April 5, 2022 **File: C-172**

Ministry of Energy, Mines and Petroleum Resources
Mines and Mineral Resources Division
6th Floor, 1810 Blanchard St.
PO Box 9320, STN. Prov. Govt.
Victoria B.C.
V8W-9N3

Attention: Manager, Reclamation

RE: Annual Reclamation Report for 2021, C-172

This letter confirms Quinsam Coal Corporation has submitted one digital copy of the 2021 Annual Reclamation Report.

Quinsam trusts this report satisfies the requirements of the format requirements and those stipulations found in the Permit C-172. The table below describes the requested information.

Table 1: Reclamation Summary

Company:	**Quinsam Coal Corporation**	
Mine Name:	**Quinsam Coal Corporation**	
***Mines Act* Permit #:**	**C-172**	
	Previous Report (2020)	**Current Report (2021)**
Total Disturbance Area (ha)	**199 (ARR Table) 159 (Shapefiles)**	**170 (ARR Table) 160.52 (Shapefiles)**
Total Reclaimed Area (ha)	**85.3 (ARR Table) 89 (Shapefiles)**	**85.3 (ARR Table) 89 (Shapefiles)**
Total Exempt Area (ha) (i.e., pit walls)	**0.00**	**0.00**
Mining Production (annual total)	**0 Tonnes**	**0 Tonnes**
Total Liability Estimate	**$12,466,000 (draft update submission Jan 27, 2020)**	
Date for next Five Year Mine Plan and Reclamation Plan update (if required)	**August 2022**	**January, 2025**

Sincerely,

Kathleen Russell Environmental Coordinator – Quinsam Coal

CC:
John McCormac Mine Controller- Quinsam Coal

Annual Reclamation Report for 2021
Mines Act Permit Number C-172

Quinsam Coal Mine

Prepared By:
Quinsam Coal Corporation
P.O. Box 5000
Campbell River, B.C.
V9W 8A3

Contact Information:

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March 31, 2022

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List of Abbreviations

B.C.	British Columbia
BMP	Best Management Practice
COPC	Contaminants of Potential Concern
COI	Contaminants of Interest
CSR-FW	Contaminated Sites Regulations Freshwater Aquatic Life 2019
DL	Detection Limit
DM	Dissolved Metals
DO	Dissolved Oxygen
EMLI	Ministry of Energy, Mines and Low Carbon Innovation
EMS	Environmental Monitoring Station
ENV	Ministry of Environment and Climate Change Strategy
EoR	Engineer of Record
Ha	Hectares
Hp	Horsepower
IPMP	Invasive Plant Management Plan
IWM	Integrated Weed Management
km	Kilometer
LLE	Long Lake Entry
masl	Metres above sea level
MDL	Mean Detection Limit
MERP	Mine Emergency Response Plan
ML/ARD	Metal Leaching/Acid Rock Drainage
MSDS	Material Safety Data Sheet
N+N	Nitrite plus Nitrate
NH3	Ammonia
NWMF	North Water Management Facility
O & G	Oil and Grease
OMS	Operation, Maintenance, and Surveillance Manual
PAG-CCR	Potentially Acid Generating Coarse Coal Reject
PAH	Polyromantic Aromatic Hydrocarbons
P-D	Dissolved Phosphorus
PEP	Provincial Emergency Program
PMP	Pest Management Plan
PNC	Permit Non-compliance
P-T	Total Phosphorus
PTS	Passive Treatment System
QA/QC	Quality Assurance/Quality Control
QCC	Quinsam Coal Corporation
QP	Qualified Professional
RPD	Relative Percent Difference
$S0_4$	Dissolved Sulphate
SOP	Safe Operating Procedures
SP1/SPD	Settling Pond 1

SP4/WD	Settling Pond 4
SWMF	South Water Management Facility
TARP	Trigger Action Response Plan
TDS	Total Dissolved Solids
TM	Total Metals
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
VIO	Vancouver Island Objective for Phosphorus in Streams
WMF	Water Management Facility
WQG	British Columbia Water Quality Guidelines Freshwater Aquatic Life
WQO	Water Quality Objectives for Middle Quinsam Lake Sub-Basin

EXECUTIVE SUMMARY

During 2021 Quinsam Coal Mine (the Site) was operated in a status of care and maintenance by the Bowra Group Inc., in its capacity as Receiver and Manager of Quinsam Coal Corporation (the Receiver). The Receiver operated the Site under the regulations of the Mines Act permit, C-172 and the Environmental Management Act permit, PE:7008.

The Receiver undertook a sales process for the assets, undertaking and properties of Quinsam Coal Corporation from December 2019 to November 17, 2021, when the process was officially closed without a buyer. The future of the site has not been determined, however; with the closure of the sales process there will be no buyer to re-start operations at the Site.

This report is intended to inform governing bodies and stakeholders on:

- Project history
- Site activities for 2021
- Environmental protection program
- Disturbance and reclamation activities to date
- Effectiveness and challenges of reclamation areas
- Management systems and effectiveness
- Compliance with conditions of C-172 and PE:7008 permits.

During the reporting period there was one failure of works, two unauthorized discharges and seven permit limit exceedances. There was no mining, surface development or reclamation performed in 2021.

A failure of works occurred in the 2-North water management system when two well pumps failed resulting in increased mine pool water levels during the year. A supplemental pumping system was installed at 3-Mains to protect the underground infrastructure and manage water levels below elevations of known subsidence zones. The well pumps were replaced in March/April 2021.

An unauthorized discharge and bypass of the authorized works (Settling Pond 4) occurred into the Quinsam River when borehole (QU1109) became artesian due to hydraulic pressure from the rising aquifer in the 2-North mine (discovered on March 17, 2021). Spill report number DGIR 204584.

An unauthorized discharge and bypass of the authorized works (Settling Pond 1) occurred and has been ongoing since early 2000 with discharge to Long Lake (Long Lake Seeps). An application to amend the permit has been submitted and work is underway to permit this area.
At the authorized discharge location Settling Pond 4 water failed to meet permit limits for both dissolved iron (3x's) with results greater than 0.3 mg/L and total suspended solids (4x's) with results greater than 25 mg/L on March 4, 9, 10, 11, 15, 19 and 22. Spill report numbers generated include DGIR 204693, 204694, 204545, 204752 and 204695.

This report has been prepared pursuant to section 10.4.4 (a) of the Health, Safety and Reclamation Code for Mines in British Columbia (HSRC). Currently the mine is in receivership with the future reclamation plans unknown. The tentative reclamation plans proposed are based on no future coal production and the mine transitioning to a closed status.

1.0 INTRODUCTION

In accordance with the C-172 and PE:7008 permits, 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). PE:7008 provides the framework for a 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, groundwater monitoring was conducted at numerous locations to provide a comprehensive understanding of effects within and outside of the mine footprint.

The Quinsam Coal Mine (the Mine) is an underground mine located approximately 25 km southwest of Campbell River B.C. on the Northwest coast of Vancouver Island, in the Strathcona Regional District. Mine access is along Highway 28 (Gold River) and FSR 9563 (Argonaut Main). The Mine also operated the coal storage and barge loading facility at Middle Point, 9km north of Campbell River. When operating, coal produced by the mine was ranked as High Volatile "A" Bituminous Coal, which was processed on-site and hauled to the Middle Point Barge Terminal for shipping to customers.

The run - of - mine (ROM) coal was processed at the on-site coal preparation plant. Waste materials generated from coal processing includes two types of waste, coarse coal reject (CCR) and fine coal refuse or tailings. Both waste materials are characterized based on the sulphur content and its potential to generate acid classified as potentially acid generating (PAG) or non-potentially acid generating (non-PAG) CCR or tailings. Waste disposal management practices include all non-PAG tailings pumped to the Tailing's Storage Facility (TSF) with the non-PAG CCR used for construction of the TSF and more recently stored in the 2-North Open Pit. Historically, PAG-CCR material was disposed of sub-aqueously on the surface at 2 and 3-South pits, and the 2-North pit pond. Underground areas for sub-aqueous disposal of PAG-CCR includes 88-Panel in the River Barrier Pillar of the 5-South mine and currently 2-Mains 7-South with PAG tailings submerged underground in the 2-North mine.

There are three authorized discharge locations where discharge to the receiving environment is permitted pursuant to Environmental Management Act Waste Discharge Authorization PE-7008. These areas include Settling Pond #1 (SP1 / SPD) discharge to Long lake, Settling Pond #4 (SP4/ WD) discharge to Middle Quinsam Lake and 7-South Surface Discharge (7SSD) discharge to the Quinsam River.

Water management includes areas 2 / 3 South, 5-South, 7-South and 2 / 3 North. Management for the 7-South includes pumping all mine impacted surface and underground water from 7-South into the 5-South mine pool. Combined water is pumped into the 2-North mine pool with pumping to surface and release at SP4. In the 2 / 3 South mine areas, contact water from PAG-CCR ponds and the Passive Treatment System is pumped to and discharged at SP1. The Long Lake Seeps include an area where mine water does not pass through the authorized works (SP1) and discharges into the receiving environment. This is considered an unauthorized discharge and bypass of the authorized works.

1.1 Project History

Quinsam Coal, the company, was founded in 1976 to explore and develop the Fee Simple coal rights in the Middle Quinsam Lake area west of Campbell River, B.C. From the subsequent exploration work and environmental baseline and mine feasibility studies the preliminary Environmental Assessment for the Quinsam Mine project was submitted in 1979. A Public Inquiry on the project in 1983 concluded that the mine could be "*constructed and operated, with appropriate mitigative measures, so that the impact to the environment, including the fishery, will be small in nature"* and recommended that the required permits and licences be issued. The Quinsam Mine went into operation in 1986 after receiving Mine Permit No. C-172 in May of 1986, with the first coal released in 1987 from the 2-North coal reserve.

Since the original Mine Permit was granted in 1986 there have been 50 amendments, with the most recent being on March 13, 2014, approving (with conditions) mining 7-South Area 5. Many of the previous amendments relate to development and associated layout of the various underground mine developments and managing the waste rejects materials produced by the coal preparation plant.

While the mine was originally planned and initially started (1987 to 1994) as a multiple open pit operation; production gradually transitioned to being wholly underground mining following development of the 2-North underground test mine in 1990.

Table 1 below provides the timeline of mine development (open pit and underground) and production since mining started in 1986. Since start-up the mine has produced 12,132,149 tonnes of clean coal with no further production since May 2019. Section 2.1 of this document provides further details in the surface and underground development to date.

During the initial years (1987 to 1991) of operation the only beneficiation to the raw coal was crushing and screening. With the transition to underground mining and the related dilution from roof material, heavy media wash plant and water-only cyclones were added in 1991. Process water for the coal preparation plant is pumped from SP4 (Appendix 1) and at that time, refuse from the plant was pumped into containment cells developed at the north end of the 2-North open pit. To meet increasing production requirements and improve fine coal recovery the coal preparation plant was upgraded in 1993 to include heavy media cyclones and centrifuges (for both coarse clean coal and the fines circuit). With these upgrades to the plant and higher production came the need to expand the tailings disposal capacity. In 1995 the 2-North Pit Tailings Disposal Facility was developed in the south end of the 2-North open pit and has been the disposal site for non-potentially acid generating (non-PAG) tailings since. Section 3.2 of this document provides further details on the management of waste (coarse coal rejects and tailings) from the coal preparation plant.

Table 1: Quinsam Mine Annual Clean Coal Production and Mine Development Timeline

Year	Clean Coal	Mining Area (Open Pit Underground (U/G))								
		2N/3N Open Pit	2N/3N (U/G)	1-South Open Pit	2-South Open Pit	2-South (U/G)	3-South (Open Pit)	4-South (U/G)	5-South (U/G)	7-South (U/G)
1987	30,000									
1988	130,000									
1989	198,000									
1990	281,000									
1991	261,500									
1992	469,000									
1993	549,500									
1994	517,500									
1995	589,000									
1996	902,600									
1997	1,066,000									
1998	702,500									
1999	193,600									
2000	236,500									
2001	314,500									
2002	341,400									
2003	312,300									
2004	410,700									
2005	542,700									
2006	458,700									
2007	472,000									
2008	436,500									
2009	393,800									
2010	447,400									
2011	467,300									
2012	366,000									
2013	347,800									
2014	228,200									
2015	130,700									
2016	15,500									
2017	53,473									
2018	210,454									
2019	56,022									
2020	0									
2021	0									
TOTAL	12,132,149									

1.2 Site Location

The site is located in the east-central area of Vancouver Island, 20 kilometres west of the City of Campbell River and within the area of the Quinsam River watershed. Access to the mine from Campbell River is by BC Provincial Highway 28 (Gold River Highway) and Ministry of Forests – Forest Service Road 9563 (Argonaut Main).
Refer to Figure 1 below for the location map, Figure 2 for the Coal Rights holdings map and Figure 3 for the surface rights owned by Quinsam Coal.

Quinsam holds 16,157 hectares of coal rights including approximately 13,400 hectares of fee-simple coal rights and 2,757 hectares of coal licences. There were 361 hectares of fee simple coal rights dropped in February 2016, and as such, are not shown in Figure 2 (Coal Licenses 327676 and 327690). Quinsam also owns 283 hectares of surface rights, these being areas within the mine's surface footprint. These areas have been incorporated into the City of Campbell River municipal limits.

Quinsam also operated a coal storage and barge loading facility at Middle Point, on leased property located about 9km north of the city of Campbell River. This facility was returned to the landlord on January 31, 2022.

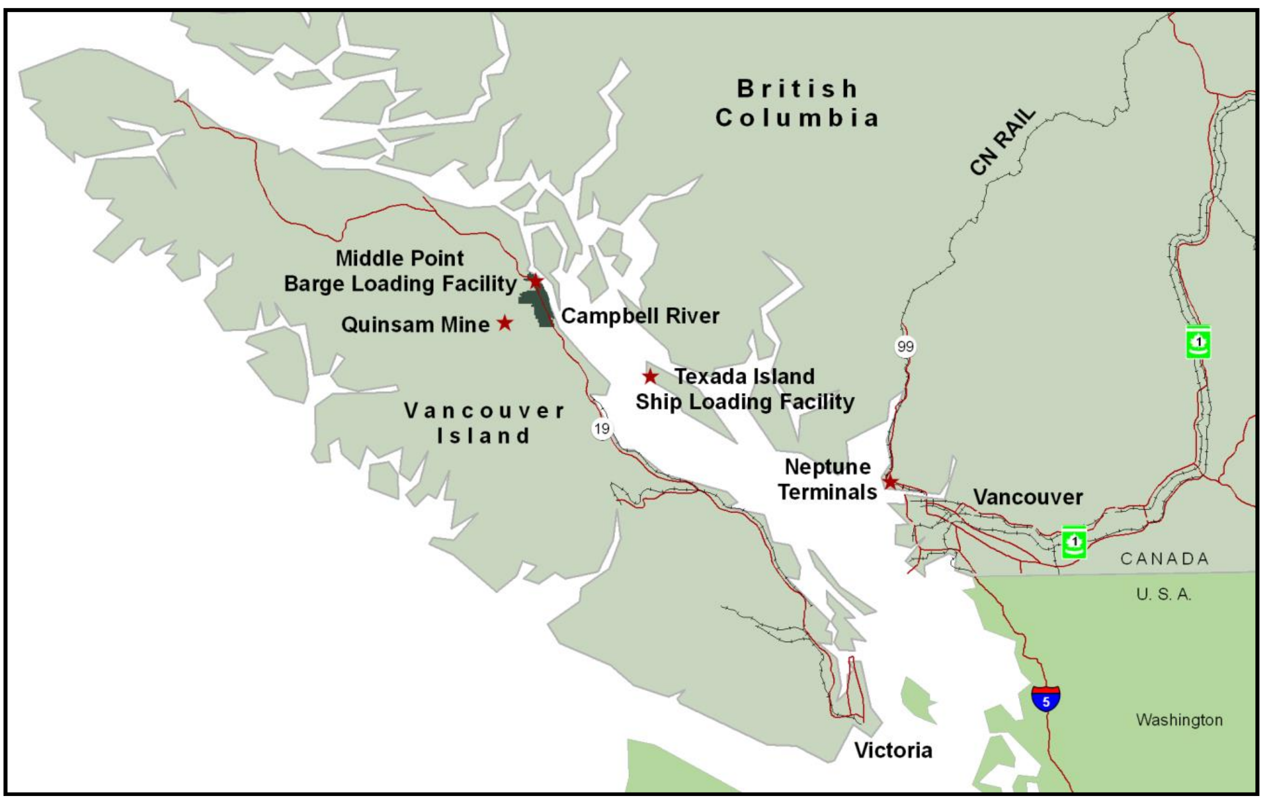


Figure 1: Project Regional Location Map

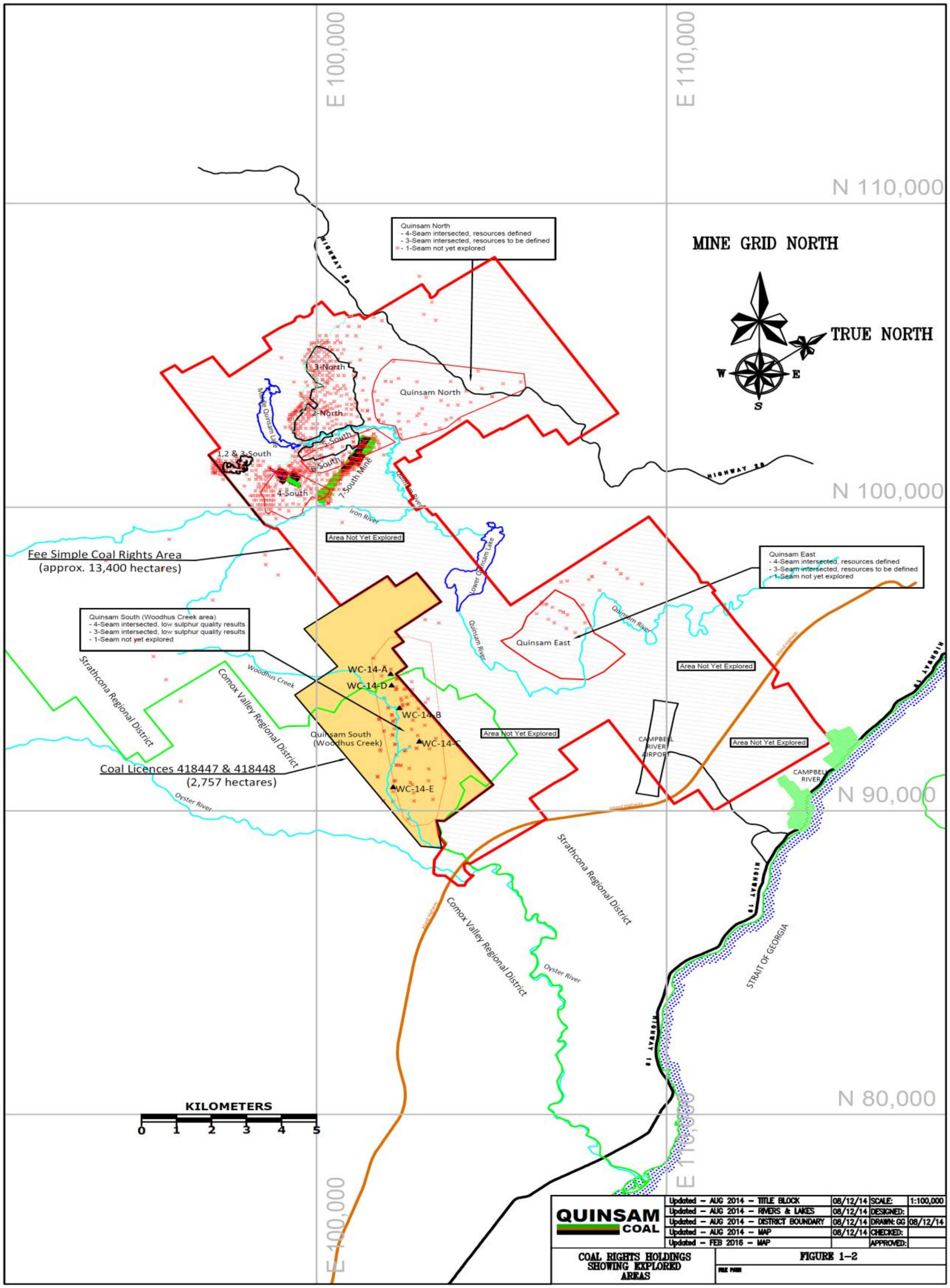


Figure 2: Coal Rights Holdings

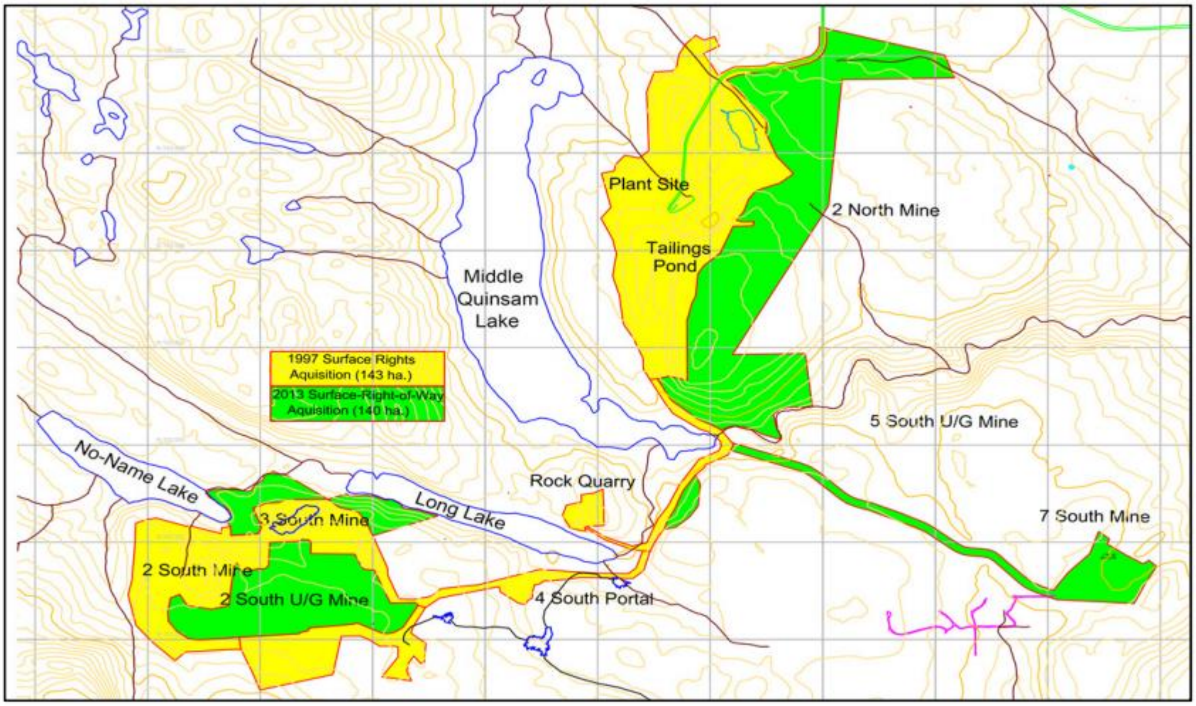


Figure 3: Surface Rights Owned by Quinsam Coal

1.3 Baseline and Regional Environmental Conditions

General Site Description: The permitted mining area at the Quinsam Mine is located in the north-western area of the fee-simple coal rights holding, which is along the north-eastern foothills of the Vancouver Island Ranges. This area is characterized by gently rolling, forest covered country incised by streams and river channels. Most prominent of these on the mine site is the Quinsam River.

Freshwater: Water Quality and Fisheries - The water bodies affected by mining activity include the Quinsam River, Middle Quinsam Lake, Long Lake and No-Name Lake. Baseline water quality data indicated the surface water to be relatively pristine, with low concentrations of nutrients, suspended solids, and dissolved metals. The waters also have low buffering capacity because of low carbonate concentrations. The Quinsam River watershed is recognized as an important fisheries habitat, with both anadromous and resident fish populations. Natural barriers in the watershed downstream of the mine site control the upstream limit of anadromous fish migration. The lakes (Middle Quinsam and Long Lake) and the Quinsam River in the vicinity of the mine host resident populations, with their migration influenced by structures for hydroelectric diversions. Production of fish in the watershed is significantly influenced by a hatchery operation located downstream.

Groundwater: The pre-mine water table typically paralleled topography, with low hydraulic gradients that steepen towards the incised streams and river channels (example, Quinsam River) and fault zones. Both the coal seams and overlying bedrock have low hydraulic conductivity resulting in low seepage rates. The groundwater is alkaline (acid consuming). The bedrock chemistry influences the groundwater 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 above guideline[1].

Vegetation: The forest lands around the Quinsam Mine are very productive for the growth of Douglas-fir and to a lesser degree red alder, hemlock and cedar with an under story including red huckleberry, skunk cabbage and lady fern. The area was initially logged approximately 50 years ago, and second growth forest is actively being harvested.

Wildlife: A diversity of wildlife inhabits the mine site area. Black-tailed deer are very common, Roosevelt elk are known to frequent the area although are not common and black bear and cougar are relatively common. Wolves have been observed in the area as well. In addition, a variety of small mammals are found at the mine. A variety of birds inhabit the mine area, including Canada geese and red-tailed hawks, and amphibians and reptiles inhabit wetland areas.

Meteorological: The Quinsam Coal Mine is located within the Coastal Western Hemlock very dry maritime variant bio geoclimatic subzone. Minimum temperatures range from -10 to -15 degrees Celsius and occur mid-winter while maximum temperatures range from 30 to 38 degrees Celsius and typically occur mid-summer. The warm, dry summer typically extends from June until September and the rainy season usually begins in early October and continues until April. Snowfall can occur between November and April; however, any snow cover is typically gone by March. Based on extrapolation from nearby weather stations, the mean annual precipitation for the site is estimated to be 1,034mm, with 16% being snow water equivalent.

Archaeological: While the mine area falls within the traditional territory of three First Nations (We Wai Kai, Wei Wai Kum and K'omoks), there is no archival record or physical evidence of any archaeological or heritage sites.

Land Use: Land use in the Quinsam Coal Mine area centers on forestry, with Douglas-fir being the major commercial tree. In addition to forestry, watershed values and particularly salmon production in the Quinsam River are important in the area as are wildlife values. While the area is unpopulated it is easily accessible for recreational activities (fishing, boating, camping and seasonal hunting). Watershed use upstream of the mine includes structures for generation of hydro-electric power.

1.4 Regional Management Plans

In 1989 the water quality of the Middle Quinsam Lake sub-basin within the Campbell River system was assessed (pre-operational data) for the purposes of establishing receiving water quality objectives (WQO), which are used as a reference point and to guide the evaluation of mine impacts to water quality. The sub-basin includes Middle Quinsam Lake, Long Lake and a portion of the

[1] CSR-AW (Contaminated Site Regulation for Aquatic Life) guideline

Quinsam River (between the confluence with the Flume Lake outflow and the confluence with the Iron River). The receiving WQO were developed for 21 characteristics, considered as parameters that could be altered by future mining activity. In 2013 the WQO were revised (tabulated below) to reflect current water quality guidelines (WQG) and background hardness.

Table 2: Revised Receiving Water Quality Objectives (Middle Quinsam Lake Sub-Basin)

Parameter	**Revised WQO (2013)**			
	Lakes (mg/L)		**Streams (mg/L)**	
	Max	**5 in 30-day Avg.**	**Max**	**5 in 30-day Avg.**
Phosphorus - total	0.007 summer avg. - Long Lake 0.006 summer avg. - Middle Quinsam Lake		0.01 (May-September)	0.005**
Periphyton biomass	-	-	-	-
Turbidity	n/a	n/a	5.0 NTU	1.0 NTU
Non-filterable residue or TSS	25	5	25	5
Hypolimnetic DO	3 mg/L min 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 (total)	0.00001	n/a	0.00001	n/a
Cobalt (total)	0.05	n/a	0.05	n/a
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
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 (WQG)	n/a	128	n/a	128

1.5 Goals and Objectives of the Reclamation Program

The objectives of the reclamation program are to provide:

- Final land surfaces compatible with the surrounding landscapes and projected future uses of the site
- Minimization of erosion and subsequent potential water quality degradation through an appropriate re-vegetation program
- Productive, self-maintaining ecosystems (forestry and wildlife habitat) in the post-mining environment
- Protection to water courses and water quality (surface and groundwater) essential to the aquatic biota
- Return the land to productive forests and recreation areas

1.6 Progressive and Ongoing Reclamation

A full-sized plan map can be found in Appendix 1, and site-specific maps can be found below in this section. Table 1 in Appendix 2 provides summaries of reclamation activities on the Site to-date. Appendix 4 (Site Pictures) displays past and present pictures for the site and reclamation areas.

The below locations have been re-contoured, seeded and planted but have zero to very few tree survival rates resulting from Scotch broom infestations. As stated previously there has been no reclamation activity or invasive plat management since 2019 due to the mine awaiting a potential sale in care and maintenance. The sites that included woody debris have had the best survival rates for vegetation growth.

During 2015 and 2019 the below listed reclamation work was undertaken. These sites have been monitored for tree survival rates, natural ingression of native plants and invasive plants with the observations noted per site.

7-South

In 2015, 0.78 hectares on the 7-South overburden disposal area was re-contoured and surfaced with approximately 4,700 bank cubic metres (BCMs) of cover soil taken from the 7-South stockpile (refer to Figure 4 below). This area is located between the 7-South raw coal stockpile area and the 7-South settling pond (7SSD). The objectives of this reclamation work were to reduce the sediment load from the area runoff into the settling pond structure and serve as reclamation test plots for different revegetation prescriptions. The area was subdivided into three, roughly equal size, areas for the following planned revegetation treatments.

- Area 1 – with the use of coarse woody debris in addition to the cover soil, this area is designed to re-establish a forest cover and allow for natural ingress of native plants. The revegetation plan included:

    - Fall 2015 reforestation – Douglas-fir planted at 1,200 stems per hectare
    - Spring 2016 reforestation – Red Alder planted at 400 stems per hectare

- Area 2 – this area is designed to evaluate the success rate for Douglas-fir stems planted at a typical forestry density, while promoting ground cover for erosion control and invasive plant management with the use of a native bunchgrass seed mix. The revegetation plan included:

    - Fall 2015 reforestation – Douglas-fir planted at 1,500 stems per hectare
    - Spring 2016 revegetation with a *Coastal Native Bunchgrass* (recipe listed below) mix at 30kg per hectare along with 11-33-11 (Nitrogen-Phosphorus-Potassium) fertilise
        - 49.5% Mountain Brome
        - 49.5% Alberni Blue Wildrye
        - 1% Schoen Slender Hairgrass

- Area 3 – this area is designed to evaluate the success rate for Douglas-fir stems planted at a slightly lower density. While promoting ground cover for erosion control and invasive plant management with the use of a native sod grass seed mix combined with the ingress of native species. The revegetation plan included:

    - Fall 2015 reforestation – Douglas-fir planted at 1,400 stems per hectare
    - Spring 2016 reforestation – Red Alder planted at 400 stems per hectare
    - Spring 2016 revegetation with a *Coastal Native Sod grass* (recipe listed below) mix at 40kg per hectare along with 11-33-11 fertiliser.
        - 75% Comox Creeping Red Fescue
        - 17% Camriv Canada Bluegrass
        - 8% Schoen Slender Hairgrass

Observations of these 3 sites include a healthy ingress of native plants such as Wild raspberry, Red alder, Western snowberry, Cotton wood, Acute and Crack willow. These native plants assist in species diversity, erosion management and maintaining healthy non-compacted soil as their root systems penetrate deeply into the soil horizon. The Red alder appear healthier with more growth than the Douglas fir. Fertilizer was applied in 2016 in most areas to aid the growth of Douglas fir. The progression of the grass seeded areas have established more cover throughout the years. Area 2 has the lowest tree survival rates. This may be due to a lack of woody debris, water or the grass seed mixture. There has been no invasive plant management for Scotch broom and all sites have this plant invading. Survival rates continue to be highest in Areas 1 and 3. The Scotch broom requires removal through either chemical or mechanical ways.

In 2016 the 7-South Portal Sump Slope area (0.34ha) was top soiled (from a local 7-South topsoil pile) with 1,700m^3, and seeded with Coastal Native Bunch grass seed at a rate of 30 kg/ha with 11-33-11 fertiliser at a rate of 225 kg/ha.

In 2017 the west corner of the highwall (0.22ha) was re-contoured and re-sloped as depicted in Figure 4.

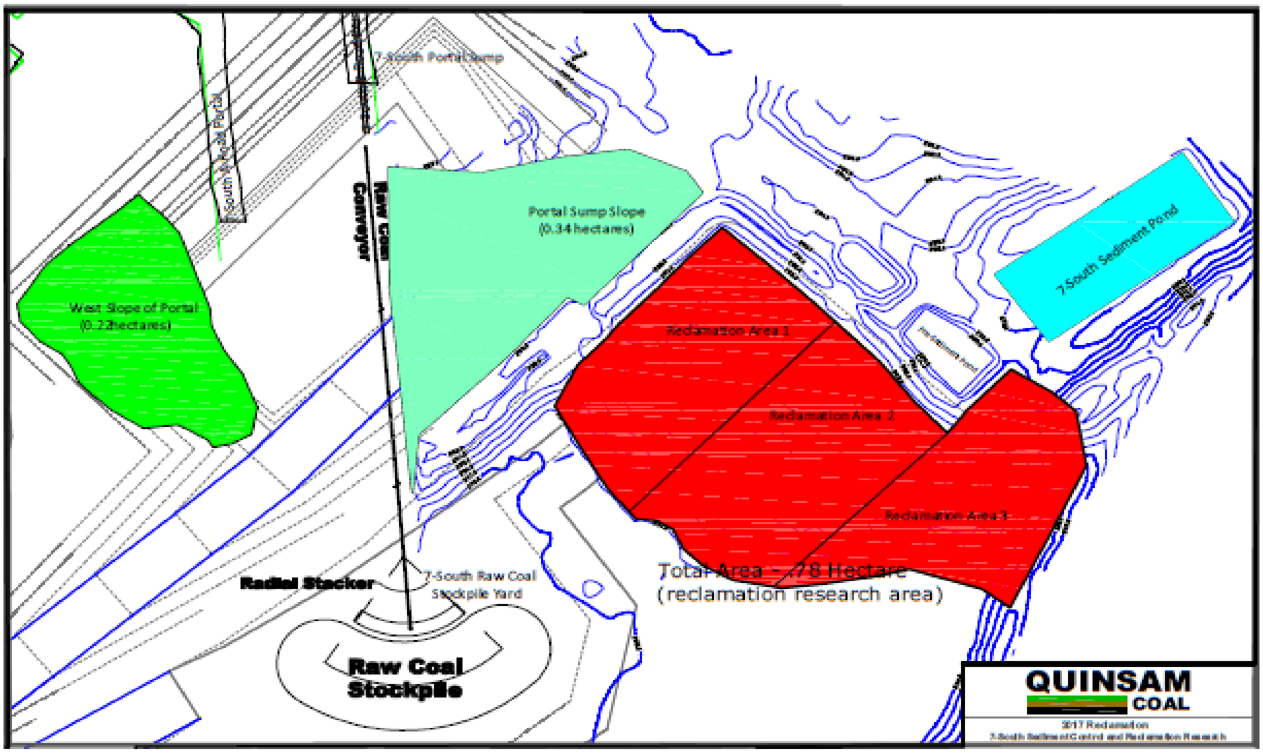


Figure 4: (2015-2017) 7-South Reclamation

1-South

The 1-South open pit had been reclaimed in 1993 (as reported in the 1993 Annual Reclamation Report[2]), with a sump remaining at the centre of the pit area originally designed to collect runoff and assess water quality. Historically the sump was used as a stage pumping system to move water from the 3-South pit to Settling Pond #1. This sump was infilled with till and overburden from the surrounding waste dump (2-South Stockpile #3 in Appendix II Table 3) and resurfaced with 11,500 BCM of topsoil from the 2-South stockpile 1-1 (Table 3 in Appendix II). The area that was recontoured was 1.94 Ha (Figure 5 below).

In 2016 hydroseeded was applied with a mixture made up of the Coastal Native Bunchgrass mix (20 kg/ha), Coastal Reclamation Mixture (50 kg/ha), Red Alder seeds (100 g/ha) and 18-18-18 fertiliser (225 kg/ha), Figure 5. In 2018 the area (1.94 Ha) was reforested with Douglas fir and Red alder at 1200 to 1400 stems per Ha.

[2] March 17, 1993 "*Annual Reclamation Report*" Brinco Coal Mining Corporation

All reclamation efforts for revegetation have been unsuccessful. The 1-South area has Scotch broom infestation, requiring management through both chemical and mechanical removal.

242 Exploration Adit

- During the spring of 2016, a boulder dense till (salvaged from the 7-South overburden dump) was recovered from the 2-South area and used to infill the portals. The high wall was re-sloped using till and other local stockpiled material, and then top soiled using 3,500 m^3 of material from the 7-South topsoil stockpile. The 242 area (0.44 hectares) was seeded using Coastal Native Bunch grass seed at a rate of 15 kg/ha, and Coastal Native Sod grass seed at a rate of 20 kg/ha. Broadcasted with the grass seed was an 11-33-11 fertiliser at a rate of 250 kg/ha.

- In 2018 the area was reforested with a mixture of Douglas fir and Red alder at 1200 stems per hectare. Currently the surrounding forest lands have been harvested. There is some Scotch broom invading the site, but the tree survival rates are successful, and the site can be considered reclaimed once inspected. Refer to Appendix 4 for photographs of the area.

4-South

- A sump that collected surface groundwater above the 4-South coal pad, was connected to the down slope side of the pad by a culvert. Over time, this culvert had oxidised and weathered through, allowing water to filter through the pad, degrading water quality (as observed at surface sampling site 4SLO). The porous culvert was exposed, plugged at the top end, and water was re-routed into a lined ditch bypassing the coal pad (which was constructed in 2015).

