.25	Below Predicted
Selenium (Se)	0.0004	0.00025	Below Predicted
Sulfate (SO_4)	2060	1540	Below Predicted
Zinc (Zn)	0.0712	0.0125	Below Predicted

According to Lorax, chemical stratification is apparent in this mine pool as the heavily mineralized water remains on the bottom of the water column and the less mineralized water remains in the upper portion due to limited mixing of the water column. Lorax described the groundwater in this area as having an age affected signature of fluoride and arsenic, directly related to the increased residence time in the groundwater system.

The mine void is “flooded” and water levels in the mine pool show little change as there are no dewatering efforts or active operations in this mine. POI are generally quite stable due to the maturity and flooded status of the mine and do not show major fluctuations. This was not determined this year due to the pressure transducer failure at QU11-01. It is noted that some POI concentrations are trending downward (iron, manganese and sulphate) while arsenic has shown a steady increase since 2013 (Figures 23-26).

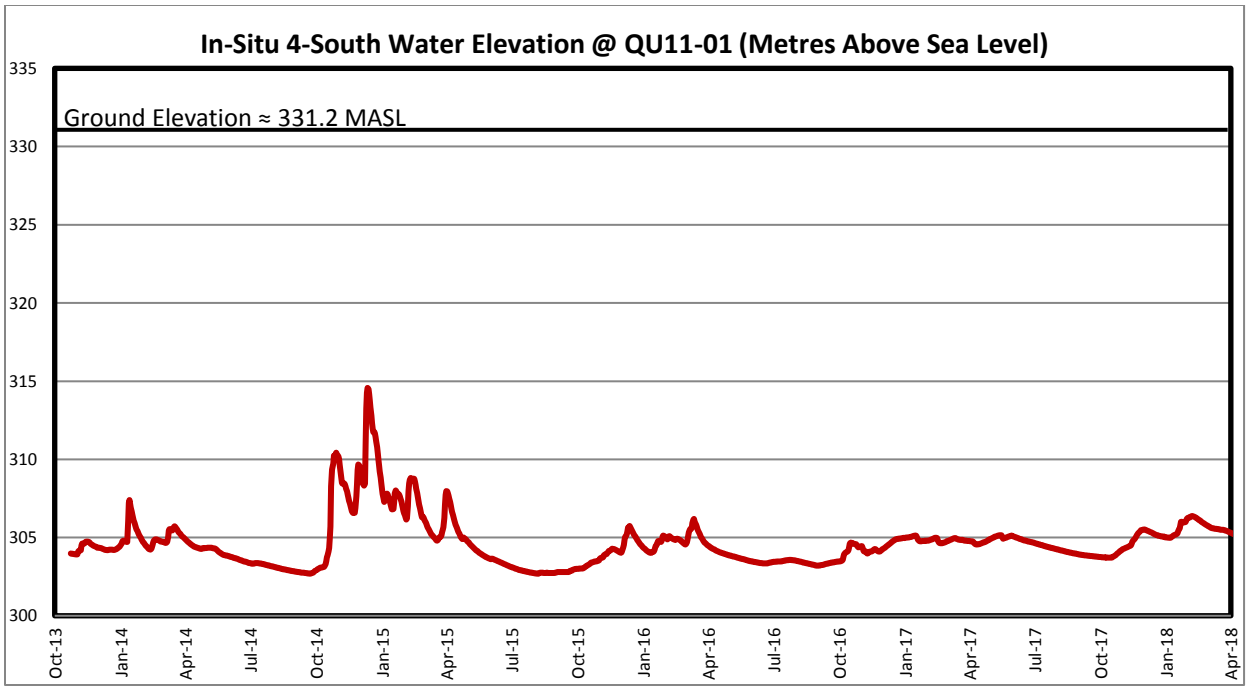


Figure 22: 4-South Mine Pool Water Elevation at QU11-01

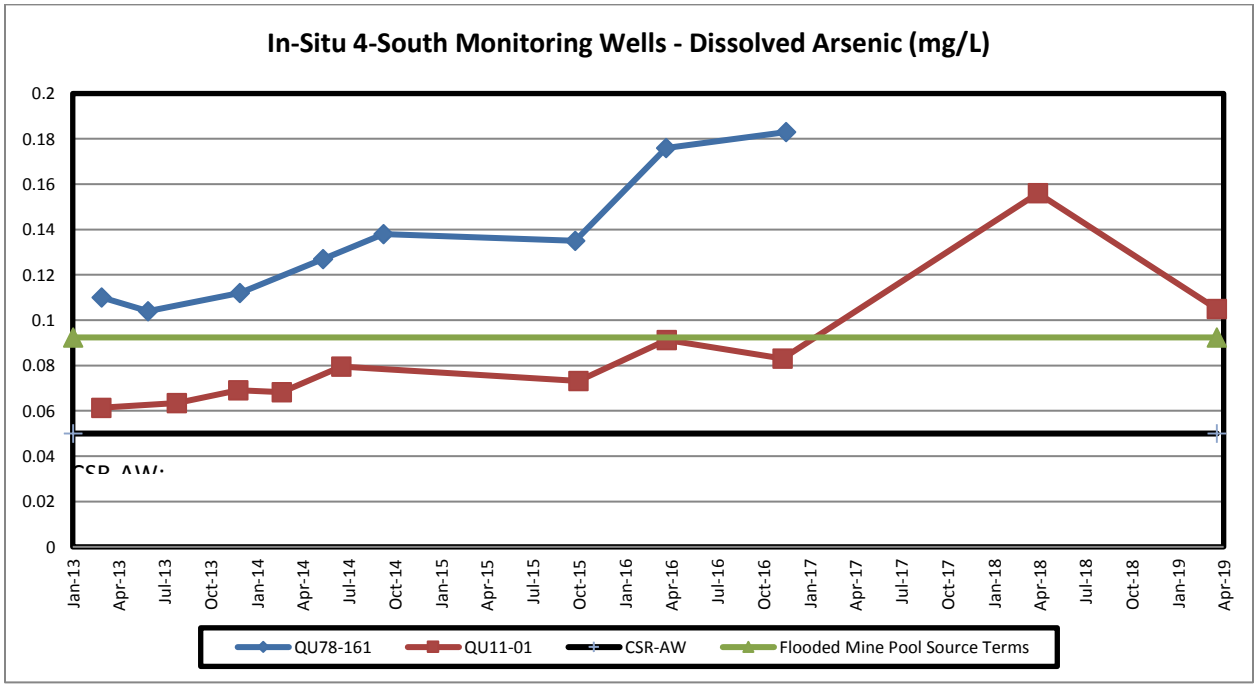


Figure 23: In-Situ 4-South Monitoring Wells - Dissolved Arsenic

The 4-South mine pool is dominated by iron reducing conditions with elevated concentrations of iron and sulphate. The chemical stratification is characterized by the high concentrations of iron

and sulphate found at depth in the mine pool. While declining, he mine pool water quality has the highest concentration of dissolved iron on the mine site, having exhibiting concentrations greater than 200 mg/L at QU11-01.

Lorax observed that sulphate has an opposite trend to fluoride; sulphate is found in lowest concentrations in the formation water and highest in the mine pool. Sulphate concentrations are elevated and follow a similar profile to dissolved iron where concentrations have been generally decreasing since 2013 to below the predicted values of the flooded mine pool.

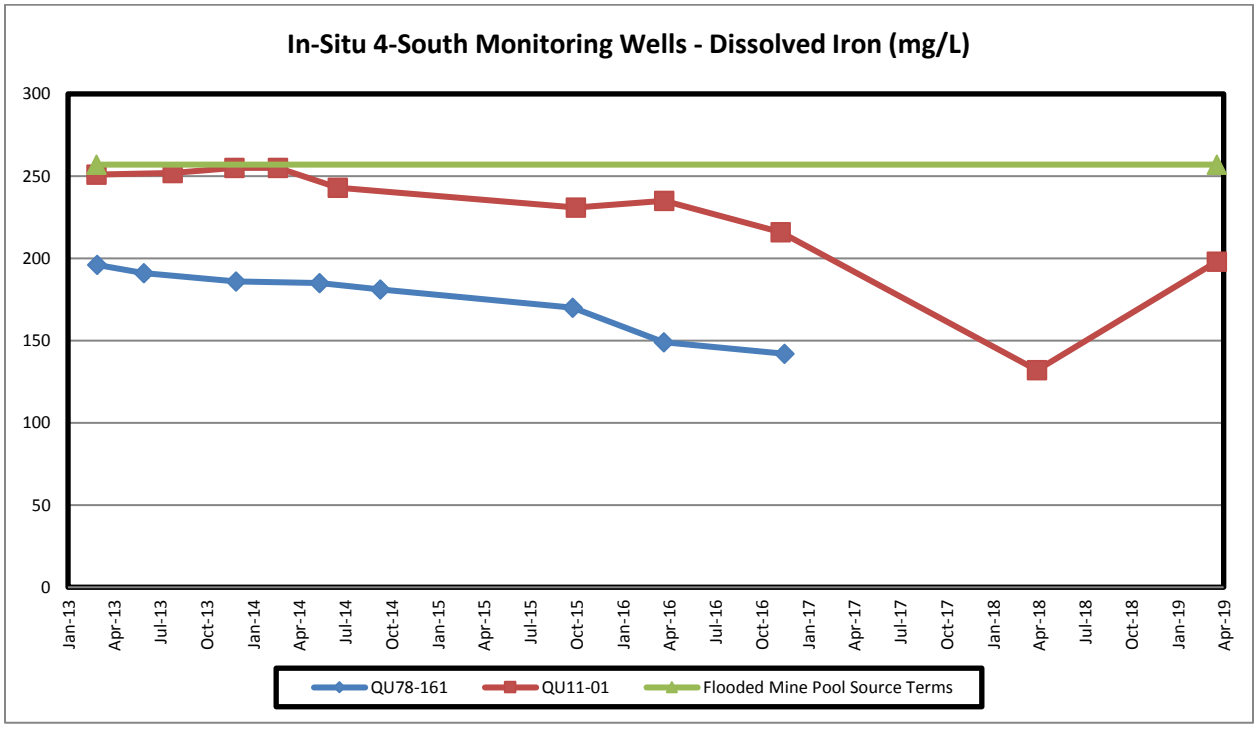


Figure 24: In-Situ 4-South Monitoring Wells - Dissolved Iron

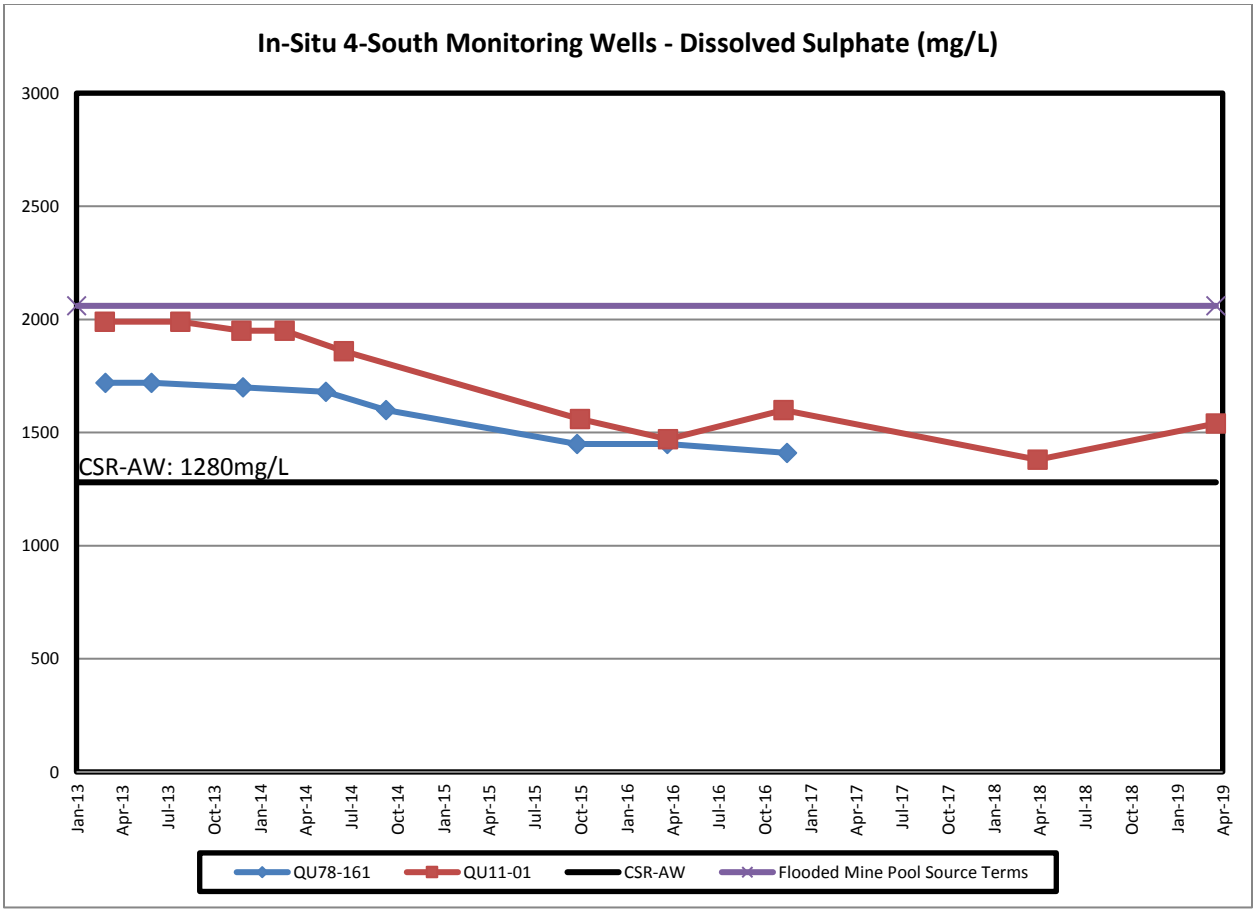


Figure 25: In-Situ 4-South Monitoring Wells - Dissolved Sulphate

4.2.6.2 4-South Ex-Situ Wells

Observations by Lorax of formation water down-gradient of the 4-South mine indicate mine and age-affected signatures suggesting a hydraulic connection between the 4-South mine pool and the down gradient monitoring wells. The hydraulic connection is most obvious at QU10-09 S, and less obvious at QU10-07 D. The strong mine signature in QU10-09 indicates that it is along the flow path of the juvenile mine waters discharging from the upper portion of the 4-South mine workings (Lorax, 2011).

Monitoring wells in this area are focused on four types of water quality:

- QU10-09 (S & D) ex-situ formation waters, outside of existing workings, assess vertical gradients and water quality adjacent to Long Lake

- QU10-07 D ex-situ formation waters; down gradient of existing workings next to the Long Lake Entrance wetland (LLE)
- QU10-08 D ex-situ up gradient of the existing workings; assess water quality immediately up gradient of existing workings

Generally, major ion concentrations highest in the mine pool waters and lowest in the formation groundwater. POI concentrations in and outside the 4-South mine pool are relatively stable, showing some minor trending.

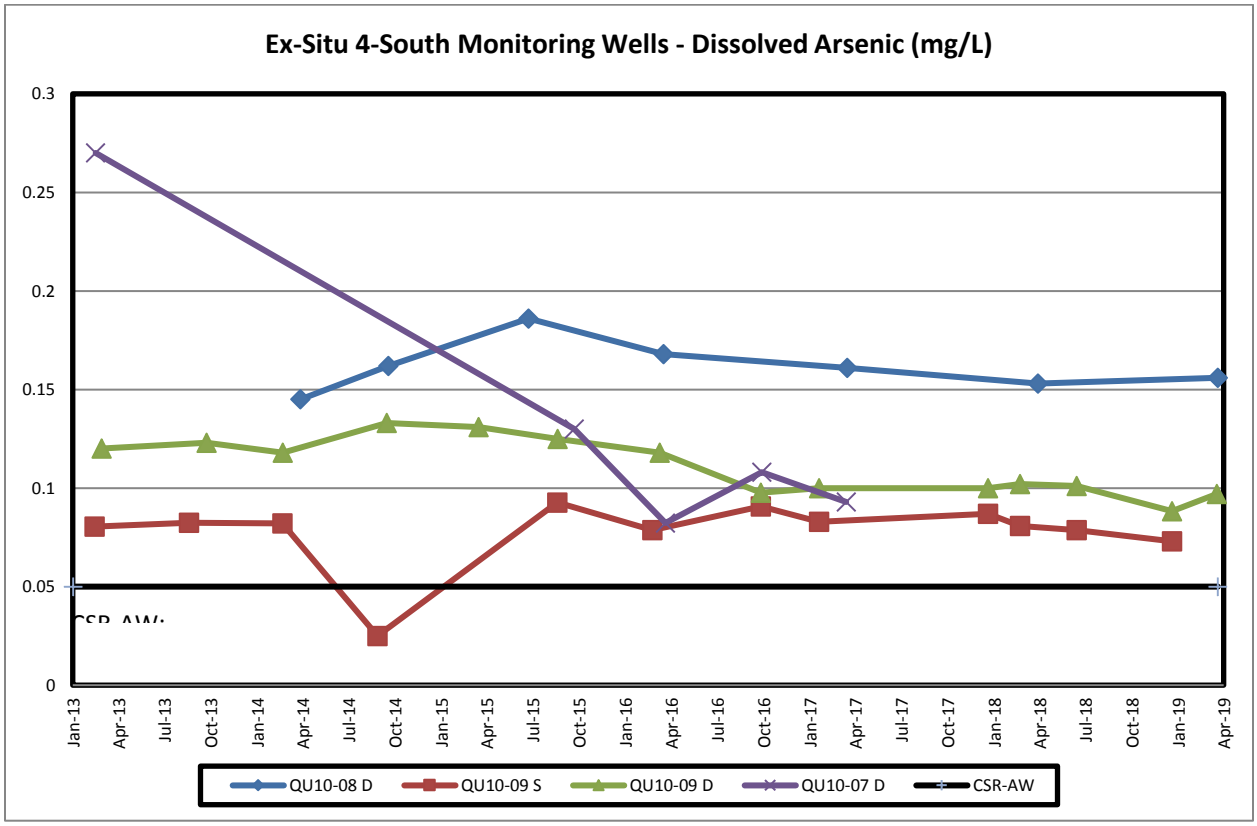


Figure 26: Ex-Situ 4-South Monitoring Wells - Dissolved Arsenic

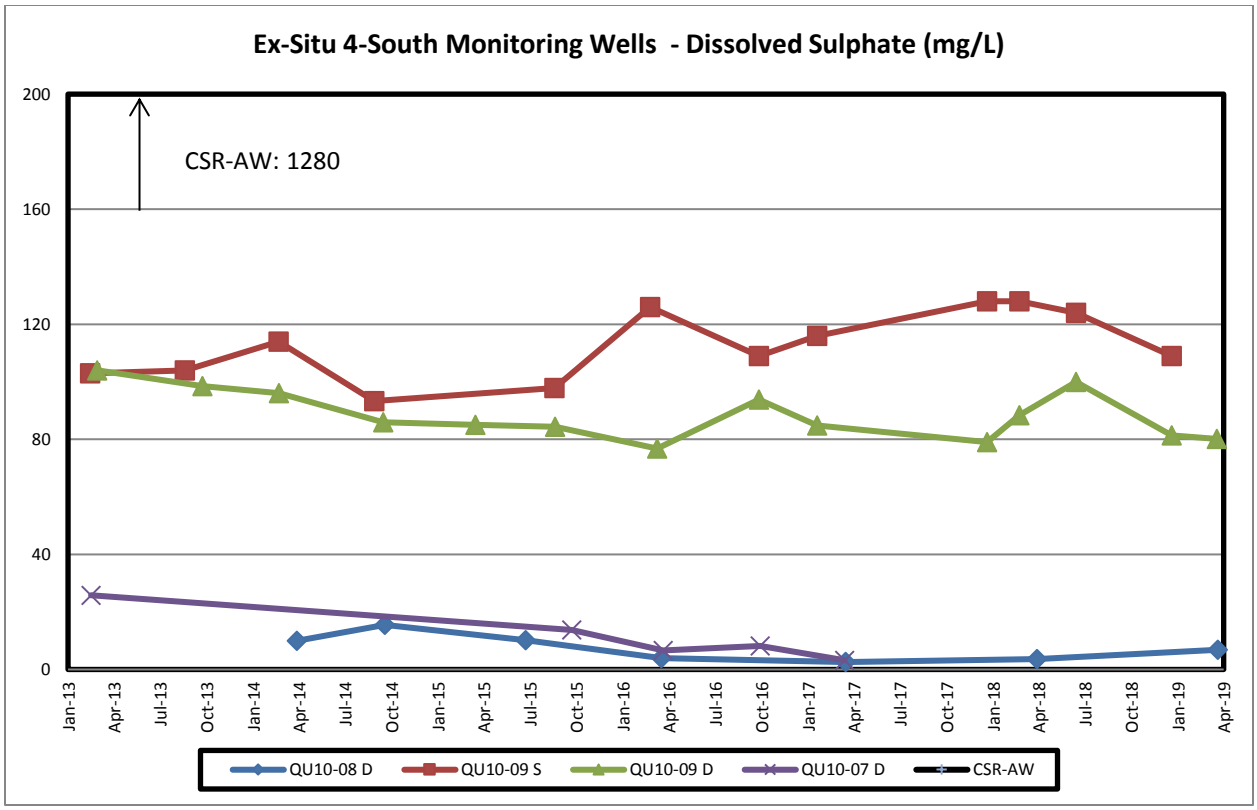


Figure 27: Ex-Situ 4S Monitoring Wells - Dissolved Sulphate

Notable observations include:

- Dissolved arsenic concentrations were elevated above CSR-AW standards (0.05mg/L) at each well for all sampling events, reflecting historic results (Figure 26)
- Dissolved iron was below 1.0 mg/L in all wells except in QU10-09 S, where results persisted between 5-6 mg/L
- Dissolved sulphate levels were generally low (as observed in the past), especially at QU10-08 D
- Dissolved sulphate levels were higher in QU10-09 S/D throughout the monitoring period
- Fluoride exceeded CSR-AW standards in well QU10-08 D during the lone sampling event resulting in 2.4 mg/L. Fluoride is an indication of younger groundwater influencing the water in this well.

4.2.7 242 Mine

The 242 Portal site was reclaimed in Spring, 2016 with backfilling of the portal, permanent slope creation, topsoil cover and subsequent revegetation. A new sampling site (242MW) was created in 2017 with the drilling and installation of an additional groundwater well.

The pH of the flooded waters of the historic 242 mine has been consistently neutral, ranging from approximately 6.5-7.5. During this monitoring period, the water exhibited low concentrations of alkalinity, sulphate and metals, consistent with past monitoring events since 2014. Consistent water quality is expected as the small amount of mining that occurred was prior to 1996, and the mine was flooded immediately, with no additional disturbances.

4.2.8 7-South Area 5 Background

In July 2018 blasting through the Long Lake Fault Zone commenced in order to gain access to 7-South Area 5 No. 4 seam coal. Mining did not occur until late January to early February 2019. A full set of groundwater well were monitored. Those include QU11-36 S/D, QU12-06S, QU11-18S/D and QU11-28. The groundwater in this area is characterized as being elevated in arsenic and with some wells exhibiting elevated concentrations of sulfide as H_2S. Figures 28 and 29 display these results since monitoring began in 2013. Currently the groundwater in this area is non-mine impacted and all monitoring results contribute to baseline conditions. These wells are monitored on an annual basis.