- 4-South portals were plugged using 600m3 of fill from the 4-South coal pad. The portal highwall was re-sloped towards the 4-South tent (used for storage of reclamation supplies). The coal pad was re-sloped (0.57 ha).

- Spring of 2016, 0.57 ha was revegetated at a rate of 30 kg/ha of the Coastal Native Bunchgrass mixture, 100 g/ha of red alder seeds, and 11-33-11 fertiliser at a rate of 250 kg/ha. Red Alder Seedlings were planted at a rate of 600 stems/ha. Further revegetation was performed in spring 2018 at 1200 stems per hectare with Douglas fir.

- The site requires invasive plant management for Scotch broom and revegetation. Photographs of the 4-South portals and coal stockpile pad are available in Appendix 4.

2-South

- Spring of 2016, 1.26-hectare area (as shown in Figure 5) surrounding the Quinsam Coal weather station (to the west of the 2-South PAG-CCR disposal site), was top-soiled with 6,300 BCM from the 2-South Topsoil Stockpile 1-1 (Appendix 2, Table 3). This area was seeded with a mixture of Coastal Native Bunchgrass (30 kg/ha), and 11-33-11 fertiliser

(250 kg/ha). Red alder seedlings were planted at a rate of 600 stems/ha. All areas require invasive plant management for Scotch broom and revegetation.

- 7500 BCM of overburden was removed from the 2-South Stockpile 2 (Appendix 2, Table 3) to use as backfill for sloping the south and east highwalls (2-South open pit). Recontouring and seeding on the south and east highwalls was completed in summer 2017 using the remaining of the 2-South Stockpile #2. All areas require invasive plant management for Scotch broom and revegetation.

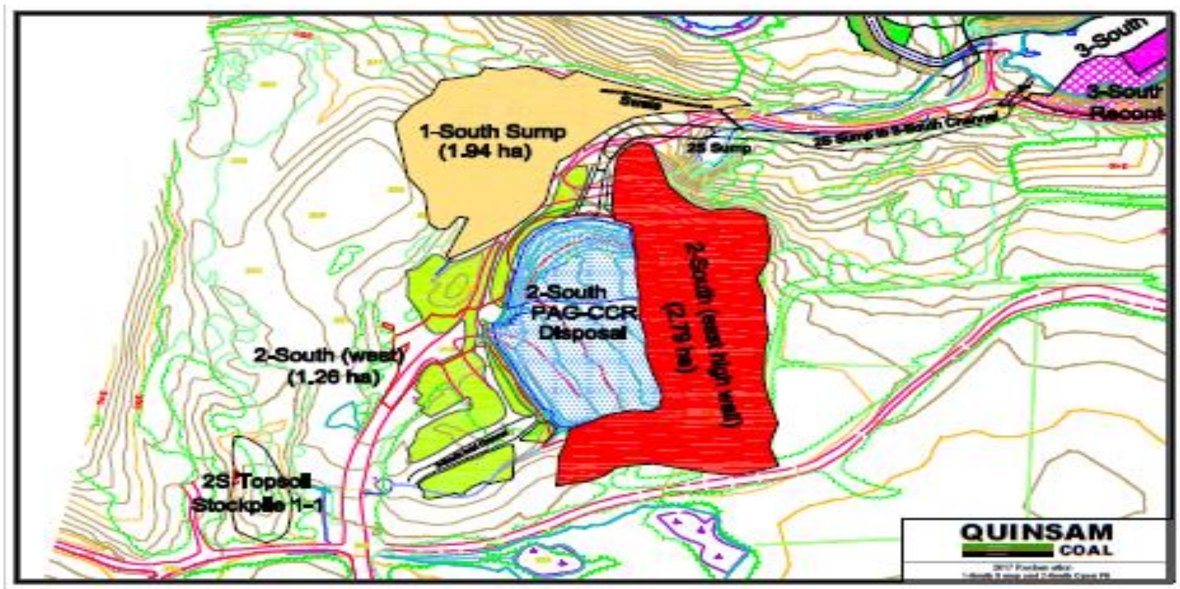


Figure 5: (2016-2017) 1-South and 2-South Reclamation Areas

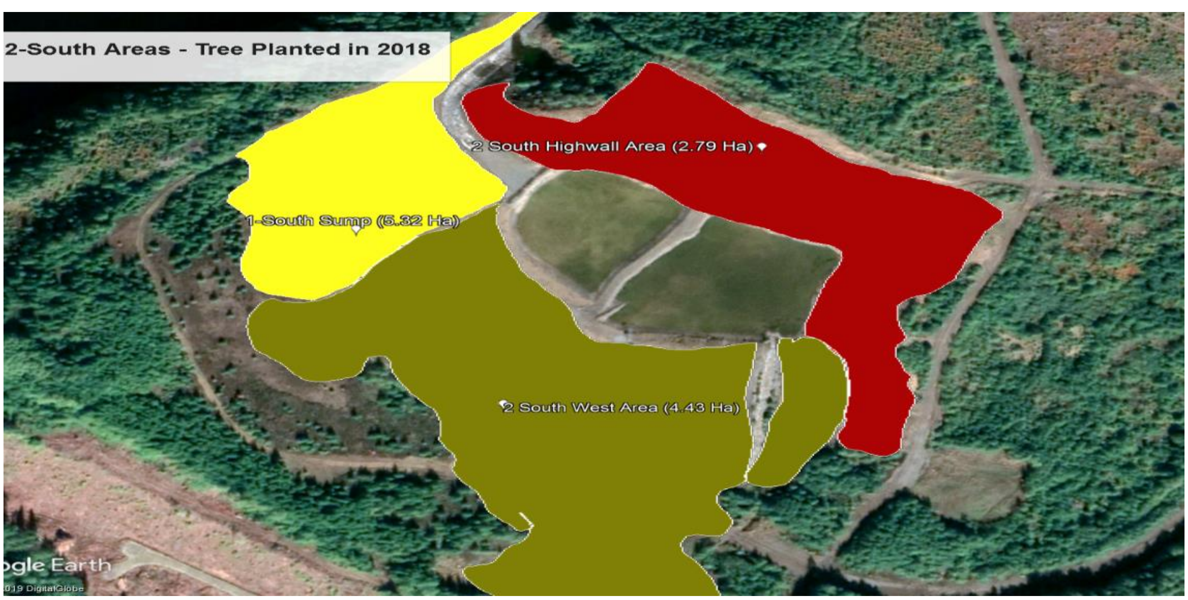


Figure 6: Tree Planting in 1-South and 2-South Areas in 2018

- In spring of 2018 the 1-South and 2-South areas were reforested again, with a mixture of Douglas fir and Red alder at 1200 to 1400 stems per hectare for a total of 12.54 Ha. This includes 1-South Sump (5.32 Ha), 2-South West (4.43 Ha) and 2-South Highwall (2.79 Ha). All areas require invasive plant management for Scotch broom and revegetation. Refer to Appendix 4 for photographs taken in March 2021 of the areas.

3-South

- In 2016 the 3-South, south highwall (1.56 ha) was backfilled and re-sloped with 7,500m^3 of material removed from the 3-South Stockpile 1-5 (Appendix 2, Table 3) and 32,500m^3 of material removed from the 3-South Stockpile 2 (north dump), after which the north dump (0.98 hectares) was re-contoured to its final configuration. The pit was re-sloped at a stable angle so that the PAG-CCR disposal site was left as an open water cover in the middle of the pond. The north dump and part of the lower slope on the re-contoured south highwall were surfaced with 8,800m^3 topsoil taken from the 3S Stockpile 1-4 (Table 3 in Appendix 2).
- The 3-South outlet channel to the west of the pit was constructed down to the stream between No Name Lake and Long Lake. The channel is not active; it remains dammed at the top awaiting authorization to discharge permit.
- Construction on the 3-South, east dyke was initiated in the fall of 2016 with construction completed in summer 2017.
- The 3-South outlet channel, the re-sloped highwall and north dump area, and the east dam were all hydroseeded, with a mixture containing 20 kg/ha Coastal Native Bunch Grass, 50 kg/ha Coastal Reclamation Mixture, and 225 kg/ha 11-33-11 fertiliser. This area is complete and considered revegetated.

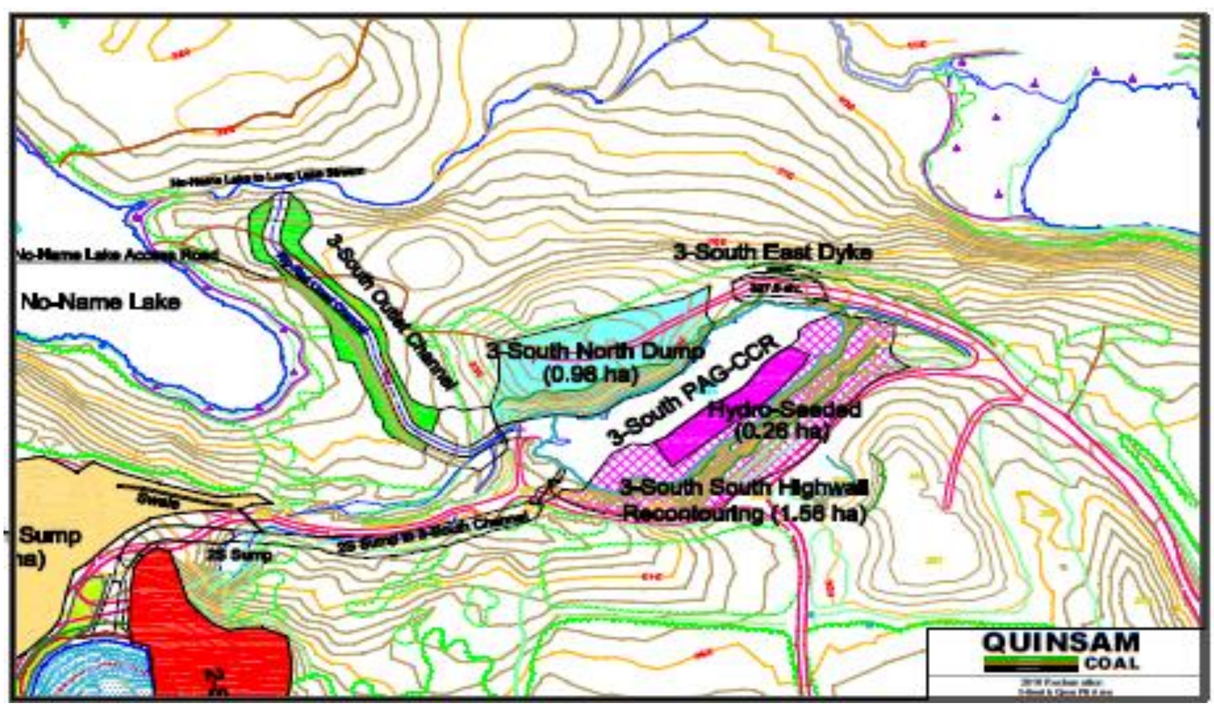


Figure 7: 2016-2017 3-South Reclamation

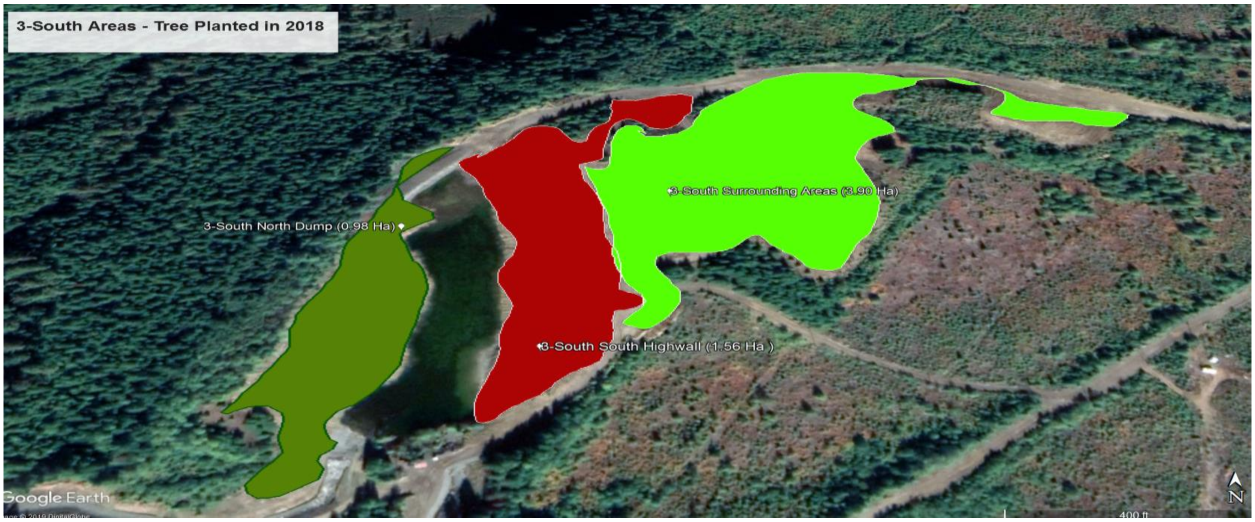


Figure 8: Ongoing -Tree Planting in 3-South Areas in 2018 and 2019

Figure 9: Ongoing -Tree Planting in 3-South Areas in 2018 and 2019

- In 2018, reforested occurred at 1200 stems per hectare with a mixture of Douglas fir and Red alder on the 3-South North Dump (0.98 Ha), the 3-South South highwall and surrounding area (5.46 Ha).
- In 2019 ongoing reclamation activities included spot planting Douglas fir, conning, and fertilizing on the 3-South highwall (1.48 Ha).
- The 1S, 2S, 3S and 4S areas are categorized as "*Ongoing*" in 2021 as all areas require invasive plant management and prescribed vegetation cover to be applied and established.

2-North

- In 2017 and 2018 the area above the 2-North mine was logged by Timberwest (38 Ha).
- In spring of 2018 Douglas fir were planted over 7 Ha at 12,000 stems per Ha in 2-North area.
- In 2019 reforestation of 18 Ha occurred with Douglas fir at 1200 stems per Ha displayed as green polygons on Figure 9 below.
- There remains 12 Ha of disturbed area to be planted as displayed by the white polygons on Figure 9 below.

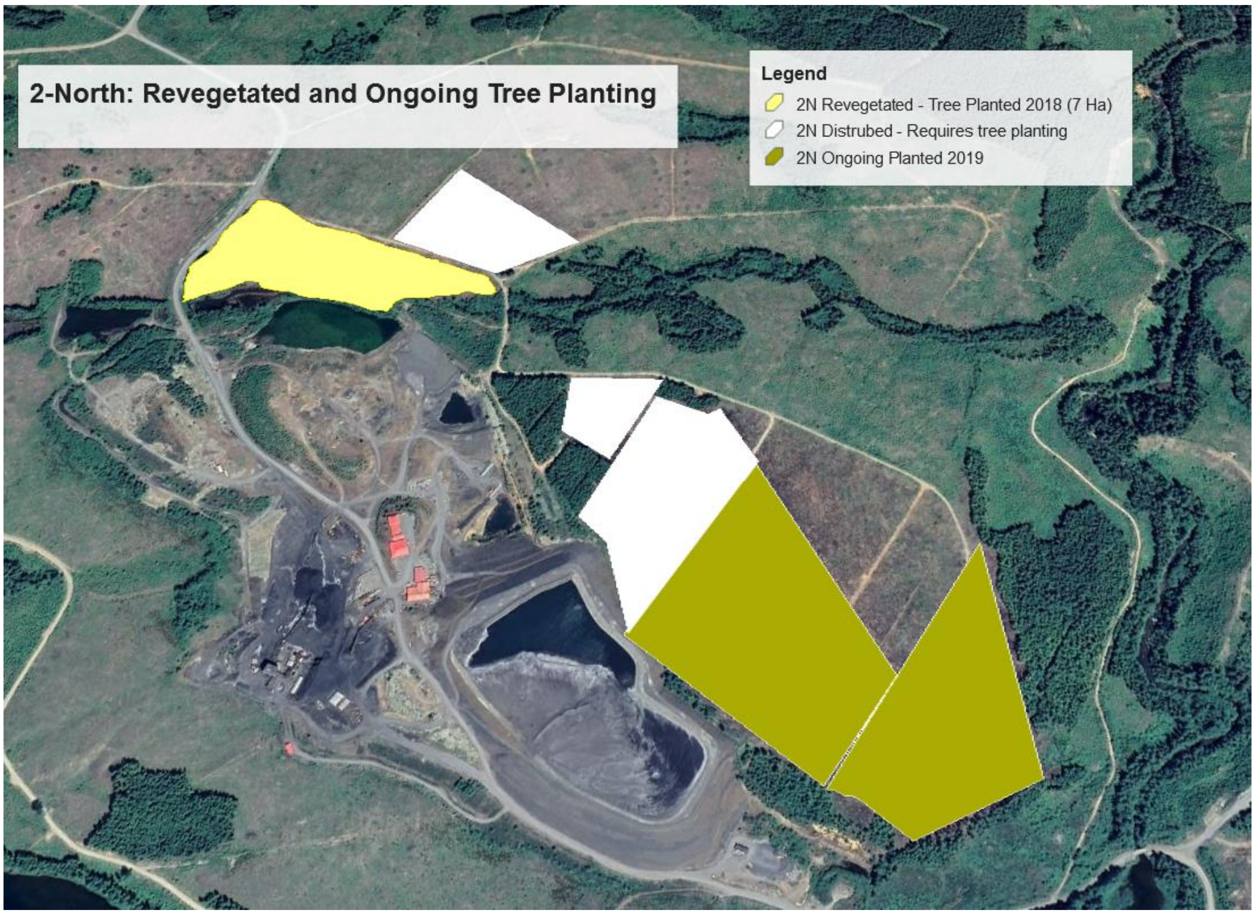


Figure 10: 2-North Area 2019 – Revegetated areas and Ongoing Reclamation

1.6.1 Invasive Plant Management Plan Update

The Invasive Plant Management Program (IPMP) was developed as part of the five-year reclamation plan for invasive plant management. The IPMP is available in Appendix 3.

Scotch broom continues to invade the site with some areas having complete infestations. The broom has spread to roadsides and invaded or encroached on reclaimed areas. These areas were treated with herbicide application or mechanical removal historically. The South end (1S, 2S, 3S and 4S) have had unsuccessful revegetation efforts because of the Scotch broom. The 1-South and part of 2-South-West areas are completely infested with zero tree survival rates.

The following herbicide application is recommended to remove Scotch broom:

- VisionMax (a.I glyphosate)
- Xiameter (silicone surfactant)

After the herbicide application the broom will be piled and burned. The ground will be ripped with a dozer and coarse woody debris will be spread out. A reclamation prescription following this includes *Coastal Native Bunchgrass* (herbicide application recommended below) mix at 30kg per hectare along with 11-33-11 (Nitrogen-Phosphorus-Potassium) fertiliser:

- 49.5% Mountain Brome
- 49.5% Alberni Blue Wildrye
- 1% Schoen Slender Hairgrass

The sites will be planted at 1200 stems per hectare using a Red alder and Douglas fir mixture. See section 1.8 for the reclamation prescription.

1.7 Current Program – Reclamation Treatment

Reclamation treatment over surface development areas will be a function of the nature of the mining disturbance as described below. The reclamation objective for the site is to return the areas back to forestry, wildlife habitat and recreational areas.

Methods for Overburden and Surface Soil Stockpiling*:* Overburden material consisting of glacial till, siltstone, sandstone and topsoil have been removed from the various open pit operations and stockpiled in specific areas. The overburden material has been either stockpiled outside of the open pit voids or used for backfilling. In the north mining area, the overburden material was placed into three stockpiles outside the 2-North Pit. The material was not used to backfill the 2-North Pit as the space was needed for fine refuse disposal.

In the south mining areas, overburden material was used to backfill the Borrow Pit, 1 South Pit and partially backfill the 2 & 3-South Pits and highwalls. Any surplus overburden material remaining has been recontoured with topsoil applied to their final formation. These areas are ongoing for establishing a vegetation cover that meets final land use objectives.

Overburden Material Dumps: Dumps (in-pit and out-of-pit) will be contoured to shapes that conform to the topography of the surrounding terrain and allow for surface drainage. Reclaimed out-of-pit dumps will have a maximum slope of 26° and a 6m bench for each 20m vertical lift. Reclaimed dump slopes and benches will receive 0.5m surfacing of growth medium material and be revegetated.

Pit Slopes: Pit slopes such as 2-North, and 5-South and 7-South portal pits will be backfilled and the backfill sloped to a maximum of 26° and then surfaced with 0.5m of growth medium material and revegetated. The 2-South and 3-South open pits were completed to this standard revegetation is ongoing.

Open Pits Backfilled with PAG-CCR: Three open pits have been partially backfilled with PAG-CCR and are currently flooded. These include the north end of 2-North (2-North Pit Pond) and 2 / 3 South pits. The key element of the reclamation plan for these areas, is the water management features required to maintain permanent subaqueous conditions. A condition of the Mine Permit amendment (January 18, 2012) approving 7-South Mine Development states:

> "*Non-PAG granular covers shall be placed over the 2-South Pit and 3-South Pit at closure to further enhance water balance to ensure permanent subaqueous storage under a minimum 1 m water cover at all times unless an alternate plan is approved by the Chief Inspector.*"

Prior to final reclamation of the 2 / 3 South open pits a granular cover ensuring permanent subaqueous storage of material will be completed. All or some of the PAG-CCR material placed in the 2-North Pit Pond will be removed unless a water balance can display the area will remain permanently saturated. This material can either be blended with Non PAG-CCR from the tailings dam or stored underground in the 2-Mains area of 7-South mine.

Roads: At closure, the final reclamation plan for on-surface roads constructed during the active life of the mine is to rip (with a dozer) to reduce surface compaction, re-contour to conform with the surrounding terrain, resurface with growth medium material and revegetate.

Drainage Channels: Drainage channels and interceptor ditches constructed and maintained throughout the active life of the mine will be stabilized to ensure they will convey the expected flow (1/3 between the 24-hour, 1000-year flood and the probable maximum flood event) at closure and directed into existing natural channels or through an existing settling pond or open pit (2-South and 3-South). All culverts will be removed.

Settling Ponds: Decant structures will be removed and spillways stabilized at settling ponds constructed as part of the water management plan. If necessary accumulated sediment will be dredged and surface prepared to support a wetland end-use.

Mine Service Area: At completion of mining the buildings will be dismantled and removed from site, concrete slabs broken up and buried and the entire area contoured to conform to the surrounding terrain, resurfaced with growth medium and revegetated.

1.8 Reclamation Prescription

After all areas are recontoured to their final formation with topsoil applied, the addition of coarse woody debris will be required in some areas of poor nutrient content. This will be randomly dispersed over the sites to provide shade, nutrients, vegetation cover and a seed bank for native species including species diversity.

The revegetation plan (for areas being contoured and resurfaced with growth medium) has two primary aims: the control of erosion and the return of productive potential. Erosion control will be established by an initial seeding as quickly as possible after substrate restoration, either by hydro-seeding or hand broadcasting, of a grass seed (primarily bunch forming grass) mixture. A typical seed mixture would be:

Native Sodgrass Species	% by Weight
Creeping Red Fescue	75
Canada Bluegrass	17
Slender Hairgrass	8

or

Native Bunchgrass Species	% by Weight
Brome	49.5
Wildrye	49.5
Slender Hairgrass	1

Where and when an immediate cover is required for erosion control (i.e. slopes above water), one of the above mixtures will be blended with Coastal Reclamation Mixture, shown below.

Coastal Reclamation Mixture	% by Weight
Annual Ryegrass	35
Creeping Red Fescue	20
Tall Fescue	25
Timothy	5
Orchard Grass	3
Brown Top	1
S.C. Red Clover	10
Alsike Clover	1

Establishment of productive forest will be based on planting a mix of Douglas-fir and Red alder. Red alder, applied as seed or planted as seedling, will fix nitrogen and help restore the soils for Douglas-fir growth over the long term. The leafy cover of the red alder promotes shade and controls invasive alien species such as Scotch broom by adding a canopy that will aid the growth of conifers (Douglas-fir). The typical planting rate for each species will be 1,200 stems per hectare.

The reclaimed sites will be evaluated on an ongoing basis and maintenance carried out, including repeat seeding, fertilizing and invasive plant management, as required.

2.0 MINING PROGRAM

2.1 Surface and Underground Development to Date

Since mining commenced in 1987 in a single open pit, development has progressed to include several open pit and underground mines to extract coal from one of the three mineable coal zones on the property: the No. 1, No. 3 and No. 4 coal zones. Table 3 below summarizes the mine development by coal zone.

Table 3: Mine Development by Coal Zone

Coal Zone	No. 1	No. 3	No. 4
Mine Development	2-North/3-North 1, 2 and 3-South 5-South	4-South	242-Adit 7-South

Following is a description of the surface and underground development undertaken to date on the Quinsam Mine site.

2-North/3-North: The north mine area lies east of and topographically higher than Middle Quinsam Lake and was the first and largest open pit mining area to be developed. The open pit was initially developed in 1986 and continued as an open pit operation until mid-1991. In late 1989 an underground test mine was developed at the south end of the 2-North open pit, with first underground coal production in 1990. The 2-North operation went entirely underground in mid-1991. In June of 1992 the original entries were reclaimed, and the current entries (#1 Mains) were developed in the centre of the open pit's east highwall. The #1 Mains have been used to access the 2-North, 3-North and 5-South mining reserves. The total disturbed surface area of the 2-North footprint is approximately 28.4 hectares and includes (from north to south) the 2-North Pit Pond (used for subaqueous disposal of PAG-CCR), the South Dam and associated old tailings disposal cells, the supply road and belt road portal entries, underground materials and supplies storage, the portal sump and the tailings disposal facility.

The Mine Permit amendment approving development of the 7-South Mine[3] also approved the disposal of potentially acid generating (PAG) tailings produced from the 7-South coal into the 2-North underground mine. PAG-tailings disposal into the 2-North underground workings commenced in 2013 and has continued intermittently until May 2019.

Refer to section 3.0 of this document for details on managing PAG-CCR and PAG-tailings and resulting water chemistry.

1-South: In 1991, development began on a series of small open pits along the No. 1 coal zone sub crop south of the Quinsam River (No-Name and Long Lake area). Development included upgrading the bridge over the Quinsam River (at the outlet of Middle Quinsam Lake), the forestry road and construction of Settling Pond 1 and related water management structures. 1-South open

[3] January 18, 2012 Mine Permit amendment approving 7-South Mine Development

pit was mined in 1991 and 1992, with overburden material moved to an out-of-pit dump located immediately south of the pit. The total disturbed surface area for the 1-South Pit and associated overburden discard dump footprint was approximately 9.7 hectares. In 1993 and 2016, this area was recontoured as described in section 1.6 but revegetation is ongoing.

2-South: The 2-South open pit was developed and mined in 1992 and 1993. Most of the overburden material from the open pit was used to backfill the 1-South open pit. A small out-of-pit overburden dump was developed at the north end of the pit. The total disturbed surface area for the 2-South Pit and associated roads and overburden discard dump footprint was approximately 8.1 hectares.

Once open mining was complete, three portal entries were developed into the exposed No. 1 coal zone at the bottom of the pit for additional coal resource recovery by underground mining. Underground mining in 2-South continued until 1996 at which point the underground infra-structure was removed and the underground mine flooded.

In 2011, the 2-South underground portal entries were plugged (contact grouted concrete plugs) as the initial step in developing the open pit as a subaqueous disposal location for PAG-CCR. The Mine Permit amendment approving development of the 7-South Mine[4] also approved the disposal of PAG-CCR produced from the 7-South coal into the 2-South open pit. To prepare the open pit as a subaqueous disposal site, a sand-bentonite liner was placed over the entire pit surface to minimize the seepage once backfilled and flooded. A total of 248,956 tonnes of PAG-CCR was backfilled into the pit from 2012 to 2014 and flooded conditions were achieved in 2014.

Refer to section 3.0 of this document for details on managing PAG-CCR and PAG-tailings and resulting water chemistry.

3-South: The 3-South open pit was developed and mined in 1993 and 1994. Overburden from the open pit was placed in out-of-pit discard dumps; one located northwest of the pit and one southeast of the pit. The total disturbed surface area for the 3-South Pit and associated roads, water diversions and overburden discard dump footprint are approximately 10.0 hectares.

In 1998 a Mine Permit amendment[5] approved the use of the 3-South open pit as a disposal site for PAG-CCR (permanent subaqueous disposal). Between 1998 and 2010 196,800 tonnes of PAG-CCR was backfilled into the pit and subsequently flooded.

Refer to section 3.0 of this document for details on managing PAG-CCR and PAG-tailings and resulting water chemistry.

In 2016, the construction of two closure structures commenced; the 3-South outlet channel (which was completed) and the 3-South east end dyke was completed but requires confirmation from compaction tests.

[4] January 18, 2012 Mine Permit amendment approving 7-South Mine Development

[5] October 1, 1998 Mine Permit amendment approving Coarse Refuse Disposal in 2-South and 3-South

The 3-South outlet channel consisted of clearing a 0.88-hectare area between the 3-South pond and the stream connecting No Name Lake and Long Lake (No Name Lake Outlet). The channel was then excavated at an average grade of 4.5%, and layered with geotextile material, and riprap. The slopes on either side of the channel were constructed at a 1.5H: 1.0V ratio, and hydro seeded for slope stability. The construction of this channel was completed in October of 2016. The outlet channel is not currently being used, whilst permitting is being acquired. The purpose of this channel will be to allow natural overflow of water from the pond when the water level reaches a certain elevation (327.15m above sea level). The current method of maintaining this water level is by mechanised pumping, as described in Section 3.2 of this report, which will be permanently replaced by the channel. The total surface disturbance of the 3-South outlet channel is 0.88ha, 0.31 ha represents the rip-rap lined channel, and 0.57 ha the associated cut-and-fill slopes.

The 3-South east end dyke was constructed to a design elevation of 329.0 metres above sea level (masl). This project was started in 2016 and completed in 2017. The surface disturbance of this channel was already accounted for within the confines of the original 3-South pit footprint.

4-South: The two underground portal entries at 4-South were developed in 1996, with coal release from 1996 to 1999 and again on an intermittent basis from 2003 to 2006. Surface development at 4-South included a highwall cut to expose the coal seam, a raw coal stacker and stockpile area and water diversion structures. The surface footprint totaled approximately 0.8 hectares. In 2016, this area was reclaimed (as described in section 1.6). Reclamation is ongoing as prescribed vegetation cover and invasive plant management is required.

5-South: The 5-South underground mining reserves were accessed through three roadways (#8 Mains) developed in 2007 beneath the Quinsam River from the 2-North underground workings. In 2011 a second entry was developed into the 5-South mine as a single portal surfacing at about the 1.5km mark on the haul road to the south mining areas (2, 3 and 4-South). This entry provided a second point of egress from the mine and the point from which PAG-CCR was conveyed into the River Barrier Pillar[6] for disposal. The surface disturbance associated with the 5-South portal is approximately 0.8 hectares.

The River Barrier Pillar is located in the area between 2-North and 5-South (beneath the Quinsam River) and mine grid east of the #8 Mains. This area was developed to increase coal resource recovery and provide a trial location of underground subaqueous disposal of PAG-CCR. The area was mined in 2011 and backfilled with 81,535 tonnes of PAG-CCR in 2012. Concrete plugs were installed in the 8-Mains roadway sealing the 5-South Mine off from the 2-North mine and River Barrier Pillar. In 2017 the infrastructure (pipelines, pumping system and electrical lines) was removed from the 5-South Mine and the portal entry was backfilled with 15 m of coarse rock from the rock quarry and 3 metres of till from the 3-South Stockpile 1-3. Further reclamation work is required such as a concrete bulkhead plug in the portal, backfilling, recontouring, invasive plant management and establishing a prescribed vegetation cover over the area.

[6] May 5, 2011 Mine Permit amendment approving PAG-CCR Storage in the River Barrier Pillar

7-South: Approval for development of the 7-South Mine was received through the January 18, 2012 Mine Permit amendment. Mine development began immediately with cover soil salvage, development of the portal pit with overburden placed on an out-of-pit dump adjacent the pit, construction of water management structures and improvements to the haul road. The surface disturbance associated with the 7-South portal, topsoil dump, overburden dump and water management structures, is approximately 8.1 hectares.

The approval for development of 7-South included subaqueous disposal of PAG-CCR into the mined-out workings in 2-Mains (refer to Figure 3 of this document). During the latter part of 2014 and early 2015 a system to transport PAG-CCR into the workings was installed. The system consists of an on-surface truck dump and hopper, a raise bore connecting the hopper to the underground workings, a silo and feeder system at the bottom of the raise bore and a conveyor connecting the feeder to the 2-Mains belt line. Underground disposal and flooding of PAG-CCR into 7-South started in March of 2015 and since then a total of 112,853 tonnes have been disposed of in the 7-South subaqueous disposal site, 2-Mains.

242: The 242 adit was originally developed as a single-entry exploration adit for extraction of a bulk sample (of what was originally thought to be 3 seam coal at the time). In 1996 approval was received to develop an additional 1,000 metres of roadway to further assess coal quality and ground and groundwater conditions. After approximately 400 metres of development, including developing a second entry, the adit was abandoned due to poor ground conditions. The area was recontoured and revegetated in 2016 with further tree planting occurring in 2018 as described in Section 1.6. Ongoing invasive plant management is required. Tree survival rates are good at this site.

Roads: The active mine site road system includes roads that are multi-user (mining and forest harvesting) and ones that are used only by Quinsam Coal. Those used only for coal mining include the 2-South and 3-South access roads and the road through the mine services area. The length of these roads; outside of other disturbance areas, is approximately 2,150 metres and cover an area of about 2.1 hectares. The entire disturbance footprint for all roads is approximately 13 hectares.

Drainage Channels: Several drainage channels have been dug to either direct non-impacted water around development areas or effluent to authorized discharge points. Drainage channels include:

- The plant site perimeter ditch, which directs effluent from the coal pad to the 2-North pit sump
- The channel between 2-South and 3-South pits, which directs effluent from 2-South to 3-South
- The 3-South discharge channel (3-South pit and the No Name Lake Outlet); not currently in use, awaiting permitting
- The south perimeter ditch above the 7-South overburden dump, which directs non-impacted water to Stream 1 (7-S).
- The discharge channel below SP1.

Settling Ponds: Three permitted settling ponds and associated inlet and outlet structures have been developed as the authorized (Effluent Permit 7008) discharge points for mine impacted water to the downstream receiving environments. Refer to Appendix 1, site maps for reference of these locations.

Settling Pond #4 (SP4, site reference E207409): SP4 is the authorized collection and discharge point for effluent (mine impacted water) from the north coal mining operation and coal preparation plant. Sources of effluent directed to this pond include 2-North underground dewatering (includes combined 5-South & 7-South underground dewatering pumped into 2-North), the 2-North portal sump which receives inflow from the 2-North pit sump and the 2-North tailings disposal facility, runoff from the mine services area (coal preparation plant, coal stockpile areas and the maintenance shop and administration offices) and the pond area itself. The pond also serves as the source of make-up process water pumped to the coal preparation plant. The surface disturbance associated with SP4 (embankment, containment area and outlet structures) is approximately 2.3 hectares.

Settling Pond #1 (SP1, site reference E218582): SP1 is the authorized collection and discharge point for effluent from the south coal mining operation (except 7-South). Sources of effluent directed to this pond include water pumped from 3-South open pit, 2-South open pit and local runoff. The surface disturbance associated with SP1 (embankment, containment area and outlet structures) is approximately 2.7 hectares.

7-South Surface Discharge (7SSD, site reference E292069): 7SSD is the authorized collection and discharge point for effluent from the 7-South mining operation. Sources of effluent directed to this pond include groundwater seepage from the 7-South overburden dump and raw coal stockpile area and local runoff. The volume of effluent reporting to 7SSD is managed by pumping from a pre-settlement sump to the 7-South portal sump from where it is pumped into the 5-South underground workings. 7SSD does not receive effluent from the underground workings. Combined water from 7-South Portal Sump and underground dewatering is pumped into the 5-South underground workings. In order to maintain the water level in 5-South mine pool this water is pumped into 3-Mains, 2-North which then pumps into SP4. The surface disturbance associated with 7SSD (embankment, containment area and outlet structures) is 0.38 hectares.

Mine Service Area: The mine service area includes the coal preparation plant and all related structures, raw coal and clean coal stockpile areas, the maintenance shop, warehouse, administration buildings and ancillary structures. The surface disturbance associated with the mine service area is approximately 33 hectares.

Other: A rock quarry is located between Middle Quinsam Lake and Long Lake. Rock (volcanic) from the quarry is crushed (after blasting) and screened for use as road ballast material. The current surface disturbance is approximately 2.43 hectares. In 2017/18 logging occurred north east of the tailings dam approximately 38 hectares.

Water Treatment: In 2012 a sulphate and iron reducing Passive Treatment System was constructed to treat water associated with the Long Lake seep. The treatment system consists of a biochemical reactor cell, a sulphide polish cell, an aeration lagoon, and a settling pond. The surface disturbance associated with the treatment system is approximately 9.05 hectares.

2.2 Permitted Reserves

The permitted reserves for the 2 North and Area 5-7 South have a total of 842,000 raw tonnes. Mining reserves on unpermitted and future development areas total 10,675,700 raw tonnes. These areas include 4-South, 6-South and Quinsam North.

Mining resources (mineable reserves not yet established) on coal holdings described as exploration areas with potential for mineable coal totals over 47 million tonnes. These areas include Quinsam North, Quinsam East and Quinsam South.

2.3 Surface and Underground Development in the Past Year

Surface:

There was no surface disturbance related to exploration or any other type of disturbance in 2021.

Underground:

There was no underground development in 2021.

2.4 Surface and Underground Development Projected for the Next Five Years

Since 2019, the mine has been in care and maintenance awaiting a potential sale with The Bowra Group Inc. appointed as Receiver and Manager of all the assets, undertakings, and property of Quinsam Coal Corporation. Effective November 17, 2021 the Receiver closed the sales process for the assets undertaking and properties of Quinsam Coal Corporation. The future of the site is under development with EMLCI.

3.0 ENVIRONMENTAL PROTECTION PROGRAM

3.1 Environmental Management Systems and Plans

In addition to the reclamation program described in Sections 1.6 through 1.8 and 4.0 of this document, Quinsam Coal has developed several management plans to ensure environmental protection and sustainability goals are achieved. These plans include, but are not limited to, the following:

- Waste (PAG material) Management Program
- Surface Water Management Program – as described by the Effluent Permit 7008 and the most recent Annual Water Quality Monitoring Report
- Groundwater Monitoring Program – as described by the most recent Annual Groundwater Monitoring Report available in the most recent Annual Water Quality Monitoring Report
- Invasive Plant Management Plan – The plan has not been updated from 2020 as no invasive plant management was performed. Refer to Appendix 3 of this report.
- Sediment and Biological Monitoring Program – implemented in 2016 (as per the Effluent Permit)

3.2 ML/ARD Characterization and Management

There was no waste material generated as no mining or coal processing occurred in 2021.

When operating all the coarse coal rejects (CCR) and fine tailings refuse produced from the No. 4 coal zone being mined in 7-South is potentially acid generating (PAG). For management purpose, and in accordance with the definition of PAG materials made in the Mine Permit amendment approving 7-South Mine development, all CCR and all tailings is regarded as PAG. In contrast the CCR and tailings produced from the No. 1 coal zone being mined in 2-North is non-potentially acid generating (N-PAG).

During operations a biweekly composite of both the CCR and tailings is collected and analysed for acid-base-accounting (ABA) characteristics, including paste pH, total sulphur, sulphate sulphur, sulphide sulphur, bulk Sobek neutralizing potential (NP), modified Sobek NP, carbonate NP and elemental composition by ICP methods. The ABA results support the characterization and management plan and practices for these materials as noted in Table 4 below.

Table 4: 2021 CCR and Tailings Production and Management

Area	Characterization	Management Method
2-North CCR	non-PAG	Backfilled into 2-North Pit next to South dam
2-North Tailings	non-PAG	Pumped into 2-North Tailings Disposal Facility
7-South CCR	PAG	Backfilled into 7-South Mine, Area 2
7-South Tailings	PAG	Pumped into 2-North Mine, 5-Mains, or 1-Mains

The management plan for the PAG material produced at Quinsam Mine includes placement in a location that will provide permanent subaqueous disposal. To-date five locations have been developed as PAG-CCR disposal sites at Quinsam Mine, three on surface and two underground.

Prior to 2014 the 3-South open pit, the 2-North pit sump, the River Barrier Pillar, and 2-South open pit were used as PAG-CCR disposal sites. Table 5 below provides a summary of their use and minimum flooding requirements.

Table 5: PAG-CCR Disposal Sites

Disposal Area	Disposal Timeframe	Tonnes Disposed	Elevation of the PAG-CCR	Flooding/Cover Requirements
3-South Open Pit	1998 to 2009	196,793	324.43	1m[7]
2-North Pit Sump	2010 to 2012	180,853	303.00	1.5m[8]
River Barrier Pillar	2011	81,535	153.5 (max.)	Within 3 months of being produced
2-South Open Pit	2012 to 2014	248,956[1.]	347.50	1m
7-South U/G	2015 to 2019	112,993	223.5 (max.)	Within 4 months of being produced

1. 11,100 tonnes of PAG-overburden from the 7-South portal pit was also disposed in the 2-South open pit.

[7] 7-South Mine Permit Amendment Application, Appendix E: report entitled "*Surface Water Management Plan – 2-South, 3-South Development*" by Golder Associates May 19, 2011

[8] Mine Permit amendment approving PAG-CCR Elevation Increase for 2-North Sump, August 16, 2012

The water covers over the surface PAG-CCR storage sites are monitored for physical parameters such as field pH and conductivity, and chemical parameters such as hardness, total and dissolved metals, sulphate, alkalinity, and acidity. The underground disposal sites are monitored for field parameters such as temperature, pH, conductivity, dissolved oxygen, and redox conditions, and analysed for turbidity, dissolved metals, dissolved organic carbon, hardness, sulphate, sulfide, alkalinity, acidity, anions, and nutrients including total dissolved phosphorous and nitrogen. These results compared to the source terms presented in the 7-South Mine Permit amendment application are discussed in Section 3.2 through 3.5.

3.3 Source Terms & Water Quality Predictions for PAG-CCR and Flooded Mine Voids

2-South Open Pit: Discharge from the Passive Treatment System (PTS) at the Sulphide Polish Cell is now directed into the 2-South Pit. 2-South open pit overflow channel has a design elevation of 349.3m. Overflow from the water cover in 2-South pit is directed down the channel into the 3-South pit. During dry periods all excess 3-South water is pumped to 2-South by toggling a valve where water would normally be directed to SP1. This closed loop system is used to minimize discharge into the receiving environment from SP1 to Long Lake by retaining water in the two PAG-CCR storage facilities, while maintaining adequate water cover during the dry season. During the wet season the valve can be toggled, and water is directed from 3-South pit into SP1. Now that all discharge water from the PTS is directed into 2-South pit continuously, this closed loop system is not used for as long as a duration during summer due to volume capacities in the two ponds. Therefore, the water is directed to SP1 and released to Long Lake. In 2021 a 58-horsepower pump was installed in the 2-South pit with the discharge line tying into the 3-South discharge pipeline where water is directed into SP1. This provides support for water management during high flows in both 2-South and 3-South pits.

Once permitted for discharge (3-South Outlet Channel), the 2 / 3 South water management system additional freshwater input will be provided to the pits from drainage that during high flow conditions (fall and winter) is currently diverted to No Name Lake. During 2021 the required water cover of 1.0m was always maintained as shown in Figure 11.

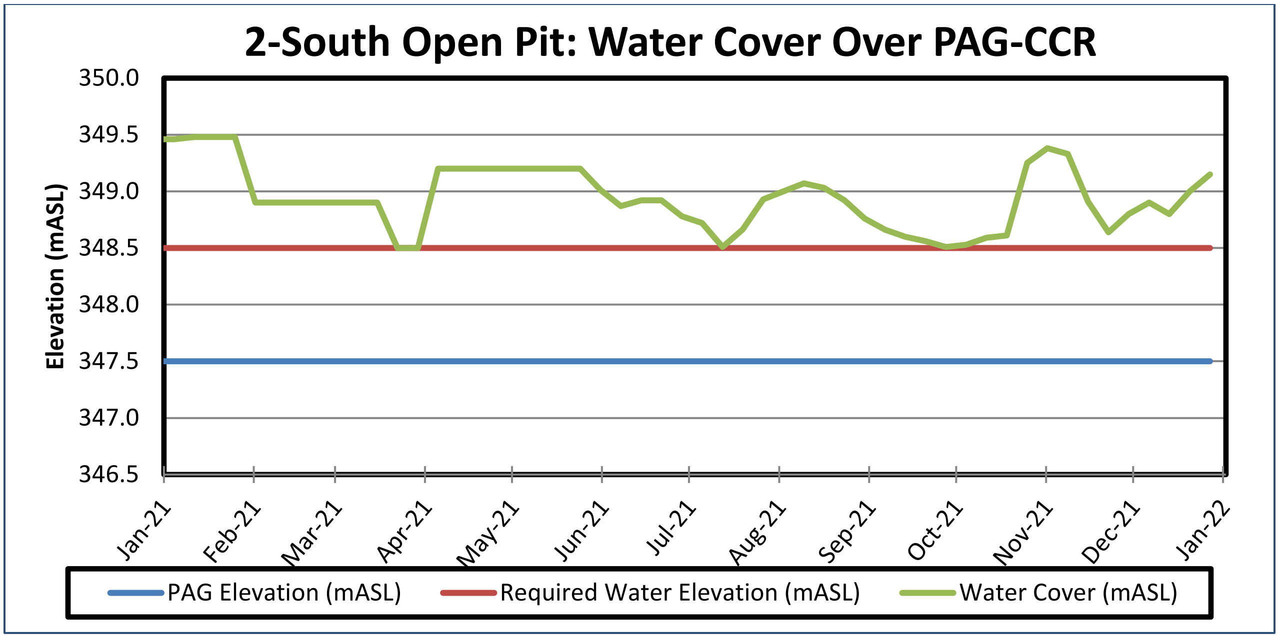


Figure 11: 2-South Open Pit: Water Cover over the PAG-CCR

Figure 12 displays sulphate concentrations since 2013, when flooding began in the 2-South pit. In 2015 the 2-South pit reached its capacity for PAG-CCR and was flooded with a water cover over the pit, which represents the first full year of a water cover. In 2015 average sulphate levels were higher (555 mg/L) than the simulated year 1-Base case average value (291 mg/L) as determined by the water quality predictions model developed by Golder Associates for the 2-South Water Quality Predictions[9].

Higher concentrations were observed during the summer months as expected. During the second full year (2016), sulphate levels were expected to drop significantly (average 62 mg/L), as they did, however the drop was still anomalously above the expected value (2016 average 358 mg/L). Since 2017 water in the 2-South pit has been augmented with water from the PTS. Water quality predictions using the PTS were not developed for this scenario and therefore dissolved sulphate is elevated above the predictions of 22 mg/L (Figure 12-13). However, based on the below seasonal average (winter, spring, summer, and fall) of dissolved sulphate, it is anticipated that sulphate will remain below 600 mg/L, greater the BC Chronic Water Quality Guideline (WQG) of 128 mg/L derived from a background hardness of 30 mg/L. This water does not flow directly to the receiving environment. All water is directed to the 3-Souh pit during the wet seasons with surface cover retained in the 2-South pit during the dry season. After the application of a granule cover and addition of freshwater into the system as originally designed, concentrations of sulphate are expected to decline over time.

[9] *"Water Quality Predictions – 2 South 3-South Development Quinsam Mine (Appendix G from the Mine Permit Amendment Application for 7-South Development)"* by Golder Associates, May 2011

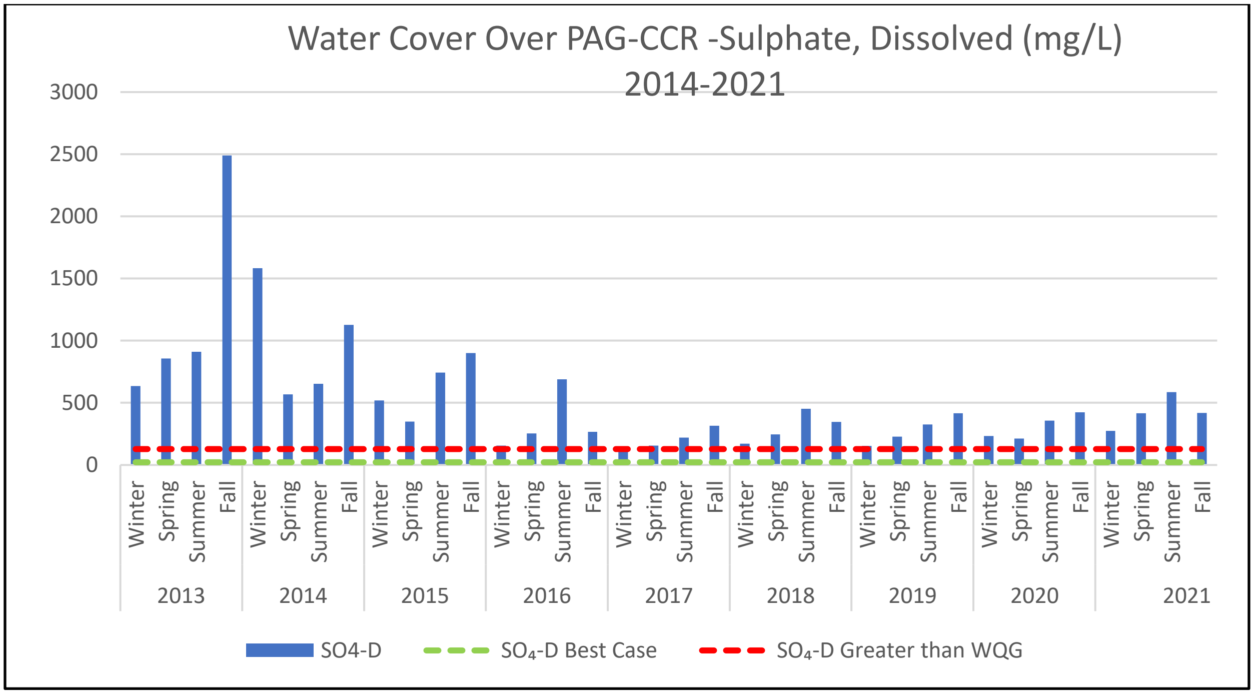


Figure 12: Sulphate Concentrations in 2-South

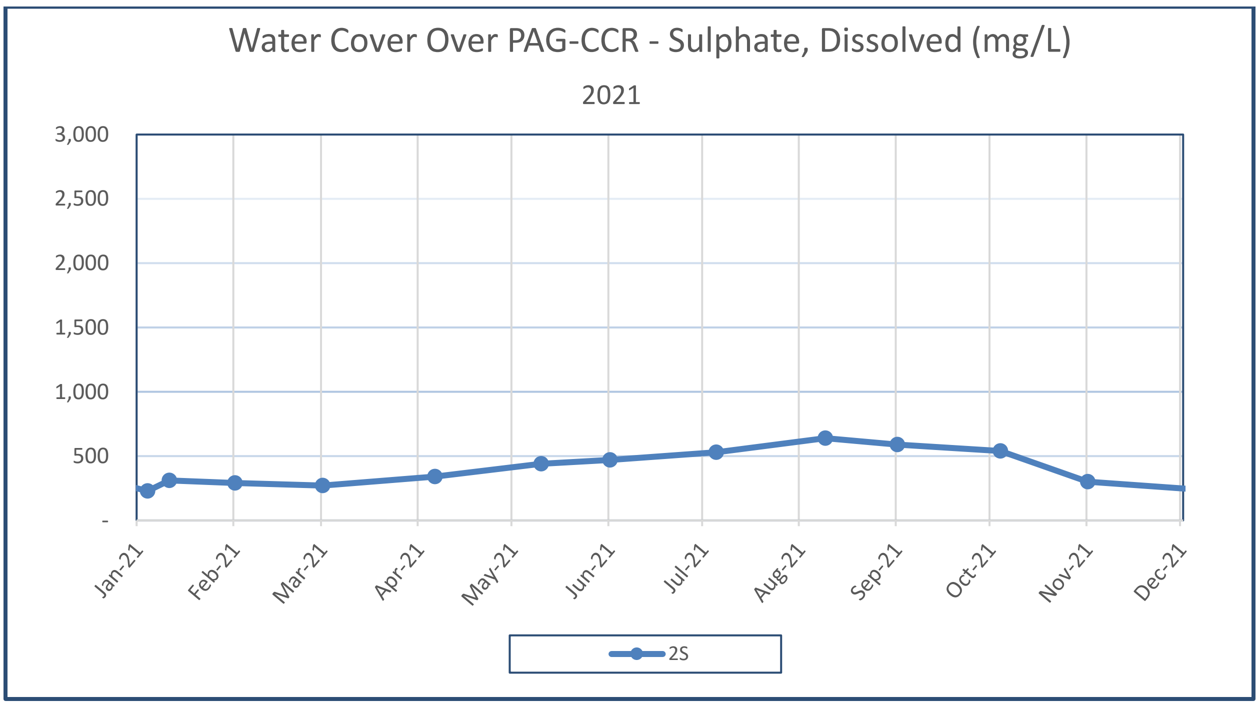


Figure 13: Sulphate Concentrations in 2-South

Table 6 below provides a summary of the water quality results of the 2-South Pit water cover in comparison to 2-South Pit Simulated Water Quality Year 10-Base Case Scenario developed by Golder Associates[10]. This model was developed based on a freshwater input from the surrounding area. When 2021 annual averages are compared to Year 10 average modeled scenario (modeled without the PTS) sulphate, antimony, boron, calcium, magnesium, potassium, sodium, tin, and uranium are above the average modeled valves. This will likely only improve once freshwater enters the system. No parameters of interest (aluminum, arsenic, cadmium, cobalt, copper, iron, lead, nickel, manganese, selenium, or zinc) exhibited concentrations of potential concern when compared to WQG's. The results indicate water quality is not being negatively influenced from the addition of the PTS, (Table 6).

[10] "*Water Quality Predictions – 2 South 3-South Development Quinsam Mine (Appendix G from the Mine Permit Amendment Application for 7-South Development)"* by Golder Associates, May 2011

Table 6: 2-South Pit Simulated Water Quality Compared to 2021 Results

Parameters	2-South Pit Simulated Water Quality Year 10-Base Case[11] (Without PTS)			2021 Results (*n=12*) (with PTS)		
	Minimum	Maximum	Average	Minimum	Maximum	*Average
Sulphate (SO_4)	22	22	22	**230**	**640**	**613****
Aluminum (Al)	0.018	0.023	0.02	0.003	0.0178	0.00247
Antimony (Sb)	0.00034	0.00044	0.00028	**0.0005**	**0.0005**	**0.000318**
Arsenic (As)	0.01	0.01	0.01	0.00011	0.00269	0.000418
Barium (Ba)	0.11	0.11	0.11	0.0128	0.0251	0.014
Beryllium (Be)	0.00068	0.00088	0.00075	0.0001	0.0001	0.000064
Boron (B)	0.15	0.15	0.15	**0.176**	**0.745**	**0.307**
Cadmium (Cd)	0.000018	0.000024	0.00002	0.00001	0.000014	0.0000064
Calcium (Ca)	42	42	42	**81.8**	**164**	**242.2**
Chromium (Cr)	0.00007	0.00091	0.00078	**0.001**	**0.001**	0.00064
Cobalt (Co)	0.00061	0.00061	0.00061	0.0002	0.00031	0.000127
Copper (Cu)	0.00088	0.0011	0.00098	0.00036	0.001	0.000262
Iron (Fe)	0.0320	0.0320	0.0320	0.005	**0.0412**	0.00531
Lead (Pb)	0.00034	0.00044	0.00038	0.0002	0.00043	0.000127
Lithium (Li)	0.014	0.014	0.014	0.0029	**0.015**	0.0088
Magnesium (Mg)	5.3	5.3	5.3	**8.49**	**16.9**	**28.4**
Manganese (Mn)	0.09	0.09	0.09	0.0014	0.0314	0.0122
Mercury (Hg)	0.00002	0.000021	0.00002	0.0000019	0.0000019	9.5E-07
Molybdenum (Mo)	0.013	0.013	0.013	0.001	0.001	0.00064
Nickel (Ni)	0.0018	0.0018	0.0018	0.001	0.001	0.00068
Potassium (K)	1.7	2.3	1.9	0.611	2.04	**2.2**
Selenium (Se)	0.00068	0.00089	0.00076	0.0001	0.0001	0.000207
Silver (Ag)	0.000014	0.000019	0.000016	**0.00002**	**0.00002**	0.0000127
Sodium (Na)	1.7	2.3	1.9	**26.8**	**124**	**40.4**
Thallium (Tl)	0.00017	0.00022	0.00019	0.00001	0.00001	0.0000064
Tin (Sb)	0.0027	0.0027	0.0027	**0.005**	**0.005**	**0.00318**
Titanium (Ti)	0.0072	0.0094	0.008	0.005	0.005	0.00318
Uranium (U)	0.00016	0.00017	0.00016	0.0001	**0.00024**	**0.000195**
Vanadium (V)	0.0088	0.011	0.0098	0.005	0.005	0.00318
Zinc (Zn)	0.0059	0.0059	0.0059	0.005	0.005	0.00318

***When a result was less than the detection level (i.e., <0.5), half detection level value was used for averaging (i.e., <0.5 = 0.25)**
****Count =13**
Highlighted indicates result is greater than Year-10 base case

[11] Table B-1: Summary of 2-South Pit Simulated Water Quality-Base Case Appendix B from the report entitled "*Water Quality Predictions – 2 South 3-South Development Quinsam Mine (Appendix G from the Mine Permit Amendment Application for 7-South Development)"* by Golder Associates, May 2011

3-South Open Pit: As described in the 2011 report written by Golder Associates titled "Water Quality Predictions – 2 South 3 South Development, Quinsam Mine"[12], the engineered flow path of the 2-South water is to the 3-South pit via a gravity fed channel, from there the 3-South pit would overflow into another engineered channel that gravity feeds to a drainage channel between No Name Lake and Long Lake.

The management plan currently in place satisfies the conditions required to maintain adequate water covers over the 2 and 3-South facilities. Apart from applying a granular cover over both pits and establishing a designed vegetation cover, the areas are completed to final reclamation design. Authorization to discharge from 3-South outlet channel into the No Name Lake connector stream is required to complete the designed water management system. An updated water balance, water quality predictions, source terms update and aquatic effects assessment will be presented with the permit application.

The water cover over the PAG-CCR disposed in 3-South pit is a collection point for 2-South pit seepage under the liner and overflow of the surface cover water. During the wet season (fall through late spring) water is pumped from 3-South Pit to SP1, the authorized discharge location, for release into the receiving environment. The 58-horsepower pump installed at 2-South pit provides a contingency plan preventing an unauthorized discharge from 3-South Pit into the No Name Lake connector stream.

During the dry season (late spring to early fall) by toggling a valve, the 3-South water is directed into the 2-South pit. If necessary, the water from SP1 can be syphoned back to 3-South for additional water. Upon authorization of the 3-South outlet channel, water will no longer be pumped to SP1.

Figure 14 below provides a record of the water cover over the PAG-CCR in 2021. During the rainy season, the water level should be kept low to provide sufficient freeboard for extreme rainfall events and then increased during the summer months. Construction of the closure structures (east end dyke with a design elevation of 329 metres above sea level (masl) and west end outlet structure with a design elevation of 327.15 masl)) will allow an increase to the water cover depth.

[12] Report Entitled "*Water Quality Predictions – 2 South 3 South Development, Quinsam Mine (Appendix G from the Mine Permit Amendment Application for 7-South Development)*" by Golder Associates, April 2011.

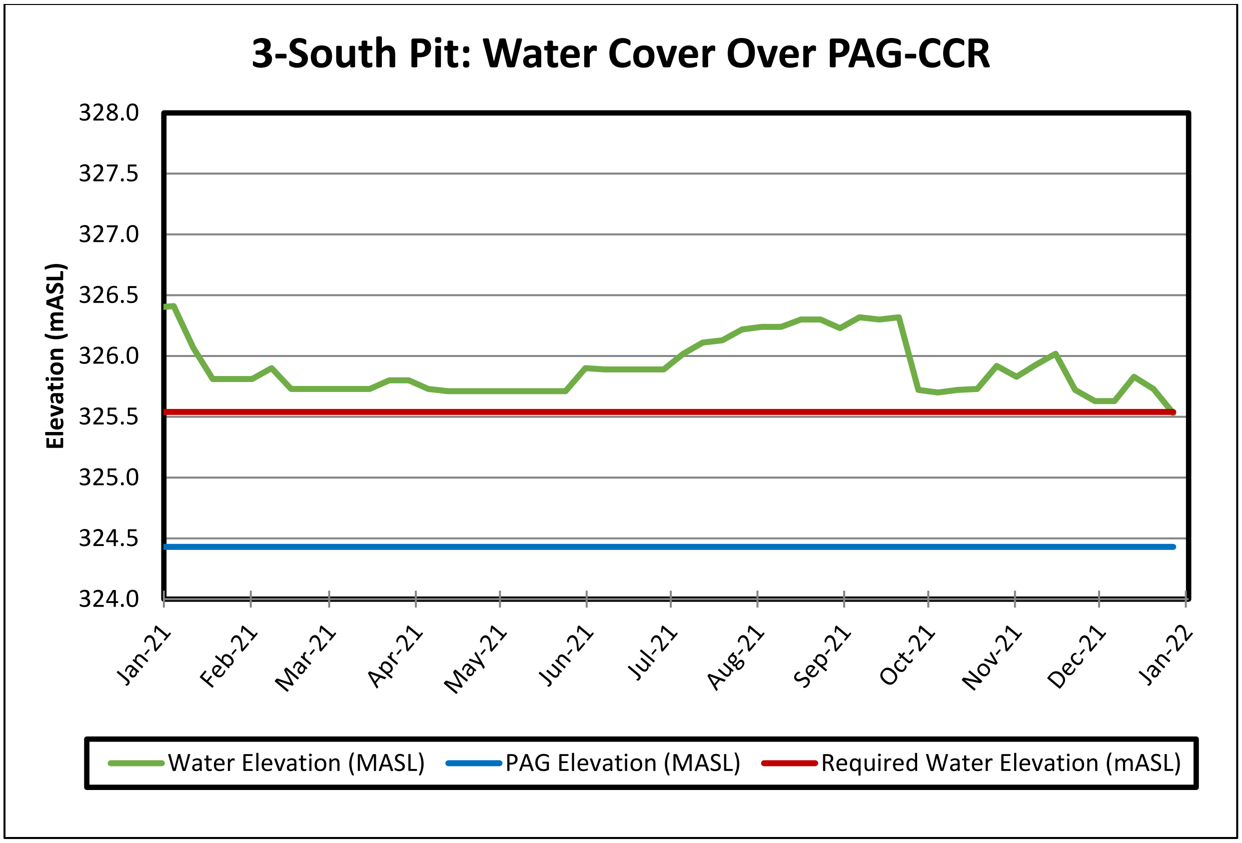
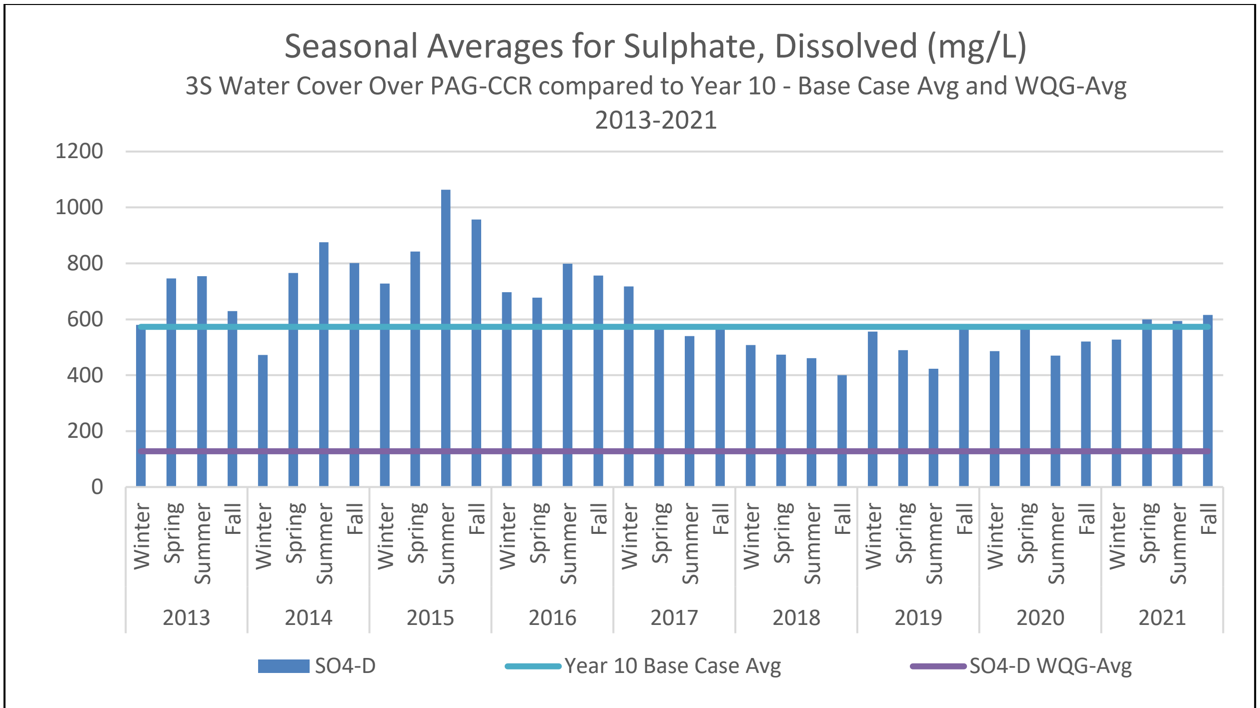


Figure 14: 3-South Pit: Water Cover Over the PAG-CCR

Figure 14 displays trends in 3-South pit since 2013. Sulphate concentrations for water cover in both 2-South and 3-South pits follow a similar trend for sulphate with 3-South slightly higher as it receives 2-South pit seepage water from under the liner and cover water discharge. Based on sulphate concentrations observed in 3-South Pit, additional freshwater influence will only decrease concentrations.

Once authorized, discharge is not expected to occur year-round as the pits are designed to retain a water cover (>1m) before discharging, as explained above. Discharge is expected to occur when the receiving environment is experiencing high flow conditions. It is anticipated that the receiving environment will have the capacity to dilute sulphate concentrations entering at around 500 mg/L to meet the chronic WQG of 128 mg/L using a background hardness of 30 mg/L, 100 meters downstream of discharge. Figure 14 below displays the seasonal average sulphate concentrations from 2013 to 2021 compared to the Year 10-Base Case average prediction of 573 mg/L and WQG of 128 mg/L. Most years water quality has been within the range of the predicted values that did not include the addition of the PTS water. In 2021 average seasonal sulphate was slightly higher in summer and fall than the modeled annual average (573 mg/L). The annual average sulphate concentration of 570 mg/L was slightly higher with 2020 annual average sulphate of 510 mg/L.



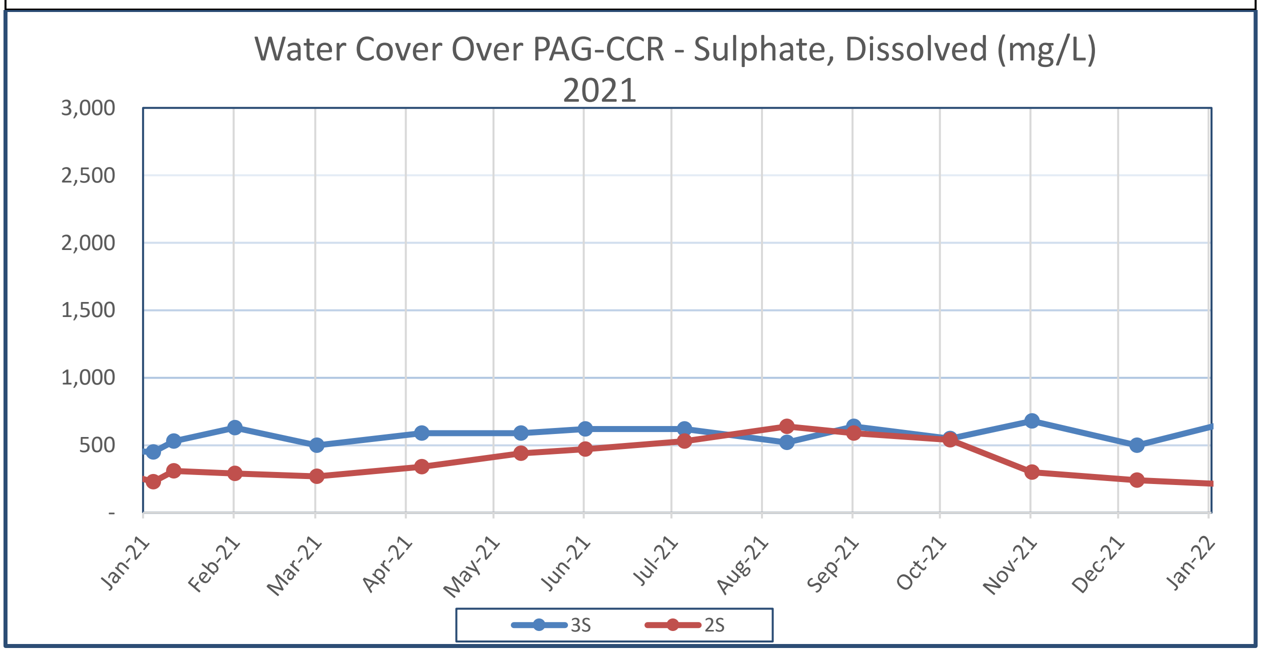


Figure 15: Sulphate Concentrations in 3-South

Table 7 below provides a summary of the 2021 minimum, maximum and average water quality results of the 3-South water cover in comparison to the simulated Year 10 - Base Case water quality model that did not include the PTS. The Year 10 - Base Case scenario was modelled using only average monthly precipitation depths. This was chosen as the most reasonable comparison for the current water quality as the pond water cover is maintained through pumping operated on a float system.

Average parameters of interest (Al, As, Cd, Co, Cu, Fe, Mn, Ni, Se, and Zn) are lower than modelled Year 10-Base Case. Those parameters above modelled values are highlighted in Table 7. Of those parameters listed below only dissolved sulphate, boron, and copper are above WQG's. Overall, based on the present water quality in 3-South pit, concentrations of parameters of interest are not elevated to concerning levels and should meet WQG's in the receiving environment.

Table 7: 3-South Pit Simulated Water Quality Compared to 2021 Results

Parameters	3-South Pit Simulated Water Quality Year 10-Base Case [13]			2021 Results (*n=8*)		
	Minimum	Maximum	Average	Minimum	Maximum	*Average
Sulphate (SO_4)	532	625	573	450	**680**	570**
Aluminum (Al)	0.023	0.024	0.024	0.003	0.0069	0.00259
Antimony (Sb)	0.0013	0.0014	0.0013	0.0005	0.001	0.000281
Arsenic (As)	0.0042	0.0.0042	0.0042	0.0002	0.00096	0.000473
Barium (Ba)	0.067	0.073	0.071	0.0113	0.0163	0.0135
Beryllium (Be)	0.0024	0.0026	0.0025	0.0001	0.0002	0.000056
Boron (B)	0.30	0.35	0.32	0.23	**0.392**	0.292
Cadmium (Cd)	0.000095	0.00011	0.00010	0.00001	0.00002	0.0000056
Calcium (Ca)	207	240	222	178	**252**	212.5
Chromium (Cr)	0.0025	0.0027	0.0026	0.001	0.002	0.00056
Cobalt (Co)	0.0081	0.012	0.0097	0.0002	0.0004	0.000113
Copper (Cu)	0.003	0.0033	0.0031	0.0002	0.0006	0.00025
Iron (Fe)	0.0320	0.0320	0.0320	0.005	0.013	0.00826
Lead (Pb)	0.0017	0.0019	0.0018	0.0002	0.0004	0.000113
Lithium (Li)	0.02	0.022	0.021	0.0061	0.0104	0.0082
Magnesium (Mg)	24	29	26	20.2	**29.8**	**26.7**
Manganese (Mn)	0.4	0.56	0.47	0.0025	0.0337	0.0102
Mercury (Hg)	0.000025	0.000028	0.000027	0.0000019	0.0000019	9.5E-07
Molybdenum (Mo)	0.0091	0.0097	0.0094	0.001	0.0012	0.00065
Nickel (Ni)	0.017	0.024	0.02	0.001	0.002	0.00056
Potassium (K)	3.1	3.4	3.3	1.55	2.6	2.09
Selenium (Se)	0.0029	0.0032	0.003	0.0001	0.0004	0.000196
Silver (Ag)	0.000019	0.00002	0.000019	**0.00002**	**0.00004**	0.0000113
Sodium (Na)	23	25	24	**26.1**	**50.7**	**38.4**
Thallium (Tl)	0.00017	0.00018	0.0018	0.00001	0.00002	0.0000056
Tin (Sb)	0.0025	0.0026	0.0025	**0.005**	**0.01**	**0.00281**
Titanium (Ti)	0.0077	0.0079	0.0078	0.005	**0.01**	0.00281
Uranium (U)	0.00067	0.00076	0.00071	0.0002	0.00021	0.00017
Vanadium (V)	0.014	0.015	0.014	0.005	0.01	0.00281
Zinc (Zn)	0.018	0.023	0.02	0.005	0.01	0.00281

***When a result was less than the detection level (i.e., <0.5), half detection level value was used for averaging (i.e., <0.5 = 0.25)**
****Count = 13**
Highlighted indicates result is greater than Year-10 base case

[13] Table B-4: Summary of 3-South Pit Simulated Water Quality-Base Case Appendix B from the report entitled "*Water Quality Predictions – 2 South 3-South Development Quinsam Mine (Appendix G from the Mine Permit Amendment Application for 7-South Development)*" by Golder Associates, May 2011

2-North Pit Pond PAG-CCR Facility: The water cover over the PAG-CCR disposed of in the 2-North Pit Pond is managed by diverting water from the 2-North underground mine dewatering system when required. In summer this water cover can be augmented by opening gate values to direct water from 2-North mine pool or if these pumps are not operating, the coal processing pump can direct water from Settling Pond #4 to the plant and then into 2-North Pit Pond (WP). This eliminates any surface discharge to the receiving environment from the North end (Settling Pond #4) during low flow. During 2021, the minimum water cover of 1.50m was mostly maintained with water cover falling slightly below 1.50 m in August and September, Figure 16 below.