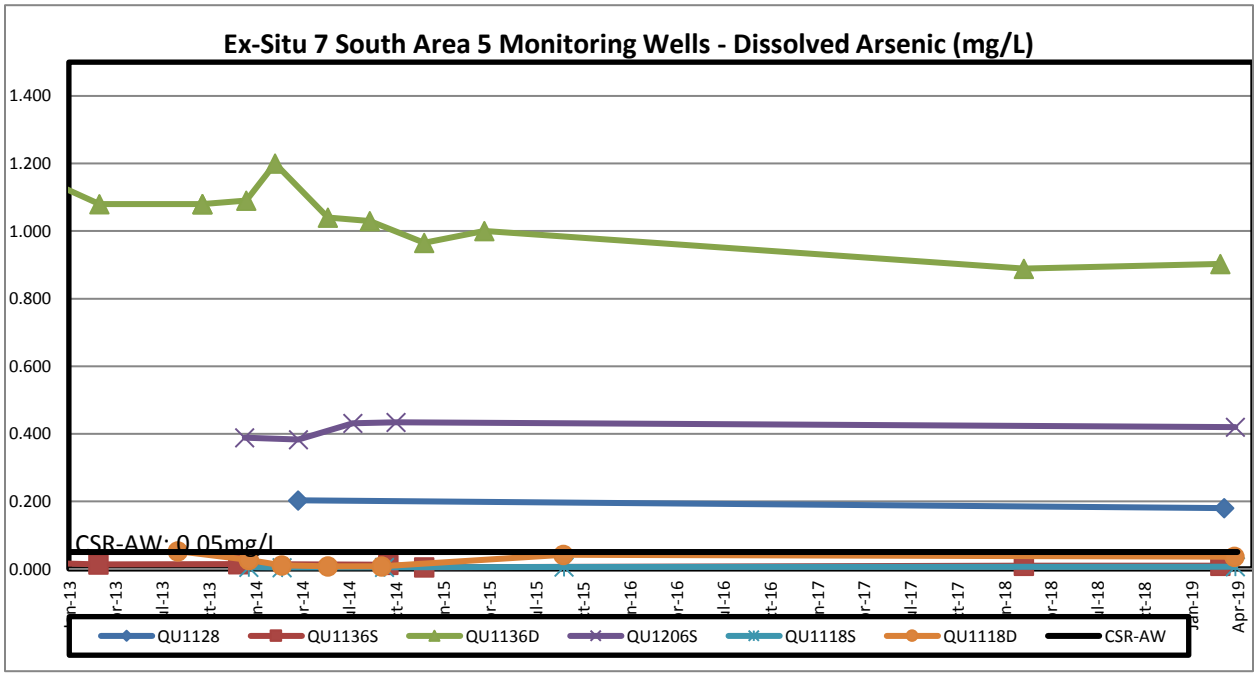


Figure 28: Dissolved Arsenic in 7SA5

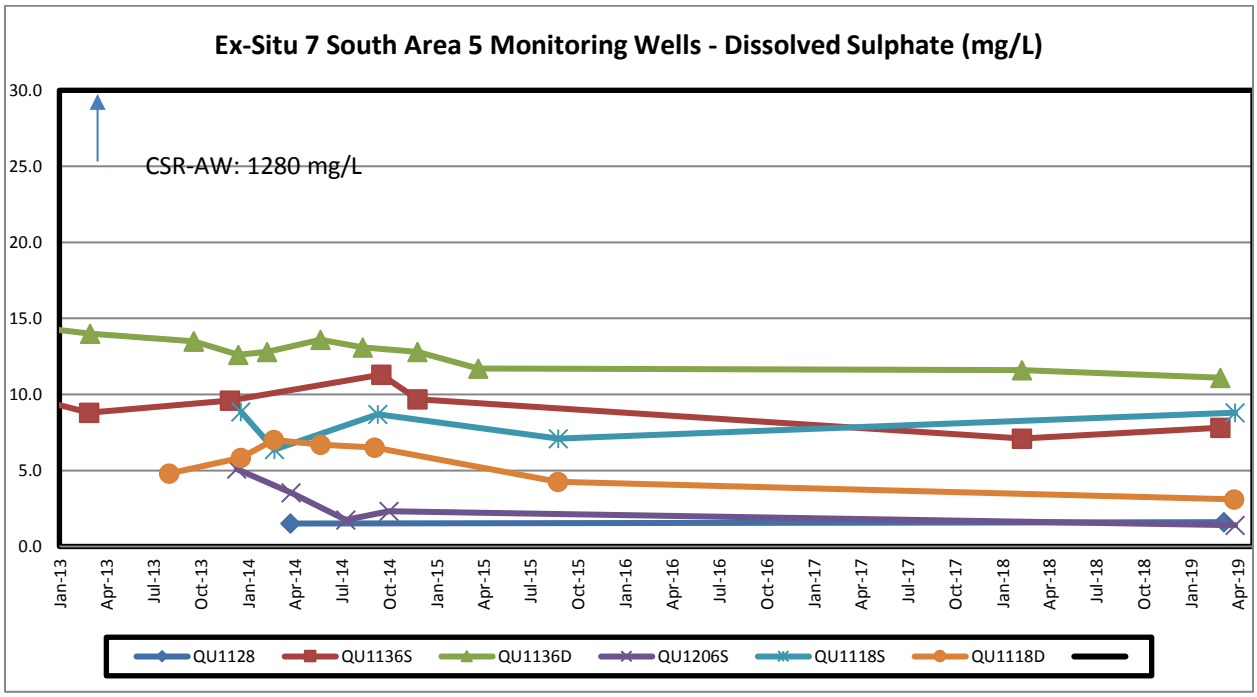


Figure 29: Dissolved Sulphate in 7SA5

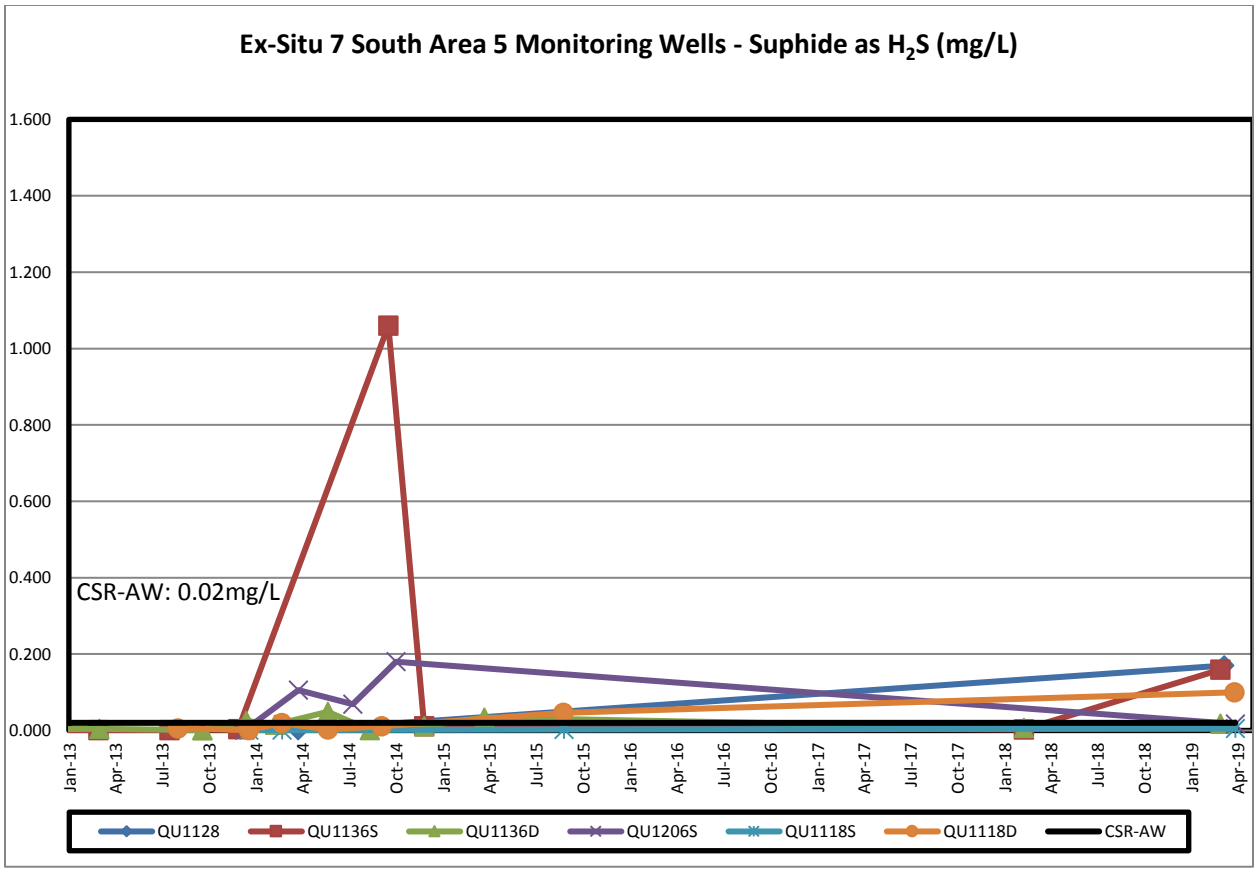


Figure 30: Sulphide as H_2S in 7SA5

5 Summary

The groundwater monitoring program at Quinsam Coal has been established to capture the interaction between mine related surface and underground disturbance areas (contact water) with the receiving environment. The comprehensive nature of this program allows Quinsam to generate water quality predictions, strategically manage surplus water generated as a result of mining activities and create management plans with a focus on mitigating potential receiving environment impacts.

During the mine operations phase, the groundwater program provides critical information to ensure that plans and targets are being achieved. For example, in-situ wells provide the necessary information to validate water quality predictions (source terms) within a mining area. The program also provides opportunity to monitor water quality associated with three key operational waste management practices:

1) Subaqueous PAG-CCR disposal
2) Fine Tailings underground storage in 2 North mine void(s)
3) Backfilled and flooded underground PAG-CCR

The information attained from monitoring these unique and innovative disposal methods will inform future waste management plans and opportunities for Quinsam Coal.

Overall, in-situ groundwater at Quinsam Coal is generally within the water quality prediction scenarios and ex-situ groundwater typically trends below the CSR-AW standards. The two exceptions to the aforementioned is groundwater influenced by host geological formations (e.g. Dunsmuir Member sandstones, Cumberland Member No.1 Coal seam and mudstones) with naturally elevated concentrations of parameters of interest and by weathering processes (i.e. mine wall oxidation and flushing) of disturbed materials within the mine footprint.

The long-term groundwater quality trend(s) demonstrate that deeper formation groundwater systems are not substantially influenced by contact water at most locations (i.e. 2-North/5-South and 7-South), as moderate concentrations of dissolved metals and low concentrations of sulphate are typical. In contrast, the underground mine voids, flooded open pit mining areas, and those areas used for subaqueous PAG-CCR and tailings stowage have, in some cases, elevated concentrations of certain parameters. Sulphate is the primary parameter of interest within these mining areas, due to the fact that sulphate has a distinctive geochemical signature and the contact water flow path can be tracked.

The groundwater program will continue to evolve as mining advances into new areas, or retreats from existing areas, and information on existing mine developments is evaluated. Furthermore, the program will be adapted to encompass the progression of our waste management strategy and any well or area specific trending.

References

1. Lorax Environmental and Enterprise Geoscience Services Ltd. (2011). Appendix I 4 South Mine Groundwater Evaluation. In *Mine Permit (C-172) Amendment Appendices I-J* (Vol. Volume 3, pp. 3-1, 4-1, 4-10, 4-11, 4-16, 5-1,6-1-7-12, 5-1). Burnaby, B.C.

2. Lorax Environmental and Enterprise Geoscience Services Ltd. (2011). Appendix I 4 South Mine Groundwater Evaluation. In *Mine Permit (C-172) Amendment Appendices K-N* (Vol. Volume 4, pp. 4-1, 4-12, 4-13, 4-13, 4-35, 5.3,6-47, 6-55). Burnaby, B.C.

3. Lorax Environmental Ltd. (2013) *Quinsam Coal Corporation Groundwater Quality Sampling Guide, (*pp. 1-1 to 4-4). Burnaby, B.C.

4. Golder Associates Ltd. (2006) *Quarterly Groundwater Monitoring Assessment Fall (2006) Quinsam Mine*, (pp. 9-12). Victoria, B.C.

5. Ministry of Environment Province of British Columbia. (2013) *Ambient Water Quality Guidelines for Sulphate. Technical Appendix*. (pp. 7). Victoria, B.C.

6. Ministry of Environment (MOE). (2013) *The British Columbia Field Sampling Manual, For Continuous Monitoring and Collection of Air, Air-Emissions, Water, Wastewater, Soil, Sediment, and Biological Samples, 2013 Edition".* Victoria, B.C.

Enterprise Geoscience Services Ltd.

Borehole Log of QU-78-161 (4 South)

Date Started	: 1978	Drilled By	: n/a
Date Completed	: 1978	Northing Coord.	: 101068.3
Hole Diameter	: 140 mm assumed	Easting Coord.	: 99409.0
Drilling Method	: n/a	Survey By	: n/a
Sampling Method	: n/a	Logged By	: n/a

Water Levels

QU-78-161: 305.14 m (12-Jan-2011)

Well: QU-78-161
Elev. m: 318.5

Depth (m)	Elev. m 318.5	USCS	Graphic Symbol	Material Description
50	268.5	SP		
55	263.5	SS		
60	258.5	SM		
65	253.5	SS		
70	248.5			
75				

4" PVC

Screen

EOH @ 71.7 m

Notes:

Borehole terminated to drift at 86.4 m.

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

03-09-2011 C:\Users\John Balfour\Documents\PROJECTS\2009 Projects\09010 Lorax\2010 Work\Borehole logs\QU-78-161.bgi

PROJECT No.: 002-1065

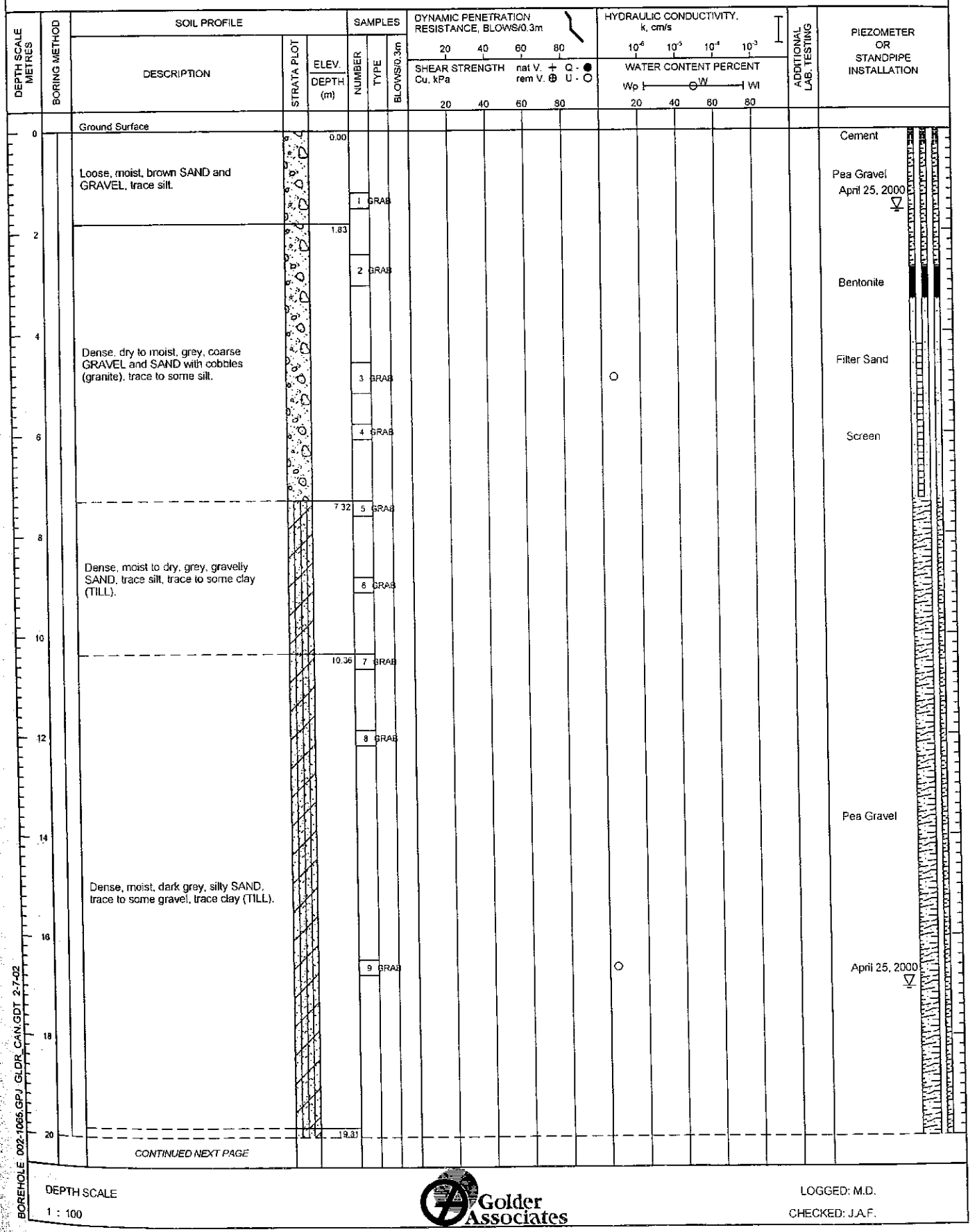
RECORD OF MONITORING WELL: MW00-1(D&S)

SHEET 1 OF 2

LOCATION: Washplant Ditch, Quinsam Mine

BORING DATE: April 17-18, 2000

DATUM: Local



BOREHOLE 002-1065.GPJ GLDR_CAN.GDT 2-7-02

DEPTH SCALE
1 : 100

Golder Associates

LOGGED: M.D.

CHECKED: J.A.F.

PROJECT No.: 002-1065

RECORD OF MONITORING WELL: MW00-1(D&S)

SHEET 2 OF 2

LOCATION: Washplant Ditch, Quinsam Mine

BORING DATE: April 17-18, 2000

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20											
22		Dense, dry, grey, gravelly SAND and GRAVEL, trace to some silt (TILL). *(continued)*									Pea Gravel
24				24.38							Bentonite
26		Dense, dry, gravelly SAND, some clay, trace silt (TILL).			10	GRAB					Screen / Filter Sand
28											
30											Drill Cuttings
32		End of MONITORING WELL.		30.48							
34											
36											
38											
40											

BOREHOLE 002-1065.GPJ GLDR_CAN.GDT 2-7-02

DEPTH SCALE
1 : 100

Golder Associates

LOGGED: M.D

CHECKED: J.A.F.

PROJECT No.: 002-1065

RECORD OF MONITORING WELL: MW00-2

SHEET 1 OF 1

LOCATION: Washplant Ditch, Quinsam Mine

BORING DATE: April 17-18, 2000

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0		Dry, grey SAND and GRAVEL (shale rock fragments) (Rock Fill).		0.00							Cement Bentonite April 19, 2000 April 25, 2000
2		SHALE (bedrock).		1.52							Filter Sand
4		Coal and Shale.		3.96	1	GRAB					
		SHALE		4.88	2	GRAB					Screen
		Coal Seam.		5.49	3	GRAB					
6		SHALE		6.10							
		End of MONITORING WELL.		6.31							
8											
10											
12											
14											
16											
18											
20											

BOREHOLE 002-1065.GPJ GLOR_CAN.GDT 2-7-02

DEPTH SCALE
1 : 100

Golder Associates

LOGGED: M.D.

CHECKED: J.A.F.

PROJECT No.. 002-1065

RECORD OF MONITORING WELL: MW00-4

SHEET 1 OF 3

LOCATION: 3S Pit, Quinsam Coal Mine

BORING DATE: Nov. 20,22&23, 2000

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V ⊕, Q ●, U ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		0.00									
		Loose, moist, grey and brown ROCK FILL, some sand and silt.											Bentonite and Concrete
2													
				3.35	1	CS							
4		Dense, moist, light brown, silty SAND, some gravel (sub-angular). (Till).											
				5.79									
6													
					2	CS							
8													
10													
12		Medium strong, grey SANDSTONE. - grades to lighter grey @ 15.24m - trace black coal @ 24.38m											
14													
16					3	CS							
18													
20					4	CS							

CONTINUED NEXT PAGE

BOREHOLE 002-1065.GPJ GLDR_CAN.GDT 2-7-02

DEPTH SCALE 1 : 100

Golder Associates

LOGGED: W.H.

CHECKED: J.A.F.

PROJECT No.: 002-1065

RECORD OF MONITORING WELL: MW00-4

SHEET 2 OF 3

LOCATION: 3S Pit, Quinsam Coal Mine

BORING DATE: Nov. 20,22&23, 2000

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V ⊕; Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20					4	CS					
22											
24											
26					5	CS					
28		Medium strong, grey SANDSTONE. - grades to lighter grey @ 15.24m - trace black coal @ 24.38m *(continued)*									
30											
32					6	CS					
34				34.14							
		VOID - likely old mine workings, broken and caved in bedrock.									
36				35.66							
38		SANDSTONE.									
40		*CONTINUED NEXT PAGE*									

002-1065.GPJ GLDR_CAN.GDT 2-7-02

BOREHOLE

DEPTH SCALE

1 : 100

Golder Associates

LOGGED: W.H.

CHECKED: J.A.F.

PROJECT No.: 002-1065

RECORD OF MONITORING WELL: MW00-4

SHEET 3 OF 3

LOCATION: 3S Pit, Quinsam Coal Mine

BORING DATE: Nov. 20,22&23, 2000

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
40											
42		SANDSTONE. *(continued)*									Nov. 24/00 ▽
44		VOID - likely old mine workings, broken and caved in bedrock.		44.51							
46		SANDSTONE.		45.72							50mm PVC Slotted Pipe
48		VOID - likely old mine workings, broken and caved in bedrock.		48.77							
50		End of MONITORING WELL.		49.68							
52											
54											
56											
58											
60											

BOREHOLE 002-1065.GPJ GLDR_CAN.GDT 2-7-02

DEPTH SCALE
1 : 100

Golder Associates

LOGGED: W.H.

CHECKED: J.A.F.

PROJECT No.. 002-1065

RECORD OF MONITORING WELL: MW00-6

SHEET 1 OF 1

LOCATION: 3S Pit, Quinsam Coal Mine

BORING DATE: Nov. 21-22, 2000

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		0.00							
2		Compact, moist, light brown TILL (FILL) (boulders, cobbles, sandy silt).			1	CS					Slough MW 6D Nov. 24/00 ▽
4					2	CS					Bentonite Seal Silica Sand
6				5.79	3	CS					MW 6S Nov. 24/00 ▽ 50mm Slotted PVC Pipe
8											
10											Bentonite Seal
12		Dense, moist to wet, dark grey, sandy SILT (Native), some gravel, cobbles and boulders. (TILL).									
14											
16											50mm Slotted PVC Pipe Silica Sand
18											Slough
20		End of MONITORING WELL.		18.59							

BOREHOLE 002-1065.GPJ GLDR_CAN.GDT 2-7-02

DEPTH SCALE

1 : 100

Golder Associates

LOGGED: W.H.

CHECKED: J.A.F.

Lorax Environmental Services Ltd.
2289 Burrard Street
Vancouver, BC, Canada, V6J 3H9
Phone: +1 (604) 688-7173
Fax: +1 (604) 688-7175
www.lorax.ca

Borehole ID: QU08-10

Project #: 885-1
Project: Quinsam Coal Groundwater Monitoring
Client: Quinsam Coal/Hillsborough Resources
Location: 7 South

Northing: 5533856.79
Easting: 324464.06
Ground Elevation: 295.02m
Steel Casing: 6 inch

Depth	Symbol	Description	Depth/Elev.	Well	Observations
ft / m		Ground Surface			
0 / 0		Overburden/ Glacial Till	0.0	Pea Gravel 0.0m-3.0m	
2					
4					
6 / 2					
8					
10					
12 / 4				Cement Grout 3.0m-17.37m	
14					
16					
18					
20 / 6					
22		Sandstone	21.3		
24					
26 / 8					
28					
30					
32 / 10					
34					
36					
38 / 12					
40					
42					
44					
46 / 14					
48					
50					
52 / 16					
54					
56					
58				Bentonite Pellets 17.37m-18.29m	

Drilled By: Drillwell
Drill Method: Downhole Hammer
Geologists: M. Storey
Drill Date: March 10, 2008

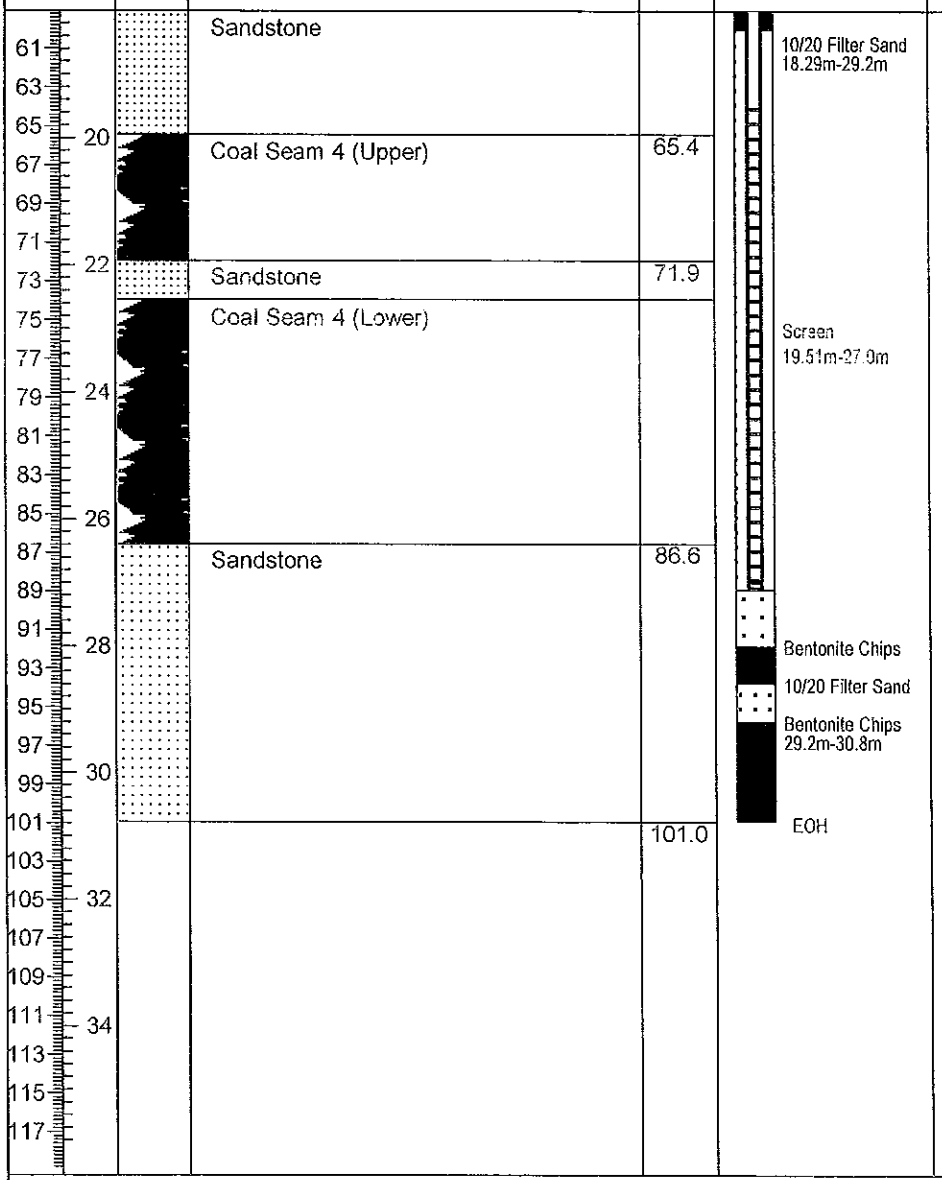
Hole Size: 7 in (0-6.5m), 6 in (6.5m-30.9m)
PVC Casing: 2 inch
Well Installation Date: April 20, 2010
Sheet: 1 of 2

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Client: Quinsam Coal/Hillsborough Resources
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Ground Elevation: 295.02m
Steel Casing: 6 inch



Drilled By: Drillwell
Drill Method: Downhole Hammer
Geologists: M. Storey
Drill Date: March 10, 2008

Hole Size: 7 in (0-6.5m), 6 in (6.5m-30.9m)
PVC Casing: 2 inch
Well Installation Date: April 20, 2010
Sheet: 2 of 2

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Fax: +1 (604) 688-7175
www.lorax.ca

Borehole ID: P08-13

Project #: 885-1
Project: Quinsam Coal Groundwater Monitoring
Client: Quinsam Coal/ Hillsborough Resources
Location: 7 South

Northing: 5535188
Easting: 323887
Ground Elevation: 220.40m
Steel Casing: 6 inch

Depth	Symbol	Description	Depth/Elev.	Well A	Well B	Observations
ft / m		Ground Surface				
0 / 0		Overburden Glacial Till			Pea Gravel 0-2.0m	
6 / 2					Cement Grout 2.0m-4.0m	
12 / 4					Pea Gravel 4.0m-6.9m	
20 / 6					Bentonite chips 6.9m-7.93m	
26 / 8					Pea Gravel 8.6m-13.72m	GW Elevation: 212.41m Well B (April 27, 2010)
32 / 10						
40 / 12						
46 / 14					Bentonite Pellets 13.72m-14.94m	GW Elevation: 207.21m Well A (April 27, 2010)
48 / 14					Pea Gravel 14.94m-21.03m	
52 / 16						
58 / 18						
66 / 20						

Drilled By: Drillwell Enterprises
Drill Method: Downhole Hammer
Geologists: M. Storey
Drill Date: March 3, 2008