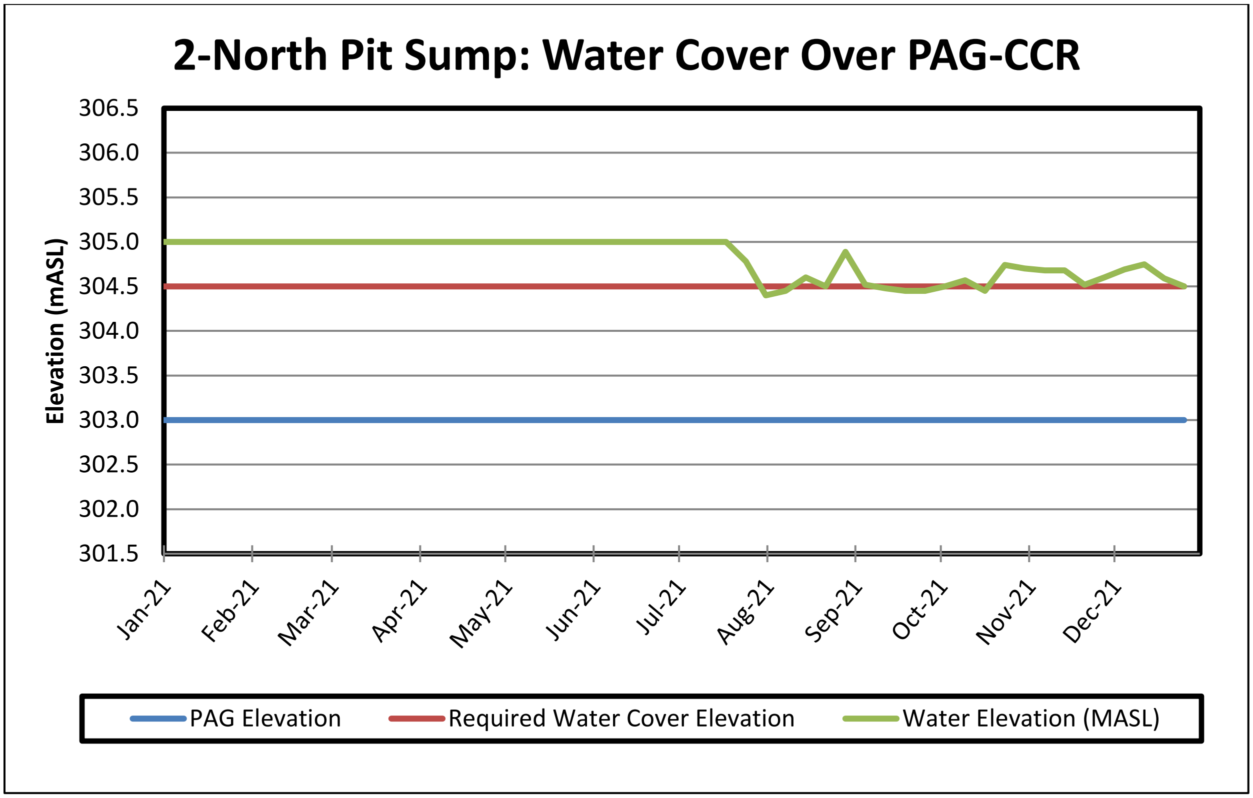
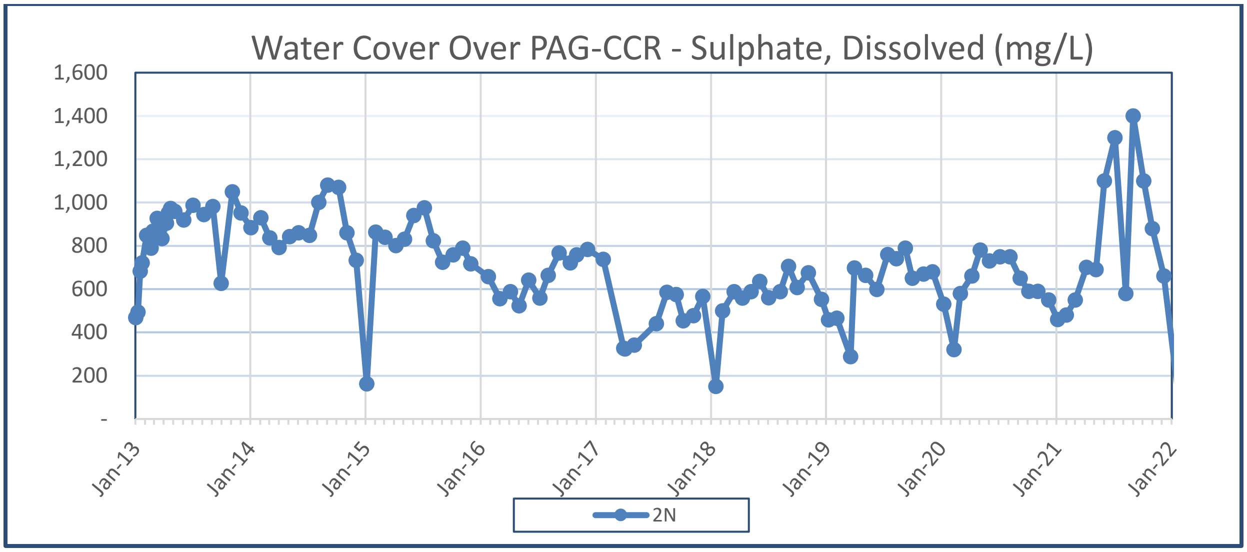


Figure 16: 2-North Pond: Water Cover Over the PAG-CCR



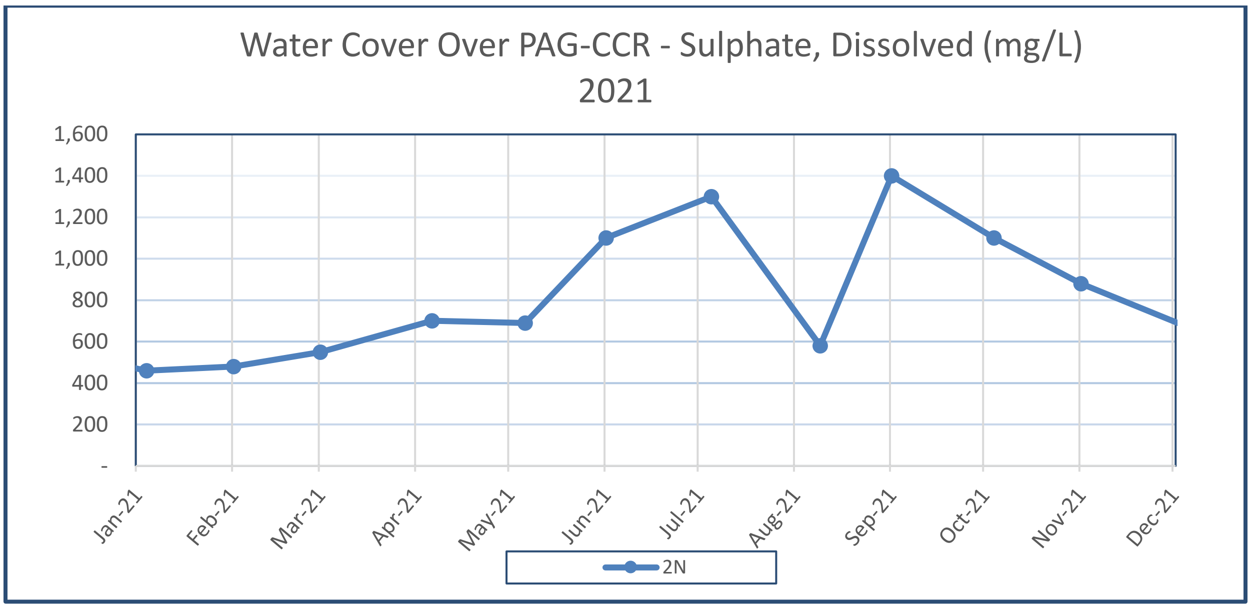


Figure 17: Sulphate Concentrations in 2-North Pond

Sulphate concentrations in 2-North Pond have remained consistent throughout the years as (Figure 17), with an increase displayed in spring and summer 2021. Increases were related to 3M2N and 1M2N water being directed into 2-North Pond. Annual average sulphate for 2021 (825 mg/L) was higher than 2020 (623 mg/L). Water quality is influenced by 2-North underground dewatering systems as explained above. Mine water is directed intermittently into the 2-North Pond to maintain water levels over PAG-CCR and to reduce discharge at SP4 during low flow periods in the receiving environment or when poor water quality develops. In March 2021 at 3M2N developed poor water quality and water was directed into 2-North Pond.

Table 8 below, provides a summary of the water quality (parameters of interest) results for the 2-North Pond water cover in comparison to expected water quality seepage. Except for pH, alkalinity, and boron all other parameter concentrations (Al, As, Cd, Co, Cu, Fe, Mn, Ni, Se, SO_4^-

and Zn) fall within the range or are lower than expected values. Marginal increases from last year are observed within all parameters except alkalinity, As, and Fe where slight decreases are observed from 2020. Overall water quality remains consistent and stable.

Table 8: 2-North Pond Seepage Source Terms

Parameters	Expected 2-North Pond Seepage Concentrations[14]	2020 Results (*n=12*)	2021 Results (*n = 12*)		
		*Average > expected	Minimum	Maximum	*Average > expected
pH	6.78 – 7.25	7.69	7.17	8.22	7.81
Acidity (as $CaCO_3$)		1.08	0.5	8.6	2.57
Alkalinity (as $CaCO_3$)	141.8 – 183.2	271	120	410	267
Sulphate (SO_4)	160 – 1160	623	460	1400	825
Aluminum (Al)	0.0040 – 0.0134	0.00484	0.0030	0.0385	0.00891
Arsenic (As)	0.0006 – 0.0500	0.000725	0.00005	0.00062	0.000273
Boron (B)	0.147 – 0.583	0.741	0.146	1.25	0.764
Cadmium (Cd)	0.000005 – 0.000156	0.0000071	0.000005	0.000028	0.0000122
Cobalt (Co)	0.0015 – 0.0565	0.000387	0.00010	0.00849	0.001625
Copper (Cu)	0.00010 – 0.00201	0.001	0.00020	0.00117	0.000498
Iron (Fe)	0.016 – 0.037	0.03458	0.0025	0.018	0.00694
Manganese (Mn)	0.057 – 0.608	0.03497	0.0126	0.290	0.1113
Nickel (Ni)	0.002 – 0.151	0.00147	0.0010	0.0181	0.00513
Selenium (Se)	0.00005 – 0.0117	0.000091	0.00005	0.00060	0.000146
Zinc (Zn)	0.0025 – 0.0160	0.00333	0.0025	0.0052	0.00356

***When a result was less than the detection level (i.e. <0.5), half detection level value was used for averaging (i.e. <0.5 = 0.25)**

[14] Table 8 from a technical memorandum entitled "*2 North Pit Sump Water Quality Estimates*" dated June 14, 2010 by Lorax Environmental

River Barrier Pillar: The River Barrier Pillar (RBP) is situated 70 m to 100 m below the Quinsam River with mining occurring from the No.1 coal seam and no pillar extractions occurring. The area is located between the 2-North and 5-South mines. Water level over disposed PAG-CCR is measured through a monitoring well (QU11-09 M). Since completion of PAG-CCR disposal in September 2012, water levels remained above the PAG-CCR elevation of 153.5 masl (fully saturated). Water level in QU11-09 M increased since 2012 from 145 m to 227 m depending on groundwater influx and dewatering efforts in 2-North mine. Figure 18 below shows the elevation of the PAG-CCR, water cover and ground elevation since 2016.

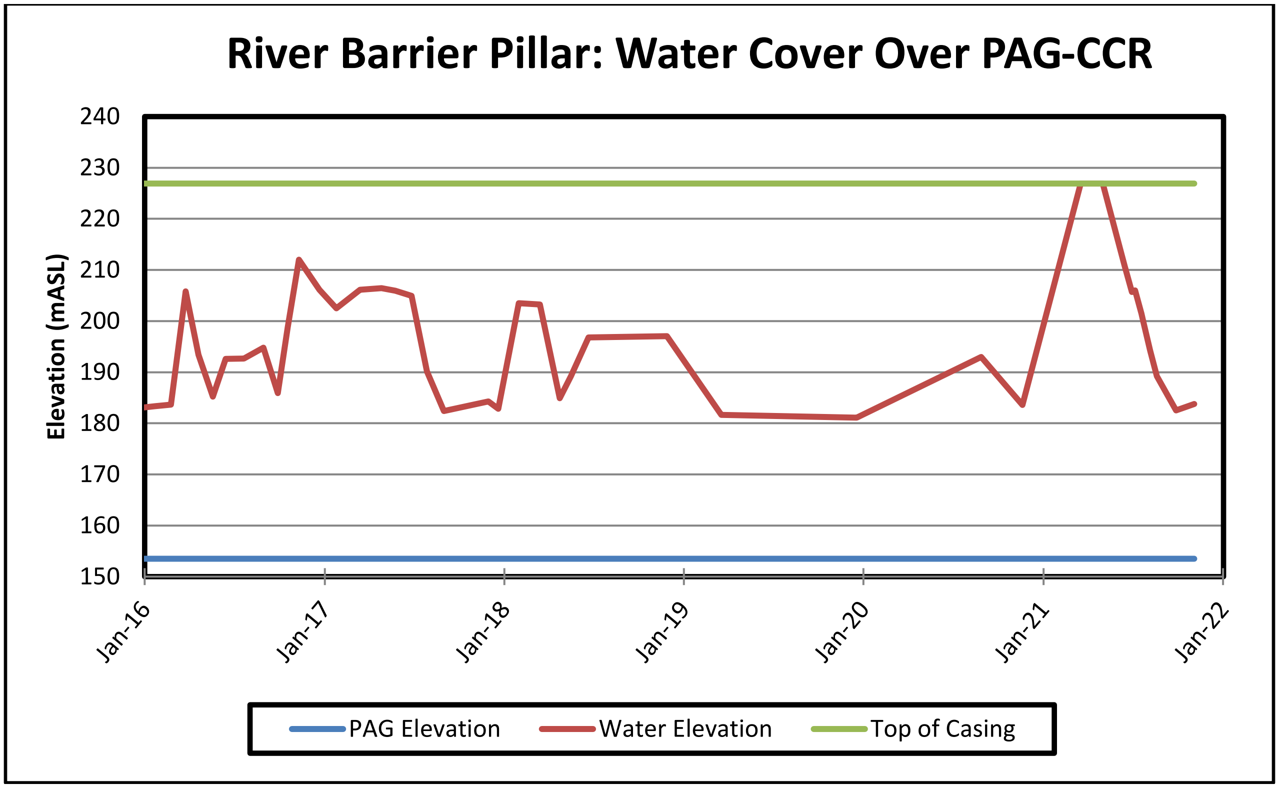


Figure 18: River Barrier Pillar: Water Cover over the PAG-CCR

Table 9 below, provides a summary of water quality (parameters of interest) for the RBP water cover in comparison to *Expected and Worst-Case Concentrations of Mine Pool Source Terms* (Source Terms*)*. It should be noted that the Source Terms were developed based on disposing PAG-CCR produced from 7-South coal (#4 coal zone) whereas the PAG-CCR in the RBP came from 5-South coal (#1 coal zone).

Concentrations of alkalinity as $CaCO_3$ remained similar from 2020 (473 mg/L) to 2021 (476 mg/L) indicating the water has a high neutralization potential. Apart from those parameters nearing worst case (SO_4^-, B, Fe, and Mn, including observed slightly lower pH) all other parameter concentrations (Al, As, Cd, Co, Cu, F, Ni, Se and Zn) are lower or within expected range. All parameters are displaying higher concentrations except Se and pH compared to previous years. Increases in concentrations are related to the increases in the confined aquifer (2-North Mine pool and RBP) rising to surface elevations (227 masl) as displayed in Figure 18. This rise in the aquifer caused mine water in the RBP to become pressurized and discharge to surface from the borehole (QU1109 M). Seepage from the RBP was expected as an upward vertical seepage into the Quinsam River.

Table 9: River Barrier Pillar (RBP) with CCR Source Terms

Parameters	Expected and Worst-Case Concentrations[15]	2020 Results (*n* = 3)	2021 Results (*n* = 7)		
		*Average > expected	Minimum	Maximum	*Average > expected nearing worst case
pH	7.5	7.25	6.58	7.46	6.86
Acidity		4.27	13.1	63.3	32.5
Alkalinity (as $CaCO_3$)	282	473	440	500	475.7
Fluoride (F)	0.71 – 1.00		0.080	0.13	0.095
Sulphate (SO_4)	396 – 1990	557	1200	1300	1285
Aluminum (Al)	0.020 – 0.050	0.0025	0.0030	0.0061	0.00344
Arsenic (As)	0.128 – 0.190	0.003	0.00341	0.0106	0.00509
Boron (B)	0.71 – 1.88	0.850	1.07	1.17	1.11
Cadmium (Cd)	0.000017 – 0.000175	0.0000083	0.000010	0.000010	0.000010
Cobalt (Co)	0.005 – 0.148	0.000167	0.00020	0.0138	0.004539
Copper (Cu)	0.001	0.000167	0.00020	0.00052	0.000246
Iron (Fe)	0.805 – 33.5	6.72	18.5	34.2	27.3
Manganese (Mn)	0.14 – 2.89	0.241	0.666	1.83	1.271
Nickel (Ni)	0.007 – 0.213	0.00083	0.0010	0.0086	0.00309
Selenium (Se)	0.0002 – 0.0040	0.000283	0.00010	0.00010	0.00010
Zinc (Zn)	0.008 – 0.088	0.00417	0.005	0.005	0.005

***When a result was less than the detection level (i.e., <0.5), half detection level value was used for averaging (i.e., <0.5 = 0.25)**

[15] Table 6-11 from a report entitled "2 North/ 3 North and 5 South Groundwater Evaluation (Appendix K from the Mine Permit Amendment Application for 7-South Development)" by Lorax Environmental dated June 2011

Figure 19 displays concentrations of sulphate in the RBP (QU1109 M) and the shallow groundwater above the RBP (QU1109 S) since 2012. As depicted, sulphate concentrations decreased in the RBP while increasing in the shallow groundwater as the water migrated upwards towards the surface. A stable, declining trend was observed in both QU1109 M and QU1109 S from 2017 until 2021 when the 2-North mine pool aquifer filled the RBP. Mine water was elevated in iron and sulphate due to an initial flushing of the mine walls and dissolution of soluble oxidized products were released. For the shallow and deep wells dissolved sulphate averaged 250 mg/L and 1041 mg/L, respectively. In 2020 dissolved sulphate averages for shallow (166 mg/L) and deep (556 mg/L) were much lower. In November 2021 the well was fitted with a tight cap ensuring no seepage from the well occurs due to the rising aquifer. It is expected that mine pool water chemistry will evolve over time and stratify with higher rates of inflow / outflow on surface where stagnant water will become strongly reducing.

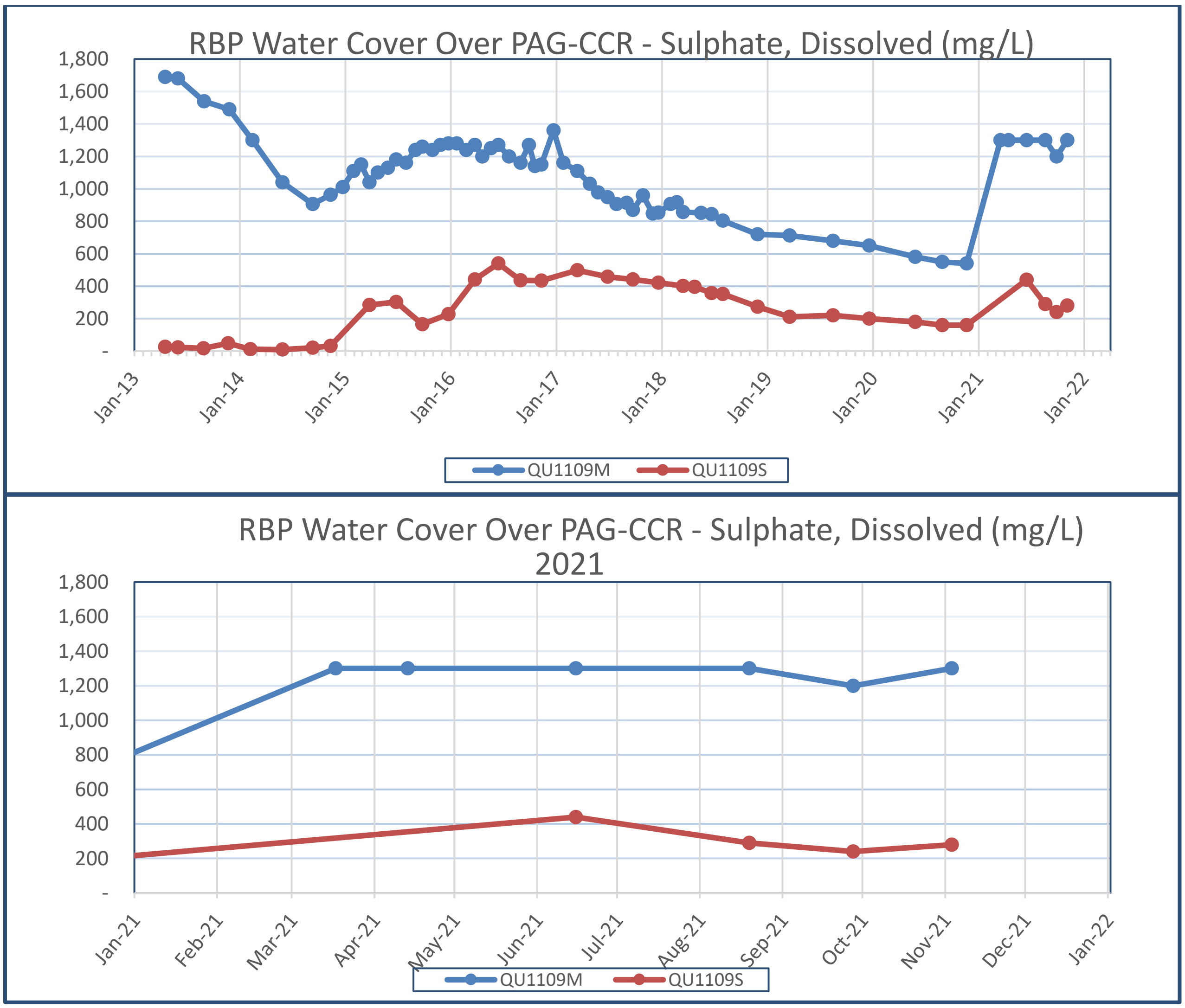


Figure 19: Sulphate Concentrations in the RBP and Shallow Groundwater

7-South U/G: Disposal of PAG-CCR into the mined-out workings in 7-South Area 2 (refer to Appendix 1, Site map) began in March 2015 and continued a periodic basis through to 2019 for a final elevation of 221.5 (masl). Both the water level and water quality over the PAG-CCR is measured through a borehole (QU14-10) developed from surface into the disposal area. Figure 19 below indicates that flooded conditions of 1 meter above the PAG-CCR were achieved throughout 2021.

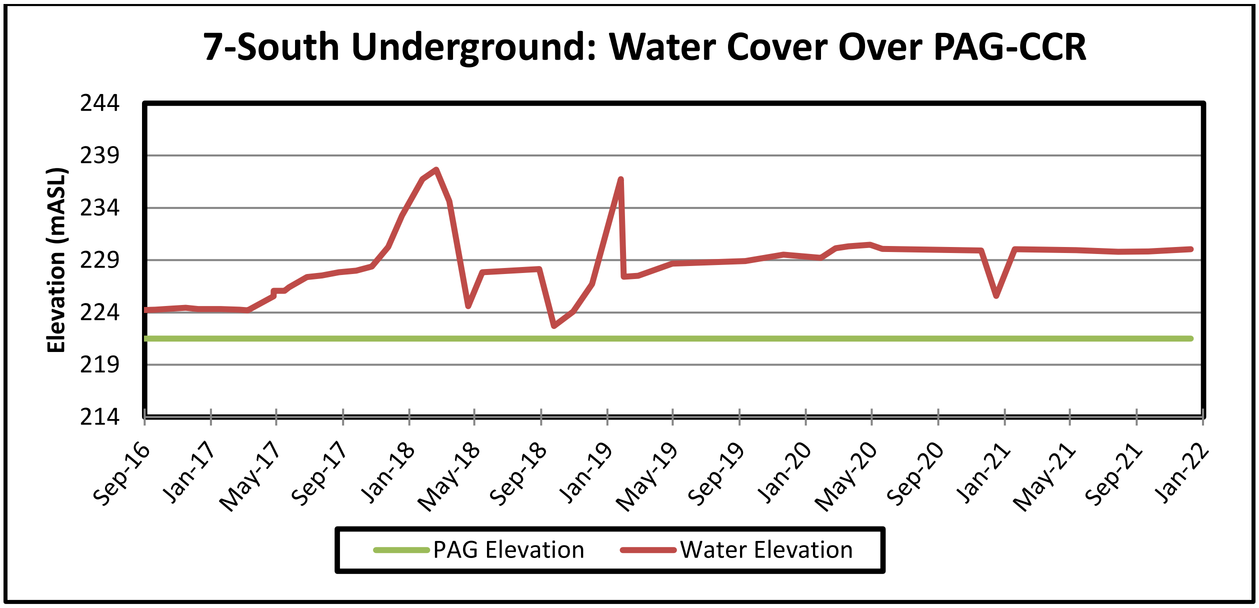
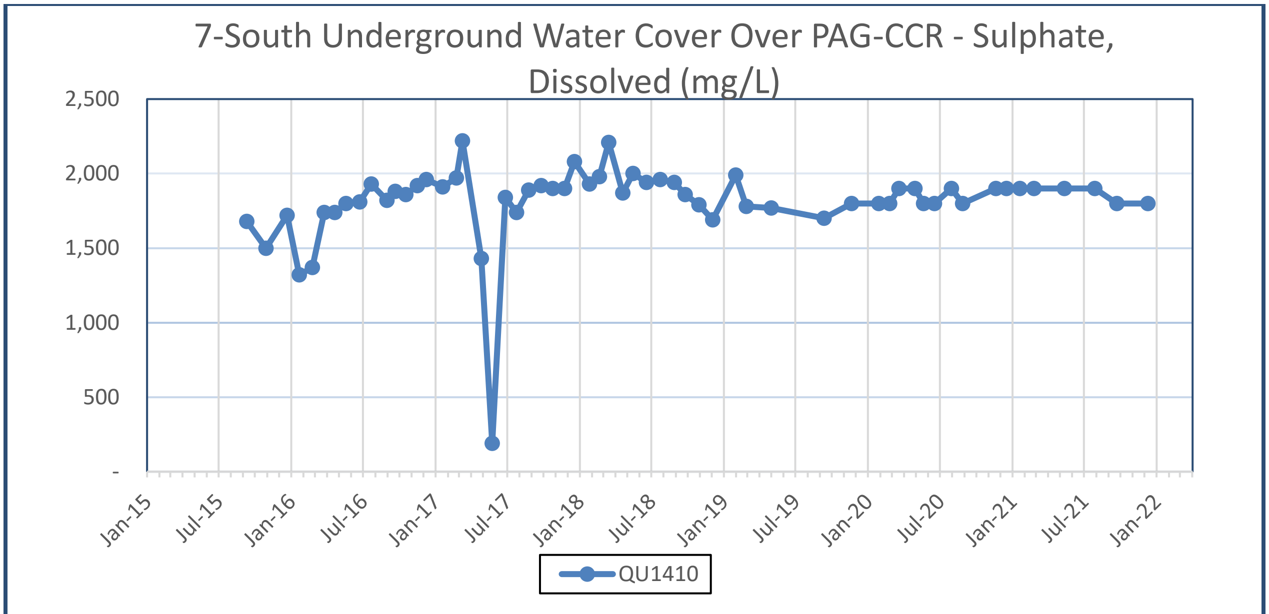


Figure 20: 7-South U/G: Water Cover Over the PAG-CCR

Following cessation of PAG-CCR disposal in February 2016 an increase in water depth to completely cover the disposed material occurred. In 2018 - 2019 further commencement of PAG-CCR disposal occurred until May 2019 with final disposal in November 2019. The lower concentration displayed in July 2017 was collected from approximately 2 meters above the PAG-CCR and all others were collected at 1 meter above the PAG-CCR. This indicates that the concentrations of chemical parameters will accumulate at depth as the mine pool stratifies. The trend of sulphate will continue to be observed in the future, with levels expected to decline towards source term predictions (Figures 20 and 21).

Table 10 below provides a summary of the 2021 water quality (parameters of interest) results of the 7-South underground water cover. Water samples were collected at 1 meter above the PAG-CCR. Table 10 compares the 2021 water quality results to Expected and Worst-Case Source Terms[16] and 2020 averages. Average sulphate concentrations remained higher than expected (1844 mg/L vs 1260 mg/L) and remained similar to 2020 (1850 mg/L).

[16] Table 6-11 from a report entitled "2 North/ 3 North and 5 South Groundwater Evaluation (Appendix K from the Mine Permit Amendment Application for 7-South Development)" by Lorax Environmental dated June 2011



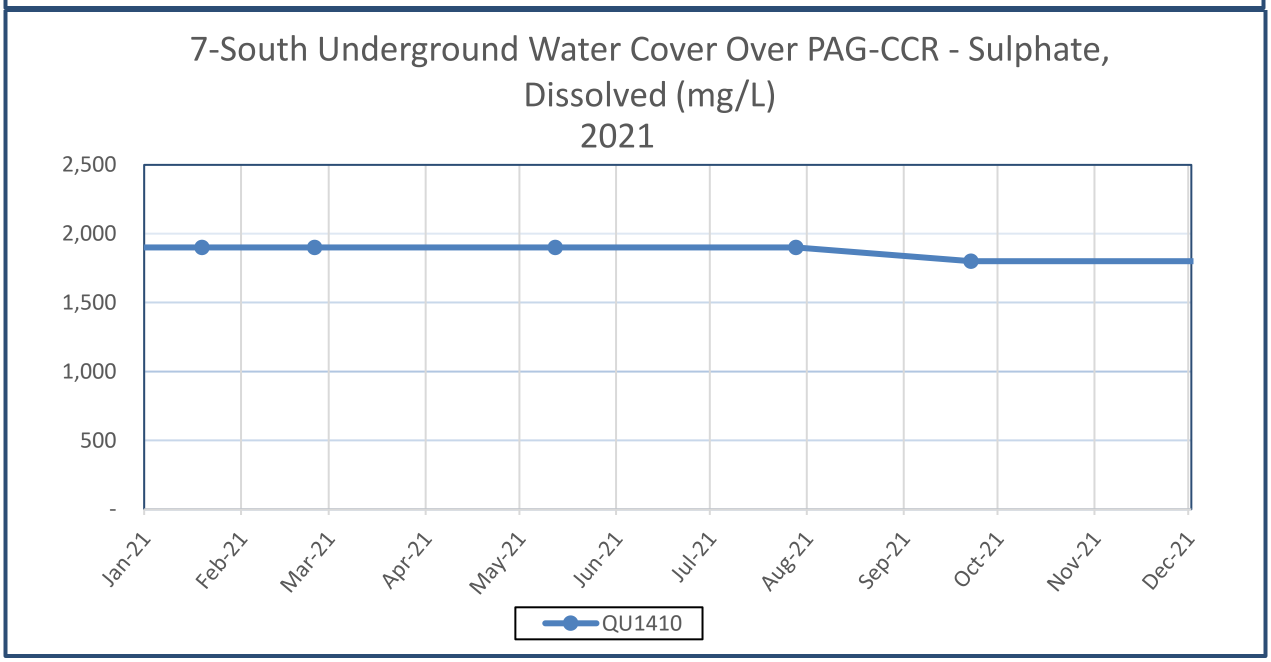


Figure 21: 7-South 2-Mains Sulphate Concentrations

The water chemistry from 2-Mains 7-South flooded PAG-CCR (Table 10) is currently compared to predicted water quality "*Scenario 2*[17]", where the PAG-CCR has not turned acidic prior to flooding. Once the 7-South mine has been completely flooded, the water quality will be compared to predictions in "*Scenario 3"* long term chemistry following flooding.

[17] Table 6-3 (Scenario 2 CCR not acidic before flooding) from a report entitled "*7 South Mine Groundwater Evaluation (Appendix J from the Mine Permit Amendment Application for 7-South Development)", by Lorax Environmental dated May 2011*

Parameters observed in Table 10, found to be just slightly higher than expected values include B and SO_4. All other parameters (pH, F, Al, As, Cd, Co, Cu, Fe, Mn, Ni, Se and Zn) are lower than expected. Arsenic is approaching the expected value of 0.19 mg/L. Marginal reductions were observed in 2021 for most parameters compared to 2020. There were minimal increases in alkalinity, arsenic, and iron.

Table 10: 7-South Mine Containing Saturated CCR Source Terms

Parameters	**Source Terms for 7 South Mine Containing Saturated CCR**[18]	**2020 Results (*n=10*)**	**2021 Results (*n* = *9)***		
		*Average > expected	Minimum	Maximum	*Average > expected
pH	6.48	6.63	5.94	6.75	6.42
Acidity (as $CaCO_3$)		25	0.5	36.2	21.11
Alkalinity (as $CaCO_3$)		301	290	320	306.7
Fluoride (F)	0.6	0.17	0.025	0.17	0.145
Sulphate (SO_4)	1260	1850	1800	1900	1844
Aluminum (Al)	0.009	0.007	0.0030	0.0075	0.0065
Arsenic (As)	0.19	0.096	0.0880	0.111	0.1024
Boron (B)	0.98	1.10	0.87	1.15	1.05
Cadmium (Cd)	0.0002	0.00002	0.000010	0.000025	0.0000217
Cobalt (Co)	0.062	0.0005	0.00042	0.0005	0.00049
Copper (Cu)	0.001	0.0008	0.00020	0.0005	0.00049
Iron (Fe)	6.705	1.720	1.75	2.49	2.09
Manganese (Mn)	2.885	1.420	1.28	1.50	1.41
Nickel (Ni)	0.122	0.003	0.0010	0.0025	0.00217
Selenium (Se)	0.004	0.0004	0.00010	0.0025	0.000217
Zinc (Zn)	0.088	0.012	0.005	0.0125	0.0108

***When a result was less than the detection level (i.e., <0.5), half detection level value was used for averaging (i.e., <0.5 = 0.25)**

[18] Table 6-3 (Scenario 2 CCR not acidic before flooding) from a report entitled "*7 South Mine Groundwater Evaluation (Appendix J from the Mine Permit Amendment Application for 7-South Development)", by Lorax Environmental dated May 2011*

2-North Underground Tailings Disposal: PAG-tailings (tailings produced from the 7-South coal) disposal into the 2-North mining voids began in 2013. To-date, two areas have been utilized for disposal; the depillared workings in 1-Mains and 5-Mains, with a total of 87,354 tonnes disposed as summarized in Table 11, below.

Table 11: PAG-Tailings Disposal Sites

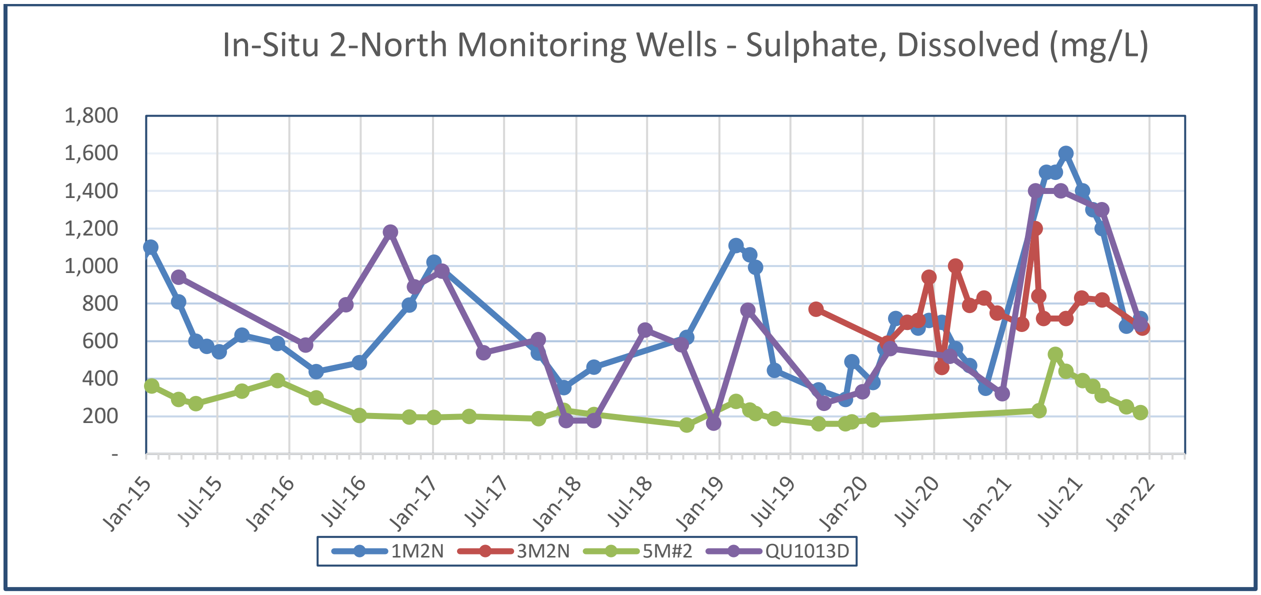
Disposal Areas	Disposal Timeframe	Tonnes Disposed
2-North 1 Mains	January 2013 to May 2014	37,793
2-North 5 Mains	May 2014 to December 2015	19,334
2-North 5 Mains	January to February 2016	1,007
2-North 5 Mains	October to December 2017	4,952
2-North 1 Mains	January to December 2018	18,749
2-North 1 Mains	January to May 2019	5,519
Total		**87,354**

The 2-North mine has been a subaqueous disposal site of fine tailings from processing of the 7-South coal since 2012. 1-Mains 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 5 Mains. In January 2018 the tailings line was redirected back to 1M2N.

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: groundwater water from the #1 coal seam within the Cumberland member of the Comox formation. The geology of the Cumberland member includes Lithic and feldspathic ("granitic") sandstone, sandy and carbonaceous mudstone; coal which includes the No. 1 and No. 2 coal zones.[19] In these areas, the mine water is classified as circum-neutral, elevated alkalinity and conductivity, with the elevated conductivity directly related to elevated sulphate and sodium concentrations. The 2-North mine waters have a distinct sulphate signature and are classified as sodium-sulphate type waters but have variable calcium and bicarbonate influence. All mine pools (2N, 3N, 2S, 3S, 4S, 5S and 7S) have a distinct sulphate geochemical signature that can be used to trace the flow paths of mine water. The in-situ waters in the 2-North mine pool are monitored at well locations 1M2N, 3Mains 2-North (3M2N), 5Mains #2 (5M#2), and borehole, QU10-13 D. QU10-13 D measures the hydraulic head above the 2-North mine (1 Mains) and fine tailings disposal.

[19] Figure 3-1: Table of Formations for the Quinsam Property: 7-South Development Volume 1: Mine Permit Appendment Application Document May30, 2011

In 2020 well pumps dewatering the 2-North mine pool failed to continue operating (February for 5-Mains #2) and (November for 1M2N). A contingency pumping system was installed in 3 Mains 2-North. Well pumps were replaced in late March 2021. Figure 22 below displays the dissolved sulphate concentrations from 2015 to present in the 2-North mine areas.



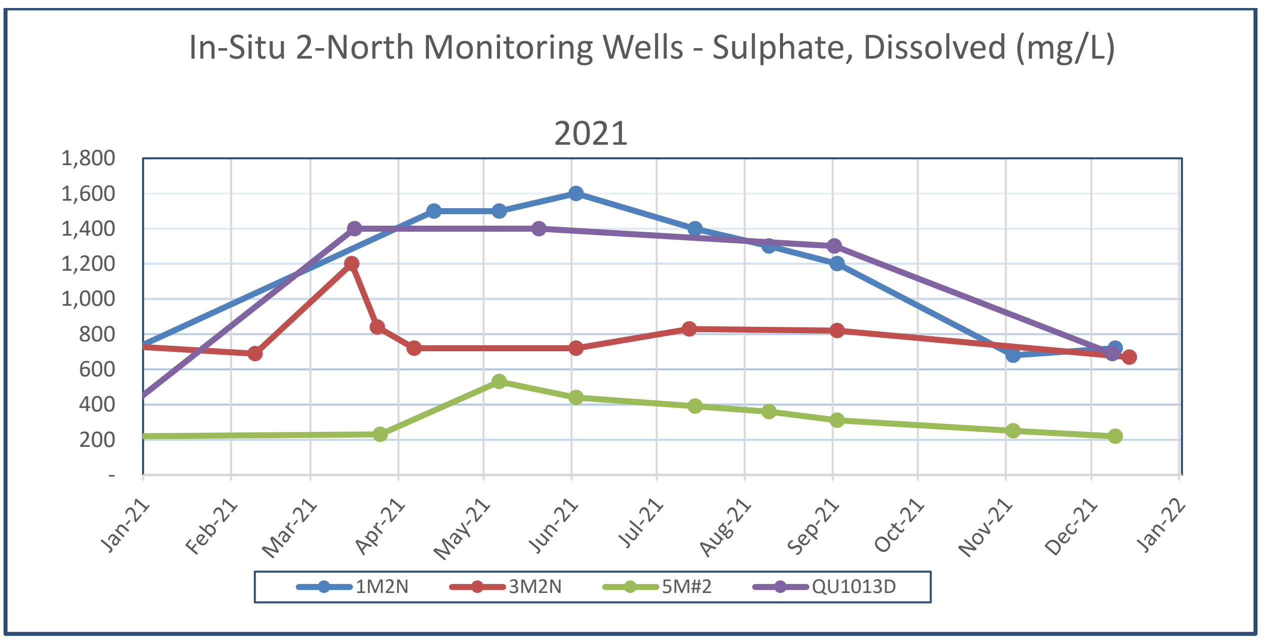


Figure 22: Dissolved Sulphate in 2-North Mine Pool

As depicted in Figure 22 sulphate concentrations were elevated from March until September from the increased mine pool in 2021. Concentrations have continued to decline into 2022.

Table 12 provides a summary of the water chemistry (parameters of interest) for the 2-North water cover over the tailings in comparison to expected and worst-case water quality. Results from sampling events were averaged using half the detection limits to an annual average.

Most parameters except pH, alkalinity, sulphate, iron, manganese, and zinc averaged below or within the expected range. Water quality in 1M2N displays higher concentrations of most parameters including sulphate, iron, manganese, and zinc, which were all above worst case scenarios. Iron is normally considerably higher in 1M2N compared to 5M2N (5M#2). When dewatering the mine pool, it is beneficial to have both 5M2N and 1M2N operating simultaneously to dilute the elevated iron coming from 1-Main's area.

Water quality at 5M2N is normally lower in most parameters compared to 1M2N due to this location being higher in elevation with less accumulated tailings stored here. The 2-North mine pool is moderately to strongly reducing, indicated by the elevated concentrations of dissolved iron and sulphide in the mine pool. The redox indicator species include iron, ammonia, and sulphide. These parameters are present in the 2-North, No. 1 Seam, and Dunsmuir sandstone groundwater.

Table 12: 2-North Underground Tailings Disposal Areas Source Terms

Parameters	Expected and Worst-Case Concentrations [20]	2021 Results					
		5M#2 (*n=9*)			1M2N (*n=8*)		
		Min	Max	*Average > expected	Min	Max	*Average >expected
pH	8.1	6.91	7.6	7.32	6.59	7.30	6.88
Acidity (as $CaCO_3$)		0.5	15.0	5.32	4.7	50.6	25.5
Alkalinity (as $CaCO_3$)	450	470	600	555	360	540	498
Fluoride (F)	1.1 – 1.2	0.057	0.088	0.075	0.064	0.14	0.093
Sulphate (SO_4)	278 – 1280	220	530	340	680	1600	1237
Aluminum (Al)	0.013 – 0.027	0.0015	0.0031	0.00201	0.0015	0.0048	0.00285
Arsenic (As)	0.113 – 0.125	0.00666	0.0109	0.00843	0.00389	0.00989	0.00621
Boron (B)	1.1 – 1.2	0.911	1.16	1.030	0.966	1.28	1.148
Cadmium (Cd)	0.00002 - 0.00008	0.000005	0.000010	0.0000061	0.000005	0.00001	0.0000081
Cobalt (Co)	0.001 – 0.023	0.00010	0.00058	0.000358	0.00010	0.00078	0.000259
Copper (Cu)	0.001 – 0.004	0.00010	0.00073	0.000334	0.00010	0.00103	0.00038
Iron (Fe)	0.490 – 2.902	0.0547	0.974	0.6133	4.09	15.4	11.2
Manganese (Mn)	0.360 – 0.950	0.103	0.310	0.217	0.515	1.41	1.032
Nickel (Ni)	0.001 – 0.033	0.0005	0.0021	0.00087	0.0005	0.0066	0.0018
Selenium (Se)	0.0002 – 0.0070	0.00005	0.00010	0.000061	0.00005	0.00043	0.000123
Zinc (Zn)	0.006 – 0.019	0.0080	0.158	0.0566	0.0025	0.336	0.06229

***When a result was less than the detection level (i.e., <0.5), half detection level value was used for averaging (i.e., <0.5 = 0.25)**

[20] Table 6-11 from a report entitled "2 North/ 3 North and 5 South Groundwater Evaluation (Appendix K from the Mine Permit Amendment Application for 7-South Development)" by Lorax Environmental dated June 2011

Table 13: 2-North Mine Void Expected Source Terms

Parameters	Expected and Worst-Case Concentrations[21]	2020 Results ($n = 3$)	QU1013D 2021 Results ($n = 5$)		
		*Average	Minimum	Maximum	*Average
		> expected			> expected
pH	8.1	6.90	6.45	6.92	6.72
Acidity		10.2	0.5	44.3	15.40
Alkalinity (as $CaCO_3$)	450	556	490	530	516
Fluoride (F)	0.29 – 0.3		0.077	0.11	0.092
Sulphate (SO_4)	278 - 1280	466	690	1400	1098
Aluminum (Al)	0.013 - 0.027	0.002	0.0015	0.0031	0.00242
Arsenic (As)	0.036 - 0.040	0.003	0.00109	0.00633	0.00267
Boron (B)	1.1 - 1.20	1.16	0.999	1.25	1.098
Cadmium (Cd)	0.00002 - 0.00008	0.0000006	0.000005	0.00001	0.000007
Cobalt (Co)	0.001 - 0.0035	0.0007	0.00010	0.00021	0.000162
Copper (Cu)	0.001 - 0.004	0.0003	0.00010	0.00020	0.00014
Iron (Fe)	0.490 - 2.45	1.423	4.37	11.9	7.01
Manganese (Mn)	0.360 - 0.95	0.264	0.642	1.47	1.077
Nickel (Ni)	0.001 - 0.008	0.00067	0.0005	0.0010	0.0007
Selenium (Se)	0.002 - 0.001	0.00057	0.00005	0.00162	0.000426
Zinc (Zn)	0.006 - 0.007	0.003	0.0025	0.005	0.0035

***When a result was less than the detection level (i.e., <0.5), half detection level value was used for averaging (i.e., <0.5 = 0.25)**

[21] Table 6-11 from a report entitled "2 North/ 3 North and 5 South Groundwater Evaluation (Appendix K from the Mine Permit Amendment Application for 7-South Development)" by Lorax Environmental dated June 2011

The water chemistry in the 2-North Mine void is compared to the average water chemistry collected from monitoring well QU1013D (Table 13). Most parameters were below the expected case except alkalinity, sulphate, iron, and manganese. Iron and manganese were above the worst case with sulphate approaching worst-case predictions.

When areas of the mine become submerged after exposure to oxygen it causes the dissolution of soluble oxidation products (iron and sulphates) into the mine water. This occurrence is not expected to continue, and concentrations will decline once the mine remains flooded. Dewatering the mine pool and continually exposing these areas causes this process to occur repeatedly, increasing metal loading into the water. The inflow of freshwater including the highly alkaline waters of the No. 1 Seam in the 2 North / 3 North mine contains a lower sulphur content. Concentrations are expected to decrease after the mine walls initially flush and settle to bottom as the mine pool stratifies.

5-South Flooded Mine Void: Currently the 5-South Mine has water from the 7-South Mine being pumped into this area. This water is then pumped into the 3-Mains area of the 2-North mine intermittently. The flooded mine void has been compared to expected and worst-case concentrations in Table 14 below, with averages from 2020 and 2021. In 2021 average concentrations of alkalinity, boron, cobalt, iron, manganese, and nickel were above the expected case with iron nearing the worst-case.

The 5-South Mine exposes the acidic PAG Rider Seam that will generate acid if not flooded. It is expected that the mature mine pool waters will become strongly reducing resulting in the dissolution of the hydrous ferric oxides and sulphates on the oxidized walls. The mine water is highly alkalinity and therefore will remain circumneutral.

Table 14: 5-South Mine Void Source Terms

Parameters	Expected and Worst-Case Concentrations[22]	2020 Results (*n* = 3)	5-South Flooded Mine Void 2021 Results (*n* = 5)		
		*Average	Minimum	Maximum	*Average
		> expected			> expected
pH	7.4	7.39	6.45	6.92	7.2
Acidity		9.3	0.5	44.3	8.7
Alkalinity (as $CaCO_3$)	282	353.3	490	530	294
Fluoride (F)	0.71 –1.00	0.19	0.077	0.11	0.17
Sulphate (SO_4)	396 - 1990	270	690	1400	350
Aluminum (Al)	0.020 - 0.050	0.0072	0.0015	0.0031	0.0134
Arsenic (As)	0.069 - 0.069	0.00555	0.00109	0.00633	0.00444
Boron (B)	0.707- 1.88	0.878	0.999	1.25	0.835
Cadmium (Cd)	0.00001 - 0.00017	0.000005	0.000005	0.00001	0.000005
Cobalt (Co)	0.005 - 0.148	0.00354	0.0001	0.00021	0.0172
Copper (Cu)	0.001 - 0.001	0.00034	0.0001	0.0002	0.00046
Iron (Fe)	0.805 – 19.1	8.68	4.37	11.9	14.37
Manganese (Mn)	0.136 – 1.3	0.231	0.642	1.47	0.385
Nickel (Ni)	0.007 - 0.213	0.0054	0.0005	0.001	0.0285
Selenium (Se)	0.0001 - 0.001	0.00009	0.00005	0.00162	0.00005
Zinc (Zn)	0.008 - 0.014	0.0025	0.0025	0.005	0.00418

***When a result was less than the detection level (i.e., <0.5), half detection level value was used for averaging (i.e., <0.5 = 0.25)**

[22] Table 6-11 from a report entitled "2 North/ 3 North and 5 South Groundwater Evaluation (Appendix K from the Mine Permit Amendment Application for 7-South Development)" by Lorax Environmental dated June 2011

4-South Water Chemistry: 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. The flooded mine pool water has 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. The dedicated in-situ monitoring well, QU11-01 is situated in the depillared area of the mine and used to determine mine-pool water chemistry. 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. Table 15 below displays maximum concentrations collected from 2021 at QU1101 compared to minimum and maximum concentrations found in 2011.

Groundwater in this area has 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. Parameters of interest (POI) are generally quite stable due to the maturity and flooded status of the mine and do not show major fluctuations. It is noted that POI concentrations (arsenic, iron, manganese, and sulphate) are displaying stable trends, Figure 23 below.

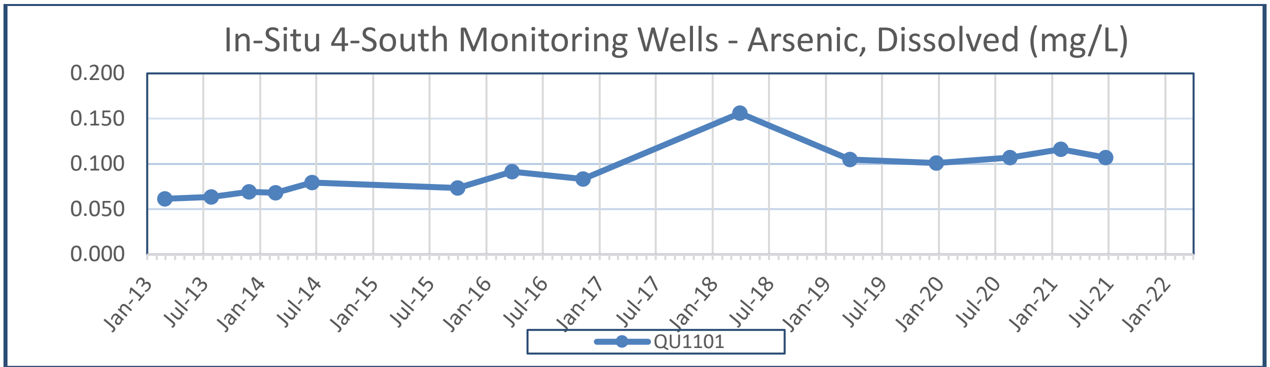
The 4-South mine pool is dominated by iron reducing conditions with elevated concentrations of iron and sulphate. The chemical stratification is characterized by the high concentrations of iron and sulphate found at depth in the mine pool. While declining, dissolved iron concentrations are highest out of everywhere on site in the 4-South mine pool. With concentrations nearing 200 mg/L at QU11-01 in recent years.

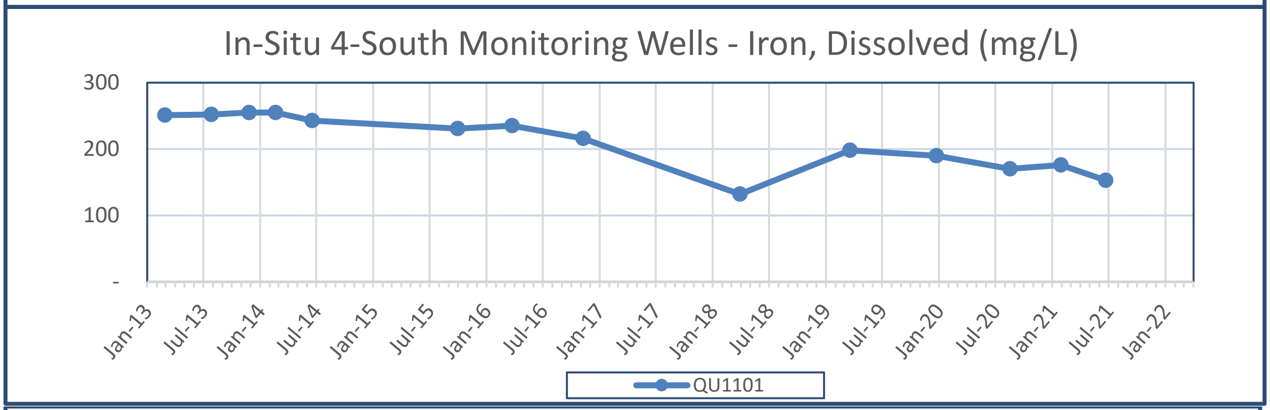
Sulphate has an opposite trend to fluoride; sulphate is found in lowest concentrations in the formation water and highest in the mine pool. Sulphate concentrations are elevated and follow a similar profile to dissolved iron where concentrations have been generally decreasing since 2013.

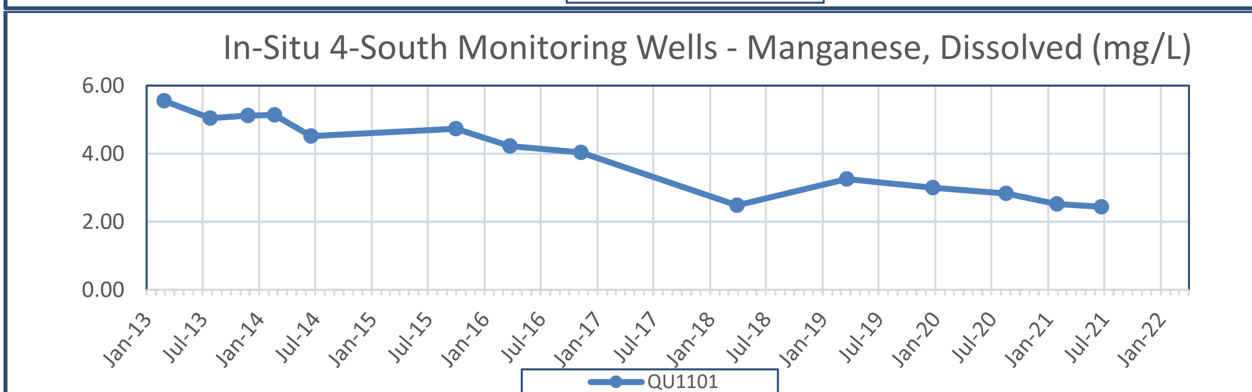
Table 15: Source Terms Comparison of Flooded 4-South Mine Void Mature Mine Pool

Parameters	4-South Groundwater Sample Range[23] 2011		4-South Flooded Mine Void 2021 Maximum Values (mg/L) (n=2)	Results Compared to Historical Range
	Low Values (mg/L)	Maximum Values (mg/L)		
Alkalinity (as $CaCO_3$)			100	N/A
Aluminum (Al)	0.018	0.494	0.035	Within range
Arsenic (As)	0.0022	0.304	0.116	Within range
Boron (B)	0.046	2.36	1.12	Within range
Cadmium (Cd)	0.000017	0.00047	<0.000050	At detection limits
Cobalt (Co)	0.000010	0.110	<0.0010	At detection limits
Copper (Cu)	0.0002	0.0564	<0.0010	At detection limits
Fluoride (F)	0.022	2.5	0.41	Within range
Iron (Fe)	0.030	257	176	Within range
Manganese (Mn)	0.0233	5.96	2.52	Within range
Selenium (Se)	N/A	N/A	<0.00050	At detection limits
Sulphate (SO_{4^-})	11.8	2060	1600	Within range
Zinc (Zn)	0.003	0.419	<0.025	At detection limits

[23] Table 4-8: 4-South Source Terms and Receiving Environment Water Quality Predictions (Mine Permit Amendment 7-South Development Volume 1, Section 4: Application Document)" dated May 2011







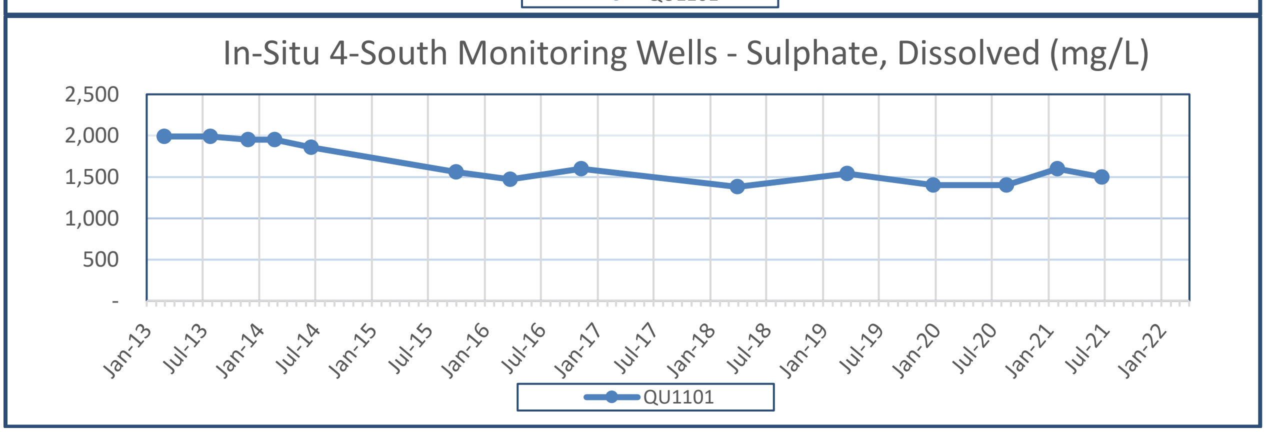


Figure 23: 4-South Flooded Mine Void Parameters of Interest

3.4 Surface Water Quality

The results and interpretation of surface water quality at the Quinsam Mine during the 2021-22 monitoring year is included in a separate document submitted as a part of PE:7008 permit in the report entitled *Annual Water Quality Monitoring Report* due June 30th. The 2021 water chemistry and summary statistics for 2-North Pond, 2-South Pit and 3-South Pit and Long Lake Seeps are available in Appendix 2, Tables 7 through 9 and 23 through 24 with summary statistics for SP1 and SP4 provided in Tables 25 and 26 for 2021.

Poor water quality developed from elevated iron in the mine water discharging into SP4 during March 2021 causing multiple permit limit exceedances. Discharge water quality from SP4 failed to meet permit limits of PE:7008 for both dissolved iron (3x's) with results greater than 0.3 mg/L and total suspended solids (4x's) with results greater than 25 mg/L on March 4, 9, 10, 11, 15, 19 and 22. Dangerous Goods Incident Report (DGIR) numbers were generated (204693, 204694, 204545, 204752 and 204695) for the elevated levels of iron and total suspended solids.

There was limited dilution at SP4 while the 1M2N and 5M#2 well pumps were being replaced. The 2-North mine water was at an elevation of approximately 244 masl by March 22, 2021. The mine water was managed through the 3-Mains 2-North (3M2N) pumping system station located at ~ 244 meters above sea level (masl) until the well pumps were replaced on March 25th and April 6th, 2021. As a result, the oxidized mine walls were flushed causing elevated iron to be discharged at SP4. Water quality improved once the well pumps were reinstalled providing more dilution at SP4.

As a result of an elevated 2-North mine pool an unauthorized discharge and bypass of authorized works occurred (discovered on March 17th) from a borehole (QU1109) discharging into the Quinsam River. The borehole became artesian from pressure in the aquifer. Discharge was mitigated with a cap on the well as of March 19, 2021, reducing the flow rate into the river from the borehole.

The aquifer decreased with the replacement of both dewatering pumps, (5M2N and 1M2N). A perennial stream was discovered near QU1109 with initial results elevated in ammonia, arsenic, conductivity (related to sodium), fluoride, iron, and sulphate. The area has been monitored for both water quality and quantity with concentrations of parameters of interest and discharge declining with the water table. Dangerous goods incident report (DGIR) 204584 was generated through the Provincial Emergency Line on March 17, 2021. A follow-up report was submitted on September 8, 2021, to ENV and EMLI. This area continues to be monitored. In November 2021 the borehole well was capped with a tight-fitting lid and an additional steel casing was placed over top of the well with a valve that opens and closes to prevent any further incidents from occurring.

SP4 EMS ID (E207409) is the authorized discharge location for the North mine area and compliance point before water enters Middle Quinsam Lake. The permitted (PE:7008) annual average rate of discharge is (0.08 m^3/s or 2,522,880 m^3) measured over 365 days / year (April 1 to March 31). In 2021 (January 1st to December 31st), the annual average discharge rate was 0.0944 m^3/s and the cumulative discharge was 2,973,629 m^3.

SP1 EMS # E218582 is the authorized discharge location and compliance point for the South mine area before water enters Long Lake. The permitted (PE:7008) annual average rate of discharge is (0.01 m^3/s or 3,153,600m^3 m^3) measured over 365 days / year (April 1st to March 31st). In 2021 (January 1st to December 31st) the annual average discharge rate was 0.0022 m^3/s and the cumulative discharge was 695,536 m^3.

In the receiving environment (rivers and lakes) water quality is compared to the BC Water Quality Guidelines - Freshwater Aquatic Life (WQG) for both acute and chronic guidelines. Results above (WQG's) were observed on the Iron River for total arsenic and dissolved copper (low flow summer) and dissolved aluminum (high flow fall), Appendix 2, Tables 41 through 43.

On the Quinsam River (QR) dissolved copper was elevated above the guidelines, which are variable and calculated from ambient hardness, pH, temperature and dissolved organic carbon observed at each site. Elevated copper was observed at site WA upstream (above mine influence) during spring, summer, and fall, and on the lakes Middle Quinsam, Long, No Name and Lower Quinsam Lakes during spring at various depths. During summer copper was found elevated at all sites except Long and Middle Quinsam Lakes at depths (1 meter, 4 meter and 9 meter) and Long Lake Outlet. During fall copper was found elevated at Long Lake at 1 meter from bottom depth, No Name Lake Outlet and QR upstream and downstream of mine influence (WA and 7SQR and IRQR). Elevated copper observed at site WA upstream (above mine influence) during spring, summer, and fall suggests that copper is prevalent in the local environment and may not be entirely related to the mine influences but also naturally occurring due to geology, erosion, or other anthropogenic sources (logging) surrounding the watershed. Other than copper there were no other parameters observed to be above the WQG's on the Quinsam River during this monitoring year.
The chronic-WQG for dissolved sulphate is 128 mg/L derived using a background hardness of 30 mg/L. Average annual dissolved sulphate concentrations on the Quinsam river ranged from 3.3 mg/L upstream of the mine influence (WA) to 47.6 mg/L downstream of the mine influence (7SQR) and further downstream after the confluence with Iron River at IRQR, average annual results were 36.5 mg/L. Although dissolved sulphate was higher than prior year's results continued to remain well below the most conservative guideline of 128 mg/L at all locations on the Quinsam river.

In Long Lake average concentrations of dissolved sulphate remained below 128 mg/L throughout each season (spring, summer, and fall) at each depth 1-meter, 4-meter, 9-meter, and 1-meter above bottom in 2021. The highest average result was observed in summer at 1 meter from bottom, 105 mg/L. In Middle Quinsam Lake average dissolved sulphate remained well below average WQG of 128 mg/L, with average results less than 60 mg/L throughout the monitoring year. This is related to the shallow depth (14 - 15 meters) of the lake, reduced retention times, faster turnover and flushing rates compared to Long Lake, which is a deeper (21-22 meters), shorter in length and has a longer retention time. As a result, Long Lake does not turn over completely at depth. During the fall when Long Lake is depleted in dissolved oxygen at depth total manganese becomes elevated above both acute (0.737 mg/L) and chronic (0.87 mg/L) WQG's at 1 meter from bottom.

Long Lake Seeps (LLS) and (LLSM) discharge waters are compared to BC Acute Water Quality Guidelines for Protection of Aquatic Life (WQG). The seeps are considered an unauthorized discharge and bypass of the authorized works (SP1). Water quality at the smaller seep (LLS) was elevated in total arsenic on 2 out of 10 (2/10) sampling events and Fe-T (8/10) and Fe-D (9/10) occasions. At the larger seep (LLSM) both total and dissolved iron was elevated above the guidelines on (1/9) sampling events for Fe-T and (5/9) sampling events for Fe-D. Refer to Appendix 2, Table 23 and 24 for the water chemistry compared to Acute -WQG.

Refer to Appendix 2, Tables 41 - 43 for receiving environment water quality observed to be above the WQG's. Those parameters observed to be outside guidelines include Al-D, As-T, Cu-D, D.O., Mn-T, pH and SO_4.

Overall, the receiving environment sites displayed similar trends as previous years with a concentration high for As-T in summer during low flow on the Iron River and elevated Al-D during high flows. Cu-D was observed above guidelines throughout the site upstream and downstream of the mine influence. Dissolved Oxygen was below 3 mg/L in the hypolimnion in Long lake during fall causing anoxic conditions at depth. Low dissolved oxygen causes elevated Mn-T at depth in Long lake.

For further information please refer to the quarterly reports submitted. This information will be summarized and compiled in the 2021-2022 *Annual Water Quality Monitoring Report* due June 31, 2022.

3.5 Groundwater Quality

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.

Hydrogeology at the site defined through studies performed by Quinsam Coal, Lorax Environmental Services and Golder Associates hydrogeology of the respective mining area. Past studies and evaluations define monitoring locations, methods and frequency with consideration to mining and hydrogeological flow paths. Appendix 2, Table 32 lists the wells, screened interval and mining area.

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 (e.g., Quinsam River).

The groundwater wells that are outside of 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), water quality standards for Freshwater Aquatic Life (AW). The aquatic life standard assumes that a minimum 1:10 dilution is available for groundwater discharged to a freshwater system. This regulation is referred to as CSR-AW for reporting purposes.

The parameters of interest captured under the CSR-AW and applied to Quinsam include arsenic (As), cobalt (Co), copper (Cu), fluoride (F), iron (Fe), sulphate (SO_4), sulphide (S_2-) (as H_2S), and zinc (Zn). These guidelines have been applied to the ex-situ groundwater.

Appendix 2, Table 33 compares the results of sampling performed in 2021 to the CSR-AW guidelines (by development area). The ex-situ groundwater quality is available in Appendix 2, Tables 34-40. Those parameters found in excess of the CSR-AW in 2021 include As, Cl, H_2S and Se.

Arsenic was found elevated in almost all ex-situ groundwater, related to the geology of the host rock formation. Groundwater that was not elevated in arsenic includes the following:

- Deep groundwater at QU1105 D that monitors the water quality and vertical gradients downstream of the River Barrier Pillar 88 panel and 2-North mine pool.
- 3-North area (QU1010 D, QU1011 D & S). Both shallow groundwater at QU1010 S and the deep groundwater at QU1011 D are situated down gradient of underground tailings disposal, measuring water quality and hydraulic head downgradient of 2 North workings. The shallow well at QU1011 S measures water quality and hydraulic gradient in the Forjan Fault.
- Shallow monitoring well outside of the 7-South Mine (QU0810)
- Monitoring wells in the 2-North area below the coal wash plant both shallow and deep (MW001, MW006) monitor seepage to Middle Quinsam lake.

Chloride was only elevated in the deep groundwater of the 3 North area QU1010 D. Concentrations of selenium were elevated in the deep groundwater well QU1105 D.

Hydrogen sulphide was elevated in almost all groundwater except:

- Deep monitoring well (QU1136 D) downgradient of 7SA5, background located between 242 mine and Iron river.
- Shallow groundwater near 4-South mine pool (QU1009 S) situated down gradient of existing workings. Accesses vertical gradients and water quality adjacent to Long Lake.
- 2-North monitoring shallow and deep wells below the Coal wash plant (MW001 and MW006)
- 3-North in the shallow and deep wells (QU1010 D and QU1011 S)

The results and interpretation of groundwater quality are also included in the *Annual Water Quality Monitoring Report.* Historically, groundwater quality results were presented and discussed in an independent report entitled *Annual Groundwater Monitoring Report*, which was submitted at the same time as this document. In an effort to link and draw conclusions on the relationships between surface and groundwater they are reported together in the *Annual Water Quality Monitoring Report*.

Source terms have been developed for parameters of interest within the various development areas. This includes geochemical characterization of the 4-South mine pool and laboratory kinetic testing conducted on the 7-South coarse coal reject, 7-South formation water, 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 sedimentation 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 (Section 3.3).

The 2021 water chemistry and summary statistics for mine pools where PAG-CCR and tailings is stored has been compared to source terms and discussed in Sections 3.2 and 3.3. All in-situ water chemistry and summary statistics for flooded mine pools with PAG-CCR, tailings, flooded mine pools without PAG-CCR or tailings and underground mine sumps is available in Appendix 2, Tables 10 through 24.

3.6 Water Quality Mitigation and Treatment

In 2012 Quinsam Mine constructed a Passive Treatment System (PTS) to assist with the management of mine impacted (2-South underground workings) seep water entering Long Lake at the Long Lake Seeps. The main parameters of concern for treatment/reduction are sulphate and iron. The PTS consists of the following components:

- Dewatering well (QU11-11): a dewatering well with a 15 Hp pump draws water at a fixed pumping rate out of the 2-South underground workings and pumps it to the first stage of the PTS (Bio-chemical reactor) at a rate of 4.5 L/s, treating approximately 142,000 m^3 of water per year.

- Sulphate concentrations from the pumped water (Inflow) ranged from 470 to 760 mg/L and averaged 692 mg/L.

- Bio-Chemical Reactor (BCR) Cell: the BCR cell is filled with an organic substrate (wood chips, hay and manure) and through sulphate reducing bacteria (in an anaerobic environment) converts sulphate to a sulphide. Depending on temperature, typical sulphate levels in BCR effluent range from 250-690 mg/L averaging 530 mg/L a reduction of 100-400 mg/L, with winter months having the least amount of reduction. In 2021 reduction efficiency was much lower than previous years ranging from -70 mg/L to 420 mg/L and averaging 94 mg/L. The highest reduction efficiency was seen in September of 63 %.

- Sulphide Polish Cell (SPC): the SPC is a lined pond filled with a mixture of wood chips and fine-grained sacrificial iron and submerged in water (effluent from the BCR cell). The excess sulphide in the BCR effluent precipitates out as iron sulphide when it contacts the iron in the substrate. It also provided annual average sulphate reduction between INF to

SPC of 174 mg/L. From here the water is discharged to a channel where it flows into the inlet of 2-South pit. This new system keeps the effluent within the authorized works.

The original design included the effluent from the sulphide polishing cell flowing passively into the last cell that included the Aeration lagoon and Settling pond. The discharge from this cell bypassed the authorized discharge location, (SP1) and was an unauthorized discharge. An authorization to bypass the works permit was required annually with the ENV until the water was redirected to 2-South pit. The below is a description of the final cells function:

- Aeration Lagoon (AL) and Settling Pond (SP): The AL is an actively aerated pond with an overflow to the SP. The AL-SP system removes nuisance constituents carried from the BCR cell and SPC, including:
    - Excess organics
    - Nutrients from the degradation of organic substrates
    - Metals
    - Excess sulphide not removed in the SPC

Through 2014 and 2016 bench scale testing had been conducted with the objectives of:

- Improving the performance of the PTS during cooler temperatures (less than 10 degrees Celsius)
- Extending the life of the media in both the BCR cell and SPC
- Improving the sulphate reduction and/or throughput volume of the PTS
- Additional sulphide removal

This testing has included an evaluation of different carbon amendments (provides additional "food" to fuel the biological community that reduces the sulphate to sulphide in the BCR cell) and an evaluation of treating the BCR effluent with non-iron supplements to remove/sequester sulphide.

In May of 2016, the addition of a 'carbon amendment system' was initiated in the existing PTS, with the added carbon source being molasses. Molasses was injected into the BCR cell influent at a rate of approximately 100 litres per week until September 2017. Observations include:

- A 10-15% reduction to overall sulphate through summer months
- Poor sulphate reduction through winter months

The carbon amendment system was favorable at assisting additional sulphate reduction. In September 2017 there was mechanical failure with the pump for the carbon amendment. The system has been difficult to bring back online. It has not operated since this time.

Pump failures at QU11-11 (INF) in December 2017. The PTS did not operate from January to August 2018 and the pump was replaced with a 15 Horsepower pump. The system operated from September 2018 until February 2020 and replaced on May 5th, 2020.

In 2021, the PTS was shut down from August 11 through September 20 (41 days) due to extreme fire hazard under the powerlines in the 2-South Area.

Water Quality:

Appendix 2, Tables 27 - 31 display the water chemistry for the sites (INF, BCR, SPCEFF, 2SI and 2SC) part of the South Water Management System (SWMS). Figures 24 and 25 below display the annual average sulphate and monthly average concentrations throughout the SWMS. As observed the 2-South Mine pool site (INF) has the highest sulphate concentrations followed by 2SC. As water flows through the PTS discharging into 2SI, 2S and 3S pits and discharges at SPD effective sulphate reduction is achieved.

Annual average dissolved sulphate concentrations are entering the PTS system from the 2-South mine pool (INF) at 620 mg/L and leaving the system at SPCEFF resulting in 445 mg/L. The station 2-South Inflow (2SI) receives discharge from the PTS, had an annual average sulphate concentration of 388 mg/L with SPD having an annual average sulphate concentration of 286 mg/L.