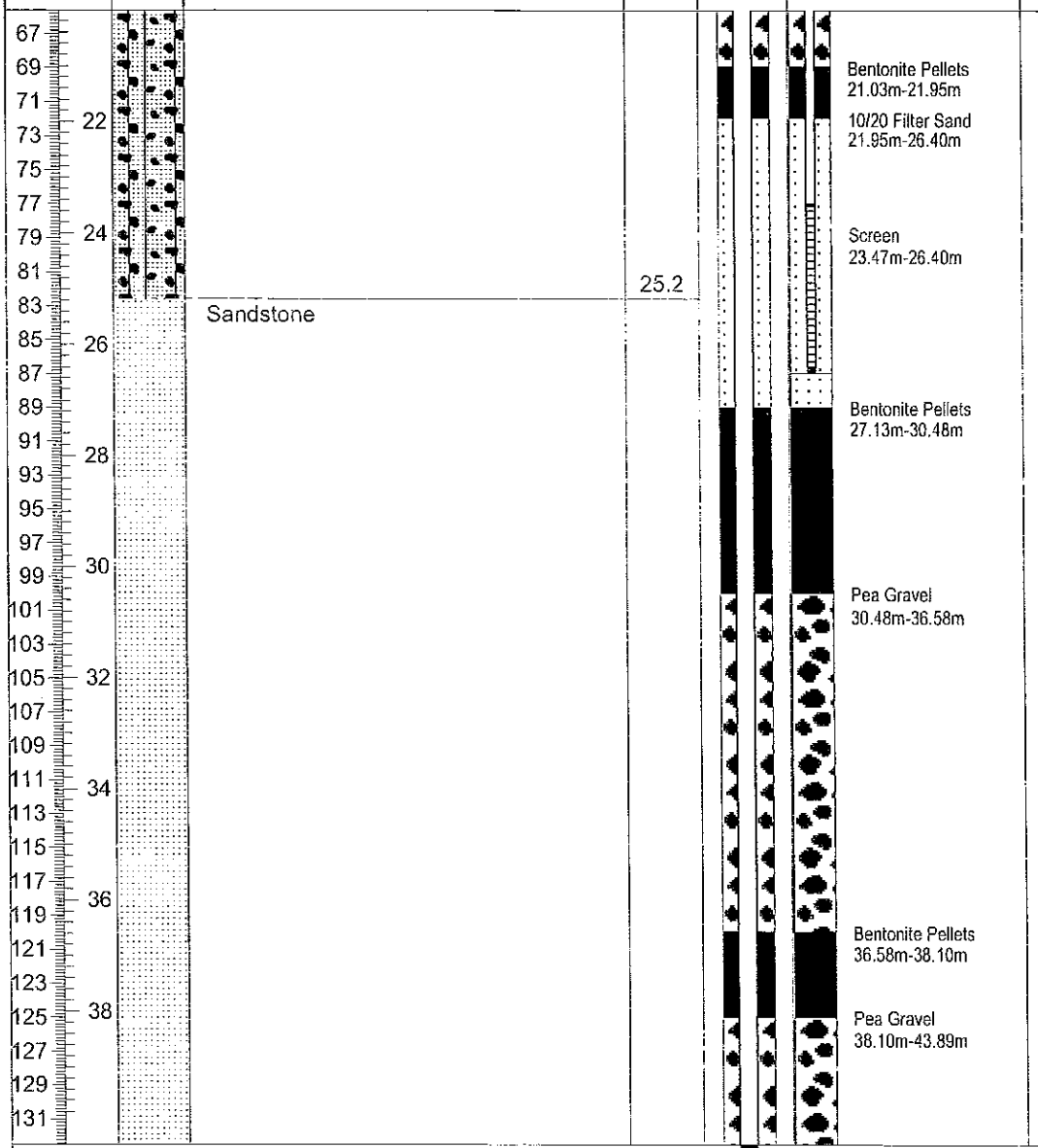
Hole Size: 7 in (0-25.5m), 5.5 in (25.5m-EOH)
PVC Casing: Well A: 2 inch,Well B: 1-1/4inch
Well Installation Date: April 20, 2010
Sheet: 1 of 3

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Borehole ID: P08-13

Project #: 885-1
Project: Quinsam Coal Groundwater Monitoring
Client: Quinsam Coal/ Hillsborough Resources
Location: 7 South

Northing: 5535188
Easting: 323887
Ground Elevation: 220.40m
Steel Casing: 6 inch



Drilled By: Drillwell Enterprises
Drill Method: Downhole Hammer
Geologists: M. Storey
Drill Date: March 3, 2008

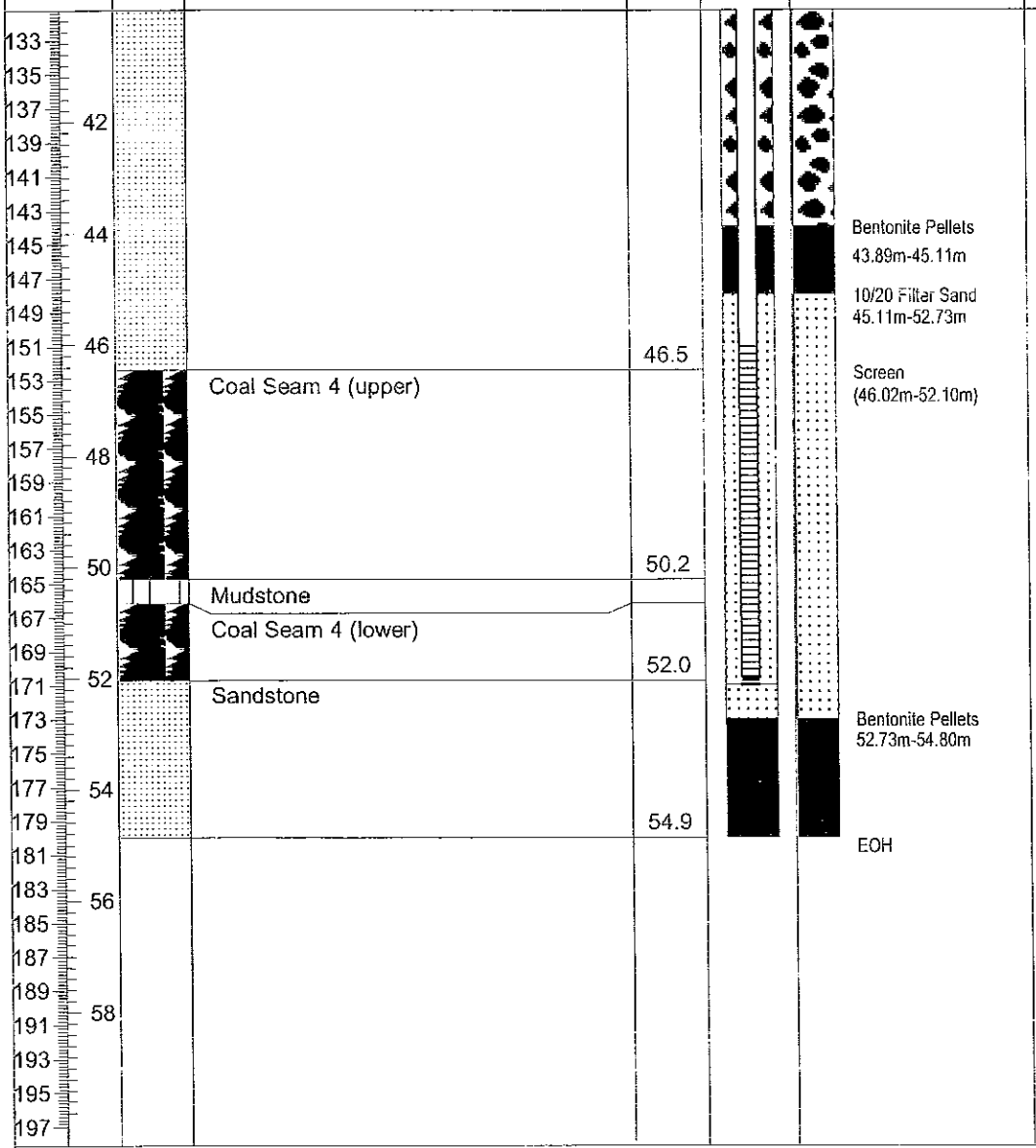
Hole Size: 7 in (0-25.5m), 5.5 in (25.5m-EOH)
PVC Casing: Well A: 2 inch,Well B: 1-1/4inch
Well Installation Date: April 20, 2010
Sheet: 2 of 3

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Borehole ID: P08-13

Project #: 885-1
Project: Quinsam Coal Groundwater Monitoring
Client: Quinsam Coal/ Hillsborough Resources
Location: 7 South

Northing: 5535188
Easting: 323887
Ground Elevation: 220.40m
Steel Casing: 6 inch



Drilled By: Drillwell Enterprises
Drill Method: Downhole Hammer
Geologists: M. Storey
Drill Date: March 3, 2008

Hole Size: 7 in (0-25.5m), 5.5 in (25.5m-EOH)
PVC Casing: Well A: 2 inch,Well B: 1-1/4inch
Well Installation Date: April 20, 2010
Sheet: 3 of 3

Enterprise Geoscience Services Ltd.

Borehole Log of QU-08-21G

Date Started	: May 20, 2008	Drilled by	: Drillwell Enterprises
Date Completed	: May 21, 2008	Northing Coord.	: 102802
Hole Diameter	: 140 mm	Easting Coord.	: 101917
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Core	Logged By	: C.G. Cathyl-Bickford

Water Levels
- QU-08-21G-S 213.14 m (10-Nov-10)
- QU-08-21G-D 212.86 m (10-Nov-10)

Well1: QU-08-21G-S
Well2: QU-08-21G-D
Elev. m: 213.66

Depth (m)	Elev. m	USCS	Material Description
0	213		NOT CORED
20	193	SS	SANDSTONE - light grey to dark brown, medium to coarse grained, non-calcareous
		SL	COAL SEAM 6- dull to bright, with siltstone/mudstone lenses
			SILTSTONE & MUDSTONE interbeds - medium brown to black, carbonaceous
30	183	SS	SANDSTONE - 26.7-34m: light to medium grey, medium to coarse grained, with conglomerate lenses. 34-52m: light to dark grey, fine to coarse grained. Top of Dunsmuir 'E' Sandstone at 34m
50	163		

Pea gravel
Bentonite chips
Pea gravel
PVC 2"/Schedule 40
Bentonite chips
PVC 1.25"/Schedule 40
Pea gravel
Bentonite chips
Pea gravel
Bentonite chips
Pea gravel
Bentonite chips
Pea gravel

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Enterprise Geoscience Services Ltd.

Borehole Log of QU-08-21G

Date Started	: May 20, 2008	Drilled by	: Drillwell Enterprises
Date Completed	: May 21, 2008	Northing Coord.	: 102802
Hole Diameter	: 140 mm	Easting Coord.	: 101917
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Core	Logged By	: C.G. Cathyl-Bickford

Water Levels
- QU-08-21G-S 213.14 m (10-Nov-10)
- QU-08-21G-D 212.86 m (10-Nov-10)

Well1: QU-08-21G-S
Well2: QU-08-21G-D
Elev. m: 213.66

Depth (m)	Elev. m (213.66)	USCS	Material Description
50	163	SS	
			COAL SEAM 5 - 52-53.3m: bright to dull, minor sandstone lensing; 53.3-55.1m: bright ot dull, with pyrite and mudstone lenses.
55	158		SANDSTONE - light grey to brown, fine to coarse grained
60	153		
65	148	SS	
70	143		
75	138	SL	COAL SEAM 4R - dull to bright. Top of Dunsmuir member middle division
			SILTSTONE - dark grey, with mudstone lenses
			COAL SEAM 4/4L - 76.9-8m: dull to bright, with mudstone beds; 79-80.4m: dull to bright, with sandstone and mudstone beds.
80	133		SANDSTONE - 80.4-92.1m: light grey to black, fine to coarse grained; Top of Dunsmuir 'C' sandstone at 81.7m; Minor siltstone/mudstone interbeds at 86m, 92m depths
85	128	SS	
90	123		
			COAL SEAM 4B- bright to dull with sandstone interbeds
95	118	SS	SANDSTONE - light grey to black, fine to coarse grained, carbonaceous
100			

Pea gravel
Bentonite chips
Pea gravel
Bentonite chips
PVC 1.25"/Schedule 40
Pea gravel
Bentonite chips
Pea gravel
PVC 2"/Schedule 40
Bentonite chips
QU-08-21G-S Screen
Filter sand
Bentonite pellets
Pea gravel
Bentonite pellets
Pea gravel
Bentonite pellets

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

05-19-2011 C:\Users\John Balfour\Documents\PROJECTS\2009 Projects\09010 Lorax\2010 Work\Borehole logs\QU-08-21Ga.bor

Enterprise Geoscience Services Ltd.

Borehole Log of QU-08-21G

Date Started	: May 20, 2008	Drilled by	: Drillwell Enterprises
Date Completed	: May 21, 2008	Northing Coord.	: 102802
Hole Diameter	: 140 mm	Easting Coord.	: 101917
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Core	Logged By	: C.G. Cathyl-Bickford

Water Levels
- QU-08-21G-S 213.14 m (10-Nov-10)
- QU-08-21G-D 212.86 m (10-Nov-10)

Well1: QU-08-21G-S
Well2: QU-08-21G-D
Elev. m: 213.66

Depth (m)	Elev. m 213.66	USCS	Material Description
100	113		SANDSTONE - light grey to black, fine to coarse grained, carbonaceous
105	108		
110	103	SS	
115	98		
120	93		
125	88		COAL SEAM 3R - bright, with carbonaceous mudstone interbeds/at top of sequence.
		SL	SILTSTONE & MUDSTONE - dark brown to grey, interbedded
		SL	COAL SEAM 3 - bright to dull, with mudstone lenses at top and bottom of sequence.
130	83	SL	SILTSTONE - medium to dark brown, with mudstone interbeds
			COAL SEAM 3L - dull to bright, interlaminated with mudstone at top of sequence.
135	78		SILTSTONE - 130-133m: dark brown, with dark brown mudstone beds - minor coal lenses at 131m and between 132.7 and 133m
140	73	SS	SANDSTONE - 133-154.6m: light to dark grey, fine to coarse grained, top of Dunsmuir 'A' sandstone at 133m.
145	68		147-149m: dark brown mudstone lenses
150			

Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
PVC 2"/Schedule 40
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Borehole Log of QU-08-21G

Date Started	: May 20, 2008	Drilled by	: Drillwell Enterprises
Date Completed	. May 21, 2008	Northing Coord.	: 102802
Hole Diameter	: 140 mm	Easting Coord.	: 101917
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Core	Logged By	: C.G. Cathyl-Bickford

Water Levels
- QU-08-21G-S 213.14 m (10-Nov-10)
- QU-08-21G-D 212.86 m (10-Nov-10)

Well1: QU-08-21G-S
Well2: QU-08-21G-D
Elev. m: 213.66

Depth (m)	Elev. m 213.66	USCS	Material Description
150	63	SS	
155	58	MS / SL	MUDSTONE - grey brown, with siltstone lenses, medium brown, carbonaceous COAL SEAM 2 - bright to dull, dirty at base (155 0-156.1m)
160	53	SS	SILTSTONE - 156-157.3m: dark grey, with dark brown mudstopbe interbeds SANDSTONE, IRONSTONE and SILTSTONE interbeds - dark grey to brown. Possible fault at 157.3m
165	48		
170	43		COAL SEAM 1 - 171.6-172.7m: dull to bright, dirty, with mudstone lensese at top and bottom of sequence (Quinsam No. 1 coal bed)
175	38	MS / SL	MUDSTONE - 172.7-173.6m: medium brown with siltstone lense at top of sequence -floor of upper bench/top of main parting at 172.9m -interlaminated coal and mudstone between 173.4m and 173.6m -base of main parting at 173.5m
180	33	SL	IRONSTONE, SILTSTONE and MUDSTONE - dark grey to brown SANDY SILT, COALY ROCK (Coal Seam 1L). SILTSTONE, IRONSTONE, SANDSTONE and MUDSTONE interbeds - 176.9-177.8m: bright coal bands 176.9-184m: dark grey to dark brown conglomerate with sandstone bed at base, dark green, coarse grained
185	28		EOH @ 185.8m
190	23		
195	18		
200			

Pea Gravel
Bentonite Pellets
PVC 2"/Schedule 40
Pea Gravel
Bentonite Pellets
QU-08-21G-D Screen
Filter Sand

Quinsam Coal
Assessment of Underground Disposal of Coarse Coal Refuse

Campbell River, B.C.

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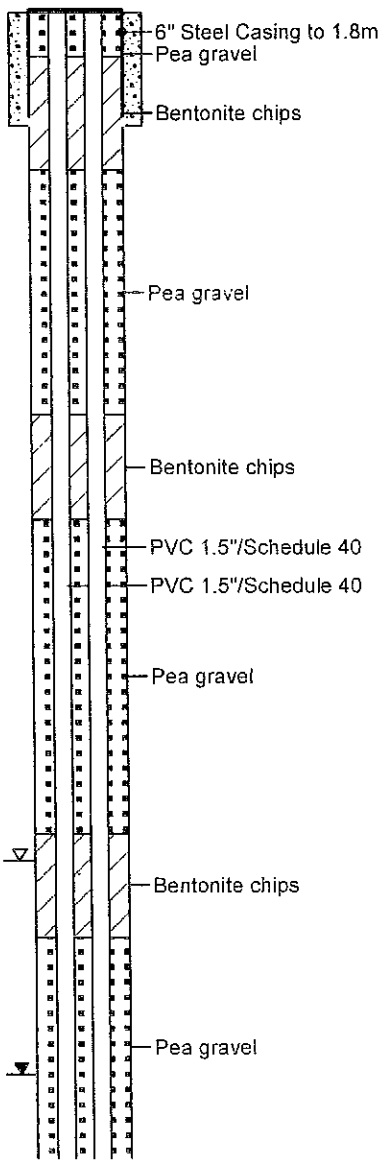
Borehole Log of QU-10-07

Date Started	: Sept 28, 2010	Drilled by	: Drillwell Enterpirses
Date Completed	: Sept 29, 2010	Northing Coord.	: 101137
Hole Diameter	: 150mm/85mm core	Easting Coord.	: 99263
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-07-S 18.538m (11/19/2010)
- QU-10-07-D 14.805m (11/19/2010)

Well1: QU-10-07-S
Well2: QU-10-07-D
Elev. m: 317.61

Depth (m)	Elev. m 317.61	USCS	Material Description
0	317		SANDY SILT (TILL) - red-brown, loose, moist.
			SANDSTONE -
			0.1-3.1m light grey, weathered, fine to medium grained.
			3.1-6.1m light grey, medium grained.
5	312		No water at 6.0m.
			6.1-9.1m medium grey, coarse-grained, moderately weathered with dark grey siltstone lens.
			9.1-12.2m medium grey, medium-coarse grained, fresh.
10	307	SS	No water at 12.2m.
			12.2-21.3m medium grey, fresh.
15	302		
20			



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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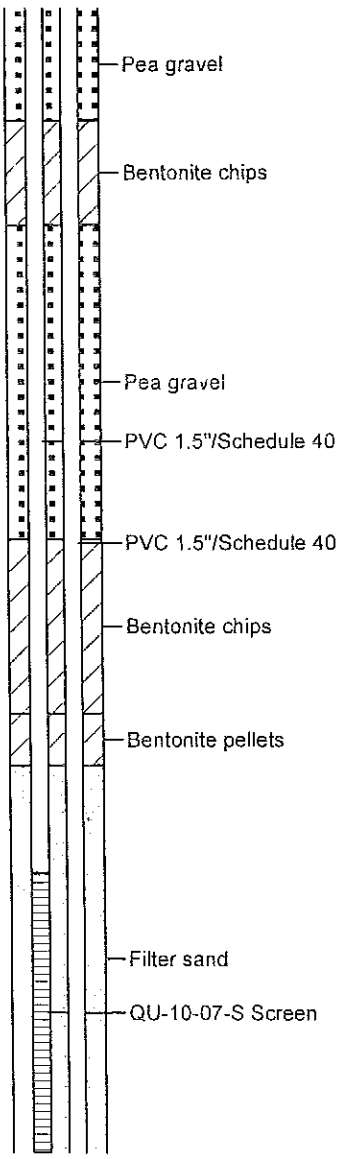
Borehole Log of QU-10-07

Date Started	: Sept 28, 2010	Drilled by	: Drillwell Enterpirses
Date Completed	: Sept 29, 2010	Northing Coord.	: 101137
Hole Diameter	: 150mm/85mm core	Easting Coord.	: 99263
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-07-S 18.538m (11/19/2010)
- QU-10-07-D 14.805m (11/19/2010)

Well1: QU-10-07-S
Well2: QU-10-07-D
Elev. m: 317.61

Depth (m)	Elev. m 317.61	USCS	Graphic Symbol	Material Description
20	297			No water at 21.3m. 21.3-24.4m light grey, fine-medium grained, moderately weathered.
25	292			24.4-30.5m light grey, fine-medium grained, fresh.
30	287	SS		30.5-36.6m very light grey, fine-grained, fresh, siltstone lens.
35	282			36.6-39.6m very light grey, fine-medium grained, moderately weathered.
40				39.6-48.8m very light grey, fine-medium grained, fresh.



Quinsam Coal
Assessment of Underground Disposal of Coarse Coal Refuse

Campbell River, B.C.

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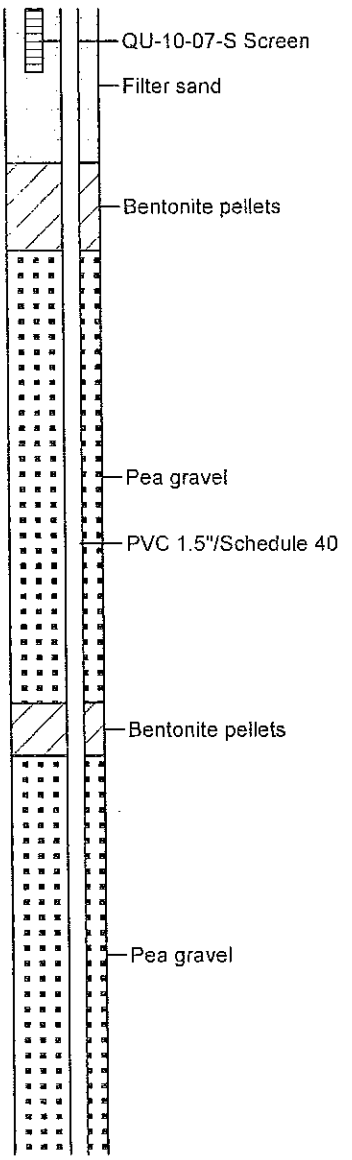
Borehole Log of QU-10-07

Date Started	: Sept 28, 2010	Drilled by	: Drillwell Enterpirses
Date Completed	: Sept 29, 2010	Northing Coord.	: 101137
Hole Diameter	: 150mm/85mm core	Easting Coord.	: 99263
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-07-S 18.538m (11/19/2010)
- QU-10-07-D 14.805m (11/19/2010)

Well1: QU-10-07-S
Well2: QU-10-07-D
Elev. m: 317.61

Depth (m)	Elev. m 317.61	USCS	Graphic Symbol	Material Description
40	277			
45	272			
50	267	SS		48.8-54.9m medium grey, fine to medium grained, fresh.
55	262			No water at 54.9m. 54.9-57.9m medium grey, fine to medium grained, moderately weathered.
60				57.9-61.0m fine grained, dark grey, fresh.



Quinsam Coal
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of Coarse Coal Refuse

Campbell River, B.C.

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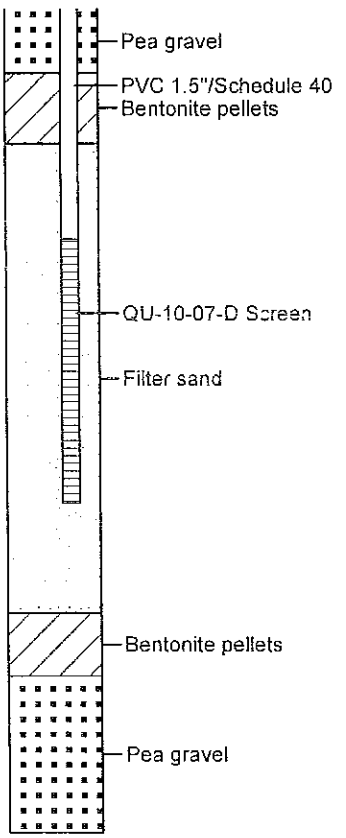
Borehole Log of QU-10-07

Date Started	: Sept 28, 2010	Drilled by	: Drillwell Enterpirses
Date Completed	: Sept 29, 2010	Northing Coord.	: 101137
Hole Diameter	: 150mm/85mm core	Easting Coord.	: 99263
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-07-S 18.538m (11/19/2010)
- QU-10-07-D 14.805m (11/19/2010)

Well1: QU-10-07-S
Well2: QU-10-07-D
Elev. m: 317.61

Depth (m)	Elev. m 317.61	USCS	Graphic Symbol	Material Description
60	257	SS		61.0-64.9m medium-dark grey, fine-medium grained, fresh.
65	252			COAL - Rapid drill penetration. Water in coal seam ~0.5 US GPM.
		MS		COAL/MUDSTONE. Borehole cored from 67.7m to 74.4m (5.5inch diameter)
		SS		Heavily fractured 67.7-69.8m: (2.1m/ 0.6m rec'y). Lost remainder of core run to 69.8m.
70	247	SL		SANDSTONE, medium grey.
				SILTSTONE,
				69.8-70.4m fine grained, dark grey, fresh, heavily fractured 69.8-70.3m, then massive.
				69.8-71.3m: (1.52m/1.4m rec'y).
		SS		heavily fractured 71.3-72.5m.
				71.3-72.7m: (1.37m/1.2m rec'y).
				70.4-71.9m SILTSTONE/SANDSTONE, fine grained, dark grey, fresh.
75	242			grey, SANDSTONE, light grey, medium-coarse grained, fresh. -72.5
				minor fractures 72.5-73.9m.
				Heavily fractured 73.9-74.4m.
				72.7-74.4m: (1.7m/1.75m rec'y).
				Flow 0.75 GPM at 74.4m.
80				EOH @ 74.4m



Quinsam Coal
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Campbell River, B.C.