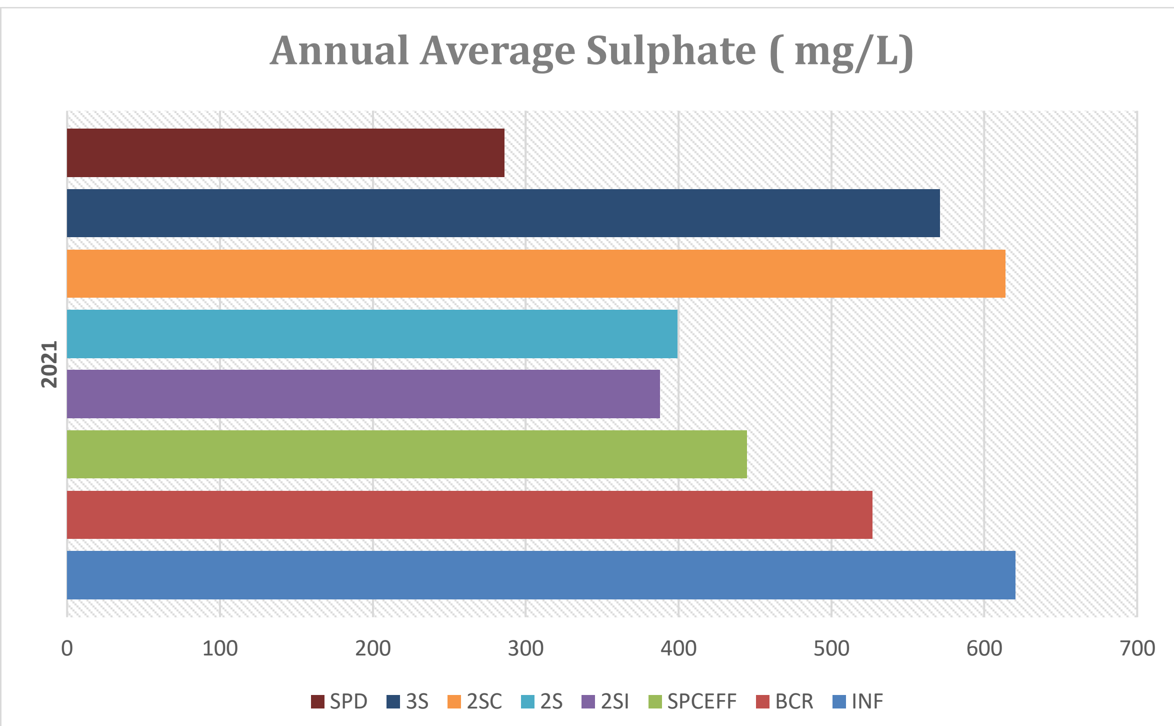


Figure 24: Annual Average Sulphate in South Water Management System (mg/L)

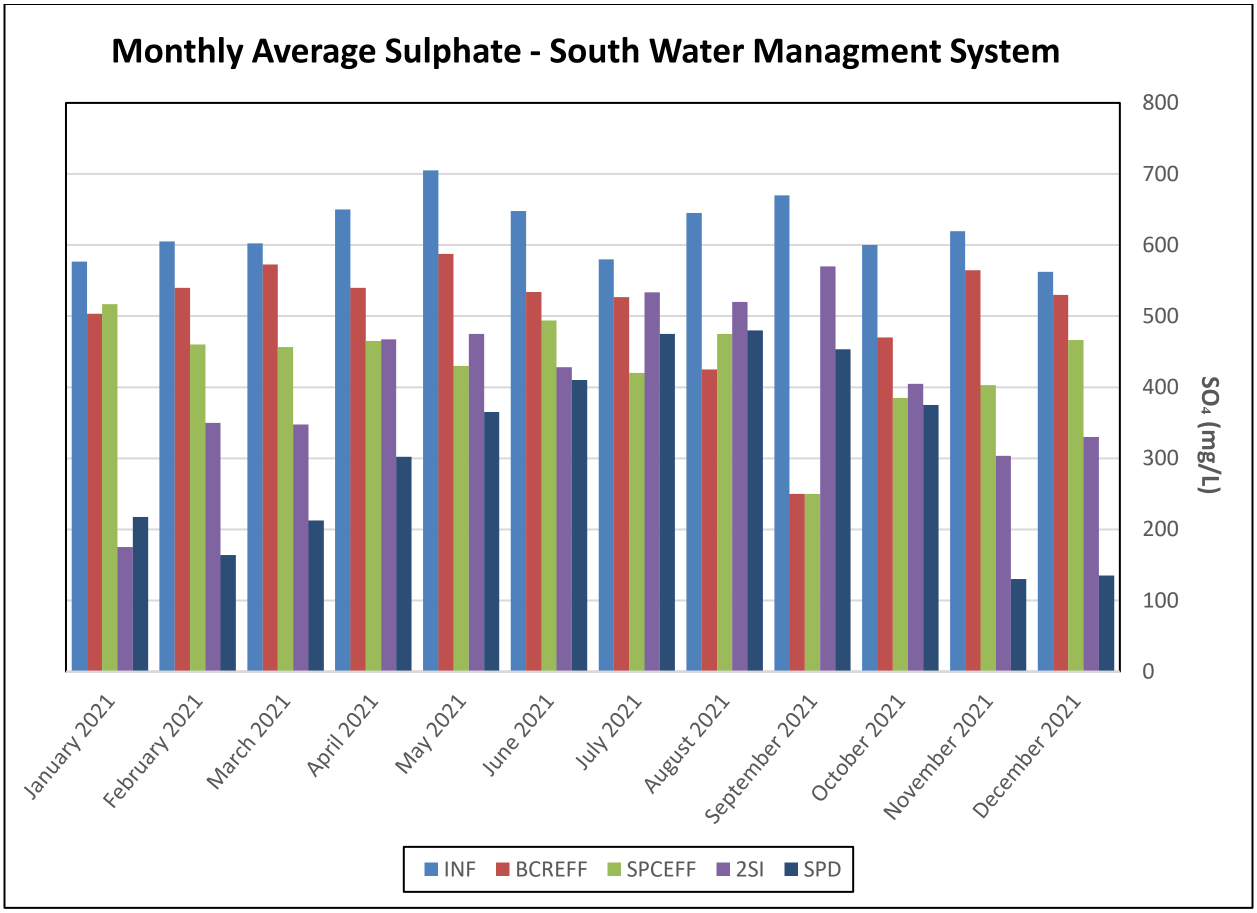


Figure 25: Monthly average sulphate from 2S mine pool (INF), PTS through to SPD.

The below Figures 26 through 27, depicts the concentrations of relative sulphate reduction compared to percent efficiency from the 2-South Mine Pool (INF) into the BCR and the INF into SPC. The PTS reduction efficiency normally decreases in the winter months and increases in summer months with warmer ambient temperatures increasing microbial activity.

During 2021 the warmer ambient temperatures increased microbial activity as observed but the full extent of potential sulphate reduction was not observed due to the system being shut off (August 11 through September 20) for part of summer. Once power was restored, the cells required a two-week period of filling and retention time. The microbial population may have increased in the cells during these warm periods with stagnant water held within the cells as displayed in October 2021 (Figures 26 and 27) where reduction efficiency is highest.

The annual average percent reduction efficiency for sulphate between INF and BCR was only 14% with % reduction between INF and SPC at 27%. The annual average reduction was 92 mg/L between INF and BCR, with the greatest reduction observed between INF and SPC of 174 mg/L. This has led to an annual average sulphate reduction of 174 mg/L through the PTS, much lower than previous years reduction rates of 300 mg/L. Overall annual average sulphate reduction from INF to SPD of 334 mg/L was achieved falling within the range of the main objective for sulphate reduction (300 mg/L).

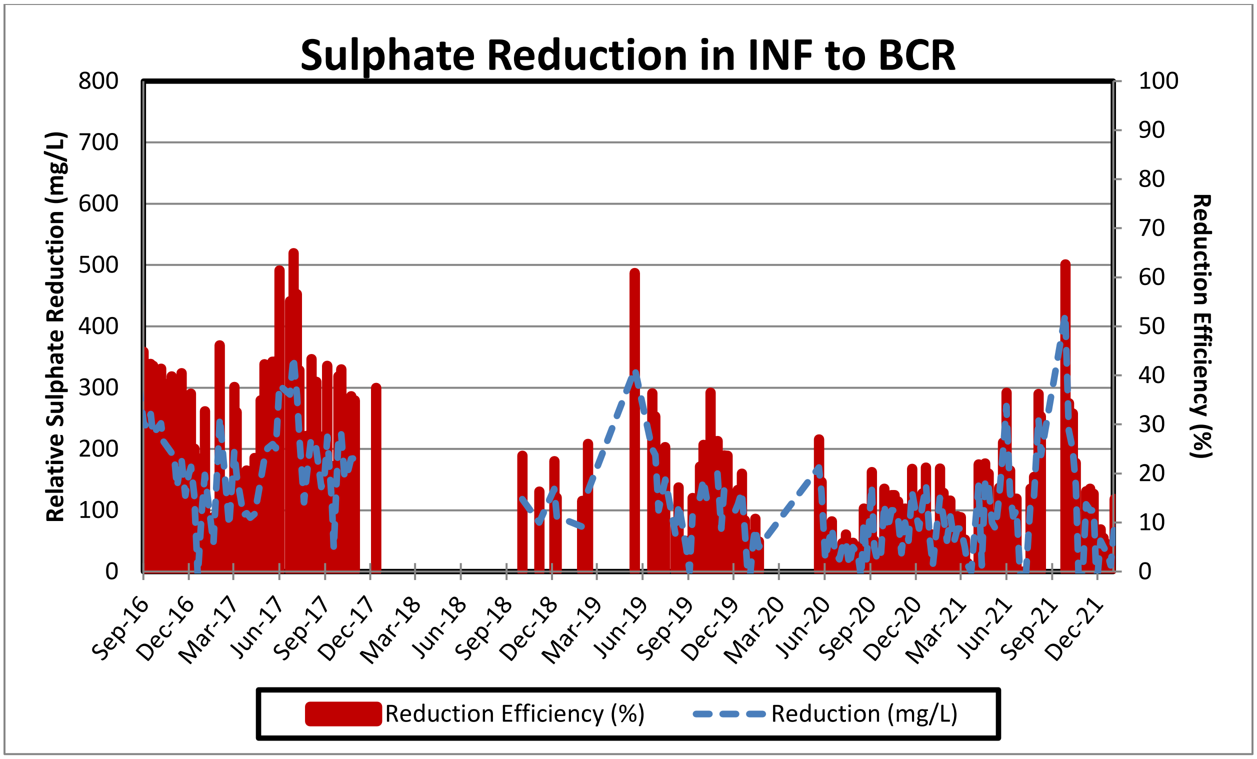


Figure 26: PTS – Sulphate Reduction INF to BCR

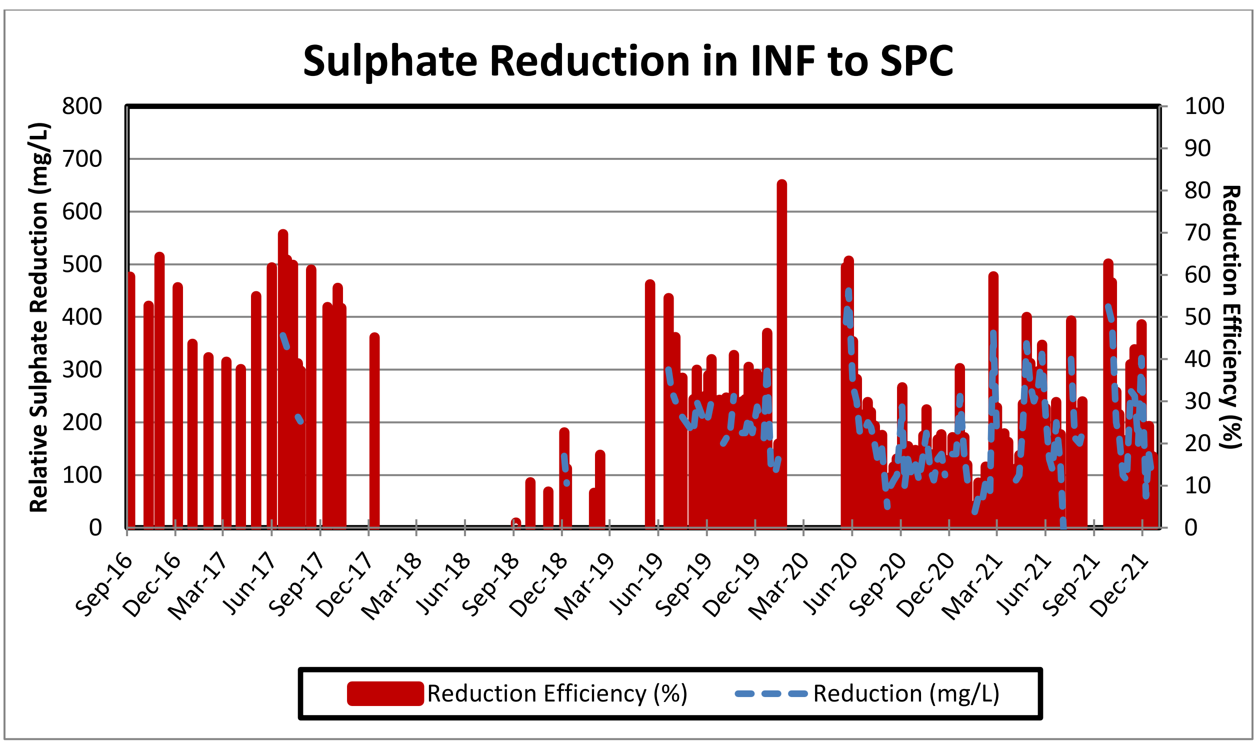


Figure 27: PTS – Sulphate Reduction INF to SPC

The PTS aids in maintaining water cover over the PAG-CCR in 2-South pit, reduces the rate of discharge and prolongs the period of no discharge at the seeps during low flow periods. The objective of pumping the mine pool down is to decrease the elevation of the water table pool below the elevation of the seeps. The period of "no flow" at the Middle Seep into Long Lake (LLSM) has been observed to be extended by pumping down the mine pool. The PTS remains in the demonstration phase with a capacity to treat 4.5L/s of mine water. If the full-scale system were to operate, the system would treat approximately 18 L/s of mine impacted water which, could potentially stop the seep discharge permanently.

Concentrations of dissolved iron in the mine pool are elevated compared to surface waters in the SWMS, depicted from Figure 28 and 29. The Sulphide Polishing Cell (SPCEFF) has displayed elevated iron on occasion due to the opening and closing of the gate value to maintain an equilibrium in the cell. Overall, the entire SWMS is effective at reducing iron concentrations in the mine water. Dissolved iron was not elevated above permit limits of (0.50 mg/L) at Settling Pond 1 throughout 2021.

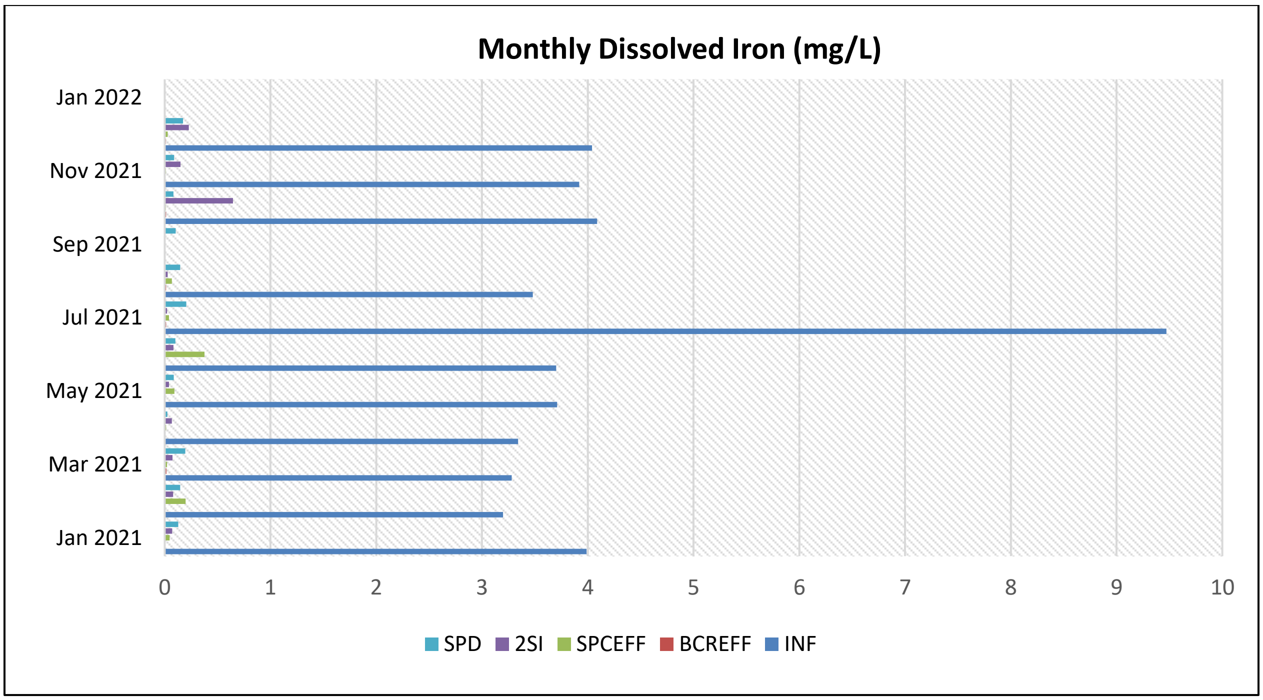


Figure 28: Monthly Dissolved Iron - South Water Management System

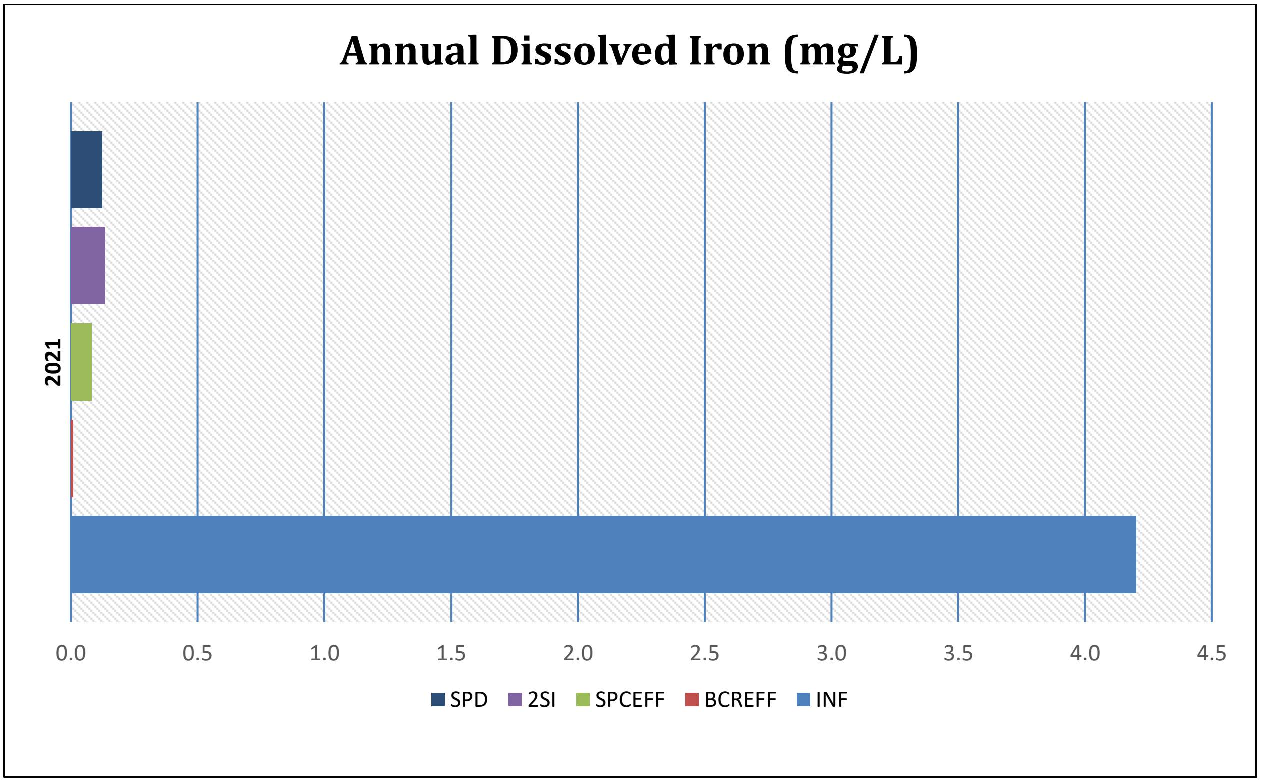


Figure 29: Annual Average Dissolved Iron - South Water Management System

The PTS is evaluated with respect to sulphate and iron reduction. In the past it has proved successful at reducing sulphate and iron in mine water from the PTS discharge. This will be accessed further in 2022 to ensure the system is functioning at its optimal state and reducing sulphate and iron as designed. The substrate in the Biochemical reactor may require replacement or possibly further nutrient addition with molasses will be implemented in the future.

3.7 Water Management

Refer to the Quinsam Coal "Annual Water Quality Monitoring Report 2020-21" for the full text and results of the summary provide below.

The water management system (settling ponds, sumps and ditches) used to manage mine impacted water at Quinsam Mine is sub-divided into three distinct areas:

- The North Water Management System
- The South Water Management System, and
- The 7-South Water Management System.

During calendar year 2021 a total of 28,561,593 m^3 of water was discharged to the receiving environment through these systems, as tabulated below in Table 16.

Table 16: 2021 Water Management Systems Discharge to the Receiving Environment

Area	Discharge (m^3)	Receiving Environment
2-North (includes 5S + 7S)	2,973,629	Middle Quinsam Lake
South (sum of SP1 + LLS discharges)	695,536 + 209,191	Long Lake
7-South	0	Outlet (to the Quinsam River) of the Lower Wetland
Total	3,878,356	

North Water Management System: The North water management system includes surface and underground pumping systems, surface ditches and sumps, the tailings disposal facility (TDF), the 2-North Pit Pond (PAG-CCR disposal), the 2-North Portal sump, Brinco wetland and Settling Pond #4 (WD / SP4).

Settling Pond #4 (SP4) EMS ID (E207409) is the authorized discharge location for the North mine area and compliance point before water enters Middle Quinsam Lake. The permitted (PE:7008) annual average rate of discharge is (0.08 m^3/s) measured over 365 days / year (April 1 to March 31). In 2021 (January 1st to December 31st), the annual average rate of discharge rate was 0.0944 m^3/s and the cumulative discharge was 2,973,629 m^3.

South Water Management System: The South water management system includes surface and underground pumping systems, 2-South and 3-South open pits (as PAG-CCR disposal areas), the PTS, a series of wetlands including the LLE wetland (which represents the discharge point and natural stream entering Long Lake) and Settling Pond #1 (SP1).

Settling Pond #1 (SPD/ SP1) EMS # E218582 is the authorized discharge location and compliance point for the South mine area before water enters Long Lake. The permitted (PE:7008) annual average rate of discharge is (0.01 m^3/s) measured over 365 days / year (April 1st to March 31st). In 2021 (January 1st to December 31st) the annual average rate of discharge rate was 0.0022 m^3/s and the cumulative discharge was 695,536 m^3.

7-South Water Management System: The 7-South system includes surface and underground pumping systems, surface ditches and sumps, a pre-settling pond, 7-South Surface Decant (7SSD) pond and the 7-South portal sump.

7-South Surface Decant (7SSD) EMS # E292069 is the authorized discharge location and compliance point for the 7-South mine area before water enters the Quinsam River. No discharge occurred from 7SSD 2021. All water is pumped into the 5-South Mine pool at borehole QU0513.

3.8 Erosion and Sediment Control

Erosion and sediment control measures utilized at the mine include:

- Use of properly graded and sloped roadside ditches and sumps, supplemented with sediment fencing and hay bales if required
- Temporary revegetation of erosion susceptible slopes
- Road grading is performed as needed

3.9 Soil Salvage and Overburden Stockpiling

Overburden material consisting of glacial till, siltstone, sandstone and topsoil have been removed from the various open pit operations and stockpiled in specific areas. The overburden material has been either stockpiled outside of the open pit voids or used for back-fill. In the north mining area, the overburden material was placed into three stockpiles outside the 2-North Pit, 2-North Stockpiles #1, 2 and 3. The material was not used to backfill the 2-North Pit as the space was needed for fine refuse disposal.

In the south mining area, overburden material was used to backfill the Borrow Pit and the 1 South Pit and partially backfill the 2 & 3-South Pits and highwalls. Surplus overburden material that was placed into stockpiles was used to reclaim the areas in 2015-2017. All topsoil stockpiles located in 2 and 3-South have been utilized. All overburden stockpiles in areas 2 and 3-South have been recontoured, top-soiled and seeded / tree planted to their final formation. The vegetation cover still requires establishment.

Table 2 and Table 3 in Appendix 2 of this report summarizes the locations, volumes and general composition of the overburden stockpiles at the mine, including cover soils for future reclamation use. There were changes to this inventory to report in 2019 (although no reclamation work was preformed). This includes removing certain areas where pervious reports (See section 1.6) have reported these areas as recontoured and top soiled. This changed the classification of these stockpiles and waste dumps as recontoured to their final formation, top soiled, seeded, tree planted and fertilized.

Where needed topsoil stockpiles are protected by signage to prevent disturbance and seeded with a grass mixture to control erosion and ingress of unwanted invasive vegetation.

North Pit Area

2N Stockpile No. 1 - this overburden stockpile was constructed immediately outside the margin of the coal sub-crop on the north end of the 2N pit. The sub-crop was buried by 10 to 15 meters of glacial clay till in this area. Prior to stockpile construction, the glacial till was cut by an excavator at an angle of 70 degrees to expose the sub-crop edge of the coal. As the coal was removed, overburden material was deposited to the north. The stockpile area has been only partially sloped. The western flank of the stockpile has been sloped down to the mine access road and has a thin layer of vegetation to prevent erosion. No topsoil has been applied to this stockpile. The eastern flank of the stockpile borders the existing open pit area. Approximately 60,000 m3 of overburden material has been removed from the 2N Stockpile No.1 and used to cap the 2 North coarse refuse dumps. No material was removed from the 2N Stockpile No.1 during this report period.

2 North Stockpile No. 2 - is constructed entirely separate from the 2 North open pit area as an out-of-pit stockpile. The overburden material was removed from the north end of the 2 North pit and end-dumped in lifts on a level ground surface that was cleared, grubbed and the topsoil removed prior to stockpile construction. The maximum height of this stockpile above the original ground surface is approximately 25 meters. The stockpile has been sloped at an average gradient of 32 degrees (approximately 63%). The surficial material in the stockpile is primarily glacial till with a mantle of some topsoil on the flanks of the pile. Over the past few years, material from the south end of the stockpile has been excavated and used, along with coarse coal rejects, to construct the existing tailings impoundment structure. In June 2003, some of the material was used to cap the coarse coal rejects dump. Approximately 41,000 m3 of overburden material from the 2N Stockpile #2 has been utilized in reclamation works over the past several years.

2N Stockpile No. 3 –located in the north mining area, is the largest of the overburden stockpiles. Much of the mine infrastructure is located on the stockpile, including the office, the mine-dry building, the warehouse, the equipment maintenance shop building, the coal preparation plant, the raw and clean coal stockpile areas and the underground material yards. The stockpile is generally 5 to 10 meters thick but attains a thickness of 25 meters on its eastern flank where progressive backfilling over the mined out 2 North footwall was carried out during the 2 North open pit operations. Over the past several years, a total of approximately 574,000 cubic meters of coarse refuse material has been added to the south dyke of the tailings pond which is part of the 2N Stockpile #3.

2-N Portal Stockpile - located above highwall by 2-North Portal is composed of 12804m^3 topsoil.

South Pit Area

3S Stockpile #1, was located southeast of the flooded 3 South Pit, was composed of two overburden stockpiles and a topsoil stockpile that originated from the 3 South Open Pit.

3S Stockpile #2, was located north of the flooded 3 South Pit, composed of overburden material that also originated from the 3 South Pit.

2S Stockpile #1 was located west of the reclaimed 2 South Pit, composed of overburden material that originated from the 1 and 2 South Pits and was used to backfill the 1 South Pit.

2S Stockpile #2 was also located west of the reclaimed 2 South Pit, composed of topsoil that originated from the 1 and 2 South Open Pits.

2S Stockpile #3, used to backfill the north end of the 2 South Pit, was overburden material that originated from the 2 South Pit.

2 South Borrow Pit - A borrow pit in the south mining area was developed for construction of an impoundment dam. Approximately 20,000 bank cubic metres (bcm) of glacial till were excavated for dam construction and the pit was later backfilled with waste rock from the 2 South mining area. This original pit was recontoured and revegetated. Further material was used and stored there from excavation and reclamation work preformed in the 2-South area. Approximately 5000 m^3 of material remains, consisting of siltstone, sandstone, till and topsoil.

7-South

7-South Overburden Stockpile: cover soil salvage and overburden were placed on an out-of-pit dump adjacent the pit. Currently there remains 11, 423 m^3 of material.

5-South

5-South Stockpile: An overburden stockpile was placed to the south of the pit consisting of 5,250 m^3 of topsoil, till and weathered rock.

3.10 Vegetation Management

Appendix 3 of this document provides the mine's *Invasive Plant Management Program*. There was no management program conducted in 2021 besides spot spraying of Glyphosate herbicide application applied at Settling Pond 1 and 4, 3-South dam and on the Tailings Dam for removal of Scotch Broom.

Glyphosate herbicide was applied to the roots of trees after brush cutting on the downstream slopes of SP1, SP4 and 3-South dam. Following the integrated Pest Management Regulations where a 10-meter pesticide-free zone is maintained around or along bodies of water.

3.11 Wildlife Protection

The Quinsam mine site is designated as a "*No Shooting Area*" under the BC Hunting and Trapping Regulations.

3.12 Archaeological Resources

Quinsam Coal has an "Archaeological Chance Find" procedure in-place to avoid or reduce adverse effects to archaeological or heritage resources discovered during activities at the mine. There are no known pre-contact or early-20th century habitation or industrial sites, no known pre-contact First Nations burials or historic graves, no old-growth forest stands, and no homesteading locations on the mine site.

4.0 RECLAMATION PROGRAM

4.1 Long Term Stability

Refer to Sections 1.6 and 1.7.

4.2 Revegetation

Refer to Sections 1.6 and 1.7.

4.3 Growth Medium

Salvage, management, and placement of suitable soils required to form the foundation for productive plant communities are the most important components of a successful reclamation program.

Growth Medium Salvage: Studies (physical and chemical properties) of the in-situ and stockpiled soils available for reclamation at the Quinsam Mine have indicated overall that they are suitable for reclamation purposes with key specific characteristics noted below.

- Soils from upland slopes and well drained portions of the landscape are textured from gravelly sand to gravelly sandy loam, indicating they will have lower nutrient and water holding capacity
- Soils from low relief and depressional areas are finer textured, moderately well decomposed organic soils which will greatly improve suitability for reclamation use.

Based on the characteristics noted above soil salvage places a priority of the finer textured organic soils and includes the salvage of coarse woody debris (stumps, roots and non-merchantable tree stems). The coarse woody debris provides important nutrient attributes and serves as habitat for a variety of organisms. As noted in Section 4.14 below reclamation research has also indicated advantages to salvaging the oxidized till layer immediately below the topsoil as growth medium material.

Growth Medium Management: Whenever possible, salvaged soil is placed directly onto an area being reclaimed. If direct placement isn't possible, salvaged soil is placed in stockpiles. The following steps are taken to maintain the quality of soil stockpiles:

- Graded and seeded to control erosion
- Signed to prevent inadvertent disturbance
- Inspected regularly and treated if required to control invasive plants.

Growth Medium Placement: Prior to placing the growth medium the base area will be prepared by:

- Re-sloping to a maximum angle of 26 degrees
- Loosening (example, by ripping with a crawler dozer) compacted areas

Growth medium will be placed over prepared areas in a 0.30m thick layer; maintaining a rough and loose configuration. Rock or blasted rock surfaces will be covered with 0.5m to 1.0m to till prior to placement of growth medium.

4.4 Landforms

Refer to Section 1.7 of this document.

4.5 Structures and Equipment

Refer to Section 1.7 of this document.

4.6 Waste Dump Reclamation

Refer to Sections 1.6 and 1.7 of this document.

4.7 Water Course Reclamation

Refer to Section 1.7 of this document.

4.8 Open Pit Reclamation

Refer to Sections 1.6 and 1.7 of this document.

4.9 Impoundment Reclamation

Refer to Section 1.7 of this document.

4.10 Road Reclamation

Refer to Section 1.7 of this document.

4.11 Infrastructure Decommissioning/Reclamation

Refer to Section 1.7 of this document.

4.12 Securing Openings

Where water seepage is possible, underground mine openings (portals) will be closed with pressure grouted concrete plugs. Other underground openings will be backfilled and covered with a layer of compacted till. This was completed at the 242-exploration adit and the 4-South Portals in 2016. In 2017 the 5-South Mine portal was backfilled and covered with a layer of compacted till. The 5-South portal still requires an engineered pressure grouted concrete plug as deigned by Golder Associates. This will be completed prior to further reclamation work preformed.

4.13 Disposal of Chemicals and Reagents

Waste oil and solvents are stored in sealed containers at a secure location and removed from site for recycling by Terrapure Nanaimo (RS15365). All scrap metal at the mine site is collected in designated containers and recycled.

4.14 Reclamation Research

Reclamation trials were established in the early 1980's as part of the environmental studies that were conducted in support of the mine opening. These trials were conducted on the 4-South test pit areas and demonstrated:

- The use of both oxidized till and topsoil as suitable substrate for trees to take root and grow. The oxidized till provides a supply of various plant essential macro- and micro-nutrients.
- Success in using red alder as a "cover crop" for Douglas-fir.

The 7-South overburden dump reclamation (described in Section 1.6 of this document) completed in 2015 and 2016 will serve as a research area to:

- Further evaluate the use of red alder as a "cover crop" for the Douglas-fir and as competition to the spread of invasive plants (Scotch Broom).
- Evaluate the use as different grass seeds mixes to control soil erosion and the spread of invasive plants.
- Further evaluate the use of coarse woody debris and a supplement to the growth medium

4.15 5-Year Reclamation Plan

Currently the mine is in receivership with future reclamation plans projected over a 5-year plan.

Areas of focus could include:

- Permitting 3-South and seep discharges,
- Site wide water balance and seepage rate calculation
- Source terms update

- Water Quality Effects Assessment
- Tailings Storage Facility closure plan
- Invasive plant management
- Revegetation
- PAG-CCR removal from 2-North Pit Pond (blending with non PAG-CCR or subaqueous storage in 2-Mains 7-South)

5.0 RECLAMATION LIABILITY COST ESTIMATE

A report entitled "*Draft Reclamation Closure Plan 2020"* was submitted in January 2020, which was prepared and submitted to EMLI as a separate, confidential document. This report describes the updated mine-wide reclamation and closure plan and associated liability cost estimated.

Appendix 1: Plan Maps

MINE GRID NORTH
TRUE NORTH
106,000N
104,000N
100,000N
98,000N
98,000E
100,000E
102,000E
104,000E
106,000E
QUINSAM RIVER
E0126402, WA
E207411, WC
Settling Pond #4
E207409, WD
E207412, WP
PDSR
E283433, 2NPS
3M2N
2-North
5M#2 (Dewatering Well)
1M2N (Dewatering Well)
Tailings Disposal Facility
Middle Quinsam Lake
E292126, SDS
Q77-78
MW2010
E206618, MQL
E286930, QRDS1
E0900504, WB
Q05-13
5SMW (Dewatering Well)
5-South
7-South
No-Name Lake
Long Lake
E217018, NNL
E217017, NNO
3-South Pit
E217015, 3S
2SC
E292131, LLS & LLSM
E206619, LLM
E219412, LLO
E292109, 7S
E292110, 7SPS
E292069, 7SSD
2-South Pit
2-South Underground
E292127, 2S
2SI
INF (QU11-11)
E292129, 4S-Lo
E292130, LLE
E217014, SPC
E292128, 3S77
E218582, SPD
E292112, LWO
7-South Portal
E292113, 7SQR
4-South
7-South Area 5
Future Mining Area
BCR-EFF
SPC-EFF
Long Lake Seep Treatment System
Settling Pond #1 (SPD)
E292232, IR8
E297231, IR6
E299256, IRQR
E297230, IR1
E292118, LQL
Lower Quinsam Lake
METERS
Underground PAG-CCR Disposal
Underground Tailings Disposal
EMS ID #, Station Code
Surface Water Flow
Pumped Water Flow
QUINSAM COAL
Updated Water Monitoring Map
15/03/22
SCALE: 1:10,000
DESIGNED:
UPDATED: SS
CHECKED:
APPROVED:
2021-2022 SITE PLAN
SURFACE WATER MONITORING
2021-2022 Annual Water Quality Report

MINE GRID NORTH
TRUE NORTH
QUINSAM RIVER
Settling Pond #4
MW00-1S & 1D
MW00-6S & 6D
Middle Quinsam Lake
Tailings Disposal Facility
2-North
3M2N
5M#2
1M2N
QU-10-11S & 11D
QU-10-10S & 10D
QU-08-21GS & 21GD
QU-10-13D
QU-11-05S & 05D
QU-11-09S & 09M
QU-08-13A & 13B
QU-14-10
QUINSAM RIVER
5-South
7-South
SSDW
1M7S(sump)
No-Name Lake
Long Lake
MW12-23
MW12-24
MW00-2
3-South Pit
MW00-4
2-South Underground
2-South Pit
INF (QU11-11)
QU-10-09S & 09D
QU-10-07D
QU-78-161
QU-11-01
QU-10-08D
4-South
Long Lake Seep Treatment System
Settling Pond #1
QU-11-28
QU-08-10
7-South Portal
7SA5
QU-11-21
7-South Area 5
Future Mining Area
QU-11-18S & 18D
QU-12-06
242NW
QU-11-36D
Lower Quinsam Lake
106,000N
104,000N
100,000N
98,000N
96,000E
98,000E
100,000E
102,000E
104,000E
106,000E
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 Water Monitoring Map
15/03/22
SCALE: 1:10,000
DESIGNED:
UPDATED: SS
CHECKED:
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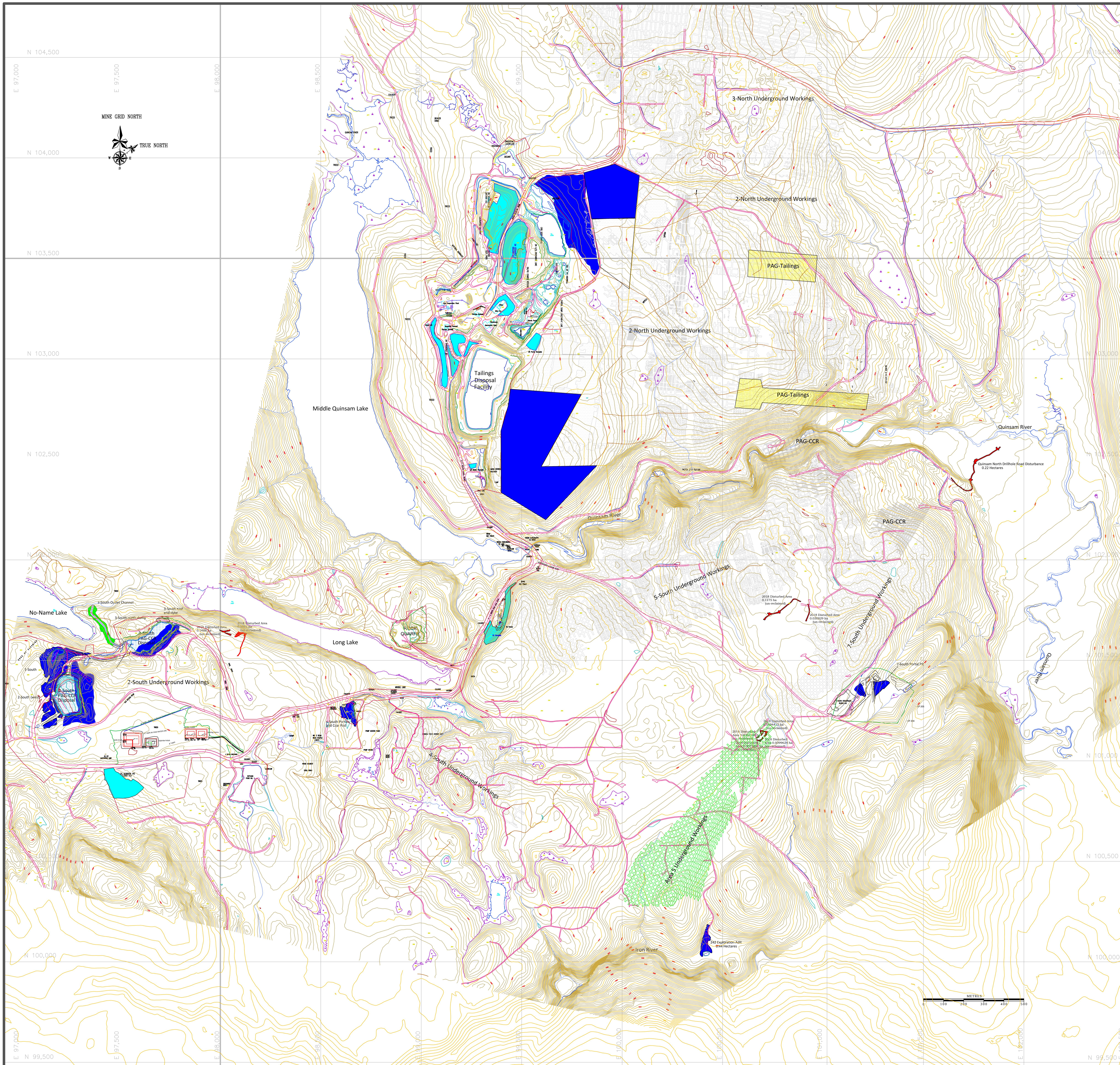
2021-2022 SITE PLAN
GROUND WATER MONITORING
2021-2022 Annual Water Quality Report



LEGEND

- Disturbed
- Ongoing
- Stockpiles

2021 Annual Reclamation Report

Stockpile Locations and Revegetated Areas

Scale: 1: 6,250	**Appendix I Plan Map**

Map Updated By: SS

Appendix 2: Tables

Appendix 2	
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Table 24	Water Chemistry for Mine Water (2-South Mine Pool at Long Lake Seep)
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Table 35	Ex-situ Groundwater 2 / 3 North
Table 36	Ex-situ Groundwater River Barrier Pillar
Table 37	Ex-situ Groundwater River Barrier Pillar
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TABLE 1
Summary of Areas Disturbed and Reclaimed to December 31, 2021
Company: Quinsam Coal Corporation Permit No.: C-172

	MINING		RECLAMATION									
	AREA		AREA		AREA		AREA		AREA REVEGETATED*		Notes	LAND USE
DISTURBANCE	DISTURBED (ha)		RECONTOURED (ha)		SEEDED/PLANTED (ha)		FERTILIZED (ha)		(ha)			OBJECTIVE**
	2021	TOTAL***	2021	TOTAL***	2021	TOTAL***	2021	TOTAL***	2021	TOTAL***		
WASTE DUMPS	-	25.470	-	28.321	-	23.120	-	23.121	-	20.100	7S test plots - Recontoured, seeded and revegetated. 2S around weather stn, 3-S North Dump. All waste dumps in 2-S and 3-S are recontoured to final design. Vegetation on-going in all areas of 2-S and 3-S.	wildlife habitat
TAILINGS PONDS	-	2.400	-	2.400	-	0.000	-	0.000	-	0.000		wildlife habitat
PLANT SITE	-	Part of Waste Dump #3	-	Part of Waste Dump #3	-	0.000	-	0.000	-	0.000		Forestry
ROADS	-	13.063	-	0.000	-	0.000	-	0.000	-	0.000		wildlife habitat
ADMINISTRATION	-	Part of Waste Dump #3	-	Part of Waste Dump #3	-	0.000	-	0.000	-	0.000		wildlife habitat
PIT (Trenches)	-	46.948	-	29.719	-	33.006	-	28.920	-	26.200	2-South west including highwalls (west and east) re-contoured and planted, 3-South highwall, 3-South South Dyke re-contoured and planted & 3-South Dam recontoured completed to final design, 7-South West of portals re-contoured and planted , 1-South Sump, 1-South Pit re-contoured and planted. All areas are on-going for designated vegetation cover. Scotch broom infestation has occurred with low tree survival rates in the 1 though 3 South mine areas.	21.1 Hectares Reclaimed to Tree Planting Standards
4S & 242 Adits (PITS)	-	1.150	-	1.010	-	1.010	-	1.010	-	0.000	242 complete waiting for vegetation cover for one more year. Area around 4S Quonset/vent/ raise/electrical and pads to reclaim. 4-South Pad "ongoing" as vegetation cover requires invasive plant management.	wildlife habitat
3_South Outlet Channel (Pit)	-	0.880	-	0.000	-	0.570	-	0.570	-	0.000	0.31 ha is rip rap ditch, as per final closure plan.	Other
STOCKPILES	-	6.410	-	5.600	-	15.200	-	5.800	-	5.600	3-S and 2-S surrounding area used for final reclamation.	1.7 Hectares Reclaimed to Tree Planting Standards
LINEAR (Exploration Drill holes/pads)	-	7.626	-	0.821	-	0.000	-	0.000	-	0.106	in 2015 2S-3S spillway rip rap ditch is as per final closure plan.	forestry
(Settling Ponds)	-	5.380	-	0.000	-	0.000	-	0.000	-	0.000		wildlife habitat
Long Lake Seep Passive Treatment System	-	9.050	-	0.000	-	0.570	-	0.000	-	0.000		wildlife habitat
Logging in 2-North*****	-	37.820	-	-	-	12.570	-	0.000	-	0.000		Other
Rock Quarry	-	2.430	-	0.000	-	0.000	-	0.000	-	0.000		Other
Cast Blast Area	-	11.800	-	40.100	-	33.300	-	33.300	-	33.300		8.3 Hectares Reclaimed To Tree Planting Standards
TOTAL	**0.000**	**170**	**0**	**108**	**0**	**119**	**0**	**93**	**0**	**85**		

*	In order for an area to be recorded as "re-vegetated" it must have supported vegetation that will lead to the designated final land use objective.
**	Specify land use. Options include: forestry, grazing, wildlife habitat, recreation, agricultural, industrial, residential and other.
***	Total up to December 31, 2021
****	0.750 ha that was applied to Linear Recontoured in 2015 has been moved up to Pit (Trenches) Recontoured. This area represents the ditch line between the 2-South and 3-South pit, originally summed under Pit Disturbance
*****	Logging in 2-North has been corrected in 2019 from 54.78 to 34.82 Hectares

TABLE 2
Quantities of Waste Rock, Tailings, Low Grade ORE, Coarse Reject and Other Mine Waste as of December 31, 2021
Company: Quinsam Coal Permit No.: C-172

Name of Waste Pile or Pond	Acid Generating Waste		Potentially Acid Generating Waste		Non-Acid Generating Waste	
Waste Dumps / Stockpiles	**2021**	**Total**	**2021**	**Total**	**2021**	**Total (m3)**
1) 2-North Overburden Stockpile # 1	0	0	0	0	0	400,000
2) 2-North Overburden Stockpile #2	0	0	0	0	0	267,400
3) 2-North Overburden Stockpile #3	0	0	0	0	0	1,800,000
Waste Dumps Total	**0**	**0**	**0**	**0**	**0**	**2,467,400**
Tailing Disposal Areas	**2021**	**Total**	**2021**	**Total**	**2021 (tonnes)**	**Total (tonnes)**
1. North Fine Tailings (Old)	0	0	0	0		192,883
2. 2-North Fine Tailings Empoundment	0	0	0	0	0	1,570,623
3. Underground 2 North, 7S Fine Tailings	0	0	0	0	0	0
Tailings Total	**0**	**0**	**0**	**0**	**0**	**1,763,506**
Low Grade Ore / Coarse Refuse Disposal	**2021**	**Total**	**2021**	**Total**	**2021 (tonnes)**	**Total (tonnes)**
1. 2N & 4S coarse refuse (pit northwest of the 2 North operation)[A]	0	0	0	0	0	711,756
2. Coarse refuse [the Cast Blast borrow pit area & material (2N) used for tailings dam]	0	0	0	0	0	1,346,018
3. North Fine Tailings (old) Used for NPAG CCR[B],[C]	0	0	0	0	0	42,892
4. 4S / 2N coarse refuse in 3 South Pit	0	0	0	196,793	0	0
5. 2N/5S coarse refuse in 2 North Pit Pond	0	0	0	180,853	0	0
6. 2 South Pit	0	0	0	248,956		0
7. 7 South Rock Disposed of in 2 South Pit	0	0	0	11,100	0	0
8. 5 South 87 Panel (CCR) Underground Storage	0	0	0	81,535	0	0
9. 7 South (CCR) 2-Mains Undreground Storage	0	0	0	112993	0	0
Coarse Refuse Total	**0**	**0**	**0**	**832,230**	**0**	**2,100,666**

[A] - 2N/3N coarse refuse that was used in the construction of the tailings dam.

[B] - 2-North non-PAG CCR

[C] - non-PAG construction cover of liner for the 2-South Pit

TABLE 3
Stockpile Locations, Volumes and Composition
2021

Stockpile #	Location	Category	Volume (m^3)	Composition
2N Stockpile #1	West of the 2-North Pit void and east of the access road.	Partially revegetated	400,000	80% mixed rock 20% Glacial Till
2N Stockpile #2	West of the access road and west of Stockpile #1.	Partially revegetated	267,400	70% Glacial Till 30% mixed rock
2N Stockpile #3	South of Stockpile #1 and #2 Current site of the Administration offices, Mine Dry, Maintenance Shops and CPP.	Partially revegetated	1,800,000	80% mixed rock 20% Glacial Till
2N Portal Stockpile	Above highwall by 2-North Portal	Partially revegetated	12,804	Topsoil
2S Borrow Pit	Southeast of the 2-South Pit	Partially revegetated	5,000	60% siltstone, 25% Sandstone, 10% Till, 5%Topsoil
5S Stockpile	South of 5-S Portal Entry	Recontoured / Disturbed	5,250	Topsoil, Till and Weathered Rock
7S Stockpile	Entrance to the 7-South portal area and conveyor system	Partially revegetated	11,423	Topsoil and Till
Used Stockpiles / Waste dumps	**Location**	**Category of disturbance remaining**	**Comment**	**Composition**
3S Stockpile #1-3	Southeast of the 3-South Pit	Recontoured to final formation	Used for backfill and re-sloping of 3-S highwall. Recontoured / top soiled to final formation. Revegetation Ongoing.	60% Siltstone 25% Sandstone 10% Till 5% Topsoil
3S Stockpile #1-5	Southeast of the 3-South Pit	Recontoured to final formation	Used for backfill and re-sloping of 3-S highwall. Recontoured / top soiled to final formation. Revegetation Ongoing.	
3S Stockpile #2	North of the 3-South Pit	Recontoured to final formation	Used for backfill and re-sloping of 3-S highwall. Recontoured / top soiled to final formation. Revegetation Ongoing.	
2S Stockpile #1	West of the 2-South Pit	Recontoured to final formation	Used for recontouring 1S and 2S, Recontoured / top soiled to final formation. Revegetation Ongoing.	
2S Stockpile #3	North of the 2-South Pit	Recontoured to final formation	Used for recontouring 2S West and highwall. Recontoured / top soiled to final formation. Revegetation Ongoing.	
2S Stockpile #2	West of the 2-South Pit	Recontoured to final formation	Recontoured / top soiled to final formation. Revegetation Ongoing.	
2S Stockpile 1-1	West of 2-South pit	Recontoured to final formation	Used for reclamation of 2S West. Revegetation Ongoing.	Topsoil
2S Stockpile 1-2	Above highwall 2-South pit	Recontoured to final formation	Used for reclamation in 2S highwall- Ongoing.	Topsoil
3S Stockpile 1-4	Southeast of the 3-South Pit	Recontoured to final formation	Used for reclamation in 3-S. Revegetation Ongoing	Topsoil

TABLE 4
Water Cover Readings From 2-North Pond
303 (MASL) Elevation of PAG-CCR

Date	Staff Gauge (m)	Date	Staff Gauge (m)
04-Jan-21	>2m Water Level Above Staff Gauge	05-Jul-21	>2m Water Level Above Staff Gauge
11-Jan-21		12-Jul-21	
18-Jan-21		19-Jul-21	
25-Jan-21		26-Jul-21	1.78
01-Feb-21		02-Aug-21	1.35
08-Feb-21		09-Aug-21	1.10
15-Feb-21		16-Aug-21	1.60
22-Feb-21		23-Aug-21	1.25
01-Mar-21		30-Aug-21	1.89
08-Mar-21		06-Sep-21	1.52
15-Mar-21		13-Sep-21	1.30
22-Mar-21		20-Sep-21	1.39
29-Mar-21		27-Sep-21	1.39
05-Apr-21		04-Oct-21	1.39
12-Apr-21		11-Oct-21	1.57
19-Apr-21		18-Oct-21	1.45
26-Apr-21		25-Oct-21	1.74
03-May-21		01-Nov-21	1.70
10-May-21		08-Nov-21	1.68
17-May-21		15-Nov-21	1.68
24-May-21		22-Nov-21	1.52
31-May-21		29-Nov-21	1.60
07-Jun-21		06-Dec-21	1.69
14-Jun-21		13-Dec-21	1.75
21-Jun-21		20-Dec-21	1.59
28-Jun-21		27-Dec-21	1.50
Water levels are maintained by pumping from 2-North mine pool			
Minimum water cover = 1.50 m			

TABLE 5

Water Cover Readings From 2-South Pit 2021

Date	Water Cover (m)	Water Cover (mASL)	PAG Elevation (mASL)	Required Water Elevation (mASL)
04-Jan-21	1.960	349.46	347.50	348.50
11-Jan-21	1.980	349.48	347.50	348.50
18-Jan-21	1.980	349.48	347.50	348.50
25-Jan-21	1.980	349.48	347.50	348.50
01-Feb-21	1.400	348.90	347.50	348.50
08-Feb-21	1.400	348.90	347.50	348.50
15-Feb-21	1.400	348.90	347.50	348.50
22-Feb-21	1.400	348.90	347.50	348.50
01-Mar-21	1.400	348.90	347.50	348.50
08-Mar-21	1.400	348.90	347.50	348.50
15-Mar-21	1.400	348.90	347.50	348.50
22-Mar-21	1.000	348.50	347.50	348.50
29-Mar-21	1.000	348.50	347.50	348.50
05-Apr-21	1.700	349.20	347.50	348.50
12-Apr-21	1.700	349.20	347.50	348.50
19-Apr-21	1.700	349.20	347.50	348.50
26-Apr-21	1.700	349.20	347.50	348.50
03-May-21	1.700	349.20	347.50	348.50
10-May-21	1.700	349.20	347.50	348.50
17-May-21	1.700	349.20	347.50	348.50
24-May-21	1.700	349.20	347.50	348.50
31-May-21	1.510	349.01	347.50	348.50
07-Jun-21	1.370	348.87	347.50	348.50
14-Jun-21	1.420	348.92	347.50	348.50
21-Jun-21	1.420	348.92	347.50	348.50
28-Jun-21	1.280	348.78	347.50	348.50
05-Jul-21	1.220	348.72	347.50	348.50
12-Jul-21	1.010	348.51	347.50	348.50
19-Jul-21	1.165	348.67	347.50	348.50
26-Jul-21	1.430	348.93	347.50	348.50
02-Aug-21	1.500	349.00	347.50	348.50
09-Aug-21	1.570	349.07	347.50	348.50
16-Aug-21	1.530	349.03	347.50	348.50
23-Aug-21	1.420	348.92	347.50	348.50
30-Aug-21	1.260	348.76	347.50	348.50
06-Sep-21	1.160	348.66	347.50	348.50
13-Sep-21	1.100	348.60	347.50	348.50
20-Sep-21	1.060	348.56	347.50	348.50
27-Sep-21	1.010	348.51	347.50	348.50
04-Oct-21	1.030	348.53	347.50	348.50
11-Oct-21	1.090	348.59	347.50	348.50
18-Oct-21	1.110	348.61	347.50	348.50
25-Oct-21	1.750	349.25	347.50	348.50
01-Nov-21	1.880	349.38	347.50	348.50
08-Nov-21	1.830	349.33	347.50	348.50
15-Nov-21	1.410	348.91	347.50	348.50
22-Nov-21	1.140	348.64	347.50	348.50
29-Nov-21	1.300	348.80	347.50	348.50
06-Dec-21	1.400	348.90	347.50	348.50
13-Dec-21	1.300	348.80	347.50	348.50
20-Dec-21	1.500	349.00	347.50	348.50
27-Dec-21	1.650	349.15	347.50	348.50

TABLE 6
Water Cover Readings from 3 South Pit 2021

Date	Water Cover (m)	Water Elevation (MASL)	PAG Elevation (MASL)	Required Water Elevation (mASL)
04-Jan-21	1.980	326.41	324.43	325.54
11-Jan-21	1.640	326.07	324.43	325.54
18-Jan-21	1.380	325.81	324.43	325.54
25-Jan-21	1.380	325.81	324.43	325.54
01-Feb-21	1.380	325.81	324.43	325.54
08-Feb-21	1.470	325.90	324.43	325.54
15-Feb-21	1.300	325.73	324.43	325.54
22-Feb-21	1.300	325.73	324.43	325.54
01-Mar-21	1.300	325.73	324.43	325.54
08-Mar-21	1.300	325.73	324.43	325.54
15-Mar-21	1.300	325.73	324.43	325.54
22-Mar-21	1.370	325.80	324.43	325.54
29-Mar-21	1.370	325.80	324.43	325.54
05-Apr-21	1.300	325.73	324.43	325.54
12-Apr-21	1.280	325.71	324.43	325.54
19-Apr-21	1.280	325.71	324.43	325.54
26-Apr-21	1.280	325.71	324.43	325.54
03-May-21	1.280	325.71	324.43	325.54
10-May-21	1.280	325.71	324.43	325.54
17-May-21	1.280	325.71	324.43	325.54
24-May-21	1.280	325.71	324.43	325.54
31-May-21	1.470	325.90	324.43	325.54
07-Jun-21	1.460	325.89	324.43	325.54
14-Jun-21	1.460	325.89	324.43	325.54
21-Jun-21	1.460	325.89	324.43	325.54
28-Jun-21	1.460	325.89	324.43	325.54
05-Jul-21	1.590	326.02	324.43	325.54
12-Jul-21	1.680	326.11	324.43	325.54
19-Jul-21	1.700	326.13	324.43	325.54
26-Jul-21	1.790	326.22	324.43	325.54
02-Aug-21	1.810	326.24	324.43	325.54
09-Aug-21	1.810	326.24	324.43	325.54
16-Aug-21	1.870	326.30	324.43	325.54
23-Aug-21	1.870	326.30	324.43	325.54
30-Aug-21	1.800	326.23	324.43	325.54
06-Sep-21	1.890	326.32	324.43	325.54
13-Sep-21	1.870	326.30	324.43	325.54
20-Sep-21	1.890	326.32	324.43	325.54
27-Sep-21	1.290	325.72	324.43	325.54
04-Oct-21	1.270	325.70	324.43	325.54
11-Oct-21	1.290	325.72	324.43	325.54
18-Oct-21	1.300	325.73	324.43	325.54
25-Oct-21	1.490	325.92	324.43	325.54
01-Nov-21	1.400	325.83	324.43	325.54
08-Nov-21	1.500	325.93	324.43	325.54
15-Nov-21	1.590	326.02	324.43	325.54
22-Nov-21	1.290	325.72	324.43	325.54
29-Nov-21	1.200	325.63	324.43	325.54
06-Dec-21	1.200	325.63	324.43	325.54
13-Dec-21	1.400	325.83	324.43	325.54
20-Dec-21	1.300	325.73	324.43	325.54
27-Dec-21	1.100	325.53	324.43	325.54

Table 7: Water Chemistry Over PAG-CCR Areas

EMS ID: E207412

Station Description: 2 North Pit Pond PAG-CCR

Site ID: WP

Date		04-Jan-2021	01-Feb-2021	01-Mar-2021	06-Apr-2021	06-May-2021	01-Jun-2021	05-Jul-2021	09-Aug-2021	01-Sep-2021	04-Oct-2021	01-Nov-2021	07-Dec-2021	Summary Statistics									
Parameter	Unit													Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	460	480	550	700	690	1100	1300	580	1400	1100	880	660	825	460	1400	12	770	324	572	695	1100	0
TSS	mg/L	10	<1.0	9.2	<1.0	1.2	4.4	16.0	2	2.4	3.2	<1.0	2	4.33	<1.0	16	12	2.36	4.88	1.0	2.2	5.6	3
Alk-T	mg/L	120	240	280	320	230	340	240	200	360	410	310	160	267	120	410	12	253	85	222	260	325	0
Acidity83	mg/L	5.1	<1.0	<1.0	<1.0	3.3	2.2	2.5	<1.0	2.8	3.9	<1.0	8.6	2.6	<1.0	8.6	12	1.6	2.5	<1.0	2.4	3.5	5
Al-T	mg/L	0.245	0.052	0.053	0.025	0.016	0.007	0.012	<0.0030	<0.0060	0.023	0.113	0.034	0.049	<0.0030	0.245	12	0.021	0.069	0.010	0.024	0.052	2
As-T	mg/L	0.00079	0.00054	0.00034	0.00052	0.00037	0.00053	0.00092	0.00025	0.00040	0.00242	0.00062	0.00019	0.00066	0.00019	0.00242	12	0.00052	0.00059	0.00036	0.00052	0.00066	0
Ba-T	mg/L	0.0145	0.0130	0.0122	0.0140	0.0135	0.0166	0.0160	0.0159	0.0129	0.0142	0.0138	0.0127	0.0141	0.0122	0.0166	12	0.0140	0.0014	0.0130	0.0139	0.0149	0
B-T	mg/L	0.192	0.631	0.500	0.735	0.781	0.970	1.150	1.020	1.030	1.130	0.888	0.360	0.782	0.192	1.150	12	0.704	0.309	0.598	0.835	1.022	0
Cd-T	mg/L	0.000030	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020	<0.000010	<0.000020	<0.000020	0.000026	0.000027	0.0000123	<0.000010	0.00003	12	0.0000097	0.0000096	<0.000010	<0.000020	0.000014	9
Ca-T	mg/L	158	204	124	150	138	191	167	231	196	194	180	207	178	124	231	12	175	31	156	185	198	0
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0010	<0.0020	<0.0020	<0.0010	<0.0010	0.00067	<0.0010	<0.0020	12	0.00063	0.00025	<0.0010	<0.0010	<0.0020	12
Co-T	mg/L	0.00177	0.00074	0.00074	0.00959	0.00262	0.00084	<0.00040	<0.00020	<0.00040	0.00047	0.00361	0.00337	0.002021	<0.00020	0.00959	12	0.000939	0.002688	0.000402	0.00079	0.002808	3
Cu-T	mg/L	0.00356	0.00061	0.0011	0.00066	0.00055	<0.0010	0.0015	<0.00050	<0.0010	0.0012	0.0021	0.00134	0.001156	<0.00050	0.00356	12	0.000898	0.000925	0.000538	0.000880	0.00138	3
Hard-T	mg/L	463	606	380	458	437	580	542	703	592	582	547	633	543	380	703	12	536	92	461	563	595	0
Fe-T	mg/L	0.461	0.154	0.233	0.360	0.134	1.040	0.422	0.071	0.284	2.190	0.613	0.160	0.510	0.071	2.190	12	0.327	0.592	0.159	0.322	0.499	0
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00040	<0.00040	<0.00020	<0.00040	<0.00040	<0.00020	<0.00020	0.000133	<0.00020	<0.00040	12	0.000126	0.000049	<0.00020	<0.00020	<0.00040	12
Mg-T	mg/L	16.6	23.6	17.2	20.3	22.4	25	30.6	30.4	25.1	23.8	23.8	28.3	23.9	16.6	30.6	12	23.5	4.5	21.9	23.8	25.9	0
Mn-T	mg/L	0.076	0.125	0.049	0.256	0.061	0.343	0.046	0.190	0.056	0.134	0.171	0.143	0.138	0.046	0.343	12	0.112	0.092	0.060	0.130	0.176	0
Hg-T	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	9.5E-07	<0.0000019	<0.0000019	12	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	12
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0020	<0.0020	<0.0010	<0.0020	<0.0020	<0.0010	<0.0010	0.0007	<0.0010	0.0011	12	0.0007	0.0003	<0.0010	<0.0010	<0.0020	11
Ni-T	mg/L	0.0066	0.0024	0.0029	0.0200	0.0143	0.0063	`	<0.0011	<0.0020	<0.0020	0.0066	0.0073	0.0060	<0.0020	0.0200	12	0.0039	0.0059	0.0019	0.0046	0.0068	2
K-T	mg/L	1.23	3.52	2.18	3.10	3.33	4.67	5.87	<0.0012	6.07	5.95	4.46	1.80	4.07	1.23	6.65	12	3.63	1.82	2.87	3.99	5.89	0
S-T	mg/L	150	283	181	233	257	344	422	<0.0013	396	381	320	222	305	150	473	12	288	100	230	301	384	0
Se-T	mg/L	0.00031	<0.00010	0.0001	<0.00010	<0.00010	<0.00020	<0.00020	<0.0014	<0.00020	<0.00020	0.00016	0.00021	0.000115	<0.00010	0.00031	12	0.000096	0.000078	<0.00010	<0.00020	0.000115	8
Si-T	mg/L	2.43	2.96	2.09	2.57	2.25	2.40	3.55	<0.0015	3.31	3.74	3.66	3.00	2.94	2.09	3.74	12	2.89	0.58	2.42	2.98	3.41	0
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000040	<0.000040	<0.0016	<0.000040	<0.000040	<0.000020	<0.000020	0.0000133	<0.000020	<0.000040	12	0.0000126	0.0000049	<0.000020	<0.000020	<0.000040	12
Na-T	mg/L	37	244	175	258	269	350	452	<0.0017	424	448	304	78	293	37	482	12	241	146	227	287	430	0
Sr-T	mg/L	0.747	1.620	1.050	1.260	1.370	1.940	2.040	<0.0018	2.260	2.120	1.660	1.280	1.651	0.747	2.460	12	1.566	0.525	1.275	1.640	2.060	0
Zn-T	mg/L	0.0061	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0019	<0.010	<0.010	0.011	0.0071	0.0047	<0.0050	0.0110	12	0.0042	0.0026	<0.0050	<0.010	0.0053	9
Al-D	mg/L	0.0035	0.0130	0.0118	0.0043	0.0033	<0.0060	<0.0060	<0.0020	<0.0060	0.0049	0.0385	0.0156	0.0089	<0.0060	0.0385	12	0.0059	0.0104	<0.0060	0.0039	0.0121	4
As-D	mg/L	<0.00010	0.00018	0.00018	0.00036	0.00027	0.00033	0.00062	<0.0021	0.00026	0.00044	0.00019	0.00013	0.00027	<0.00010	0.00062	12	0.00023	0.00015	0.00018	0.00027	0.00034	1
Ba-D	mg/L	0.0159	0.0112	0.0116	0.0139	0.0118	0.0149	0.0143	<0.0022	0.013	0.0123	0.0127	0.0122	0.0133	0.0112	0.0159	12	0.0132	0.0016	0.0121	0.0129	0.0145	0
B-D	mg/L	0.146	0.507	0.476	0.743	0.731	0.940	1.080	<0.0023	1.100	1.070	0.774	0.354	0.764	0.146	1.250	12	0.668	0.340	0.499	0.758	1.073	0
Be-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.0024	<0.00020	<0.00010	<0.00010	<0.00010	0.000067	<0.00010	<0.00020	12	0.000063	0.000025	<0.00010	<0.00010	<0.00020	12
Cd-D	mg/L	0.000026	0.000013	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020	<0.0025	<0.000020	<0.000010	0.000019	0.000028	0.000012	<0.000010	0.00003	12	0.00001	0.00001	<0.000010	<0.000020	0.00001	8
Ca-D	mg/L	224	133	123	145	130	185	150	<0.0026	213	185	172	209	174	123	224	12	170	37	142	178	210	0
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0027	<0.0020	<0.0010	<0.0010	<0.0010	0.00067	<0.0010	<0.0020	12	0.00063	0.00025	<0.0010	<0.0010	<0.0020	12
Co-D	mg/L	<0.00020	0.00111	0.00054	0.00849	0.00102	0.00065	<0.00040	<0.0028	<0.00040	0.00039	0.00334	0.00326	0.001625	<0.00020	0.00849	12	0.000689	0.002439	<0.00040	0.000595	0.001648	4
Cu-D	mg/L	0.00023	0.00046	0.00044	0.00032	0.00031	0.0005	0.00117	<0.0029	<0.00040	0.00037	0.0009	0.00088	0.00050	<0.00040	0.00117	12	0.000422	0.000316	0.00029	0.000405	0.000595	2
Hard-D	mg/L	626	410	375	448	407	566	493	<0.0030	644	560	525	644	530	375	672	12	521	104	438	542	630	0
Fe-D	mg/L	0.0147	<0.0050	<0.0050	0.0060	<0.0050	<0.010	0.018	<0.0031	0.0150	0.0071	<0.0050	<0.0050	0.00694	<0.0050	0.018	12	0.00522	0.00568	<0.0050	<0.010	0.009	7
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00040	<0.00040	<0.0032	<0.00040	<0.00020	<0.00020	<0.00020	0.000133	<0.00020	<0.00040	12	0.000126	0.000049	<0.00020	<0.00020	<0.00040	12
Mg-D	mg/L	16.0	19.1	16.5	21.3	20.3	25.3	28.7	<0.0033	27.5	23.5	22.8	29.4	23.3	16.0	29.4	12	22.8	4.8	20.0	23.1	27.8	0
Mn-D	mg/L	0.013	0.102	0.039	0.213	0.018	0.290	0.025	<0.0034	0.047	0.118	0.163	0.137	0.111	0.013	0.290	12	0.075	0.088	0.036	0.110	0.165	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0035	<0.0000019	<0.0000019	<0.0000019	<0.0000019	9.5E-07	<0.0000019	<0.0000019	12	0.00000095	0.000000	<0.0000019	<0.0000019	<0.0000019	12
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0036	<0.0020	<0.0010	<0.0010	<0.0010	0.00067	<0.0010	<0.0020	12	0.00063	0.00025	<0.0010	<0.0010	<0.0020	12
Ni-D	mg/L	0.0053	0.0029	0.0027	0.0181	0.0099	0.0055	<0.0020	<0.0037	<0.0020	0.0012	0.0061	0.0069	0.00513	<0.0020	0.0181	12	0.00336	0.00498	0.00115	0.00410	0.0063	3
K-D	mg/L	0.929	2.260	2.290	3.170	3.000	4.590	5.580	<0.0038	6.430	5.710	4.410	1.870	3.873	0.929	6.430	12	3.379	1.865	2.282	3.790	5.612	0
S-D	mg/L	178	185	176	250	235	352	413	<0.0039	425	373	309	223	297	176	454	12	281	102	213	279	383	0
Se-D	mg/L	0.0006	0.00011	0.0001	<0.00010	<0.00010	<0.00020	<0.00020	<0.0040	<0.00020	<0.00010	0.00018	0.00021	0.000146	<0.00010	0.0006	12	0.00011	0.000151	0.000087	<0.00020	0.000128	7
Si-D	mg/L	2.09	2.46	2.21	2.45	2.08	2.51	3.46	<0.0041	3.33	3.66	3.00	2.93	2.81	2.08	3.66	12	2.76	0.59	2.39	2.72	3.36	0
Na-D	mg/L	5	161	169	269	247	342	425	<0.0042	483	425	302	81	281	5	483	12	195	155	167	286	425	0
Sr-D	mg/L	0.71	1.05	1.04	1.27	1.24	1.87	2.00	<0.0043	2.23	2.09	1.52	1.33	1.56	0.71	2.34	12	1.47	0.53	1.19	1.43	2.02	0
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0044	<0.010	<0.0050	<0.0050	0.0052	0.00356	<0.0050	0.0052	12	0.00335	0.00131	<0.0050	<0.0050	<0.010	11
pH-F	pH Units	7.79	8.22	7.35	8.00	8.07	7.95	7.95	<0.0045	7.67	7.80	7.85	7.92	7.81	7.17	8.22	12	7.81	0.30	7.76	7.88	7.96	0
Cond-F	uS/cm	1132	1420	1452	1981	2100	2750	2940	<0.0046	3290	1948	1967	1731	2169	1132	3320	12	2055	738	1661	1974	2798	0