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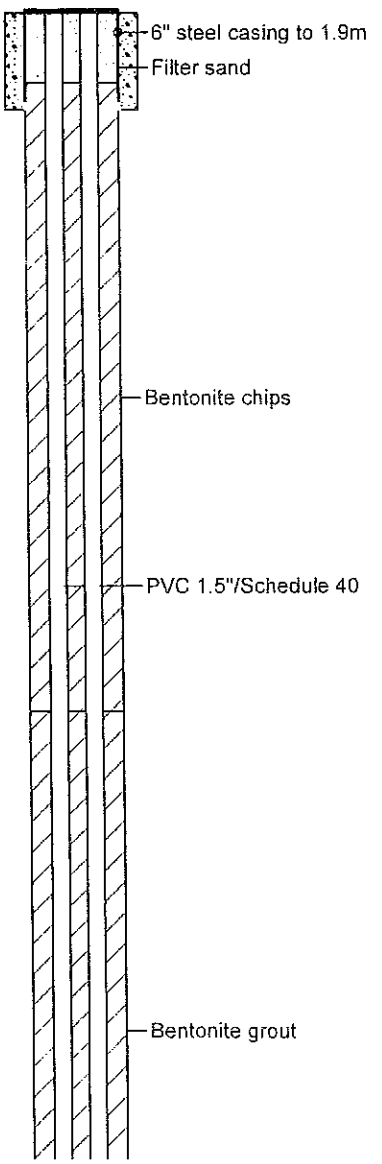
Borehole Log of QU-10-08

Date Started	: Sept 29, 2010	Drilling Company	: Drillwell Enterpirses
Date Completed	: Sept 30, 2010	Northing Coord.	: 100893
Hole Diameter	: 150 mm/85 mm core	Easting Coord.	: 98905
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-08-S: 307.50m (11/19/2010)
- QU-10-08-D: 306.54m (11/19/2010)

Well1: QU-10-08-S
Well2: QU-10-08-D
Elev. m: 339.17

Depth (m)	Elev. m 339.17	USCS	Graphic Symbol	Material Description
0	339			SANDSTONE - 0-1.8m: green-grey, medium-coarse, fresh
				1.8-7.3m: medium-grey, fine grained, moderately weathered, non-carbonaceous
5	334			
				7.3-18.9m: dark grey, fine grained, fresh, non-carbonaceous
10	329	SS		
15	324			
				18.9-21.3m: dark grey, fine-grained, slightly weathered, non-carbonaceous
20	319			
				21.3-37.2m: medium: grey, fine-medium: grained, fresh, non-carbonaceous
25				



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Borehole Log of QU-10-08

Date Started	: Sept 29, 2010	Drilling Company	: Drillwell Enterpirses
Date Completed	: Sept 30, 2010	Northing Coord.	: 100893
Hole Diameter	: 150 mm/85 mm core	Easting Coord.	: 98905
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels

▼ QU-10-08-S: 307.50m (11/19/2010)

▽ QU-10-08-D: 306.54m (11/19/2010)

Well1: QU-10-08-S
Well2: QU-10-08-D
Elev. m: 339.17

Depth (m)	Elev. m 339.17	USCS	Graphic Symbol	Material Description
25	314			
30	309			
35	304	SS		37.2-64.0m: light grey, coarse-grained, fresh, slightly carbonaceous. Hole dry at resumption of drilling next day (Sept 30/10)
40	299			
45	294			
50				

PVC 1.5"/Schedule 40

Bentonite grout

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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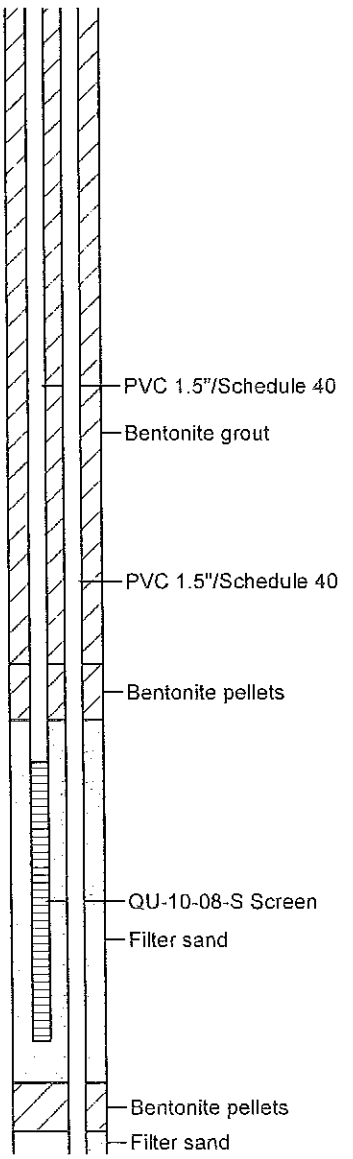
Borehole Log of QU-10-08

Date Started	: Sept 29, 2010	Drilling Company	: Drillweil Enterpirses
Date Completed	: Sept 30, 2010	Northing Coord.	: 100893
Hole Diameter	: 150 mm/85 mm core	Easting Coord.	: 98905
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-08-S: 307.50m (11/19/2010)
- QU-10-08-D: 306.54m (11/19/2010)

Well1: QU-10-08-S
Well2: QU-10-08-D
Elev. m: 339.17

Depth (m)	Elev. m 339.17	USCS	Graphic Symbol	Material Description
50	289			
55	284			
60	279	SS		64.0-66.4m: light grey, coarse-grained, fresh, not carbonaceous
65	274			66.4-71.5m: medium: grey, coarse grained, fresh, non-carbonaceous
70	269			Dry hole at 71.3m. Borehole cored from 71.3m to EOH 71.5-73.6m: light grey, coarse grained, fresh, non-carbonaceous, moderately fractured. (2.13 m/2.06 rec'y) 73.6-75.7m: light grey, coarse grained, fresh, non-carbonaceous, massive fracture
75				



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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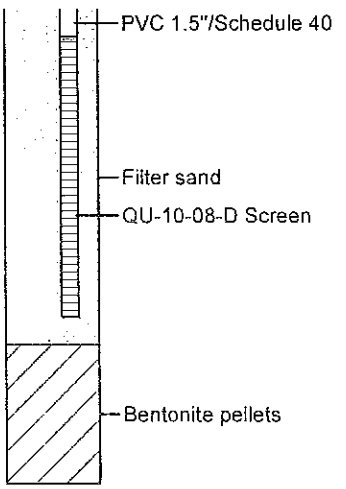
Borehole Log of QU-10-08

Date Started	: Sept 29, 2010	Drilling Company	: Drillwell Enterpirses
Date Completed	: Sept 30, 2010	Northing Coord.	: 100893
Hole Diameter	: 150 mm/85 mm core	Easting Coord.	: 98905
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-08-S: 307.50m (11/19/2010)
- QU-10-08-D: 306.54m (11/19/2010)

Well1: QU-10-08-S
Well2: QU-10-08-D
Elev. m: 339.17

Depth (m)	Elev. m 339.17	USCS	Material Description
75	264	SS	
		SL	SILTSTONE/COAL Interface
			COAL SEAM 3- heavily fractured
		MS	COAL SEAM 3 and MUDSTONE lenses - heavily fractured 76.4-79.1m: (2.74 m/2.74 rec'y)
80	259		COAL Seam 3 - minor pyrite, heavily fractured 79.1-81.1m: (1.98 m/0.71 rec'y)
		SS	SANDSTONE - 81.1-82.6m: (1.52 m/1.52 rec'y) 81.4-82.6m: dark grey, fine to medium: grained with thin coal stringers (1/8 to 1/2 inch), heavily fractured 82.6-82.9m: light grey, very coarse grained, fresh, minor fractures 82.6-84.1m: (1.52 m/1.42 rec'y) 82.9-85.3m: light-medium: grey, med-coarse grained, massive, fresh 84.1-85.6m: (1.52 m/1.52 rec'y)
85	254		EOH @ 85.3m
90	249		
95	244		
100			



Quinsam Coal
Assessment of Underground Disposal of Coarse Coal Refuse

Campbell River, B.C.

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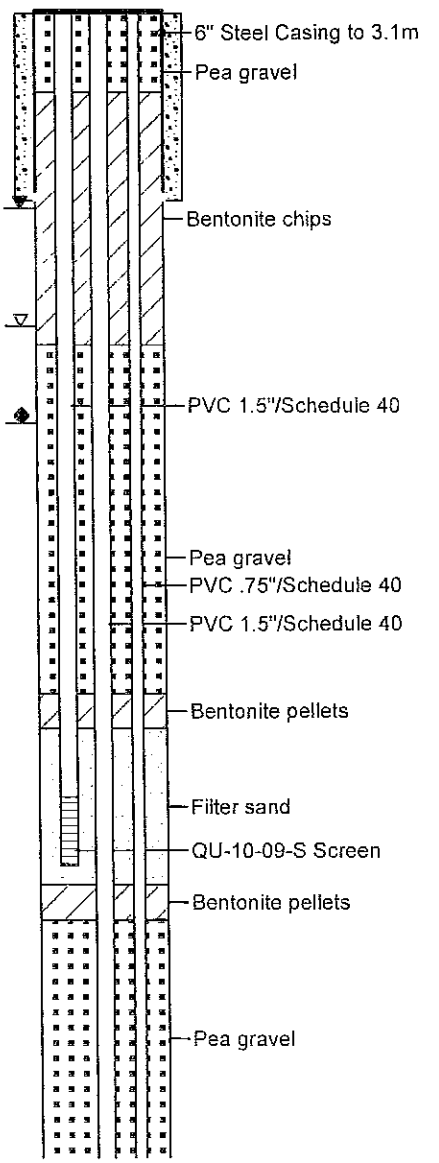
Borehole Log of QU-10-09

Date Started	: Oct 1, 2010	Drilled By	: Drillwell Enterprises
Date Completed	: Oct 5, 2010	Northing Coord.	: 101346
Hole Diameter	: 150 mm	Easting Coord.	: 98931
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-09-S: 300.91m
- QU-10-09-D: 298.84m
- QU-10-09-P: 291.48m

Well1: QU-10-09-S
Well2: QU-10-09-D
Well3: QU-10-09-P
Elev. m: 304.31

Depth (m)	Elev. m 304.31	USCS	Graphic Symbol	Material Description
0	304	f42		Sandy SILT (TILL) - with boulders, red-brown
		ss		SANDSTONE -
				3.05-6.1m: light to dark grey, medium grained, fresh, non-carbonaceous
5	299			6.1-9.14m: light to dark grey, medium-coarse grained
				8 thin coal stringers (3.18mm) between 6.55-6.71m in weathered siltstone lens
				quartz vein at 7.3m
				9.1-12.2m: light grey, coarse grained
10	294			iron-stained quartz vein fracture zones at 11.1-11.6m
				conglomerate inclusions between 11.7-11.9m
				12.2-15.2m: light grey, coarse grained
				15.2-18.3m:
				interval.
				conglomerate inclusions 13.3-14.0m and 14.5-14.8m
				weathered zone at 14.3m
15	289			18.3-22.6m: light grey, medium coarse grained
				conglomerate lense at 17.7m
				22.6-23.5m: light grey, medium coarse grained
20				



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Borehole Log of QU-10-09

Date Started	: Oct 1, 2010	Drilled By	: Drillwell Enterprises
Date Completed	: Oct 5, 2010	Northing Coord.	: 101346
Hole Diameter	: 150 mm	Easting Coord.	: 98931
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-09-S: 300.91m
- QU-10-09-D: 298.84m
- QU-10-09-P: 291.48m

Well1: QU-10-09-S
Well2: QU-10-09-D
Well3: QU-10-09-P
Elev. m: 304.31

Depth (m)	Elev. m 304.31	USCS	Material Description
20	284	SS	conglomerate lense 20.3-20.4m
			23.5-27.4m: weathered
			27.4-29.6m: medium grey, fine-medium grained, with thin shale stingers
25	279		minor conglomerate inclusions @ 25.3m
			29.6-32m: light to medium grey, fine to medium grained
30	274		32-33.5m: medium grey, medium grained with disseminated shale stringers
			33.5-38.1m: light to medium grey, medium-coarse grained, fractures 32-33.2m COAL seam (1" thick) at 32.2m
			38.1-39.3m: light to medium grey, weathered mudstone lense @ 112 to 112.5 ft, fractures from 117.5 to 124
35	269		flow 9 GPM at 37.8m
		MS	MUDSTONE - dark brown, multiple fractures
40		SS	SANDSTONE - 39.3-42.7m: light to medium grey, medium grained

Pea gravel
Bentonite pellets
PVC 1.5"/Schedule 40
Pea gravel
PVC .75"/Schedule 40
Bentonite pellets
QU-10-09-D Screen
Filter sand
Bentonite pellets

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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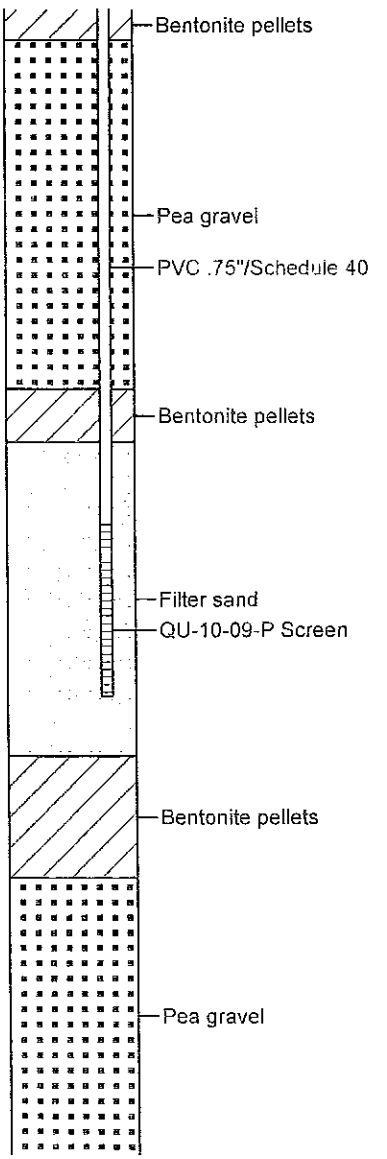
Borehole Log of QU-10-09

Date Started	: Oct 1, 2010	Drilled By	: Drillwell Enterprises
Date Completed	: Oct 5, 2010	Northing Coord.	: 101346
Hole Diameter	: 150 mm	Easting Coord.	: 98931
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-09-S: 300.91m
- QU-10-09-D: 298.84m
- QU-10-09-P: 291.48m

Well1: QU-10-09-S
Well2: QU-10-09-D
Well3: QU-10-09-P
Elev. m: 304.31

Depth (m)	Elev. m 304.31	USCS	Material Description
40	264		fractured at 40.2m
		SS	42.7-45.7m: light to medium grey, medium grained, heavily fractured, MUDSTONE bed (20 cm thick, dark brown) thin COAL stringer @43.1m
45	259		45.7-49.2m: light grey, coarse grained, heavily fractured
			47.6-47.8m: mudstone bed (dark brown)
50	254		COAL SEAM 2, heavily fractured with mudstone and coal stringers at base flow 12 GPM at 49.4m
		MS	MUDSTONE - dark brown, heavily fractured, with coal stringers over 6" interval. Flow 16 GPM at 50.3m
55	249	SL	SILTSTONE - 54.9-57.3m: dark brown, heavily fractured. 6 inches of light grey unweathered SILTSTONE at base coal stringers at 55.2m. Thin coal stringers in weathered mudstone between 55.2-56.1m
		MS	MUDSTONE - dark brown, fractured on 15.24cm spacing, disseminated COAL stringers (1 ft interval) at base of 91.4m moderately fractured mudstone sequence, mudstone heavily fractured at base. Flow 28 GPM at 57.3m
60		SL	



Quinsam Coal
Assessment of Underground Disposal
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Campbell River, B.C.

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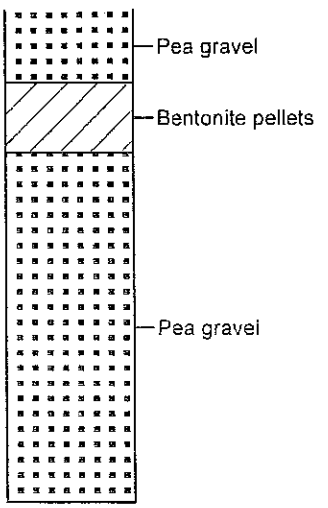
Borehole Log of QU-10-09

Date Started	: Oct 1, 2010	Drilled By	: Drillwell Enterprises
Date Completed	: Oct 5, 2010	Northing Coord.	: 101346
Hole Diameter	: 150 mm	Easting Coord.	: 98931
Drilling Method	: Air Rotary with wireline coring	Survey By	: McElhanney
Sampling Method	: Grab sample/core log	Logged By	: O. Quinn

Water Levels
- QU-10-09-S: 300.91m
- QU-10-09-D: 298.84m
- QU-10-09-P: 291.48m

Well1: QU-10-09-S
Well2: QU-10-09-D
Well3: QU-10-09-P
Elev. m: 304.31

Depth (m)	Elev. m 304.31	USCS	Material Description
60	244		SILTSTONE -
			59.7-61.6m: grey-brown, heavily fractured. Flow 24 GPM at 196m
			fractured 60.3-60.5m
			coal lenses (61.0-91.4cm) between 60.8-61.6m
			61.6-64.3m: light to dark brown
			moderately fractured between 61.7-62.6m with thin coal stringers in fracture zones
		SL	heavily fractured to base at 64.3m
65	239		64.3-68.6m: grey-brown
			moderately fractured between 64.3-65.4m
			heavily fractured 65.4-65.7m
			moderately fractured 65.7-66.3m
			highly fractured 66.3-66.5m
			moderately fractured 66.5-67.1m
70	234		EOH @ 68.6m. Flow 30 GPM at 68.6m.
75	229		
80			



Quinsam Coal
Assessment of Underground Disposal of Coarse Coal Refuse

Campbell River, B.C.

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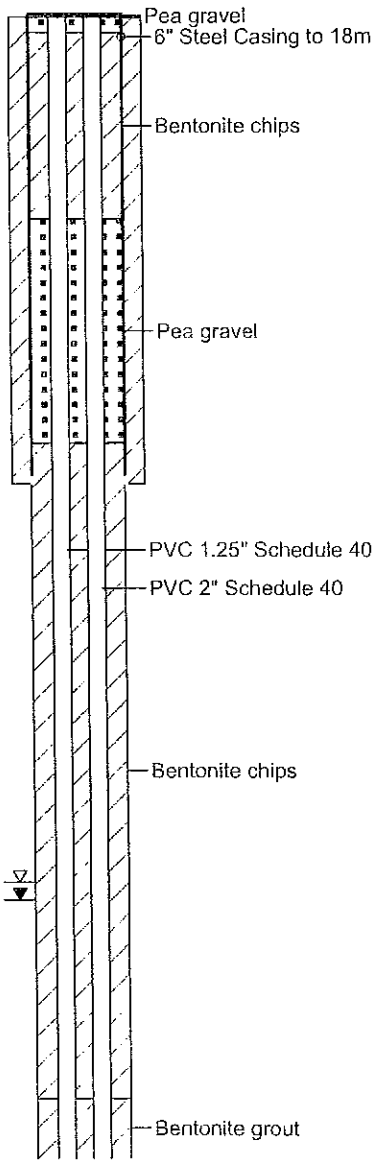
Borehole Log of QU-10-10

Date Started	: Oct 6, 2010	Drilled by	: Drillwell Enterprises
Date Completed	: Oct 7, 2010	Northing Coord.	: 102903
Hole Diameter	: 150 mm	Easting Coord.	: 101506
Drilling Method	: Air Rotary	Survey By	: McElhanney
Sampling Method	: Grab sample	Logged By	: O. Quinn

Water Levels
- QU-10-10-S: 210.55M (11/19, 2010)
- QU-10-10-D: 210.44M (11/18/2010)

Well1: QU-10-10-S
Well2: QU-10-10-D
Elev. m: 244.26

Depth (m)	Elev. m 244.26	USCS	Material Description
0	244		Silty, sandy TILL - with boulders, red-brown
5	239		TILL - grey, with boulders
10	234		
15	229		
20	224	SS	SANDSTONE - 17.7-24.4m: light grey, fine-medium grained, slightly weathered, slighily carbonaceous to 21.3m
25	219	SS	24.4-29.3m: medium grey, fined grained, fresh
30	214	SL	SILTSTONE - dark grey, fresh
35	209	SS	SANDSTONE - 31.1-34.8m: dark grey, fine grained, fresh; 34.8-38.1m: light grey, fine-medium grained, moderately weathered; flow 0.25 US GPM at 36.6m
40	204	SS	COAL SEAM 5 - shiny, with light grey/brown, coarse-grained sandstone; SANDSTONE - 38.4-42.7m: medium grey, fine-med grained, fresh; 42.7-57.9m: grey, medium-coarse grained, fresh; Flow 7.5 US GPM at 42.7m
45			



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Borehole Log of QU-10-10

Date Started	: Oct 6, 2010	Drilled by	: Drillwell Enterprises
Date Completed	: Oct 7, 2010	Northing Coord.	: 102903
Hole Diameter	: 150 mm	Easting Coord.	: 101506
Drilling Method	: Air Rotary	Survey By	: McElhanney
Sampling Method	: Grab sample	Logged By	: O. Quinn

Water Levels
- QU-10-10-S: 210.55M (11/19, 2010)
- QU-10-10-D: 210.44M (11/18/2010)

Well1: QU-10-10-S
Well2: QU-10-10-D
Elev. m: 244.26

Depth (m)	Elev. m 244.26	USCS	Material Description
45	199		
		SS	Flow 10 US GPM at 48.8m
50	194		
55	189		
			COAL (No. 4 Seam). Flow 10 US GPM at 57.91m
60	184		SANDSTONE - 58.2-63.1m: grey, fine-medium grained, fresh
			63.1-80.8m: light grey, medium-coarse grained, fresh
65	179		Flow 10 US GPM at 67.1m
		SS	
70	174		
75	169		
80	164	MS	MUDSTONE - dark brown, weathered
			COAL (No. 4 B) - shiny, interbedded with dark grey MUDSTONE
		MS	MUDSTONE - dark grey, fresh
85	159		SANDSTONE - 84.73-105.77m: light grey, coarse grained, fresh
		SS	
90			

Bentonite grout
PVC 1.25" Schedule 40
Bentonite chips
Bentonite pellets
Filter sand
QU-10-10-S Screen
Bentonite pellets
PVC 2" Schedule 40
Pea gravel
Bentonite pellets
Pea gravel
Bentonite pellets
Pea gravel
Bentonite pellets
Pea gravel

Quinsam Coal
Assessment of Underground Disposal of Coarse Coal Refuse

Campbell River, B.C.

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Borehole Log of QU-10-10

Date Started	: Oct 6, 2010	Drilled by	: Drillwell Enterprises
Date Completed	: Oct 7, 2010	Northing Coord.	: 102903
Hole Diameter	: 150 mm	Easting Coord.	: 101506
Drilling Method	: Air Rotary	Survey By	: McElhanney
Sampling Method	: Grab sample	Logged By	: O. Quinn

Water Levels
- QU-10-10-S: 210.55m (11/19, 2010)
- QU-10-10-D: 210.44m (11/18/2010)

Well1: QU-10-10-S
Well2: QU-10-10-D
Elev. m: 244.26

Depth (m)	Elev. m 244.26	USCS	Material Description
90	154	SS	SANDSTONE (cont'd)
95	149		
100	144		
105	139		COAL - shiny, interbedded with dark brown MUDSTONE
		SL	SILTSTONE - dark brown, fresh
110	134		COAL SEAM 3R - dull to shiny with light brown, weathered mudstone
		SL	SILTSTONE - dark brown, fresh
115	129		COAL SEAM 3 - shiny
		MS	MUDSTONE - dark brown, fresh
		SS	SANDSTONE - 118.3-118.9m: light grey, coarse grained with dull COAL SEAM 3L.
120	124	MS	118.9-120.1m: light grey, fine-medium grained, fresh
			MUDSTONE - dark brown, fresh
125	119	SS	SANDSTONE - 121.9-132.9m: light grey, medium grained, fresh, with interbedded dark brown, fresh, carbonaceous MUDSTONE
			Flow 10 US GPM at 128.0m
130	114		132.9-141.1m: light to medium grey. fine-coarse grained, fresh
135			

Well construction:
- Pea Gravel
- Bentonite pellets
- Pea Gravel
- Bentonite pellets
- Pea Gravel
- Bentonite pellets
- PVC 2" Schedule 40
- Pea Gravel
- Bentontie pellets
- Pea Gravel
- Bentonite pellets
- Pea Gravel
- Bentonite pellets
- Pea Gravel
- Bentonite pellets

Quinsam Coal
Assessment of Underground Disposal of Coarse Coal Refuse

Campbell River, B.C.

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Enterprise Geoscience Services Ltd.

Borehole Log of QU-10-10

Date Started	: Oct 6, 2010	Drilled by	: Drillwell Enterprises
Date Completed	: Oct 7, 2010	Northing Coord.	: 102903
Hole Diameter	: 150 mm	Easting Coord.	: 101506
Drilling Method	: Air Rotary	Survey By	: McElhanney
Sampling Method	: Grab sample	Logged By	: O. Quinn

Water Levels
- QU-10-10-S: 210.55m (11/19, 2010)
- QU-10-10-D: 210.44m (11/18/2010)

Well1: QU-10-10-S
Well2: QU-10-10-D
Elev. m: 244.26

Depth (m)	Elev. m 244.26	USCS	Material Description	Well
135	109	SS		Bentonite pellets
				Pea Gravel
140	104		Flow 12 US GPM at 140.2m	
		MS	MUDSTONE - dark brown, fresh	Bentonite pellets
			COAL SEAM 2 - shiny, with dark brown, fresh MUDSTONE	
145	99		MUDSTONE -	Pea Gravel
			144.3-148.7m: medium brown, fresh	PVC 2" Schedule 40
			148.7-149.0m: COAL lens	Bentonite pellets
			148.7-150.3m: dark brown	
150	94	MS	150.3-156.7m: dark brown, with grey-green, fine-medium grained SILTSTONE, fresh	Pea Gravel
155	89		156.7-160.9m: dark brown, fresh	Bentonite pellets
			Flow 12 US GPM at 158.5m	
160	84		COAL SEAM 2L/1R - shiny, with light brown, fresh MUDSTONE	Pea Gravel
		MS	MUDSTONE -	Bentonite pellets
			162.5-165.4m: light brown, fresh	
165	79		Flow 12 US GPM at 164.6m	
		MS	COAL SEAM 1- shiny	QU-10-10-D Screen
			MUDSTONE - grey-brown, fresh	Sand Pack
		MS	COAL SEAM 1 - shiny, with medium-brown, fresh, MUDSTONE	
170	74	MS	MUDSTONE - dark brown-grey, fresh	
			COAL - shiny, with medium-brown, fresh, MUDSTONE	
			MUDSTONE - dark brown-grey, fresh	
175	69	SL	COAL SEAM 1L - shiny with medium-brown. fresh MUDSTONE	Bentonite pellets
			SILTSTONE -	Pea Gravel.
			173.1-177.7m: green-grey, fresh	
180			EOH @ 179.83m (Flow 12 US GPM)	

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Borehole Log of QU-10-11

Date Started	: Oct 8, 2010	Drilled by	: Drillwell Enterprises
Date Completed	: Oct 13, 2010	Northing Coord.	: 103177
Hole Diameter	: 150 mm	Easting Coord.	: 101451
Drilling Method	: Air Rotary	Survey By	: McElhanney
Sampling Method	: Grab sample	Logged By	: O. Quinn

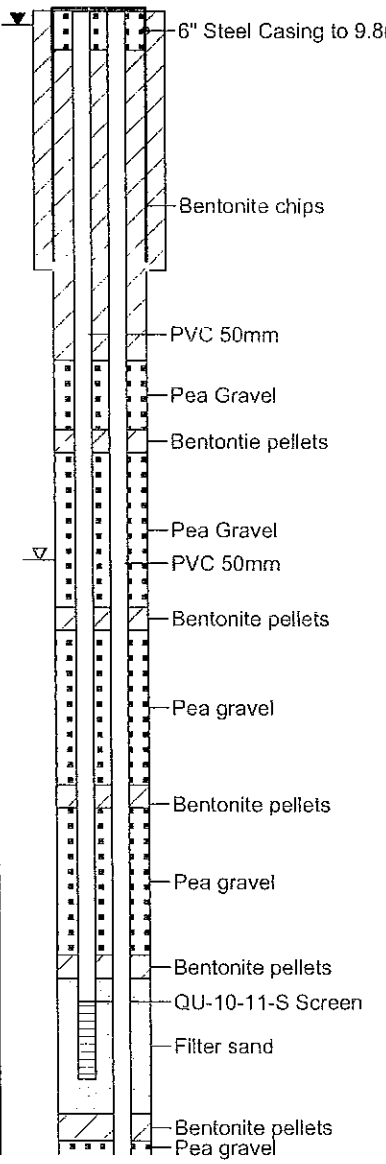
Water Levels

▼ QU-10-11-S 248.939 m (21/01/2011)

▽ QU-10-11-D 227.892 m (08/02/2011)

Well1: QU-10-11-S
Well2: QU-10-11-D
Elev. m: 249.5

Depth (m)	Elev. m 249.5	USCS	Material Description
0	249	f42	sandy SILT TILL - with boulders 0-3.7m red brown 3.7-9.1m grey-brown
5	244		
10	239	ss	SANDSTONE - 9.1-17.4m light grey, coarse-grained, highly weathered
15	234		17.4-18.9m greenish grey, medium grained 18.9-25.9m light grey, medium grained
20	229		
25	224		25.9-34.4m light grey, medium grained, moderately weathered
30	219		Hole dry at 33.5m
35	214		34.1-45.7m light-medium grey, medium to coarse grained, fresh
40	209		flow at fracture (40.8m) 30 US GPM
45			



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Enterprise Geoscience Services Ltd.

Borehole Log of QU-10-11

Date Started	: Oct 8, 2010	Drilled by	: Drillwell Enterprises
Date Completed	: Oct 13, 2010	Northing Coord.	: 103177
Hole Diameter	: 150 mm	Easting Coord.	: 101451
Drilling Method	: Air Rotary	Survey By	: McElhanney
Sampling Method	: Grab sample	Logged By	: O. Quinn

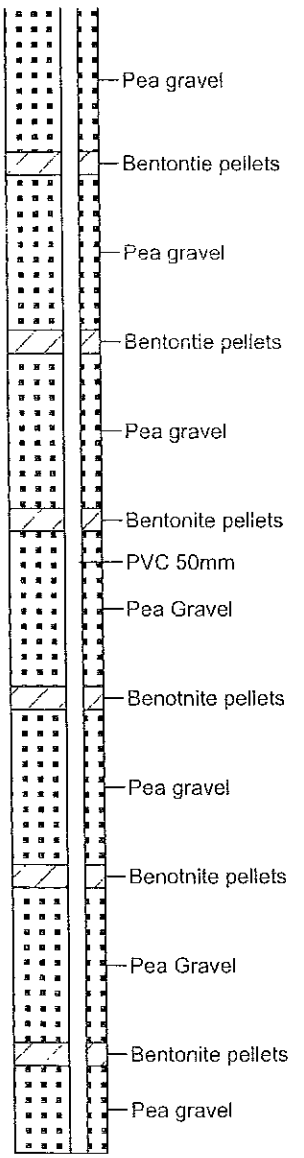
Water Levels

▼ QU-10-11-S 248.939 m (21/01/2011)

▽ QU-10-11-D 227.892 m (08/02/2011)

Well1: QU-10-11-S
Well2: QU-10-11-D
Elev. m: 249.5

Depth (m)	Elev. m 249.5	USCS	Material Description
45	204	SS	45.7-47.5m dark grey, fine-medium grained, fresh, carbonaceous
			COAL SEAM - dirty
50	199		SANDSTONE - 47.8-71.3m grey to grey-brown, medium-coarse to medium grained, fresh flow 30 US GPM at 48.8m
55	194		flow 30 US GPM at 54.9m
60	189	SS	
65	184		flow 20 US GPM at 67.1m (water was flowing out of adjacent exploration hole, QU-05-10 during this measurement)
70	179	MS	COAL SEAM 4B- with SILTSTONE/MUDSTONE
			MUDSTONE - dark brown, fresh
			COAL (No. 4 B Seam) - with SILTSTONE/MUDSTONE
75	174		SANDSTONE - 72.85-86.26m grey brown to grey, medium to coarse grained, fresh
80	169	SS	flow 15 US GPM at 79.25m
85	164		86.26-91.44m dark brown, fine grained, fresh
90			



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Borehole Log of QU-10-11

Date Started	: Oct 8, 2010	Drilled by	: Drillwell Enterprises
Date Completed	: Oct 13, 2010	Northing Coord.	: 103177
Hole Diameter	: 150 mm	Easting Coord.	: 101451
Drilling Method	: Air Rotary	Survey By	: McElhanney
Sampling Method	: Grab sample	Logged By	: O. Quinn

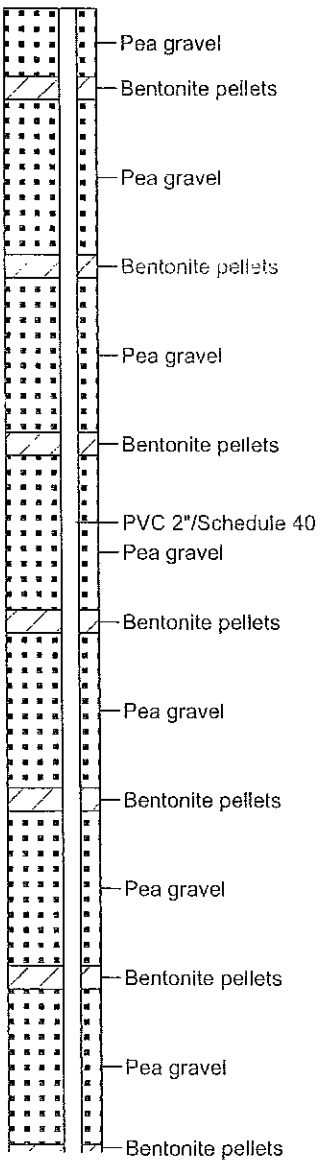
Water Levels

▼ QU-10-11-S 248.939 m (21/01/2011)

▽ QU-10-11-D 227.892 m (08/02/2011)

Well1: QU-10-11-S
Well2: QU-10-11-D
Elev. m: 249.5

Depth (m)	Elev. m 249.5	USCS	Material Description
90	159	SS	SANDSTONE (cont'd) - 91.44-94.49m dark grey, medium grained, fresh. flow 12 US GPM at 91.44m. (QU-10-05 flowing during measurement).
95	154	SS	COAL SEAM 3R - shiny, with dark brown, fresh MUDSTONE
		MS	SANDSTONE - medium grey
			MUDSTONE - 96.93-102.11m dark brown, fresh flow 30 US GPM at 97.54m (QU-10-05 flowing during measurement).
100	149		COAL SEAM 3L - shiny, with dark brown, fresh MUDSTONE
		MS	MUDSTONE - 103.02-106.07m dark brown, fresh flow 18 US GPM at 103.63m (QU-10-05 flowing during measurement).
105	144	SS	
		MS	SANDSTONE - light grey, fine-medium grained with dark brown mudstone
110	139	SS	MUDSTONE - 108.21-109.73m dark brown, fresh, with minor COAL seams flow 30 US GPM at 109.73m (QU-10-05 flowing during measurement).
115	134		SANDSTONE - 109.73-115.21m grey, fine to medium grey, with dark brown MUDSTONE lenses 115.21-130.45m grey, fine to medium grained, fresh flow 12 US GPM at 115.82m (QU-10-05 flowing during measurement). COAL stringers at 118.87m and 121.62-121.92m flow 7 US GPM at 121.92m (QU-10-05 flowing during measurement).
120	129		
125	124		flow 9 US GPM at 128.02m (QU-10-05 flowing during measurement).
130	119	SL	SILTSTONE - 130.45-132.89m dark brown, fresh flow 6 US GPM at 132.59m (QU-10-05 flowing during measurement).
		MS	MUDSTONE - dark brown
135			



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Borehole Log of QU-10-11

Date Started	: Oct 8, 2010	Drilled by	: Drillwell Enterprises
Date Completed	: Oct 13, 2010	Northing Coord.	: 103177
Hole Diameter	: 150 mm	Easting Coord.	: 101451
Drilling Method	: Air Rotary	Survey By	: McElhanney
Sampling Method	: Grab sample	Logged By	. O. Quinn

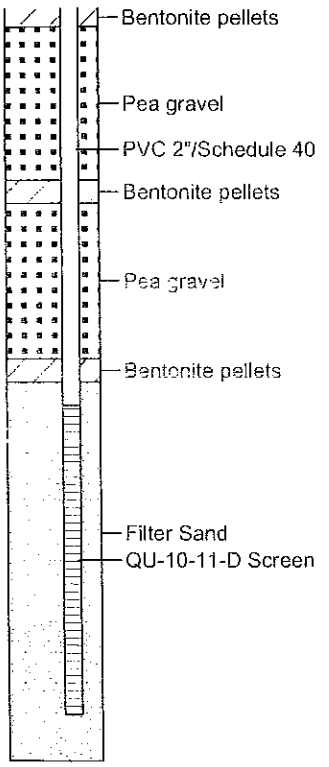
Water Levels

▼ QU-10-11-S 248.939 m (21/01/2011)

▽ QU-10-11-D 227.892 m (08/02/2011)

Well1: QU-10-11-S
Well2: QU-10-11-D
Elev. m: 249.5

Depth (m)	Elev. m 249.5	USCS	Graphic Symbol	Material Description
135	114	MS		coal beds at 134.11, 136.25 and 138.07m
140	109			COAL SEAM 2 - shiny, with MUDSTONE
		MS		MUDSTONE - flow 4 US GPM at 140.21m (QU-10-05 flowing during measurement).
		MS		COAL SEAM 2- shiny, with MUDSTONE
				MUDSTONE - fresh
145	104			COAL SEAM 2L/1U
		MS		MUDSTONE - medium grey-brown, with shiny COAL stringers
150	99			flow 16 US GPM at 146.3m (QU-10-05 flowing during measurement).
				COAL SEAM 1 - shiny with MUDSTONE flow 4 US GPM at 152.4m (QU-10-05 flowing during measurement).
155	94	MS		MUDSTONE - light brown to green/grey
				COAL SEAM 1L - shiny with MUDSTONE
160	89	SS		SANDSTONE - greenish grey, fine-medium grained, fresh
				flow 11 GPM at 158.5m (QU-10-05 flowing during measurement).
		SH		SHALE - red-brown, fresh
165	84			EOH @ 164.59m, flow 11 GPM
170	79			
175	74			
180				



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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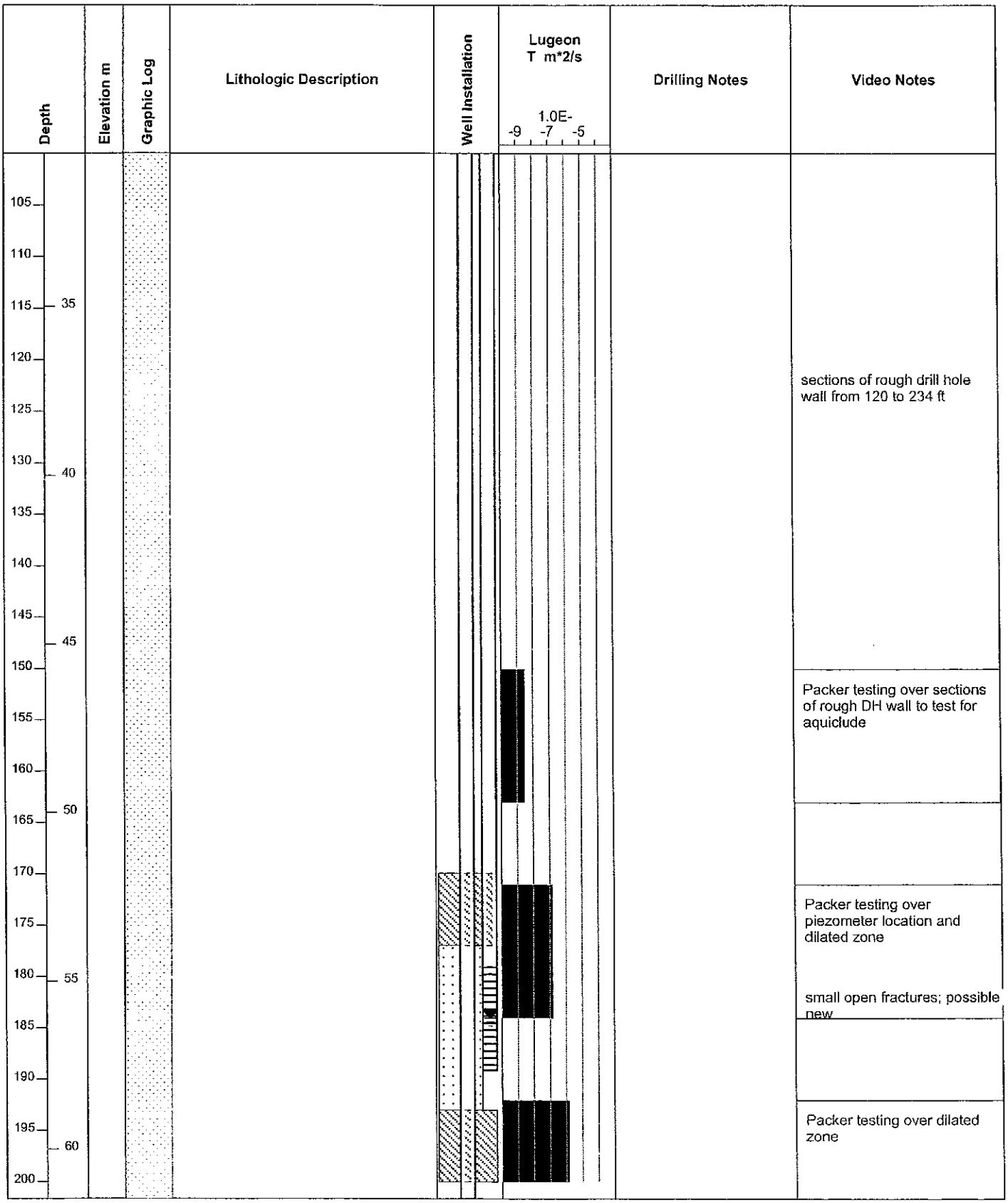
LOG FOR DRILLHOLE #: Qu10-13 | Page: 1 of 5

Client: Hillsborough Resources
Project: 7S Permit
Drilling Method: Rotary
Drilling Contractor: DrillWell
Engineer: M Cullen, L Fletcher
Date Started: Nov 5, 2011

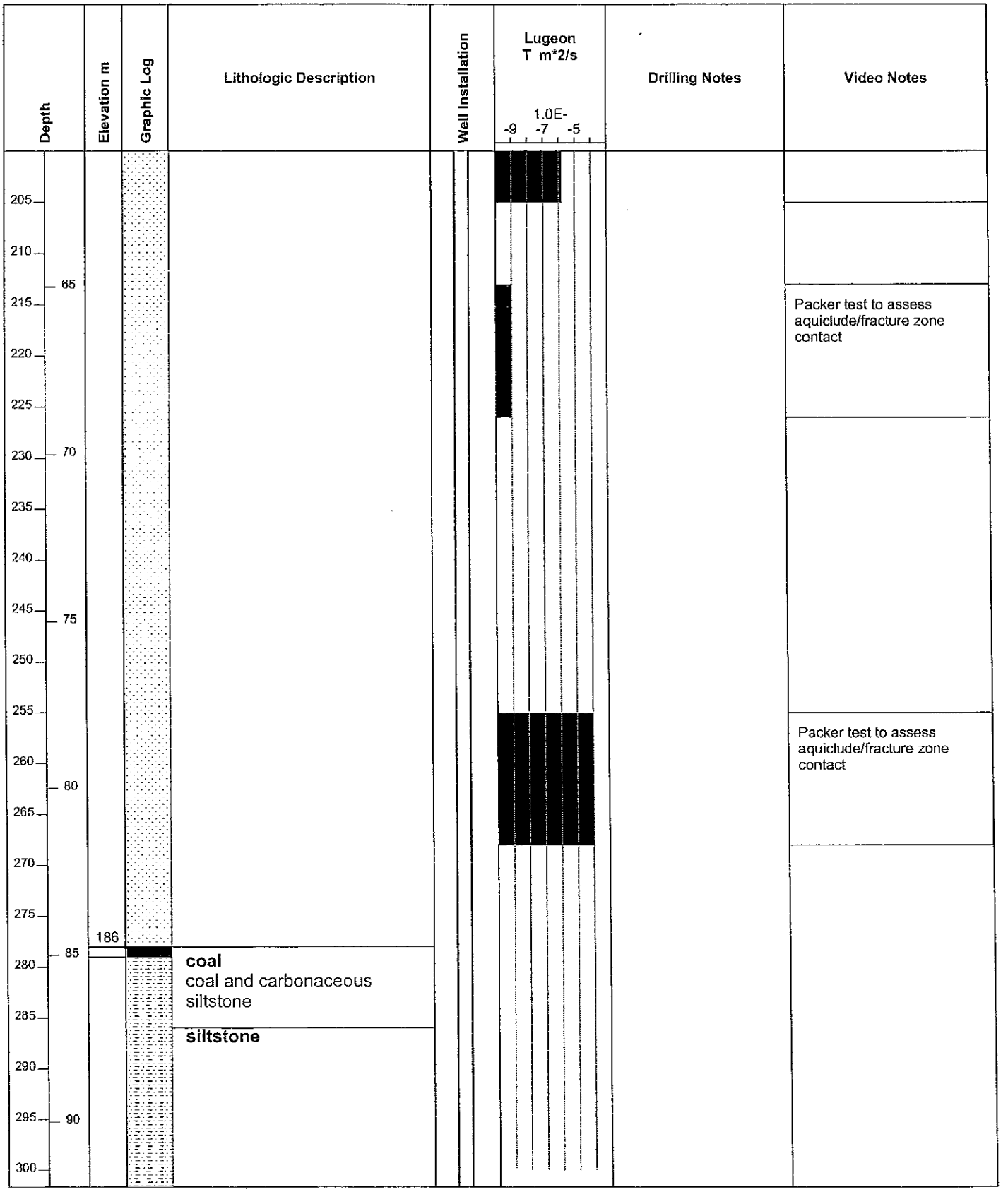
Co-ordinates:
Collar Elev.: 270.68
Dip/Dip direction: vert
Total Depth: 483
Casing Depth: 5
Hole dia:

Depth (ft / m)	Elevation m	Graphic Log	Lithologic Description	Well Installation	Lugeon T m*2/s (1.0E-9 … 1.0E-5)	Drilling Notes	Video Notes
0 ft / 0 m	271		Ground Surface				
	269		**overburden**				
5 ft			**sedimentary sequence** Dunsmuir Formation				
10 ft							
15 ft / 5 m							
20 ft							
25 ft							
30 ft / 10 m							
35 ft							
40 ft							horiz fractures: staining, pre-existing, possible open
45 ft							
50 ft / 15 m							
55 ft							
60 ft							
65 ft / 20 m							
70 ft							
75 ft							
80 ft / 25 m							
85 ft							
90 ft							, no fractures evident
95 ft							
100 ft / 30 m							

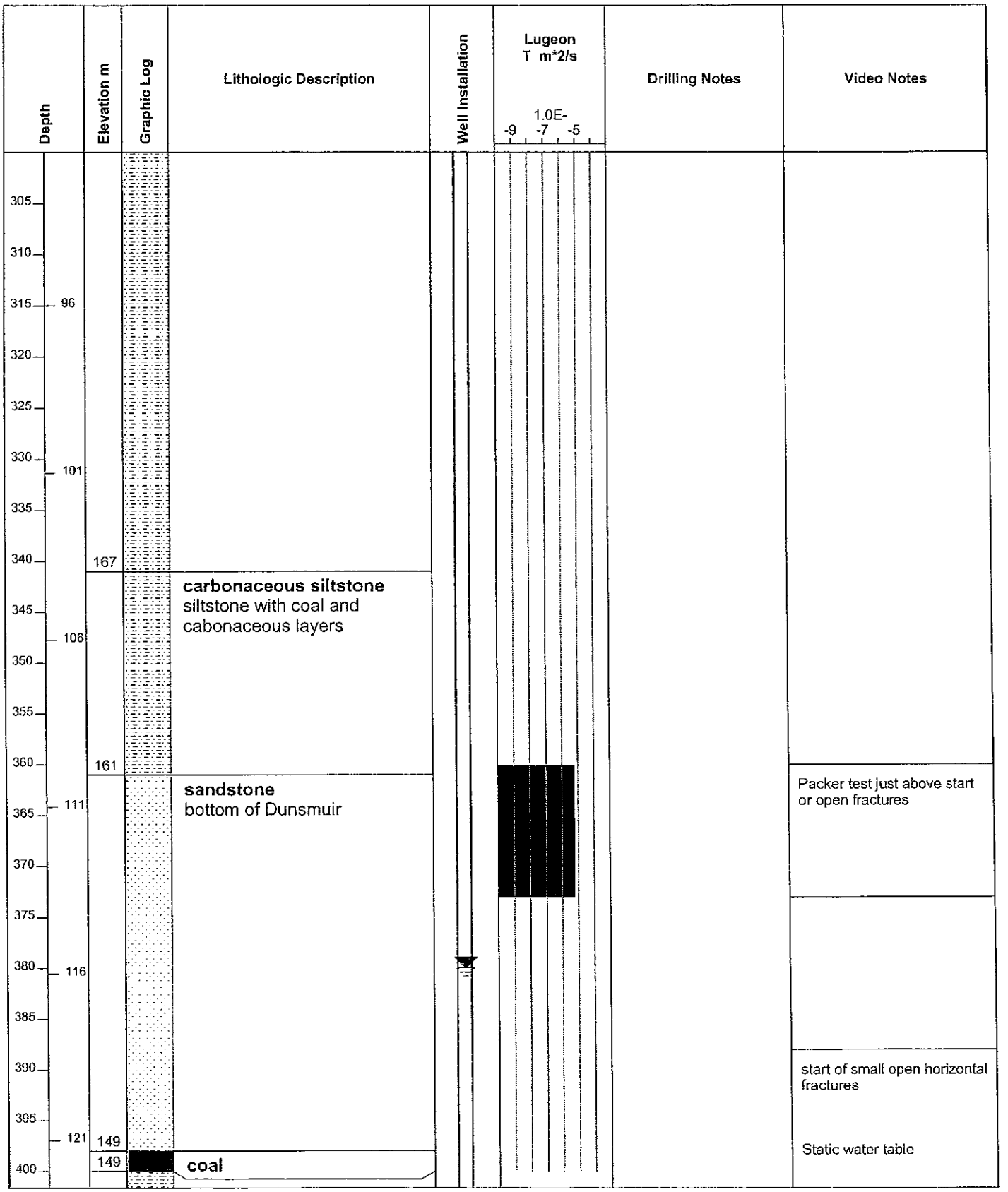
LOG FOR DRILLHOLE #: Qu10-13 **Page: 2 of 5**



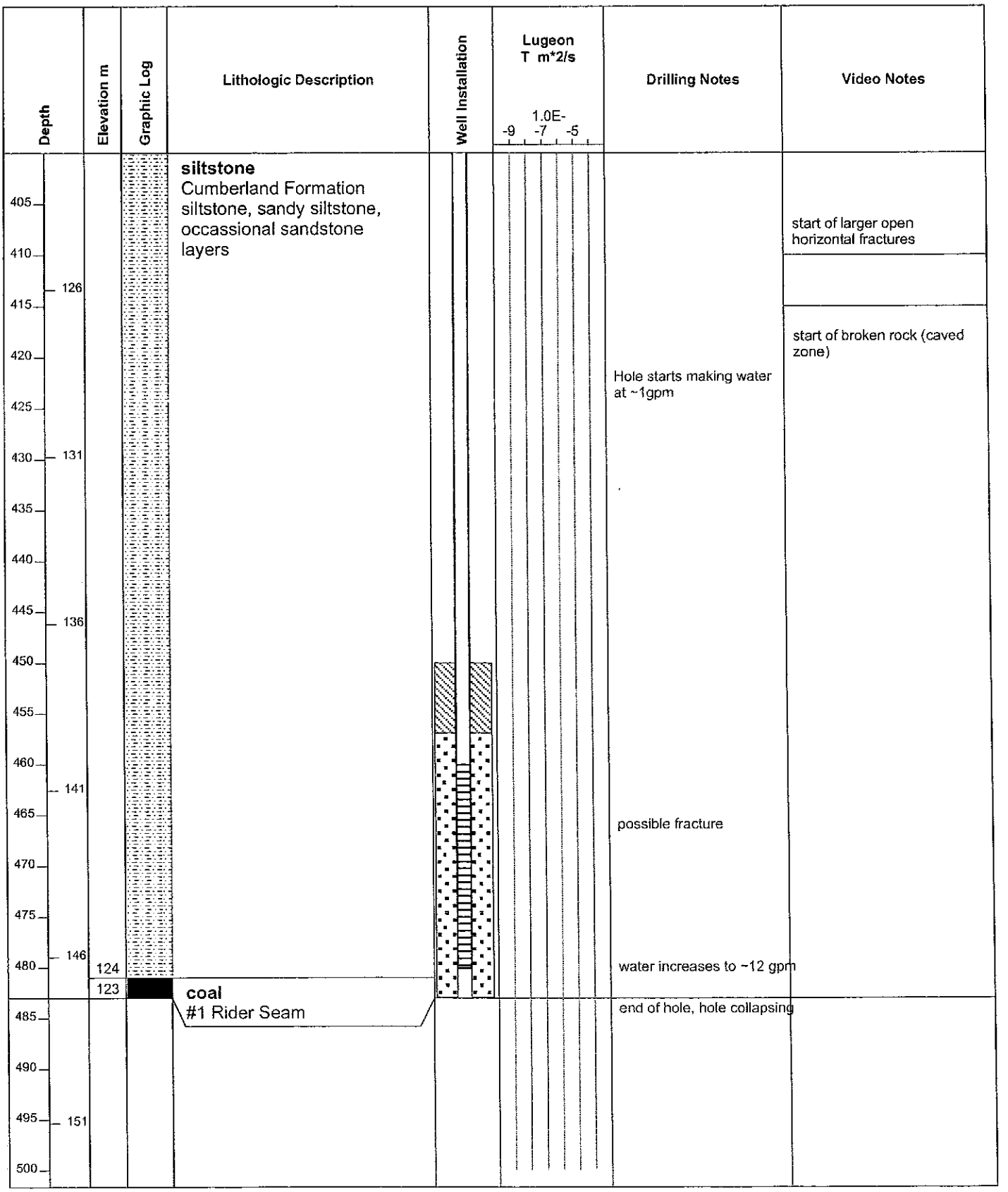
LOG FOR DRILLHOLE #: Qu10-13 **Page: 3 of 5**



LOG FOR DRILLHOLE #: Qu10-13 **Page: 4 of 5**



LOG FOR DRILLHOLE #: Qu10-13 **Page: 5 of 5**



Enterprise Geoscience Services Ltd.

Borehole Log of QU-11-01 (4 South)

Date Started	: 4 Jan 2011	Drilled By	: Dirtiwell Enterprises
Date Completed	: 6 Jan 2011	Northing Coord.	: 101056.7
Hole Diameter	: 140 mm	Easting Coord.	: 99134.6
Drilling Method	: Air rotary with wireline coring	Survey By	: Quinsam
Sampling Method	: Core	Logged By	: N. Bazowski

Water Levels

▼ QU-11-01: 290 01 m (19-Feb-11)

▽

Well: QU-11-01
Elev. m: 316.368

Depth (m)	Elev. m 316.368	USCS	Graphic Symbol	Material Description	Remarks
65	251.37				
		SP			
70	246.37				
		SS			+ Shale traps at 73 m.
75	241.37				+ Shale traps at 76 m.
80	236.37	SM			
		SS			+ Hole intersects minedrift at 85.2 m.
85	231.37			EOH @ 85.2 m	
90					

4" PVC

Screen

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

03-09-2011 C:\Users\John Balfour\Documents\PROJECTS\2009 Projects\090010 Lorax\2010 Work\Borehole logs\QU-11-01.bor

Enterprise Geoscience Services Ltd.

Borehole Log of QU-11-03 (2 North)

Date Started	: Jan 12, 2011	Drilled By	: Drillwell Enterprises
Date Completed	:	Northing Coord.	: n/a
Hole Diameter	: 150 mm / 140 mm core	Easting Coord.	: n/a
Drilling Method	: Air rotary with wireline coring	Survey By	:
Sampling Method	: Grab sample / Core	Logged By	: N. Bazowski

Water Levels

▼ QU-11-03: 42.21 m bTOC (18-Jan-2011)

▽

Well: QU-11-03
Elev. m: xxx

Depth (m)	Elev. m 304	USCS	Graphic Symbol	Material Description	Remarks
65	239				
				From 0 - 69.34 m not logged SANDSTONE, zone of silty sandstone, from: 71.52 - 73.64 m and 74.18 - 75.44 m Conglomerate at base from: 81.58 - 81.75 m	+ Completion details to follow.
70	234	SP			
75	229				
80	224	SS		SILTSTONE	
85	219	SM		SILTSTONE, Coaly siltstone and coal, Coal layers from: 86.48-86.54 m 86.66-87.57 m 87.67-87.98 m 89.71-90.08 m	
90					

4" PVC

Quinsam Coal
Assessment of Underground Disposal of Coarse Coal Refuse

Campbell River, B.C.

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Enterprise Geoscience Services Ltd

Borehole Log of QU-11-03 (2 North)

Date Started	: Jan 12, 2011	Drilled By	: Drillwell Enterprises
Date Completed	.	Northing Coord.	: n/a
Hole Diameter	: 150 mm / 140 mm core	Easting Coord.	: n/a
Drilling Method	: Air rotary with wireline coring	Survey By	:
Sampling Method	: Grab sample / Core	Logged By	: N. Bazowski

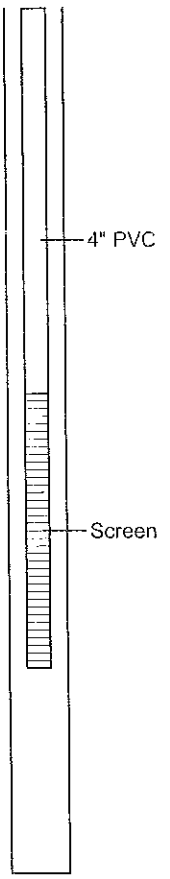
Water Levels

▼ QU-11-03: 42.21 m bTOC (18-Jan-2011)

▽

Well: QU-11-03
Elev. m: xxx

Depth (m)	Elev. m 304	USCS	Graphic Symbol	Material Description
90	214	SM		SILTSTONE, Sandstone and Conglomerate
95	209			
100	204	SS		
105	199			
110	194	CO		Coaly siltstone
				EOH @ 110.64 m
115				



Remarks

+ Hole intersetcs mine void.

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Enterprise Geoscience Services Ltd

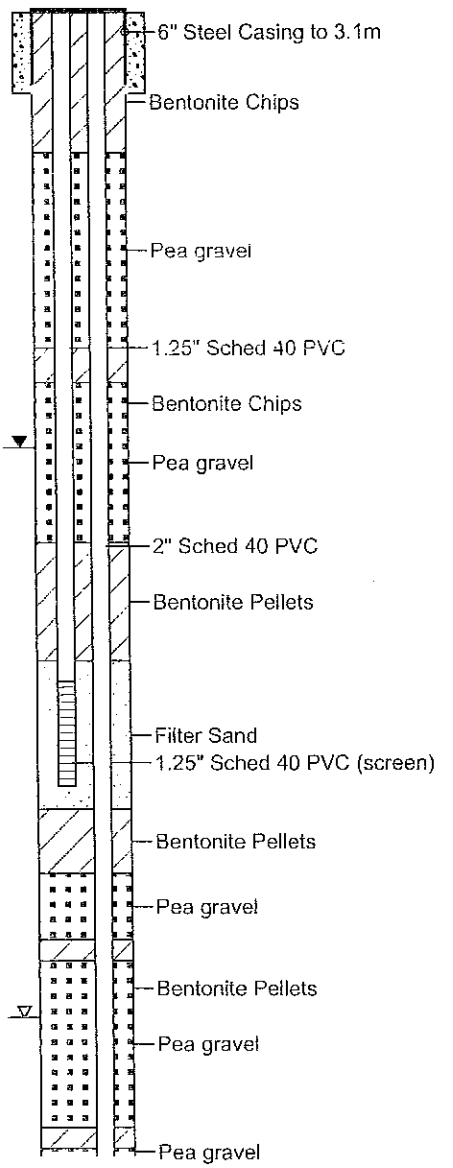
Borehole Log of QU-11-05

Date Started	: Feb 15, 2011	Drilled By	: Drillwell Enterprise
Date Completed	: Feb 18, 2011	Northing Coord.	: 102648.3
Hole Diameter	: 140 mm	Easting Coord.	: 101075.9
Drilling Method	: Air rotary with wireline coring	Survey By	: QCC
Sampling Method	: Core	Logged By	: N. Bazowski

Water Levels
- QU-11-05-S: 19.00 m (8-Mar-11)
- QU-11-05-D: 43.95 m (8-Mar-11)

Well1: QU-11-05-S
Well2: QU-11-05-D
Elev. m: 228.39

Depth (m)	Elev. m 228.39	USCS	Graphic Symbol	Material Description
0	228			NOT CORED
5	223			SANDSTONE
10	218			10-10.06 m: Coaly Siltstone
				10.14-10.31m: Coaly Siltstone
15	213			10.31-10.57m: Siltstone
		SW		
20	208			
				23.55-23.72m: Conglomerate
25	203			24.54-24.73m: Conglomerate
				24.9-24.97m: Conglomerate
30	198			25.47-25.55m: Conglomerate
		SW		30.45-30.51m: Coaly Siltstone (fractured)
				COAL
35	193			SANDSTONE
				COAL - 4B Coal Seam
				SANDSTONE
40	188			32.75-33.04 m: Silty Coaly Sandstone
		SW		
45	183			
50				



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

Bentonite Pellets

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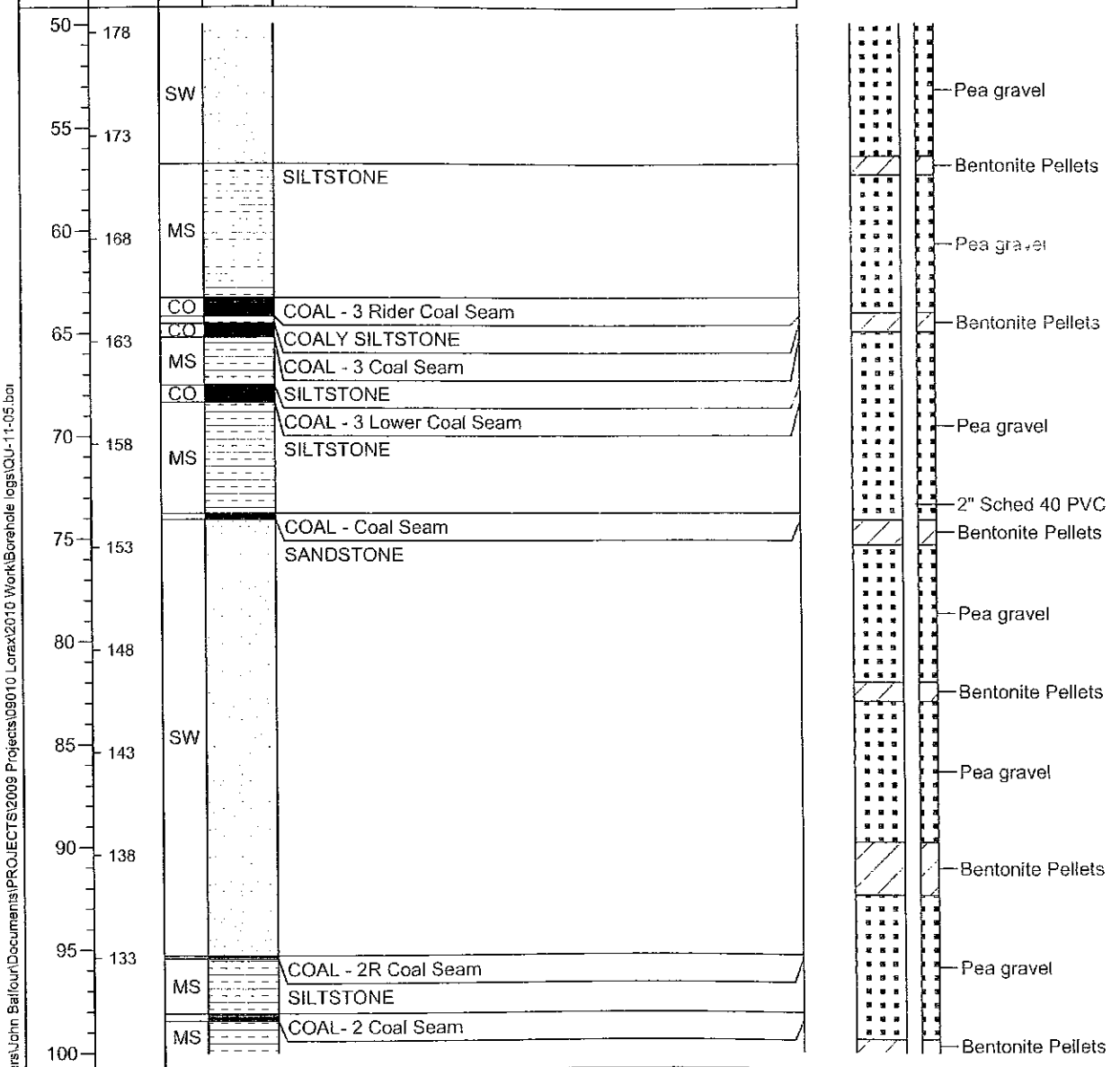
Enterprise Geoscience Services Ltd.

Borehole Log of QU-11-05

Date Started	: Feb 15, 2011	Drilled By	: Drillwell Enterprise
Date Completed	: Feb 18, 2011	Northing Coord.	: 102648.3
Hole Diameter	: 140 mm	Easting Coord.	: 101075.9
Drilling Method	: Air rotary with wireline coring	Survey By	: QCC
Sampling Method	: Core	Logged By	: N. Bazowski

Water Levels
- QU-11-05-S: 19.00 m (8-Mar-11)
- QU-11-05-D: 43.95 m (8-Mar-11)

Well1: QU-11-05-S
Well2: QU-11-05-D
Elev. m: 228.39



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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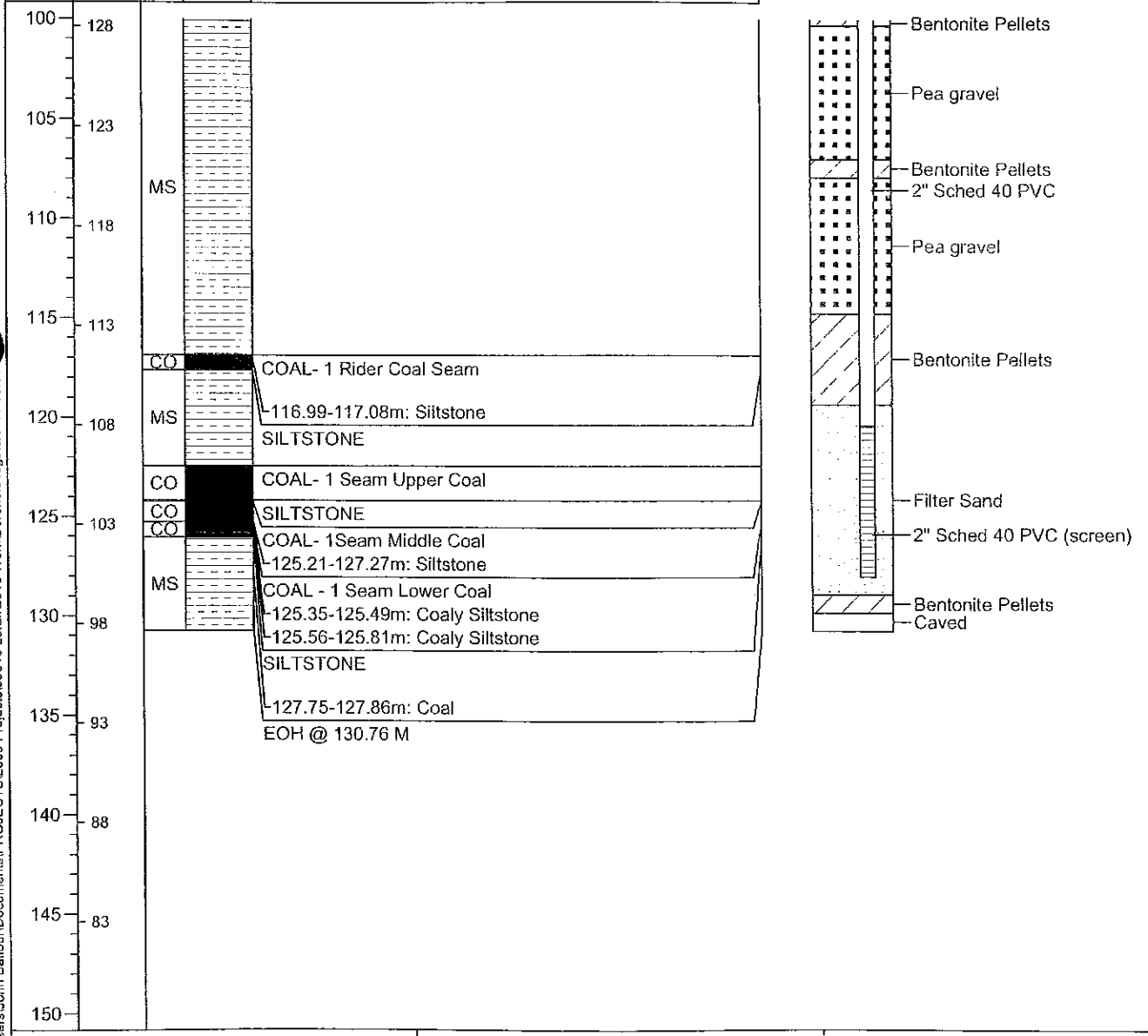
Enterprise Geoscience Services Ltd.

Borehole Log of QU-11-05

Date Started	: Feb 15, 2011	Drilled By	: Drillwell Enterprise
Date Completed	: Feb 18, 2011	Northing Coord.	: 102648.3
Hole Diameter	: 140 mm	Easting Coord.	: 101075.9
Drilling Method	: Air rotary with wireline coring	Survey By	: QCC
Sampling Method	: Core	Logged By	: N. Bazowski

Water Levels
- QU-11-05-S: 19.00 m (8-Mar-11)
- QU-11-05-D: 43.95 m (8-Mar-11)

Well1: QU-11-05-S
Well2: QU-11-05-D
Elev. m: 228.39



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Enterprise Geoscience Services Ltd.

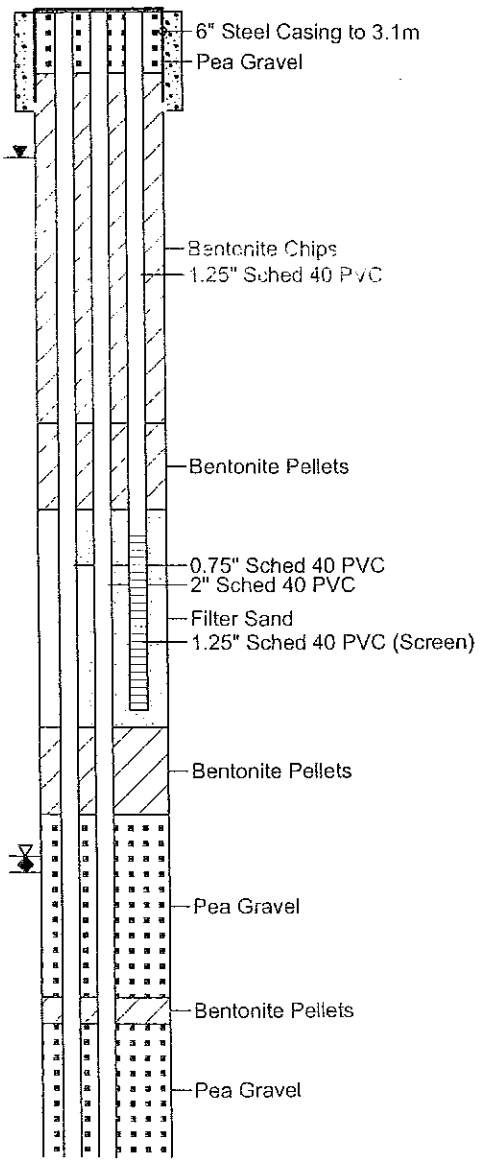
Borehole Log of QU-11-09

Date Started	:	Drilled By	: Drillwell Enterprise
Date Completed	: March 8, 2011	Northing Coord.	: 102561.8
Hole Diameter	: 152 mm / 140 mm	Easting Coord.	: 100736
Drilling Method	: Air rotary with wireline coring	Survey By	: QCC
Sampling Method	: Grab sample and core	Logged By	: N. Bazowski

Water Levels
- QU-10-09-S: 5.05 m
- QU-10-09-D: 29.52 m
- QU-10-09-P: 30.08 m

Well1: QU-10-09-S
Well2: QU-10-09-D
Well3: QU-10-09-P
Elev. m: 226.297

Depth (m)	Elev. m	USCS	Material Description
0	226		OVERBURDEN
5	221		
10	216		
15	211	MS	SILTSTONE
			SANDSTONE
20	206		
25	201	SW	
30	196		
35	191		
40			



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Enterprise Geoscience Services Ltd

Borehole Log of QU-11-09

Date Started	:	Drilled By	: Drillwell Enterprise
Date Completed	: March 8, 2011	Northing Coord.	: 102561.8
Hole Diameter	: 152 mm / 140 mm	Easting Coord.	: 100736
Drilling Method	: Air rotary with wireline coring	Survey By	: QCC
Sampling Method	: Grab sample and core	Logged By	: N. Bazowski

Water Levels
- QU-10-09-S: 5.05 m
- QU-10-09-D: 29.52 m
- QU-10-09-P: 30.08 m

Well1: QU-10-09-S
Well2: QU-10-09-D
Well3: QU-10-09-P
Elev. m: 226.297

Depth (m)	Elev. m 226.297	USCS	Material Description
40	186	SW	
45	181	MS	SILTSTONE
50	176	SW	SANDSTONE
55	171		
60	166		
65	161		at 67.16 m coring starts
70	156		
75	151	MS	SILTSTONE
		CO	COAL - 1 RiderSeam
		MS	SILTSTONE
80		CO	COAL - 1 Seam Upper

Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
2" Sched 40 PVC
0.75" Sched 40 PVC
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Filter Sand
2" Sched 40 PVC (Screen)

Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Enterprise Geoscience Services Ltd.

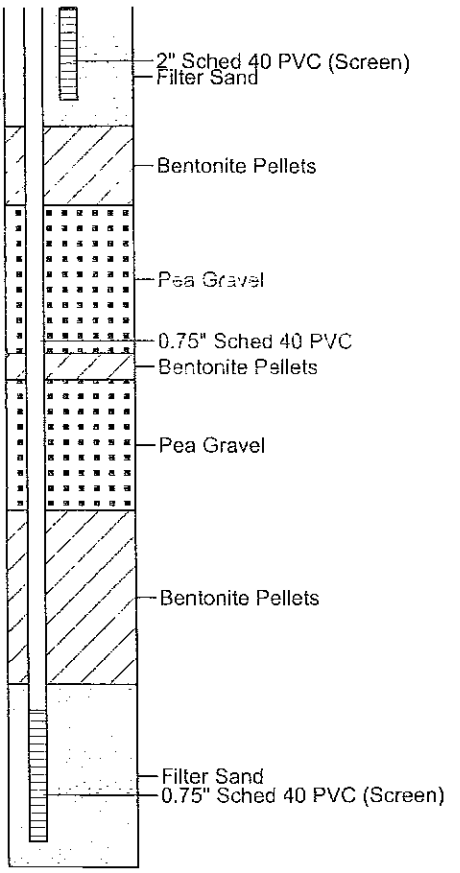
Borehole Log of QU-11-09

Date Started	:	Drilled By	: Drillwell Enterprise
Date Completed	: March 8, 2011	Northing Coord.	: 102561.8
Hole Diameter	: 152 mm / 140 mm	Easting Coord.	: 100736
Drilling Method	: Air rotary with wireline coring	Survey By	: QCC
Sampling Method	: Grab sample and core	Logged By	: N. Bazowski

Water Levels
- QU-10-09-S: 5.05 m
- QU-10-09-D: 29.52 m
- QU-10-09-P: 30.08 m

Well1: QU-10-09-S
Well2: QU-10-09-D
Well3: QU-10-09-P
Elev. m: 226.297

Depth (m)	Elev. m 226.297	USCS	Material Description
80	146	CO	
		MS	SILTSTONE
			COAL- 1 Seam Lower
			SILTSTONE
85	141		
		MS	
90	136		
95	131		
		GC	CONGLOGERATE 96.2-96.64 m: Very Coarse Grained Sandstone 97.08-967.45 m: Very Coarse Grained Sandstone
100	126	MS	SILTSTONE
		SW	SANDSTONE
105	121	GC	COGLOMERATE
110	116		EOH @ 110.19
115	111		
120			



Quinsam Coal
Assessment of Underground Disposal
of Coarse Coal Refuse

Campbell River, B.C.

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Borehole Log of QU11-18

HILLSBOROUGH Resources Limited

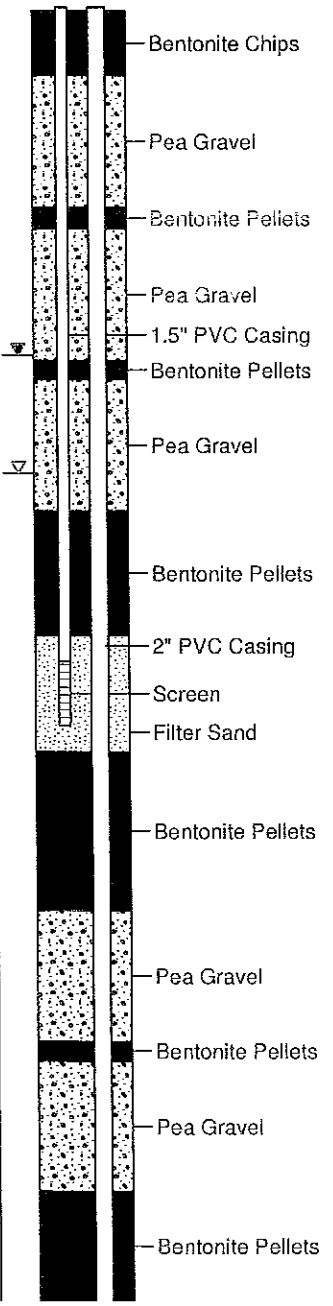
Quinsam Coal Corporation
Project #: J885-7

Date Drilled	: August 2011	Mine Grid Northing (m)	: 100690.81
Date Installed	: Dec 12, 2011	Mine Grid Easting (m)	: 100542.84
Hole Diameter	: 150 mm/ 85 mm core	Logged By	: N. Bazowski (QCC)
Drilling Method	: Air Rotary w/ wireline coring	Surveyed By	: QCC
Drilling Company	: Drillwell Enterprises	Installed By	: M. Storey (Lorax)

Water Levels
- QU11-18S: 283.59 m (Mar 19, 2012)
- QU11-18D: 278.09 m (Mar 19, 2012)

Well1: MW11-18S PVC Stickup 0.16m
Well2: MW11-18D PVC Stickup 0.16m
Elev.: 299.71 m (ground surface)

Depth (m)	Elev. (m asl) 299.71	Cored Interval	GRAPHIC	DESCRIPTION
0	299			TILL (not logged)
5	294			
10	289			
15	284			
20	279			
25	274			
30	269			
35	264			Drilled with casing, not logged
40	259			SANDSTONE, grey, fine to medium grained Fault zone 37.2-37.7 m with fractures infilled with rusty clays, little water flow inferred
45	254			Coal (4 Seam) with some calcite, few surfaces display powdery orange mineral (realgar) in minor amounts SILTSTONE COAL (4L Seam), dirty dull to bright clean, pyrite noted in limited intervals SILTSTONE, medium grey
50	249			
55	244			COAL (4B Seam) SILTSTONE, medium grey
60				



Borehole Log of QU11-18

HILLSBOROUGH Resources Limited

Quinsam Coal Corporation
Project #: J885-7

Date Drilled	: August 2011	Mine Grid Northing (m)	: 100690.81
Date Installed	: Dec 12, 2011	Mine Grid Easting (m)	: 100542.84
Hole Diameter	: 150 mm/ 85 mm core	Logged By	: N. Bazowski (QCC)
Drilling Method	: Air Rotary w/ wireline coring	Surveyed By	: QCC
Drilling Company	: Drillwell Enterprises	Installed By	: M. Storey (Lorax)

Water Levels
- QU11-18S: 283.59 m (Mar 19, 2012)
- QU11-18D: 278.09 m (Mar 19, 2012)

Well1: MW11-18S PVC Stickup 0.16m
Well2: MW11-18D PVC Stickup 0.16m
Elev.: 299.71 m (ground surface)

Depth (m)	Elev. (m asl) 299.71	Cored Interval	GRAPHIC	DESCRIPTION
60	239			
				SANDSTONE, medium grey, fine grained, tight
65	234			SILSTONE, medium to dark grey, trace coal
				Airlift yield increased 12 GPM at 66.8 m
70	229			COAL (3 Zone)
75	224			Discrepancy between geophysical log and chip log
80	219			SILTSTONE, mostly grey interbedded with some brown, 5% calcite, 5% coal, fault zone
85	214			SILTSTONE, fractures noted 88-88.5 m and 94.3 m
90	209			
95	204			
100	199			SANDSTONE, greenish grey, fine to medium grained
				CONGLOMERATE
105	194			SILSTONE, with minor mudstone, some fractures
				BENSON CONGLOMERATE, both clast and matrix supported
110	189			SILSTONE, hematitic and dark green, 20 cm fault zone at 111.7 m
				CONGLOMERATE
115	184			EOH 115.2 m.
120				

Bentonite Pellets
PVC Casing
Screen
Filter Sand
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel

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Borehole Log of QU11-36D

HILLSBOROUGH Resources Limited

Quinsam Coal Corporation
Project #: J885-7

Date Drilled	: December 2011	Mine Grid Northing (m)	: 100111.42
Date Installed	: Dec 20, 2011	Mine Grid Easting (m)	: 100322.46
Hole Diameter	: 150 mm/ 85 mm core	Logged By	: N. Bazowski (QCC)
Drilling Method	: Air Rotary w/ wireline coring	Surveyed By	: QCC
Drilling Company	: Drillwell Enterprises	Installed By	: M. Storey (Lorax)

Water Levels
▼ QU11-36D: Water level 260.86 m (Mar 19, 2012)
▽

Well: MW11-36D PVC Stickup 0.22 m
Elev.: 285.89 m (ground surface)

Depth (m)	Elev. (m asl) 285.89	Cored Interval	GRAPHIC	DESCRIPTION
0	285			TILL (not logged)
5	280			
10	275			BR (drilled)
15	270			
20	265			
				COAL (5 Seam)
25	260			BR
30	255			SANDSTONE, medium to coarse grained, fractured with oxidation surfaces throughout Possible fault at ~33.6 m
35	250			
40	245			
				SANDSTONE, fine to medium grained, with overlying pyritic SILSTONE (top 5 cm)
45				

Bentonite Chips
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
2" PVC Casing
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel
Bentonite Pellets
Pea Gravel

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Borehole Log of QU11-36D

HILLSBOROUGH Resources Limited

Quinsam Coal Corporation
Project #: J885-7

Date Drilled	: December 2011	Mine Grid Northing (m)	: 100111.42
Date Installed	: Dec 20, 2011	Mine Grid Easting (m)	: 100322.46
Hole Diameter	: 150 mm/ 85 mm core	Logged By	: N. Bazowski (QCC)
Drilling Method	: Air Rotary w/ wireline coring	Surveyed By	: QCC
Drilling Company	: Drillwell Enterprises	Installed By	: M. Storey (Lorax)

Water Levels
▼ QU11-36D: Water level 260.86 m (Mar 19, 2012)
▽

Well: MW11-36D PVC Stickup 0.22 m
Elev.: 285.89 m (ground surface)

Depth (m)	Elev. (m asl) 285.89	Cored Interval	GRAPHIC	DESCRIPTION
45	240			
50	235			SANDSTONE
				COAL (4L Seam)
55	230			BR (drilled)
60	225			COAL (4B Seam)
				BR (drilled)
65	220			
70	215			
75	210			
80	205			BENSON CONGLOMERATE
				EOH 80.0 m
85	200			
90				

Pea Gravel
Bentonite Pellets
Pea Gravel
2" PVC Casing
Bentonite Pellets
filter sand
Screen
Bentonite Pellets
Pea Gravel

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LORAX ENVIRONMENTAL

Borehole Log of MW12-23

HILLSBOROUGH Resources Limited

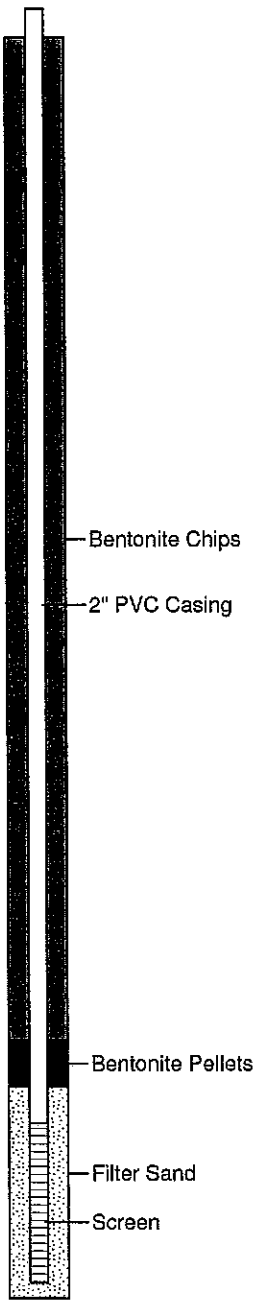
Quinsam Coal Corporation
Project #: A305-3

Date Drilled	: Oct 3, 2012	Mine Grid Northing (m)	: 101584.912
Date Installed	: Oct 4, 2012	Mine Grid Easting (m)	: 97205.970
Hole Diameter	: 150 mm	Logged By	: L.Findlater
Drilling Method	: Air rotary	Surveyed By	: QCC
Drilling Company	: Drillwell Enterprises	Installed By	: L. Findlater

Water Levels
▼ MW12-23: dry (Oct 23, 2012)
▽

Well: MW12-23 PVC Stickup 0.55 m
Elev.: 334.299 m (ground surface).

Depth (m)	Elev. (m asl) 334.299	GRAPHIC	DESCRIPTION
0	334		FILL and OVERBURDEN (not logged)
			SILTSTONE, brownish grey, slightly weathered
			SILTSTONE, as above, fresh
5	329		SILTSTONE, dark grey, fresh
			SILTSTONE, medium grey with pink flecks, sandy
			SILTSTONE, medium grey, interbedded with light grey, fine SANDSTONE
			SILTSTONE, medium brownish grey
10	324		SILTSTONE, interbedded tan-grey, fine sandy and dark grey
			SILTSTONE, interbedded reddish brown and greenish grey fine sandy siltstone layers, greenish grey layer trending to silty fine sandstone
15	319		
20	314		Hole drilled with water; no noticeable fractures or water bearing zones encountered during drilling. Drilling dusty throughout.
25			EOH at 24.4 m



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LORAX ENVIRONMENTAL

Borehole Log of MW12-24

HILLSBOROUGH Resources Limited

Quinsam Coal Corporation
Project #: A305-3

Date Drilled	: Oct 3, 2012	Mine Grid Northing (m)	: 101583.676
Date Installed	: Oct 4, 2012	Mine Grid Easting (m)	: 97207.129
Hole Diameter	: 150 mm	Logged By	: L.Findlater
Drilling Method	: Air rotary	Surveyed By	: QCC
Drilling Company	: Drillwell Enterprises	Installed By	: L. Findlater

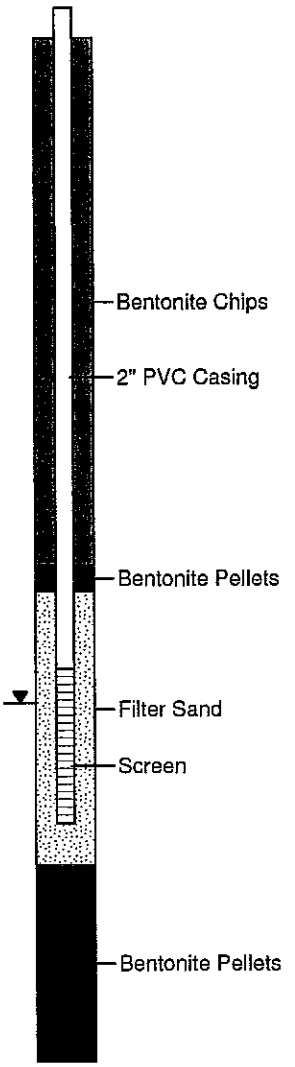
Water Levels

▼ MW12-24: 13.448 m bTOC (Oct 23, 2012).

▽

Well: MW12-24 PVC Stickup 0.58 m
Elev.: 334.354 m (ground surface).

Depth (m)	Elev. (m asl) 334.354	GRAPHIC	DESCRIPTION
0	334		FILL and OVERBURDEN (not logged)
			SILTSTONE, dark brown-grey, slightly weathered
5	329		SILTSTONE, dark grey, fresh
			SILTSTONE, light tan-grey, fine sandy
			SILTSTONE, as above, with pink flecks and trending towards silty fine sandstone
			SILTSTONE, grey
10	324		SILTSTONE, greenish grey, fine sandy
			SILTSTONE, interbedded reddish brown and greenish grey fine sandy siltstone layers, greenish grey layer somewhat trending to silty fine sandstone
15	319		Hole drilled with air only, dusty drilling throughout with no noticeable fractures. Some water dripping at collar at 60 ft rod change,however no water at end of discharge pipe
20	314		EOH at 19.8 m
25			



APPENDIX VII

QUINSAM COAL CORPORATION
NON-COMPLIANCE REPORTING
NOTIFICATION

To: EnvironmentalCompliance@gov.bc.ca

Subject: 2019-02-21 Authorization # 7008, permit non-compliance for 24-hour composite sample collected for Total Suspended Solids (TSS) at Settling Pond #4, EMS ID: E207409.

Attention: *Non-compliance Report for Authorization #7008*
Permit non-compliance for TSS at EMS ID: E207409, Settling Pond #4 (WD) where a composite 24-hour TSS result of 28.3 mg/L was recorded. This settling pond has a TSS permit limit of 25 mg/L.

Date of Non-compliance: 2019-02-01

Location of Non-compliance 5800 Argonaut Main, 49°56'6.14"N. 125°29'26.15"W

Nature of Non-compliance: A 24-hour composite sample for total suspended solids was above the permit limit threshold of 25 mg/L, resulting in 28.3 mg/L on February 1, 2019. This is suspected to be attributed to freezing conditions at the mine site and possibly a dirty bottle causing sample contamination. Figure 1 below displays the 9-day forecast for temperature in Campbell River resulting in ambient temperatures dropping below zero degrees Celsius on February 2nd through 9th.

As per Section 4.3. 1 of the effluent permit PE: 7008

Composite sampling: The permittee shall collect a grab sample instead of a composite sample when the weather conditions result in freezing conditions, rendering collection of composite samples not feasible.

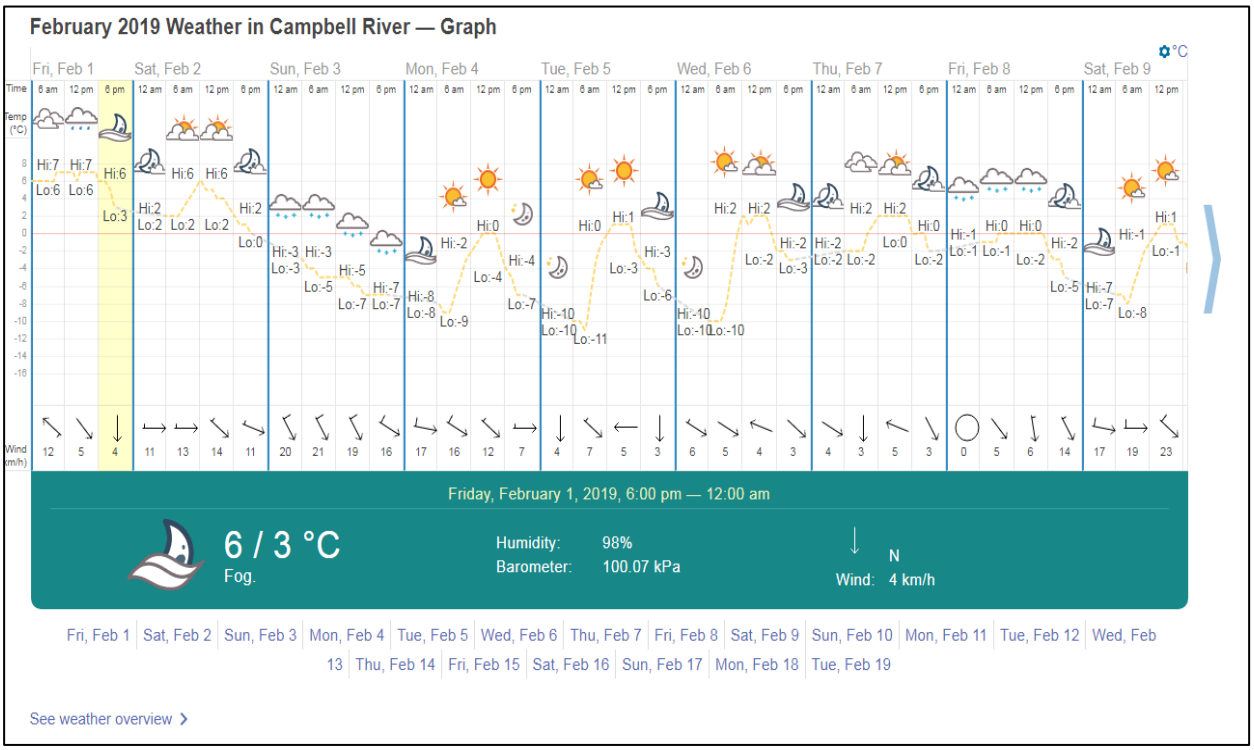
The Environmental Coordinator did not check the weather over the weekend (February 1st through 3rd) and arrange for grab samples to be collected. This resulted in the composite samples freezing in the bottles. The freezing conditions may have compromised the samples integrity and skewed the results higher. When trying to remove the ice, the bottle was shook causing any residue build-up of salts and calcium deposited previously on the inside and bottom of the bottle to be removed. The build-up or scaling of this material is normally difficult to remove through

the cleaning process with a dilute solution of hydrochloric acid; however, when the ice was shaken in the sample it would have worked as an abrasive and removed all build up on the bottles. This may have been the culprit of the elevated TSS results.

It also may be possible that freezing in and around Brinco brook may cause additional particulates before entry into Settling Pond # 4. Another consideration with freezing conditions is chunks of ice may carry coagulated particles through the pond at surface (due to floating ice). This may transport particulates near the sampling intake tubing and not allow settling as its bonded with ice. Also, ice forming in and around the intake/sampler area may provide reason for localized particulate to be formed with the ice.

Whatever the reason TSS resulted in a permit non-compliance above 25 mg/L on February 1st and was observed in the February 3rd sample at 22 mg/L that was also frozen in the composite sample collection bottle. On February 4th a grab sample resulted in 13.6 mg/L confirming TSS above detection limits, leading to the conclusion that there was TSS in the water column, whether the scaling on the bottles contributed to elevated TSS cannot be determined decisively.

Figure 1: Nine Day Temperature Forecast



https://www.timeanddate.com/weather/canada/campbell-river/historic

Initial Response/Actions taken: On February 4th all bottles were removed from the sampler and grab samples have been collected since the weather resulted in freezing conditions. Results of the TSS samples were not received from Maxxam Analytical Laboratory until February 20th, 2019 and were reviewed on February 21st, 2019.

Provincial Emergency Response was contacted on February 21st, 2019. A dangerous goods investigation report (DGIR) was filed and a number generated (DGIR 184299).

All available analytical results from January 31st to present were reviewed and compared to permit limits. Maxxam Analytics was contacted, and total metals analysis was requested from the remaining TSS sample (WDCOMP-1Feb19-P) collected from February 1st, 2019.

Monitoring Conducted: The results of the total metals analysis collected February 1st at Settling Pond #4 (WD) displayed elevated concentrations of calcium, magnesium, potassium, sodium, sulfur and iron, as suspected. Indicating this may have been a result of scaling or build up on the inside of the bottle contributing to TSS. Figure 2 displays a picture of the actual sample and indicates there is no optical TSS but the sample does appear slightly murky most likely from the high concentrations of calcium (189 mg/L), sodium (396 mg/L) and sulphur (292 mg/L).

Other monitoring included daily 24-hour composite TSS samples collected at Setting pond #4 until February 3rd, 2019 with grab samples collected daily from February 4th to present, all proceeding TSS results were below permit limits of 25 mg/L as indicated in Table 1 below.

A full metals analysis for both total and dissolved was also collected on February 4th, 2019 as part of the monitoring schedule required under the effluent permit PE 7008. This included the downstream location WC that enters the receiving environment near the inlet of Middle Quinsam Lake.

The results of the sample collected at Settling Pond #4 on February 4th, indicated that TSS results were below detection limits of 4 mg/L and all metals were below permit limits.

Table 1 below, indicates the analytical results collected from Setting pond #4 for TSS. Table 2 below compares the results from total metals collected on February 1st to those collected on February 4th.

Table 1: Total Suspended Solid Results from Settling Pond #4

Date	Collection Method	TSS Result (mg/L)
January 31st, 2019	24-hour composite (Frozen)	13.2
February 1st, 2019	24-hour composite (Frozen)	28.4
February 2nd, 2019	24-hour composite (Frozen)	5.2
February 3rd, 2019	24-hour composite (Frozen)	22.8
February 4th, 2019	Grab	13.6
February 5th, 2019	Grab	5.6
February 6th, 2019	Grab	<4.0
February 7th, 2019	Grab	<4.0



Figure 2: Sample collected from February 1st, 2019 at Settling Pond #4 with elevated TSS

Table 2: Analytical details from February 1st compared to February 4th at Settling Pond # 4

MAXXAM Parameter Name	Units	Results from Feb. 1st	Result from Feb. 4th	Difference between Feb. 1st and 4th
Acidity (pH 4.5)	mg/L		<1.0	
Acidity (pH 8.3)	mg/L		<1.0	
Alkalinity (PP as CaCO3)	mg/L		<1.0	
Alkalinity (Total as CaCO3)	mg/L		405	
Bicarbonate (HCO3)	mg/L		494	
Carbonate (CO3)	mg/L		<1.0	
Hydroxide (OH)	mg/L		<1.0	
Total Suspended Solids	mg/L	**28.4**	<4.0	
Dissolved Sulphate (SO4)	mg/L		657	
Total Aluminum (Al)	mg/L	0.0346	0.0125	0.0221
Total Antimony (Sb)	mg/L	<0.0010	<0.00050	N/A
Total Arsenic (As)	mg/L	0.00296	0.00211	0.0009
Total Barium (Ba)	mg/L	0.0333	0.0254	0.0079
Total Beryllium (Be)	mg/L	<0.00020	<0.00010	N/A
Total Bismuth (Bi)	mg/L	<0.0020	<0.0010	N/A
Total Boron (B)	mg/L	1.17	0.958	0.2120
Total Cadmium (Cd)	mg/L	0.000042	0.000011	0.0000
Total Calcium (Ca)	mg/L	189	152	37.0
Total Chromium (Cr)	mg/L	<0.0020	<0.0010	N/A
Total Cobalt (Co)	mg/L	0.0215	0.00077	0.0207
Total Copper (Cu)	mg/L	0.0538	0.00163	0.0522
Total Hardness (CaCO3)	mg/L	544	436	108.0
Total Iron (Fe)	mg/L	1.99	1.14	0.8500
Total Lead (Pb)	mg/L	<0.00040	<0.00020	N/A
Total Lithium (Li)	mg/L	0.0160	0.0136	0.0024
Total Magnesium (Mg)	mg/L	17.4	13.8	3.60
Total Manganese (Mn)	mg/L	0.508	0.190	0.3180
Total Molybdenum (Mo)	mg/L	<0.0020	<0.0010	N/A
Total Nickel (Ni)	mg/L	0.0391	0.0041	0.0350
Total Potassium (K)	mg/L	5.08	4.38	0.7000
Total Selenium (Se)	mg/L	<0.00020	<0.00010	N/A
Total Silicon (Si)	mg/L	3.89	3.41	0.4800
Total Silver (Ag)	mg/L	<0.000040	<0.000020	N/A
Total Sodium (Na)	mg/L	396	305	91
Total Strontium (Sr)	mg/L	1.55	1.38	0.1700
Total Sulphur (S)	mg/L	292	246	46
Total Thallium (Tl)	mg/L	<0.000020	<0.000010	N/A
Total Tin (Sn)	mg/L	<0.010	<0.0050	N/A
Total Titanium (Ti)	mg/L	<0.010	<0.0050	N/A
Total Uranium (U)	mg/L	<0.00020	<0.00010	N/A
Total Vanadium (V)	mg/L	<0.010	<0.0050	N/A
Total Zinc (Zn)	mg/L	0.010	<0.0050	N/A
Total Zirconium (Zr)	mg/L	<0.00020	<0.00010	N/A

As indicated by the highlighted grey in Table 2 above, the greatest difference between the samples collected on February 1st and 4th is displayed in concentrations of hardness (108 mg/L), calcium (37 mg/L), magnesium (3.60 mg/L), sodium (91 mg/L) and sulphur (46 mg/L).

Water hardness is caused by compounds of calcium and magnesium, and by a variety of other metals. General guidelines for classification of waters are: 0 to 60 mg/L (milligrams per liter) as calcium carbonate is classified as soft; 61 to 120 mg/L as moderately hard; 121 to 180 mg/L as hard; and more than 180 mg/L as very hard. Water quality that is leaving the mine site has very hard water with high concentrations of calcium, sodium and sulphur.

Table 3 below displays the results of the downstream location WC collected on February 4th and compares this to applicable acute *Provincial Water Quality Guidelines for Protection of Aquatic Life (Acute WQG)*.

Table 3:Downstream Location WC Collected on February 4th, 2019

Parameter	Results (mg/L)	Lab Mean Detection Limit	Acute WQG (mg/L)
Acidity (pH 4.5)	<1.0	1.0	
Acidity (pH 8.3)	<1.0	1.0	
Alkalinity (PP as CaCO3)	<1.0	1.0	
Alkalinity (Total as CaCO3)	370	1.0	
Bicarbonate (HCO3)	452	1.0	
Carbonate (CO3)	<1.0	1.0	
Hydroxide (OH)	<1.0	1.0	
Total Suspended Solids	<4.0	4.0	**25**
Dissolved Sulphate (SO4)	593	10	
Total Aluminum (Al)	0.0090	0.0030	
Total Antimony (Sb)	<0.00050	0.00050	
Total Arsenic (As)	0.00099	0.00010	**0.005**
Total Barium (Ba)	0.0215	0.0010	
Total Beryllium (Be)	<0.00010	0.00010	
Total Bismuth (Bi)	<0.0010	0.0010	
Total Boron (B)	0.882	0.050	
Total Cadmium (Cd)	<0.000010	0.000010	
Total Calcium (Ca)	136	0.050	
Total Chromium (Cr)	<0.0010	0.0010	
Total Cobalt (Co)	0.00041	0.00020	**0.05**
Total Copper (Cu)	0.00098	0.00050	**0.007**
Total Hardness (CaCO3)	393	0.50	
Total Iron (Fe)	0.366	0.010	**1**
Total Lead (Pb)	<0.00020	0.00020	
Total Lithium (Li)	0.0121	0.0020	
Total Magnesium (Mg)	13.2	0.050	
Total Manganese (Mn)	0.0594	0.0010	**0.8**
Total Molybdenum (Mo)	<0.0010	0.0010	
Total Nickel (Ni)	0.0056	0.0010	**0.025**
Total Potassium (K)	4.08	0.050	
Total Selenium (Se)	<0.00010	0.00010	
Total Silicon (Si)	3.21	0.10	
Total Silver (Ag)	<0.000020	0.000020	**0.0001**
Total Sodium (Na)	281	0.050	
Total Strontium (Sr)	1.23	0.0010	
Total Sulphur (S)	235	3.0	
Total Thallium (Tl)	<0.000010	0.000010	
Total Tin (Sn)	<0.0050	0.0050	
Total Titanium (Ti)	<0.0050	0.0050	
Total Uranium (U)	<0.00010	0.00010	
Total Vanadium (V)	<0.0050	0.0050	
Total Zinc (Zn)	<0.0050	0.0050	**0.03**
Total Zirconium (Zr)	<0.00010	0.00010	
Total Mercury (Hg)	<0.0000020	0.0000020	**0.0001**
Dissolved Aluminum (Al)	0.0064	0.0030	
Dissolved Antimony (Sb)	<0.00050	0.00050	
Dissolved Arsenic (As)	0.00064	0.00010	
Dissolved Barium (Ba)	0.0218	0.0010	
Dissolved Beryllium (Be)	<0.00010	0.00010	
Dissolved Bismuth (Bi)	<0.0010	0.0010	
Dissolved Boron (B)	0.831	0.050	
Dissolved Cadmium (Cd)	<0.0000050	0.0000050	**0.000170**

Dissolved Calcium (Ca)	131	0.050	
Dissolved Chromium (Cr)	<0.0010	0.0010	
Dissolved Cobalt (Co)	0.00042	0.00020	
Dissolved Copper (Cu)	0.00034	0.00020	
Dissolved Hardness (CaCO3)	384	0.50	
Dissolved Iron (Fe)	0.0181	0.0050	**0.35**
Dissolved Lead (Pb)	<0.00020	0.00020	
Dissolved Lithium (Li)	0.0121	0.0020	
Dissolved Magnesium (Mg)	14.0	0.050	
Dissolved Manganese (Mn)	0.0598	0.0010	
Dissolved Molybdenum (Mo)	<0.0010	0.0010	
Dissolved Nickel (Ni)	0.0053	0.0010	
Dissolved Potassium (K)	4.10	0.050	
Dissolved Selenium (Se)	<0.00010	0.00010	
Dissolved Silicon (Si)	3.03	0.10	
Dissolved Silver (Ag)	<0.000020	0.000020	
Dissolved Sodium (Na)	290	0.050	
Dissolved Strontium (Sr)	1.36	0.0010	
Dissolved Sulphur (S)	229	3.0	
Dissolved Thallium (Tl)	<0.000010	0.000010	
Dissolved Tin (Sn)	<0.0050	0.0050	
Dissolved Titanium (Ti)	<0.0050	0.0050	
Dissolved Uranium (U)	<0.00010	0.00010	
Dissolved Vanadium (V)	<0.0050	0.0050	
Dissolved Zinc (Zn)	<0.0050	0.0050	
Dissolved Zirconium (Zr)	<0.00010	0.00010	
Dissolved Mercury (Hg)	<0.0000020	0.0000020	

As a result of this exceedance it is unlikely there would be any adverse effects on the downstream aquatic receptors in Middle Quinsam Lake. The water from Settling Pond #4 travels through extensive wetlands prior to entering Middle Quinsam Lake near the inlet. The water quality at WC (the downstream sampling location prior to entering Middle Quinsam Lake) was found to be of good quality when compared to Acute Provincial Water Quality Guidelines for protection of aquatic life, displayed in Table 3 above. All applicable parameters were found below the guidelines. Therefore, one can assume there was no adverse effects on aquatic life.

Future action items: Ensure grab samples are collected when the weather conditions result in freezing conditions, rendering collection of composite samples not feasible. Ensure all bottles are cleaned weekly with an abrasive cleaner to reduce the risk of sample contamination.

If there are any further requirements, please contact me at the undersigned.

Contact information:

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QUINSAM COAL
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E-mail: kathleen.russell@quinsam.com

APPENDIX VIII

Annual Status R

AUTHORIZATION NUMBER: 7008
AUTHORIZATION TYPE: Effluent, Permit
LEGAL AUTHORIZATION HOLDER NAME: Quinsam Coal Corporation

AUTHORIZED PERSON NAME: Kathleen Russell
AUTHORIZED PERSON SIGNA: K. Russell KR
SIGNATURE DATE: September 10, 2019

I understand that it is an offense to mislead a government official, and I declare that all of the information presented is accurate and true.
I have been given the authority by the authorization holder to sign this form.

CONDITION NUMBER	CONDITION DESCRIPTION	COMPLIANT? (Yes/No/ND)	ACTION TAKEN
Section 1	AUTHORISED DISCHARGES		
Section 1.1	This subsection applies to the discharge of effluent from the NORTH COAL MINING OPERATION AND COAL PREPARATION PLANT. The site reference number for this discharge is E207409		
Section 1.1.1	The maximum and average authorized rates of discharge are 0.32 m^3/s and 0.08 m^3/s respectively. The authorized discharge period is 365 d/a. The maximum flow rate observed was 0.282 m^3/s. The average annual flow rate was calculated as 0.1203 m3/s, above the average authorized discharge rate of 0.080 m^3/s.	No	The average rate of discharge was 0.1203 m3/s . Refer to the Annual Report, Section (6.1.1), page 30, Figure 4. This is for permit fee calculations only. Discharge rates are expected to be reduced in 2019-2019.
Section 1.1.2	The characteristics of the discharge shall not exceed the specified permit limits (See 1.1.2 of PE7008).	No	One TSS result (28mg/L) that was above permit limits of 25 mg/L. Refer to the Annual Report, Appendix I, Table2. Spill report No. DGIR 184299
Section 1.1.5	The location of the facilities from which the discharge originates is Block 26, Block 120 and Block 148, Comox Land District.	Yes	N/A
Section 1.1.6	The location of the point of discharge is Block 120, Comox Land District.	Yes	N/A
Section 1.2	This subsection applies to the discharge of effluent from the SOUTH COAL MINING OPERATION. The site reference number for this discharge is E218582.		
Section 1.2.1	The maximum and average authorized rates of discharge are 0.46 m^3/s and 0.10 m^3/s, respectively. The authorized discharge period is 365 d/a. The maximum flow rate observed was 0.0265m3/s. The average annual flow rate was calculated as 0.244m3/s.	Yes	Refer to the Annual Report, Section (6.2), page 32, Figure 5.
Section 1.2.2	Discharge from the South Mining Operation shall not exceed the specified permit limits.	Yes	All discharge met permit limits.
Section 1.2.3	The authorized works are surface runoff collection and diversion ditches, flocculation facilities, settling pond, 3 pit sumps (1S, 2S and 3S Pits), an adit sump (4S Adit), pumping facilities, and related appurtenances approximately located.	ND	Permit amendment needs to occur to remove 1S , 4S audit sump. The flocculation facilities include the treatment system cells Aeration lagoon and Settling pond.
Section 1.2.5	The location of the facilities from which the discharge originates is Block 98 and Block 149, Comox Land District.	Yes	N/A
Section 1.2.6	The location of the point of discharge is Block 149,Comox Land District.	Yes	N/A
Section 1.3-1.3.6	This subsection applies to the discharge of effluent from the BLOCK 242 COAL MINING OPERATION as shown on attached Site Plan C. The site reference number for this discharge is E225796.	Yes	No discharge occurred from this site during 2018-2019. This site is non-operational and reclaimed. Permit amendment is underway to remove this site from the permit.
Section 1.4	This subsection applies to the discharge of effluent from the 7 SOUTH MINING OPERATION. The site reference number for this discharge is E292069.	Yes	N/A
Section 1.4.1	The maximum authorized rate of discharge is 0.005 m^3/s. The authorized discharge period is 365 d/a. Discharge did not occur in 2018/2019.	Yes	
Section 1.4.2	The characteristics of the discharge from the 7 South Mining Operation shall not exceed the specified permit limits.	Yes	Refer to the Annual Report, Section (6.3), pages 34 -35.
Section 1.4.5	The location of the facilities and point of discharge is Block 120, Comox Land District, except part in plan 12164, 13574, 13641, VIP53617 and VIP64817.	Yes	N/A
Section 2	Specific Requirements		
Section 2.1	North Coal Mining and Coal Preparation Plant Operation (Settling Pond #4)		
Section 2.1.1	Rate of Discharge: The maximum flow of 0.32 m^3/s is the peak routed outflow from the settling pond resulting from the following inputs: a) The assumed response of the gravity fed catchment area defined in Subsection 2.1.3 up to a 1 in 10 year return period rainfall of 24 hour duration; and b) The maximum combined pumping rate from the 2-North portal sump, 2-North underground workings, and the tailings facility, as specified in Subsection 2.1.2. The Director may from time to time redefine the maximum outflow based upon actual on-site measurements.	Yes	N/A
Section 2.1.2	Pumping Rate: The combined rate at which effluent may be pumped from the 2-North portal sump, 2-North underground workings and the tailings facility to the settling pond shall not exceed 0.32 m^3/s unless authorization has been obtained from the Director. Pumping rates shall be decreased as necessary to accommodate flows as defined in Subsection 2.1.1 (a).	Yes	N/A
Section 2.1.3	Catchment Area: The gravity drained settling pond catchment area shall not exceed 4 hectares unless authorization has been obtained from the Director.	Yes	N/A
Section 2.1.4	Wash Plant Effluent: Wash plant effluent shall not be conveyed to the 2-North pit sump via the wash plant ditch. The Permittee shall keep records of the date, duration and estimated volume of any overflow from the wash plant effluent sump. Subject to review of this data, the Director may request changes to the works.	Yes	All fine tailing are directed to the tailings impoundment or underground 2-North Mine.
Section 2.1.5	Settling Pond Solids and Storage Volume: Settled solids which have accumulated in the settling pond shall be removed as required to maintain a minimum water depth below the pond decant of 1.0 m and a minimum water storage volume of 2,300 m^3. The removed solids shall be disposed of in a manner approved by the Director.	Yes	Settled solids have not accumulated to a point that requires them to be removed at this time.
Section 2.1.6	Discharge Routing: The discharge from the settling pond shall be conveyed to Middle Quinsam Lake in a manner acceptable to the Director.	Yes	N/A
Section 2.1.7	Effluent Characteristics (for Total Suspended Solids): The characteristics of the effluent with respect to total suspended solids shall be equivalent to or less than the levels specified in Subsection 1.1.2 for discharge rates of up to 0.32 m^3/s (or as may be redefined by the Director according to Subsection 2.1.1). Variances may be allowed by the Director for higher discharge rates. The Director may as well, in the future, establish a maximum level for total suspended solids during extreme storm events.	No	One TSS result (28mg/L) that was above permit limits of 25 mg/L. Sample was frozen in composite sample bottle. This may have compromised the sample. Refer to the Annual Report, Appendix I, Table 2. Spill report No. DGIR 184299
Section 2.2	South Coal Mining Operation (Settling Pond #1)		
Section 2.2.1	Rate of Discharge: The maximum flow of 0.46 m^3/s is the peak routed outflow from the settling pond resulting from an assumed response of the maximum equivalent catchment area as defined in Subsection 2.2.2 to a design 1 in 10 year return period rainfall of 24 hour duration. The Director may from time to time redefine the maximum routed outflow based upon actual on-site measurements.	Yes	N/A
Section 2.2.2	Catchment Area: The maximum equivalent settling pond catchment area shall not exceed 68.4 hectares as defined in the South Pit Water Management. Settling Pond 1, Quinsam Coal Project. Ker, Priestman and Associates Limited, March 1990 unless authorization has been obtained from the Director.	Yes	N/A

Authorized Person Initial: KR Date: Sept. 10, 2019

CONDITION NUMBER	CONDITION DESCRIPTION	COMPLIANT? (Yes/No/ND)	ACTION TAKEN
Section 2.2.3	Settling Pond Solids and Storage Volume: Settled solids which have accumulated in the settling pond shall be removed as required to maintain a minimum water depth below the pond decant of 1.0 m and a minimum water storage volume of 1400 m^3. The removed solids shall be disposed of in a manner approved by the Director.	Yes	Settled solids have not accumulated to a point that requires them to be removed at this time.
Section 2.2.4	Discharge Routing: The discharge from the settling pond shall be conveyed to Long Lake through the adjacent wetlands as specified in Figure 1, South Pit Water Management. Settling Pond 1, Quinsam Coal Project, Ker, Priestman and Associates Limited, March 1990.	Yes	N/A
Section 2.2.5	Effluent Characteristics (for Total Suspended Solids): The characteristics of the effluent with respect to total suspended solids shall be equivalent to or less than the levels specified in Subsection 1.2.2 for discharge rates up to 0.46 m^3/s (or as may be redefined by the Director according to Section 2.2.1). Variances may be allowed by the Director for higher discharge rates. The Director may as well, in the future, establish a maximum level for total suspended solids during extreme storm events.	Yes	Refer to the Annual Report, Appendix I, Tables 10 and 28.
Section 2.3 - 2.3.4	Block 242 Coal Mining Operation		This site is non-operational and reclamation efforts are establishing.
Section 2.4	7-South Mining Operation Settling Pond		
Section 2.4.1	Rate of Discharge : The maximum flow of 0.005 m^3/s is the peak routed outflow from the settling pond resulting from an assumed response of the maximum equivalent catchment area as defined in subsection 2.4.3 to a design I in 10 year return period of 24 hour duration. Additional flow from the 7S adit sump pump must not cause the settling pond to overflow or exceed the maximum flow. The Director may from time to time redefine the maximum routed outflow based upon actual on-site measurements.	Yes	N/A
Section 2.4.2	Pumping Rate: The Permittee shall keep records of the date, duration and estimated volume when water from the 7 South Adit Sump (7S Portal Sump) is pumped to the settling pond and submit the records to the Regional Waste Manager upon request.	Yes	To date, no water has ever been routed from the 7S-Sump to 7SSD. Therefore no records exist. All water from 7-South (Adit)Portal Sump (7SPS) is pumped underground to 5S mine pool.
Section 2.4.3	Catchment Area: The maximum settling pond catchment area shall not exceed 3.14 hectares as defined in the Surface Water Management Plan -7 South Development Quinsam Mine, Golder Associates, April 12, 2012 (Appendix B) unless authorization has been obtained from the Director.	Yes	N/A
Section 2.4.4	Settling Pond Solids and Storage Volume: Settled solids which have accumulated in the settling pond shall be removed as required to maintain a minimum water depth below the pond decant of 1.0 m and a minimum water storage volume of 340 m^3. The removed solids shall be disposed of in a manner approved by the Director.	ND	Settled solids have not accumulated to a point that requires them to be removed at this time. A minimum water cover of 1.0m is not sustained at all times as water management practices have changed to have minimal water discharged from the pond. Based on experience, it is difficult to maintain a 1.0m cover and discharge at appropriate levels. There has been far less TSS exceedances with the new practice.
Section 2.4.5	Discharge Routing: The discharge from the settling pond shall be conveyed to the Quinsam River via an ephemeral stream (Stream I) and a wetland (Lower Wetland) adjacent the Quinsam River in a manner acceptable to the Director.	Yes	Refer to the Annual Report, Appendix I, Table 33 (No discharge occurred).
Section 2.4.6	Settling Pond Discharge Dilution Ratio: The 7-South settling pond must not discharge unless a minimum flow is measured in Stream 1 (7S monitoring site). The minimum Stream 1 to discharge ratio shall be documented to the satisfaction of the Director in the Environmental Procedures Manual required in Section 3.2.	Yes	Refer to the Annual Report, Appendix I, Table 33 (No discharge occurred).
Section 2.4.7	Settling Pond Discharge Effluent Quality Model Validation: The Permittee shall report on the settling pond performance in the annual report. The purpose of the report is to validate the effluent water quality prediction model using actual flow and water quality data. The Director may amend the permit, if required, or request an amendment of the permit for environmental protection based on the report findings.	Yes	Refer to the Annual Report, Section 6.3 and Appendix I, Table 33 (No discharge occurred). Previous Annual reports (where discharge occurred) validated the model.
Section 2.4.8	Contingency Measures: In the event of a 7-South settling pond discharge permit limit exceedance, the settling pond discharge valve must be closed immediately and the effluent must temporarily be diverted to the 5S mine or 7S mine underground workings, or to another area acceptable to the Director. Details of the contingency measures shall be documented in the Environmental Procedures Manual required under Section 3.2. Additionally, the Permittee shall follow Section 3.9 requirements.	Yes	The 7-South settling pond water is directed to 7-S Sump via pumping. Refer to the Annual Report Section 2.1.3 and Figure 4. Details of the contingency measures are documented in the Environmental Procedures Manual (EPM).
Section 2.4.9	Toxicity Failure Monitoring and Reporting Procedures	Yes	There have been no toxicity failures in the past. Toxicity samples were not collected due to zero discharge.
Section 3.2	Environmental Procedures Manual (EPM)	Yes	The EPM was submitted on March 31, 2019 to the ENV compliance review website.
Section 3.3	Acid Generation Control	Yes	N/A
Section 3.4	Water Quality Objectives	Yes	N/A
Section 3.5	Nutrient Control	Yes	N/A
Section 3.6	Chemical Storage Containment Works	Yes	N/A
Section 3.7	Spill Reporting	Yes	See Annual Report (Appendix VII).
Section 3.8	Additional Works	Yes	Long Lake Seep Treatment System cells BCR-EFF, SPC-EFF, AL-EFF, SP-EFF, 7-South Containment Pond (7SCP) and 2-North PAG CCR Pond (WP) are additional works that can be used as facilities for the removal of nutrients and metals from the effluent or the provision of additional settling pond capacity as well as flocculation facilities, if required.
Section 3.9 (3.9.1-3.9.2)	Maintenance of Works, Non-Compliances and Emergency Procedures	Yes	Refer to Annual Report, Section 2 and 6, Figures 1 - 4, Appendix I (Table 2) and Appendix VII.
Section 3.10	Bypasses	No	Long Lake Seep bypasses the works.
Section 3.11	Environmental Review Procedure - An Environmental Technical Review Committee of six members has been formed. This Committee is composed of technical representatives from the Department of Fisheries and Oceans; Environment Canada; the Ministry of Environment; the Ministry of Energy, Mines and Natural Gas; the City of Campbell River; and the Permittee for the purpose of coordinating and reviewing the construction and operational monitoring results. **Based on the recommendations of the Committee, the Director may revise the monitoring requirements in Section 4.**	**No**	Number and committee members stated in this section is incorrect. Environment Canada and Department of Fisheries and Oceans are not in attendance. The Committee does not provide recommendations for revisions to the monitoring program to the Director and revisions are not being made to the monitoring program. All information is submitted in the Annual Report and then presented at 2 separate ETRC meetings, one for agencies and another for both agencies and stakeholders. See Annual Report (Appendix V) for the meeting outcomes.
Section 3.12	**Future Monitoring** **Based on the results** of the Effluent and In Mine Releases monitoring program specified in Subsection 4.1 **and / or** data obtained from the Receiving Environment monitoring program specified in Subsection 4.2, **the Director may revise the monitoring requirements in Section 4.**	**No**	The clause in the Permit 7008, Section 3.12 specifies that the Director can revise the monitoring program based on the results. The monitoring program will not be revised by the Director unless a permit amendment is submitted. The results of monitoring have been presented for over 15 years in Annual Reports and at ETRC meetings. The monitoring program requires revision and reduction of monitoring sites, frequency and parameters. QCC is bankrupt and has limited staff to work through monitoring programs, quality control, quality assurance, data management, reclamation, reporting and permit amendments. The conditions of this clause need to be adhered to by ENV in order to reduce monitoring and focus resources on other areas like reclamation.
Section 4.0	MONITORING AND REPORTING REQUIREMENTS	Yes	
Section 4.1.1	Effluent and In-Mine Release	Yes	

Authorized Person Initial: KM

Date: Sept 10, 2019

CONDITION NUMBER	CONDITION DESCRIPTION	COMPLIANT? (Yes/No/ND)	ACTION TAKEN
Section 4.1.1	North Coal Mining and Coal Preparation Plant Operation	Yes	
Section 4.1.1 i)	Decant WD (EMS # E207409). Missing (7/353) daily composite samples collected. Water level in the pond was extremely low during the day and only discharged during the evening. The suction line for the composite sampler was not low enough in the water for required sample volume to be collected.	No	Suction line was lowered to below decant riser in order to collect a daily composite sample.
Section 4.1.1 ii)	Culvert, at Middle Quinsam Lake Road - WC (EMS # E207411)	No	(3/26) total suspended solid samples were not collected on a biweekly schedule.
Section 4.1.1 iii)	2-North Portal Sump Effluent - 2N-P-Sump (EMS # E283433).	Yes	N/A
Section 4.1.1 iv)	Additional Sites Monitoring Schedule : 2-North Pit Sump CCR Cover (WP) EMS # E207412, South Dyke Sump (SDS) EMS # E292126	Yes	SDS sump was redirected to underground 2-North mine. This site needs to be remove from this permit.
Section 4.1.2	South Coal Mining Operation		
Section 4.1.2 (i)	Decant - SPD (EMS # E218582) Missing (1/233) daily composite TSS samples collected. Missing parameters alkalinity, acidity (1/ 6 monthly events) and sulphate (2 / 52) weekly required events.	Yes	Beaver had clogged the decant riser, no flow could be released. On May 23rd, 2018 flow meter calculated mud as water level. Flow ceased May 14th, 2018.
Section 4.1.2 (ii)	Culvert, Downstream End of Access Road - SPC (EMS # E217014)	Yes	N/A (Remove site)
Section 4.1.2 (iii)	South Pit Main Sump Water- 3S (EMS # E217015)	Yes	N/A
Section 4.1.2 (iv)	Additional Monitoring Sites Schedule: 2-South Pit In Pit Water Cover (2S) EMS # E292127, 1977 Bulk Pit Sample (3S77) EMS # E292128, Culvert Downstream of the 4 South Access Road (4S-Lo) EMS # E292129	No	Continuous outflow to 2-South Pit was lost (2/365) days due too battery failure. Battery has been replaced. Sites like 3S77, 4S-Lo and SPC need to be removed. Only monitor LLE monthly when flowing.
Section 4.3	Block 242 Coal Mining Operation	Yes	NA - Area is non-operational and reclaimed.
Section 4.1.4	7 South Mining Operation		
Section 4.1.4 (i)	Decant - 7SSD (EMS # E292069)	Yes	Refer to the Annual Report, Appendix I, Table 33
Section 4.1.4 (ii)	7-South Adit Sump EMS # E292110	Yes	NA - This pond is never pumped to 7S Settling Pond.
Section 4.2	Receiving Environment Monitoring Sites and Monitoring Requirements		
Section 4.2.1 (i)	Initial Dilution Zone Monitoring Sites - Long Lake Entrance- LLE (EMS # E292130) missed one required monthly metals (total and dissolved), nutrients, TSS, sulphate, alkalinity and acidity.	No	Refer to the Annual Report, Appendix I, Table 22. Work was being preformed on culvert to remove the beaver dam and sample was not collected.
Section 4.2.1 (ii)	Road Crossing bridge on Stream 1 above the Lower Wetland -7S (EMS # E292109).	Yes	Refer to the Annual Report, Appendix I, Table 26
Section 4.2.2	Seep Monitoring Sites		N/A
Section 4.2.2 (i)	Long Lake Seep- LLS / LLSM (EMS # E292131)	Yes	Refer to the Annual Report, Appendix I, Tables 23 - 24
Section 4.2.3	Receiving Water (Stream and Lakes) Monitoring Sites. **7-South Mining Operation (Areas 1 to 4):** Quinsam River downstream of 7 South Mining Operation (7SQR) (EMS # E292113), **7-South Area 5 Mining Operation:** Stream- Iron River upstream of mining operations (IR1) (EMS #E297230), Iron River upstream of 7SA5 (IR6) (EMS # E297231), Iron River downstream of 7SA5 and 242 inputs (IR8) (EMS # E297232), Quinsam River downstream of confluence with Iron River (IRQR) (EMS # E299256).	Yes	Missed monthly sampling in February due to dangerous conditions. Refer to the Annual Report, Appendix I, Tables 150 - 165. There are too many locations on the Iron River. Remove IR1 maintain IR6, IR8 and IRQR. Remove monthly sampling.
Section 4.2.4	Sediment and Benthic Monitoring Sites	NA	N/A
Section 4.2.4 (i)	7-South Area 5 sediment proposal	Yes	Proposed the sediment and benthic site for 2019
Section 4.2.5	Stream Monitoring Requirements		
Section 4.2.5 (i)	General Requirements Applicable to All Sites Defined Under Section 4.2.3 (E292112)- Lower Wetland Outlet (LWO) missed a sample set during fall, sample set for all parameters (metals (T) & (D), alkalinity, acidity, TSS, SO4-D & DOC).	Yes	Authorization was received from ENV to temporarily suspend monitoring from this site for Q3 due to no discharge from 7SSD. This site needs to be revised and monitoring should only occur if there is discharge from 7SSD.
Section 4.2.6	Lake Monitoring Requirements		There are too many lakes to continually monitor three times per year. Revisions to the monitoring program need to be made. Suggest removing No Name and Lower Quinsam Lakes and only sampling Long and Middle Quinsam Lakes during spring and early fall.
Section 4.2.6 (i)	General Requirements Applicable to All Sites Defined Under Section 4.2.3.	Yes	All samples were obtained in accordance with the permit.
Section 4.2.7	Sediment Benthic Monitoring Requirements	N/A	Scheduled for 2020
Section 4.2.7 (i)	General Requirements Applicable to All Sites Defined Under Section 4.2.4	N/A	N/A
Section 4.3	Additional Monitoring Requirements		
Section 4.3.1	Composite sampling	No	Equipment is established and routinely inspected. Refer to Non-compliance list for information on missed samples. Appendix I, Table 2. Composite sample tables, Appendix I, Tables 27-28.
Section 4.3.2	Continuous Flow Recording	No	Missing two days of outflow at 2S. Refer to Annual Report, Appendix I, Tables 2, 29 to 333 and 166 to 172 and Appendix II, Graphs 56 to 68.
Section 4.3.3	Iron River Flow Monitoring	Yes	Annual Report, Appendix II, Graph 62
Section 4.3.4	pH and Conductivity Monitoring	Yes	Annual Report, Appendix I , Tables 37 to 39. This is not useful information. Needs to be removed from the permit. Only take pH/ Conductivity when collecting a sample.
Section 4.3.5	Monitoring of Seeps	Yes	Annual Report Appendix I , Tables 9, 23 and 24.
Section 4.3.6	Groundwater Observation Wells	Yes	Groundwater results and discussion is integrated into the Annual Report, Refer to Appendix II, Tables 161 to 267 and Appendix VI.
Section 4.3.7	Monitoring of Drainage Ditches and Water Channels	Yes	Operations are checked daily by either the environmental technician or shift bosses.
Section 4.3.8	Precipitation Monitoring	Yes	Annual Report, Appendix I, Table 42
Section 4.3.9	Block 242 Monitoring	Yes	Not operational, area has been reclaimed
Section 4.4	Monitoring Procedures	Yes	N/A
Section 4.4.1	Sampling and Analytical Procedures	Yes	N/A
Section 4.5	Reporting	Yes	N/A
Section 4.5.1	7 South Area 5 Reporting	Yes	Refer to Annual Report Section 8.8.1 to 8.1.3.

Authorized Person Initial: KR Date: Sept. 10, 2019

APPENDIX IX

MINE GRID NORTH

TRUE NORTH

53°

106,000N

104,000N

102,000N

100,000N

98,000N

96,000E

98,000E

100,000E

102,000E

104,000E

106,000E

QUINSAM RIVER

Settling Pond #4

MW00-1S & 1D
MW00-6S & 6D

Bronco Brook

QU-11-03

5M#2
(Dewatering Well)

2-North

3M2N

QU-10-11S & 11D

QU-10-10S &10D

1M2N
(Dewatering Well)

QU-10-13D

QU-08-21GS & 21GD

Quinsam Syncline

QU-11-05S & 05D

QU-11-09S & 09M

QU-08-13A & 13B

QU-14-20

Overlook Fault

QU-05-13A

Tailings
Disposal
Facility

Middle
Quinsam
Lake

QUINSAM RIVER

5SDUV
(Dewatering Well)

5-South

7-South

1M7S(sump)

Roadway Fault

Long Lake Fault

7-South Portal

QU-08-10

QU-11-28

7SA5

QU-11-21

7-South
Area 5

Future Mining Area

QU-11-18S & 18D

QU-12-06

QU-11-36D

No-Name Lake

Long Lake

MW00-2

MW12-23
MW12-24

3-South Pit

MW00-4

2-South Underground

INF (QU11-11)

2-South Pit

QU-10-09S & 09D

QU-10-07D

QU-78-161

QU-11-01

4-South

QU-10-08D

Long Lake Seep
Treatment System

Settling Pond #1

Unnamed Fault 1

Unnamed Fault 2

Lower
Quinsam
Lake

METERS
0 20 40 60 80 100

Groundwater Monitoring Well

Groundwater Flow (mine impacted water)

Groundwater Flow (non-mine impacted water)

Pumping (mine impacted water)

Underground PAG-CCR Disposal

Underground Tailings Disposal

QUINSAM COAL

Updated - September 2019 - MAP	04/09/19	SCALE:	1:10,000
		DESIGNED:	
		DRAWN: SS	04/09/19
		CHECKED:	
		APPROVED:	

2018-2019 SITE PLAN
GROUND WATER MONITORING

2018-2019 Annual Water Quality Report

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MINE GRID NORTH

TRUE NORTH

53°

106,000N

104,000N

102,000N

100,000N

98,000N

96,000E

98,000E

100,000E

102,000E

104,000E

106,000E

QUINSAM RIVER

E0126402,WA

E207411,WC

Settling Pond #4

E207409,WD

E207412,WP

Brinco Trench

PDSR

5M#2

(Dewatering Well)

2-North

E283433,2NPS

3M2N

Tailings Disposal Facility

Middle Quinsam Lake

1M2N

(Dewatering Well)

E286930,QRDS1

QUINSAM RIVER

Quinsam Syncline

Overlook Fault

Boundary Fault

E292126,SDS

077-78

MW2010

E206618,MQL

QUINSAM RIVER

E0900504,WB

5SMW

(Dewatering Well)

5-South

7-South

Q05-13

No-Name Lake

Long Lake

E217018,NNL

E217017,NNO

3-South Pit

E292131,LLS & LLSM

E217015,3S

2SC

E206619,LLM

E219412,LLO

2-South Pit

2-South Underground

E292127,2S

2SI

NF (QU11-11)

E292129,4S-Lo

E292130,LLE

E217014,SPC

E292128,3S77

E218582,SPD

BCR-EFF

SPC-EFF

Long Lake Seep Treatment System

Settling Pond #1

4-South

7-South Area 5

Future Mining Area

Long Lake Fault

E292110,7SPS

E292069,7SSD

7-South Portal

E292109,7S

E292112,LWC

E292113,7SQR

QUINSAM RIVER

E297232,IR8

E297231,IR6

E299256,IRQR

E297230,IR1

QUINSAM RIVER

E292118,LQL

Lower Quinsam Lake

METERS

0 20 40 60 80 100

Underground PAG-CCR Disposal

Underground Tailings Disposal

EMS ID #, Station Code

Surface Water Flow

Pumped Water Flow

Updated - September 2019 - MAP	04/09/19	SCALE:	1:10,000	
		DESIGNED:		
		DRAWN: SS	04/09/19	
		CHECKED:		
		APPROVED:		

QUINSAM COAL

2018-2019 SITE PLAN
SURFACE WATER MONITORING

2018-2019 Annual Water Quality Report

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