Table 8: Water Chemistry Over PAG-CCR Areas

EMS ID: E217015

Station Description: 3 South Pit

Site ID: 3S

Date / Parameter	Unit	04-Jan-2021	11-Jan-2021	01-Feb-2021	01-Feb-2021	01-Mar-2021	06-Apr-2021	10-May-2021	01-Jun-2021	05-Jul-2021	09-Aug-2021	01-Sep-2021	01-Sep-2021	4-Oct-21	1-Nov-21	7-Dec-21	Summary Statistics: Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	450	530	630	630	500	590	590	620	620	520	640	650	550	680	500	580	450	680	15	576	67	525	590	630	0
TSS	mg/L																									
Alk-T	mg/L	140		230	230	210	170	150	130	130	120	120	120	160	180	160	160	120	230	14	156	39	130	155	177	0
Acidity83	mg/L	4.8		<1.0	<1.0	3.3	2.7	3.0	1.5	2.6	3.6	1.4	1.1	2.5	3.8	4.6	2.6	<1.0	4.8	14	2.09	1.4000	1.42	2.65	3.52	2
Al-T	mg/L	0.0502				0.0101	0.0236		0.0063		0.0045			0.0083	0.0118	0.0061	0.0151	0.0045	0.0502	8	0.0109	0.0154	0.0063	0.0092	0.0147	0
As-T	mg/L	0.0012				0.0004	0.0004		0.0005		0.0007			0.0004	0.0005	0.0002	0.0005	0.0002	0.0012	8	0.00048	0.00031	0.00039	0.00047	0.00055	0
Ba-T	mg/L	0.0138				0.0126	0.0121		0.0134		0.0154			0.0147	0.0177	0.0137	0.0142	0.0121	0.0177	8	0.0141	0.0018	0.0132	0.0138	0.0149	0
B-T	mg/L	0.239				0.267	0.275		0.347		0.348			0.333	0.354	0.23	0.299	0.230	0.354	8	0.295	0.052	0.260	0.304	0.347	0
Cd-T	mg/L	<0.000010				<0.000010	<0.000010		<0.000010		<0.000010			<0.000010	<0.000010	<0.000010	0.000005	<0.000010	<0.000010	8	0.000005	0	<0.000010	<0.000010	<0.000010	8
Ca-T	mg/L	182				218	226		207		205			203	260	244	218	182	260	8	217	25	205	213	231	0
Cr-T	mg/L	<0.0010				<0.0010	<0.0010		<0.0010		<0.0010			<0.0010	<0.0010	<0.0010	0.0005	<0.0010	<0.0010	8	0.0005	0	<0.0010	<0.0010	<0.0010	8
Co-T	mg/L	<0.00020				<0.00020	<0.00020		<0.00020		<0.00020			<0.00020	<0.00020	<0.00020	0.0001	<0.00020	<0.00020	8	0.0001	0	<0.00020	<0.00020	<0.00020	8
Cu-T	mg/L	<0.00050				<0.00050	<0.00050		<0.00050		<0.00050			<0.00050	<0.00050	<0.00050	0.00025	<0.00050	<0.00050	8	0.00025	0	<0.00050	<0.00050	<0.00050	8
Hard-T	mg/L	541				656	681		630		636			609	778	728	657	541	778	8	653	72	624	646	692	0
Fe-T	mg/L	0.106				0.023	0.052		0.025		0.025			0.026	0.043	0.024	0.041	0.023	0.106	8	0.035	0.029	0.025	0.026	0.045	0
Pb-T	mg/L	<0.00020				<0.00020	<0.00020		<0.00020		<0.00020			<0.00020	<0.00020	<0.00020	0.0001	<0.00020	<0.00020	8	0.0001	0.0	<0.00020	<0.00020	<0.00020	8
Mg-T	mg/L	20.8				26.9	28.2		27.6		30.4			24.8	31.4	28.8	27.4	20.8	31.4	8	27.2	3.3	26.4	27.9	29.2	0
Mn-T	mg/L	0.0366				0.0078	0.0040		0.0098		0.0107			0.0061	0.0131	0.0149	0.0129	0.0040	0.0366	8	0.0105	0.0102	0.0074	0.0102	0.0135	0
Hg-T	mg/L	<0.0000019				<0.0000019	<0.0000019		<0.0000019		<0.0000019			<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	8	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	8
Mo-T	mg/L	<0.0010				<0.0010	<0.0010		<0.0010		<0.0010			<0.0010	<0.0010	<0.0010	0.0005	<0.0010	<0.0010	8	0.0005	0	<0.0010	<0.0010	<0.0010	8
Ni-T	mg/L	<0.0010				<0.0010	<0.0010		<0.0010		<0.0010			<0.0010	<0.0010	<0.0010	0.0005	<0.0010	<0.0010	8	0.0005	0	<0.0010	<0.0010	<0.0010	8
K-T	mg/L	1.60				1.82	2.02		2.25		2.66			2.47	2.38	1.78	2.12	1.6	2.66	8	2.09	0.38	1.81	2.13	2.40	0
S-T	mg/L	162				196	197		202		209			190	243	198	200	162	243	8	199	22	195	198	204	0
Se-T	mg/L	0.00017				0.00015	0.00015		<0.00010		<0.00010			<0.00010	0.00033	0.00028	0.000154	<0.00010	0.00033	8	0.00012	0.000107	<0.00010	0.00015	0.000198	3
Si-T	mg/L	2.27				2.00	2.16		0.93		2.45			2.47	2.93	2.41	2.20	0.93	2.93	8	2.11	0.58	2.12	2.34	2.46	0
Ag-T	mg/L	<0.000020				<0.000020	<0.000020		<0.000020		<0.000020			<0.000020	<0.000020	<0.000020	0.00001	<0.000020	<0.000020	8	0.00001	0	<0.000020	<0.000020	<0.000020	8
Na-T	mg/L	37.7				31.3	31.0		39.4		51.5			49.6	45.7	25.1	38.9	25.1	51.5	8	37.9	9.5	31.2	38.5	46.7	0
Sr-T	mg/L	1.13				1.38	1.36		1.43		1.38			1.39	1.58	1.39	1.38	1.13	1.58	8	1.37	0.12	1.38	1.38	1.40	0
Zn-T	mg/L	<0.0050				<0.0050	<0.0050		<0.0050		<0.0050			<0.0050	<0.0050	<0.0050	0.0025	<0.0050	<0.0050	8	0.0025	0.0000	<0.0050	<0.0050	<0.0050	8
Al-D	mg/L	0.0069				<0.0030	<0.0030		<0.0030		<0.0030			<0.0030	0.0033	<0.0060	0.00259	<0.0030	0.0069	8	0.0022	0.0019	<0.0030	<0.0030	0.00308	6
As-D	mg/L	0.0010				0.0004	0.0004		0.0006		0.0007			0.0004	0.0004	<0.00020	0.0005	<0.00020	0.0010	8	0.0004	0.0003	0.0004	0.0004	0.0006	1
Ba-D	mg/L	0.0127				0.0113	0.0127		0.0132		0.0155			0.0138	0.0163	0.0129	0.0135	0.0113	0.0163	8	0.0135	0.0016	0.0127	0.0130	0.0142	0
B-D	mg/L	0.248				0.233	0.276		0.315		0.392			0.354	0.288	0.230	0.292	0.230	0.392	8	0.287	0.058	0.244	0.282	0.325	0
Be-D	mg/L	<0.00010				<0.00010	<0.00010		<0.00010		<0.00010			<0.00010	<0.00010	<0.00020	0.000056	<0.00010	<0.00020	8	0.000055	0.000018	<0.00010	<0.00010	<0.00010	8
Cd-D	mg/L	<0.000010				<0.000010	<0.000010		<0.000010		<0.000010			<0.000010	<0.000010	<0.000020	0.0000056	<0.000010	<0.000020	8	0.0	0.0000018	<0.000010	<0.000010	<0.000010	8
Ca-D	mg/L	178				191	231		210		200			195	243	252	213	178	252	8	211	27	194	205	234	0
Cr-D	mg/L	<0.0010				<0.0010	<0.0010		<0.0010		<0.0010			<0.0010	<0.0010	<0.0020	0.00056	<0.0010	<0.0020	8	0.00055	0.00018	<0.0010	<0.0010	<0.0010	8
Co-D	mg/L	<0.00020				<0.00020	<0.00020		<0.00020		<0.00020			<0.00020	<0.00020	<0.00040	0.000113	<0.00020	<0.00040	8	0.000109	0.000035	<0.00020	<0.00020	<0.00020	8
Cu-D	mg/L	0.00025				0.0006	<0.00020		0.00028		0.0002			<0.00020	0.00027	<0.00040	0.00025	<0.00020	0.0006	8	0.000215	0.000158	0.000175	0.000225	0.000273	3
Hard-D	mg/L	529				569	698		643		617			592	725	751	640	529	751	8	636	78	586	630	704	0
Fe-D	mg/L	0.0100				<0.0050	0.0057		0.0130		0.0121			0.0092	0.0086	<0.010	0.0083	<0.0050	0.0130	8	0.0074	0.0036	0.0055	0.0089	0.0105	2
Pb-D	mg/L	<0.00020				<0.00020	<0.00020		<0.00020		<0.00020			<0.00020	<0.00020	<0.00040	0.000113	<0.00020	<0.00040	8	0.000109	0.000035	<0.00020	<0.00020	<0.00020	8
Mg-D	mg/L	20.2				22.5	29.7		28.9		28.7			25.1	28.6	29.8	26.7	20.2	29.8	8	26.4	3.7	24.5	28.6	29.1	0
Mn-D	mg/L	0.0337				0.0027	0.0025		0.0062		0.0140			0.0033	0.0117	0.0077	0.0102	0.0025	0.0337	8	0.0070	0.0104	0.0032	0.0069	0.0123	0
Hg-D	mg/L	<0.0000019				<0.0000019	<0.0000019		<0.0000019		<0.0000019			<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	8	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	8
Mo-D	mg/L	<0.0010				<0.0010	<0.0010		0.0012		<0.0010			<0.0010	<0.0010	<0.0020	0.00065	<0.0010	0.00120	8	0.00061	0.00028	<0.0010	<0.0010	0.00063	7
Ni-D	mg/L	<0.0010				<0.0010	<0.0010		<0.0010		<0.0010			<0.0010	<0.0010	<0.0020	0.00056	<0.0010	<0.0020	8	0.00055	0.00018	<0.0010	<0.0010	<0.0010	8
K-D	mg/L	1.55				1.71	2.08		2.30		2.60			2.42	2.25	1.81	2.09	1.55	2.60	8	2.06	0.37	1.79	2.17	2.33	0
S-D	mg/L	159				164	203		210		208			189	226	210	196	159	226	8	195	24	183	206	210	0
Se-D	mg/L	0.0004				0.0002	0.0002		<0.00010		<0.00010			<0.00010	0.0003	0.0003	0.0002	<0.00010	0.0004	8	0.0001	0.0001	<0.00010	0.0002	0.0003	3
Si-D	mg/L	2.11				1.90	2.08		0.98		2.52			2.41	2.38	2.30	2.08	0.98	2.52	8	2.01	0.49	2.04	2.21	2.39	0
Na-D	mg/L	37.6				26.9	33.0		41.2		50.7			48.5	43.0	26.1	38.4	26.1	50.7	8	37.4	9.2	31.5	39.4	44.4	0
Sr-D	mg/L	1.11				1.25	1.40		1.41		1.41			1.32	1.46	1.4	1.34	1.11	1.46	8	1.3	0.1	1.3	1.4	1.4	0
Zn-D	mg/L	<0.0050				<0.0050	<0.0050		<0.0050		<0.0050			<0.0050	<0.0050	<0.010	0.00281	<0.0050	<0.010	8	0.00273	0.00088	<0.0050	<0.0050	<0.0050	8
pH-F	pH Units	7.47	7.57	7.13	7.13	7.64	7.74	8.00	7.97	7.99	7.47	7.81		7.61	7.27	7.87	7.62	7.13	8.00	14	7.61	0.30	7.47	7.62	7.86	0
Cond-F	uS/cm	2590	1287	1194	1194	1240	1398	1502	1426	1342	1229	1366		1140	1271	1138	1380	1138	2590	14	1348	365	1203	1279	1390	0

Table 9: Water Chemistry Over PAG-CCR Areas

EMS ID: E292127

Station Description: 2 South Pit CCR Water Cover

Site ID: 2S

Date		04-Jan-2021	11-Jan-2021	01-Feb-2021	01-Mar-2021	01-Mar-2021	06-Apr-2021	10-May-2021	01-Jun-2021	05-Jul-2021	09-Aug-2021	01-Sep-2021	04-Oct-2021	1-Nov-21	7-Dec-21	Summary Statistics									
Parameter	**Unit**															**Average**	**Min**	**Max**	**Count**	**Geo.Mean**	**STDV**	**1st Quar.**	**Med**	**3rd Quart**	**Count <DL**
SO4-D	mg/L	230	310	290	270	270	340	440	470	530	640	590	540	300	240	390	230	640	14	367	140	275	325	515	0
TSS	mg/L										<1.0		<1.0	<1.0		0.5	<1.0	<1.0	3	0.5	0	<1.0	<1.0	<1.0	3
Alk-T	mg/L	110		170	160	160	140	150	130	100	170	110	69	140	88	130	69	170	13	126	32	110	140	160	0
Acidity83	mg/L	2.4		<1.0	1.2	1.1	<1.0	1.5	<1.0	2.0	2.7	1.6	1.6	4.2	2.6	1.7	<1.0	4.2	13	1.4	1.1	1.1	1.6	2.4	3
Al-T	mg/L	0.0717		0.0319	0.0261	0.0267	0.0147	0.0104	0.0035	0.0042	<0.0030	0.0031	0.0034	0.0494	0.0340	0.0216	<0.0030	0.0717	13	0.0119	0.0214	0.0035	0.0147	0.0319	1
As-T	mg/L	0.00015		0.00294	0.00231	0.00231	0.00016	0.00031	0.00038	0.00129	0.00098	0.00116	0.00107	0.00039	0.00017	0.00105	0.00015	0.00294	13	0.00066	0.00094	0.00031	0.00098	0.00129	0
Ba-T	mg/L	0.0147		0.0136	0.0130	0.0132	0.0185	0.0231	0.0230	0.0243	0.0255	0.0229	0.0193	0.0197	0.0133	0.0188	0.0130	0.0255	13	0.0182	0.0047	0.0136	0.0193	0.0230	0
B-T	mg/L	0.202		0.264	0.247	0.253	0.345	0.470	0.518	0.609	0.645	0.676	0.601	0.371	0.180	0.414	0.180	0.676	13	0.376	0.181	0.253	0.371	0.601	0
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	<0.000010	<0.000010	0.000005	<0.000010	<0.000010	13	0.000005	0.0	<0.000010	<0.000010	<0.000010	13
Ca-T	mg/L	91		115	102	104	119	142	132	138	165	146	124	119	82	122	82	165	13	119	23	104	119	138	0
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	<0.0010	0.0005	<0.0010	<0.0010	13	0.0005	0.0000	<0.0010	<0.0010	<0.0010	13
Co-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	<0.00020	0.0001	<0.00020	<0.00020	13	0.0001	0.0000	<0.00020	<0.00020	<0.00020	13
Cu-T	mg/L	0.00089		<0.00050	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	0.00066	<0.00050	<0.00050	0.00057	0.00088	0.00064	0.000455	<0.00050	0.00089	13	0.000397	0.000252	<0.00050	<0.00050	0.00064	7
Hard-T	mg/L	265		338	300	306	339	403	382	405	480	428	368	349	237	353	237	480	13	347	67	306	349	403	0
Fe-T	mg/L	0.128		0.089	0.056	0.059	0.056	0.038	<0.010	0.083	0.053	0.029	0.017	0.103	0.096	0.063	<0.010	0.128	13	0.049	0.036	0.038	0.056	0.089	1
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	<0.00020	0.0001	<0.00020	<0.00020	13	0.00	0.00	<0.00020	<0.00020	<0.00020	13
Mg-T	mg/L	8.9		12.7	11.1	11.3	10.1	11.9	12.5	14.9	16.7	15.5	14.3	12.3	8.1	12.3	8.1	16.7	13	12.1	2.5	11.1	12.3	14.3	0
Mn-T	mg/L	0.0087		0.0335	0.0263	0.0272	0.0153	0.0147	0.0071	0.0599	0.0067	0.0055	0.0028	0.0201	0.0338	0.0201	0.0028	0.0599	13	0.0146	0.016	0.0071	0.0153	0.0272	0
Hg-T	mg/L	<0.0000019		<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	13	9.5E-07	0	<0.0000019	<0.0000019	<0.0000019	13
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	<0.0010	0.0005	<0.0010	<0.0010	13	0.0005	0	<0.0010	<0.0010	<0.0010	13
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	<0.0010	<0.0010	0.0005	<0.0010	<0.0010	13	0.0005	0	<0.0010	<0.0010	<0.0010	13
K-T	mg/L	0.77		1.32	1.13	1.15	1.03	1.34	1.51	1.81	1.91	1.94	1.73	1.30	0.60	1.35	0.60	1.94	13	1.28	0.42	1.13	1.32	1.73	0
S-T	mg/L	80		104	90	97	114	144	151	171	202	191	184	122	66	132	66	202	13	125	45	97	122	171	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	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	13	0.00005	0	<0.00010	<0.00010	<0.00010	13
Si-T	mg/L	3.17		1.69	1.41	1.42	2.38	2.23	2.21	3.41	4.12	4.21	2.78	4.06	3.65	2.83	1.41	4.21	13	2.64	1.02	2.21	2.78	3.65	0
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	<0.000020	0.00001	<0.000020	<0.000020	13	0.00001	0	<0.000020	<0.000020	<0.000020	13
Na-T	mg/L	34		48	39	41	57	72	78	99	115	112	109	59	26	68	26	115	13	62	32	41	59	99	0
Sr-T	mg/L	0.71		0.85	0.80	0.81	1.04	1.46	1.49	1.60	1.85	1.91	1.69	1.05	0.60	1.22	0.60	1.91	13	1.14	0.46	0.81	1.05	1.60	0
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	<0.0050	0.0025	<0.0050	<0.0050	13	0.0025	0.0000	<0.0050	<0.0050	<0.0050	13
Al-D	mg/L	0.0077		<0.0030	0.0036	<0.0030	<0.0030	<0.0030	0.0034	<0.0030	<0.0030	<0.0030	<0.0030	0.01780	0.0132	0.00444	<0.0030	0.0178	13	0.0028	0.0053	<0.0030	<0.0030	0.0036	8
As-D	mg/L	0.00011		0.00269	0.00216	0.00209	0.00014	0.00025	0.00042	0.00118	0.00096	0.00115	0.00106	0.00032	0.00016	0.00098	0.00011	0.00269	13	0.00060	0.00087	0.00025	0.00096	0.00118	0
Ba-D	mg/L	0.0145		0.0141	0.0128	0.0129	0.0195	0.0228	0.0224	0.0231	0.0251	0.0236	0.0186	0.0188	0.0130	0.0186	0.0128	0.0251	13	0.0180	0.0046	0.0141	0.0188	0.0228	0
B-D	mg/L	0.206		0.268	0.235	0.233	0.348	0.463	0.499	0.578	0.730	0.745	0.635	0.332	0.176	0.419	0.176	0.745	13	0.374	0.202	0.235	0.348	0.578	0
Be-D	mg/L	<0.00010		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	13	0.00005	0	<0.00010	<0.00010	<0.00010	13
Cd-D	mg/L	<0.000010		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000014	<0.000010	0.0000057	<0.000010	0.000014	13	0.0000054	0.0	<0.000010	<0.000010	<0.000010	12
Ca-D	mg/L	94		117	102	101	122	143	138	126	164	158	121	117	82	122	82	164	13	120	24	102	121	138	0
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	0.0005	<0.0010	<0.0010	13	0.0005	0	<0.0010	<0.0010	<0.0010	13
Co-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	0.00031	0.000116	<0.00020	0.00031	13	0.000109	0.000058	<0.00020	<0.00020	<0.00020	12
Cu-D	mg/L	0.00054		0.00043	0.001	0.00114	0.00036	0.00036	0.00044	0.00054	0.00038	0.0005	0.00047	0.00072	0.00047	0.00057	0.00036	0.00114	13	0.00053	0.00024	0.00043	0.00047	0.00054	0
Hard-D	mg/L	272		346	299	296	350	407	398	374	476	463	361	339	239	355	239	476	13	348	69	299	350	398	0
Fe-D	mg/L	0.0144		<0.0050	0.0063	<0.0050	0.0126	<0.0050	0.0158	0.0412	0.0242	0.0218	0.0113	0.027600	0.0309	0.01643	<0.0050	0.041200	13	0.01146	0.01214	0.0063	0.0144	0.0242	3
Pb-D	mg/L	<0.00020		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00043	<0.00020	<0.00020	0.000125	<0.00020	0.00043	13	0.000112	0.00	<0.00020	<0.00020	<0.00020	12
Mg-D	mg/L	8.9		13.1	10.8	10.8	10.7	12.1	12.7	14.2	16.3	16.9	14.5	11.7	8.5	12.4	8.5	16.9	13	12.2	2.6	10.8	12.1	14.2	0
Mn-D	mg/L	0.0071		0.0302	0.0155	0.0153	0.0114	0.0028	0.0106	0.0014	0.0029	0.0053	0.0022	0.0124	0.0314	0.0114	0.0014	0.0314	13	0.0077	0.0099	0.0029	0.0106	0.0153	0
Hg-D	mg/L	<0.0000019		<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	13	9.5E-07	0	<0.0000019	<0.0000019	<0.0000019	13
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	<0.0010	0.0005	<0.0010	<0.0010	13	0.0005	0.0000	<0.0010	<0.0010	<0.0010	13
Ni-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	0.0005	<0.0010	<0.0010	13	0.0005	0.000	<0.0010	<0.0010	<0.0010	13
K-D	mg/L	0.76		1.44	1.21	1.20	1.06	1.41	1.53	1.76	1.88	2.04	1.70	1.29	0.61	1.38	0.61	2.04	13	1.31	0.42	1.20	1.41	1.70	0
S-D	mg/L	81		109	93	93	115	146	157	173	206	211	188	116	72	135	72	211	13	128	48	93	116	173	0
Se-D	mg/L	<0.00010		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	0.000054	<0.00010	0.0001	13	0.000053	0.000014	<0.00010	<0.00010	<0.00010	12
Si-D	mg/L	3.10		1.82	1.44	1.42	2.29	2.33	2.28	3.36	4.36	4.29	2.89	3.49	3.48	2.81	1.42	4.36	13	2.64	0.98	2.28	2.89	3.48	0
Na-D	mg/L	34		49	38	39	60	75	79	92	115	124	106	58	27	69	27	124	13	62	32	39	60	92	0
Sr-D	mg/L	0.705		0.899	0.815	0.797	1.070	1.440	1.470	1.700	1.810	1.950	1.650	0.986	0.609	1.223	0.609	1.950	13	1.141	0.463	0.815	1.07	1.65	0
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	<0.0050	0.0025	<0.0050	<0.0050	13	0.0025	0.0000	<0.0050	<0.0050	<0.0050	13
pH-F	pH Units	7.58	7.15	7.95	7.95	7.95	7.94	8.19	8.12	8.12	7.73	7.83	7.88	7.72	8.01	7.87	7.15	8.19	14	7.86	0.27	7.76	7.95	8.00	0
Cond-F	uS/cm	1610	912	814	814	814	955	1217	1187	1213	1281	1386	1073	805	731	1058	731	1610	14	1029	265	814	1014	1216	0

Table 10: Water Chemistry for Flooded Underground PAG-CCR Mine Pool Area (River Barrier Pillar - 88 Panel)

		QU1109M							Summary Statistics									
Date		17-Mar-2021	17-Mar-2021	13-Apr-2021	15-Jun-2021	19-Aug-2021	27-Sep-2021	03-Nov-2021										
Parameter	Units								Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	1300	1300	1300	1300	1300	1200	1300	1285	1200	1300	7	1285	37	1300	1300	1300	0
TSS	mg/L			48.0					48.0	48.0	48.0	1.0	48.0	0.0	48.0	48.0	48.0	0.0
Alk-T	mg/L	460	460	500	470	500	440	500	476	440	500	7	475	24	460	470	500	0
Acidity83	mg/L	49	48	22	63	17	15	13	33	13	63	7	27	20	16	22	48	0
Al-T	mg/L	<0.0060	0.0073	<0.0060	<0.0060	<0.0060			0.00386	<0.0060	0.0073	5	0.00358	0.00192	<0.0060	<0.0060	<0.0060	4
As-T	mg/L	0.00497	0.00512	0.0113	0.00388	0.00367			0.00579	0.00367	0.0113	5	0.00528	0.00315	0.00388	0.00497	0.00512	0
Ba-T	mg/L	0.0202	0.0204	0.0222	0.0178	0.011			0.0183	0.011	0.0222	5	0.0178	0.0044	0.0178	0.0202	0.0204	0
B-T	mg/L	1.23	1.19	1.26	1.10	1.23			1.20	1.10	1.26	5	1.20	0.06	1.19	1.23	1.23	0
Cd-T	mg/L	0.000088	0.000076	0.000047	0.000028	<0.000020			0.0000498	<0.000020	0.000088	5	0.0000388	0.0000325	0.000028	0.000047	0.000076	1
Ca-T	mg/L	234	231	212	218	242			227	212	242	5	227	12	218	231	234	0
Cr-T	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020			0.001	<0.0020	<0.0020	5	0.001	0.000	<0.0020	<0.0020	<0.0020	5
Co-T	mg/L	0.014	0.014	0.004	0.001	<0.00040			0.007	<0.00040	0.014	5	0.003	0.007	0.001	0.004	0.014	1
Cu-T	mg/L	0.0042	0.0039	0.0023	0.0021	<0.0010			0.0026	<0.0010	0.0042	5	0.0021	0.0015	0.0021	0.0023	0.0039	1
Hard-T	mg/L	702	689	635	653	712			678	635	712	5	678	33	653	689	702	0
Fe-T	mg/L	34.8	34.8	30.3	30.5	22.2			30.5	22.2	34.8	5	30.1	5.1	30.3	30.5	34.8	0
Pb-T	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040			0.00020	<0.00040	<0.00040	5	0.0002	0	<0.00040	<0.00040	<0.00040	5
Mg-T	mg/L	28.6	27.3	25.5	26.2	26.4			26.8	25.5	28.6	5	26.8	1.2	26.2	26.4	27.3	0
Mn-T	mg/L	1.82	1.83	1.48	1.40	0.98			1.50	0.98	1.83	5	1.47	0.35	1.40	1.48	1.82	0
Hg-T	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019				0.00000095	<0.0000019	<0.0000019	4	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	4
Mo-T	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020			0.001	<0.0020	<0.0020	5	0.001	0	<0.0020	<0.0020	<0.0020	5
Ni-T	mg/L	0.009	0.009	0.002	<0.0020	<0.0020			0.004	<0.0020	0.0087	5	0.003	0.004	<0.0020	0.002	0.009	2
K-T	mg/L	7.03	6.95	6.90	6.89	7.08			6.97	6.89	7.08	5	6.97	0.08	6.90	6.95	7.03	0
S-T	mg/L	442	441	421	414	457			435	414	457	5	435	17	421	441	442	0
Se-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020			0.0001	<0.00020	<0.00020	5	0.0001	0	<0.00020	<0.00020	<0.00020	5
Si-T	mg/L	4.14	4.35	4.40	4.20	4.13			4.24	4.13	4.40	5	4.24	0.12	4.14	4.20	4.35	0
Ag-T	mg/L	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040			0.00002	<0.000040	<0.000040	5	0.00002	0.0	<0.000040	<0.000040	<0.000040	5
Na-T	mg/L	504	482	499	456	505			489	456	505	5	489	21	482	499	504	0
Sr-T	mg/L	2.50	2.63	2.47	2.56	2.69			2.57	2.47	2.69	5	2.57	0.09	2.50	2.56	2.63	0
Zn-T	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010			0.005	<0.010	<0.010	5	0.005	0	<0.010	<0.010	<0.010	5
Al-D	mg/L	<0.0060	0.0061	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.00344	<0.0060	0.0061	7	0.00332	0.00117	<0.0060	<0.0060	<0.0060	6
As-D	mg/L	0.0045	0.0049	0.0106	0.0037	0.0034	0.0038	0.0048	0.0051	0.0034	0.0106	7	0.0047	0.0025	0.0037	0.0045	0.0048	0
Ba-D	mg/L	0.0189	0.021	0.0214	0.0172	0.0106	0.0155	0.0117	0.0166	0.0106	0.0214	7	0.0161	0.0043	0.0136	0.0172	0.0200	0
B-D	mg/L	1.13	1.11	1.17	1.10	1.11	1.07	1.08	1.11	1.07	1.17	7	1.11	0.03	1.09	1.11	1.12	0
Be-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0001	<0.00020	<0.00020	7	0.000	0	<0.00020	<0.00020	<0.00020	7
Cd-D	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00001	<0.000020	<0.000020	7	0.00001	0	<0.000020	<0.000020	<0.000020	7
Ca-D	mg/L	219	229	204	221	241	217	220	221.6	204	241	7	221	11	218	220	225	0
Cr-D	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.001	<0.0020	<0.0020	7	0.001	0	<0.0020	<0.0020	<0.0020	7
Co-D	mg/L	0.0128	0.0138	0.00385	0.00072	<0.00040	<0.00040	<0.00040	0.004539	<0.00040	0.0138	7	0.001215	0.006131	<0.00040	0.00072	0.008325	3
Cu-D	mg/L	<0.00040	0.00052	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.000246	<0.00040	0.00052	7	0.000229	0.000121	<0.00040	<0.00040	<0.00040	6
Hard-D	mg/L	658	682	608	662	703	634	636	655	608	703	7	654	32	635	658	672	0
Fe-D	mg/L	32.3	34.2	29.3	30.9	21.5	24.5	18.5	27.3	18.5	34.2	7	26.7	5.9	23	29.3	31.6	0
Pb-D	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.0002	<0.00040	<0.00040	7	0.0002	0	<0.00040	<0.00040	<0.00040	7
Mg-D	mg/L	26.80	26.70	24.00	26.90	24.30	22.10	21.00	24.50	21.00	26.90	7	24.40	2.40	23.10	24.30	26.80	0
Mn-D	mg/L	1.67	1.83	1.36	1.41	0.98	0.98	0.67	1.27	0.67	1.83	7	1.21	0.42	0.98	1.36	1.54	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	7	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	7
Mo-D	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.001	<0.0020	<0.0020	7	0.001	0	<0.0020	<0.0020	<0.0020	7
Ni-D	mg/L	0.0080	0.0086	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0031	<0.0020	0.0086	7	0.0018	0.0036	<0.0020	<0.0020	0.0045	5
K-D	mg/L	6.69	6.97	6.37	6.93	6.87	6.82	6.77	6.77	6.37	6.97	7	6.77	0.20	6.73	6.82	6.90	0
S-D	mg/L	419	422	405	414	420	393	415	413	393	422	7	413	10	410	415	420	0
Se-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0001	<0.00020	<0.00020	7	0.0001	0	<0.00020	<0.00020	<0.00020	7
Si-D	mg/L	3.94	4.19	4.09	4.08	3.88	4.05	4.10	4.05	3.88	4.19	7	4.05	0.10	4.00	4.08	4.09	0
Na-D	mg/L	470	470	462	470	492	466	476	472	462	492	7	472	10	468	470	473	0
Sr-D	mg/L	2.34	2.61	2.31	2.51	2.64	2.49	2.62	2.50	2.31	2.64	7	2.50	0.13	2.42	2.51	2.62	0
Zn-D	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.005	<0.010	<0.010	7	0.005	0	<0.010	<0.010	<0.010	7
pH-F	pH Units	6.74	6.74	7.46	6.87	6.58	6.75	6.86	6.86	6.58	7.46	7	6.85	0.28	6.74	6.75	6.87	0
Cond-F	uS/cm	2666	2666	3400	2637	3169	2937	2889	2909	2637	3400	7	2897	289	2666	2889	3053	0
H2SEquiv	mg/L	0.0914	0.0298	0.1380	0.0308	0.0106	1.0600	0.0234	0.1977	0.0106	1.0600	7	0.0607	0.3829	0.0266	0.0308	0.1147	0

Table 11: Water Chemistry for Flooded Underground PAG-CCR Mine Pool Areas (7-South Mine 2-Mains)

		QU1410									Summary Statistics									
Date		19-Jan-2021	24-Feb-2021	24-Feb-2021	12-May-2021	28-Jul-2021	28-Jul-2021	22-Sep-2021	22-Sep-2021	09-Dec-2021										
Parameter	Units										Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	1900	1900	1800	1900	1900	1800	1800	1800	1800	1844	1800	1900	9	1843	52	1800	1800	1900	0
TSS	mg/L																			
Alk-T	mg/L	300	300	290	300	310	310	320	320	310	306.7	290	320	9	306.5	10	300	310	310	0
Acidity83	mg/L	<1.0	16.5	18.6	29.6	16.4	22.1	36.2	33.9	16.2	21.11	<1.0	36.2	9	14.73	10.97	16.4	18.6	29.6	1
Al-T	mg/L																			
As-T	mg/L																			
Ba-T	mg/L																			
B-T	mg/L																			
Cd-T	mg/L																			
Ca-T	mg/L																			
Cr-T	mg/L																			
Co-T	mg/L																			
Cu-T	mg/L																			
Hard-T	mg/L																			
Fe-T	mg/L																			
Pb-T	mg/L																			
Mg-T	mg/L																			
Mn-T	mg/L																			
Hg-T	mg/L																			
Mo-T	mg/L																			
Ni-T	mg/L																			
K-T	mg/L																			
S-T	mg/L																			
Se-T	mg/L																			
Si-T	mg/L																			
Ag-T	mg/L																			
Na-T	mg/L																			
Sr-T	mg/L																			
Zn-T	mg/L																			
Al-D	mg/L	<0.015	<0.015	<0.015	<0.0060	<0.015	<0.015	<0.015	<0.015	<0.0060	0.0065	<0.0060	<0.015	9	0.00612	0.00198	<0.015	<0.015	<0.015	9
As-D	mg/L	0.1020	0.0893	0.0880	0.1110	0.1070	0.1080	0.1040	0.1020	0.1100	0.1024	0.0880	0.1110	9	0.1020	0.0084	0.1020	0.1040	0.1080	0
Ba-D	mg/L	0.0151	0.0145	0.0148	0.0149	0.0159	0.0157	0.0152	0.0150	0.0159	0.0152	0.0145	0.0159	9	0.0152	0.0005	0.0149	0.0151	0.0157	0
B-D	mg/L	1.01	1.10	1.10	1.04	1.15	1.13	1.06	0.87	1.01	1.05	0.87	1.15	9	1.05	0.08	1.01	1.06	1.10	0
Be-D	mg/L	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	0.000217	<0.00020	<0.00050	9	0.000204	0.000066	<0.00050	<0.00050	<0.00050	9
Cd-D	mg/L	<0.000050	<0.000050	<0.000050	<0.000020	<0.000050	<0.000050	<0.000050	<0.000050	<0.000020	0.0000217	<0.000020	<0.000050	9	0.0000204	0.0000066	<0.000050	<0.000050	<0.000050	9
Ca-D	mg/L	526	494	495	496	536	543	522	524	547	520	494	547	9	520	20.8	496	524	536	0
Cr-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	0.00217	<0.0020	<0.0050	9	0.00204	0.00066	<0.0050	<0.0050	<0.0050	9
Co-D	mg/L	<0.0010	<0.0010	<0.0010	0.00049	<0.0010	<0.0010	<0.0010	<0.0010	0.0004	0.00049	0.00042	<0.0010	9	0.0005	0.0000	<0.0010	<0.0010	<0.0010	7
Cu-D	mg/L	<0.0010	<0.0010	<0.0010	<0.00040	<0.0010	<0.0010	<0.0010	<0.0010	<0.00040	0.000433	<0.00040	<0.0010	9	0.000408	0.000132	<0.0010	<0.0010	<0.0010	9
Hard-D	mg/L	2010	1900	1880	1830	2000	2040	1930	1960	2010	1951	1830	2040	9	1949	70	1900	1960	2010	0
Fe-D	mg/L	1.91	1.75	1.75	1.91	2.48	2.49	1.99	2.04	2.48	2.09	1.75	2.49	9	2.07	0.31	1.91	1.99	2.48	0
Pb-D	mg/L	<0.0010	<0.0010	<0.0010	<0.00040	<0.0010	<0.0010	<0.0010	<0.0010	<0.00040	0.000433	<0.00040	<0.0010	9	0.000408	0.000132	<0.0010	<0.0010	<0.0010	9
Mg-D	mg/L	169.00	161.00	158.00	144.00	162.00	165.00	153.00	158.00	156.00	158.40	144.00	169.00	9	158.30	7.20	156.00	158.00	162.00	0
Mn-D	mg/L	1.50	1.30	1.28	1.39	1.42	1.45	1.43	1.46	1.48	1.41	1.28	1.50	9	1.41	0.08	1.39	1.43	1.46	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	9	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	9
Mo-D	mg/L	0.0093	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	0.00292	<0.0020	0.0093	9	0.00236	0.00248	<0.0050	<0.0050	<0.0050	8
Ni-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	0.00217	<0.0020	<0.0050	9	0.00204	0.00066	<0.0050	<0.0050	<0.0050	9
K-D	mg/L	7.75	6.90	6.75	6.88	7.60	7.61	6.86	7.14	7.53	7.22	6.75	7.75	9	7.21	0.40	6.88	7.14	7.60	0
S-D	mg/L	613	586	576	578	614	621	632	599	596	602	576	632	9	601	20	586	599	614	0
Se-D	mg/L	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	0.000217	<0.00020	<0.00050	9	0.000204	0.000066	<0.00050	<0.00050	<0.00050	9
Si-D	mg/L	3.19	3.07	3.06	3.04	3.27	3.23	3.40	3.27	3.13	3.18	3.04	3.40	9	3.18	0.12	3.07	3.19	3.27	0
Na-D	mg/L	57	54	53	51	68	68	59	60	65	59	51	68	9	59	7	54	59	65	0
Sr-D	mg/L	4.52	4.46	4.29	4.68	4.35	4.29	4.67	4.61	4.73	4.51	4.29	4.73	9	4.51	0.17	4.35	4.52	4.67	0
Zn-D	mg/L	<0.025	<0.025	<0.025	<0.010	<0.025	<0.025	<0.025	<0.025	<0.010	0.0108	<0.010	<0.025	9	0.0102	0.0033	<0.025	<0.025	<0.025	9
pH-F	pH Units	6.65	5.94	5.94	6.73	6.48		6.47		6.75	6.42	5.94	6.75	7	6.41	0.35	6.21	6.48	6.69	0
Cond-F	uS/cm	2242	2247	2247	3785	3003		2967		2927	2774	2242	3785	7	2726	574	2247	2927	2985	0
H2SEquiv	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	9	0.0010	0.0000	0.0010	0.0010	0.0010	0

Table 12: Water Chemistry for Flooded Underground Mine Pool with PAG-Tailings (1-Mains 2-North)

		1M2N								Summary Statistics									
Date		13-Apr-2021	06-May-2021	02-Jun-2021	14-Jul-2021	09-Aug-2021	02-Sep-2021	03-Nov-2021	09-Dec-2021										
Parameter	Units									Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	1500	1500	1600	1400	1300	1200	680	720	1237	680	1600	8	1183	354	1080	1350	1500	0
TSS	mg/L		31.0	42.0	28.0	24.0				31.2	24.0	42.0	4.0	30.6	7.7	27.0	29.5	33.8	0.0
Alk-T	mg/L	520	360	520	540	540	520	500	490	498	360	540	8	495	58	497	520	525	0
Acidity83	mg/L	23.8	21.4	50.6	30.9	31.2	21.9	19.6	4.7	25.5	4.7	50.6	8	21.8	13.0	20.9	22.9	31.0	0
Al-T	mg/L	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0036	<0.0060	0.00307	<0.0060	0.0036	8	0.00307	0.00021	<0.0060	<0.0060	<0.0060	7
As-T	mg/L	0.0047	0.0041	0.0043	0.0062	0.0074	0.0095	0.0110	0.0057	0.0066	0.0041	0.0110	8	0.0062	0.0025	0.0046	0.0059	0.0080	0
Ba-T	mg/L	0.0307	0.0272	0.0256	0.0228	0.0206	0.0194	0.0221	0.0186	0.0234	0.0186	0.0307	8	0.0231	0.0042	0.0203	0.0	0.0260	0
B-T	mg/L	1.11	1.14	1.13	1.29	1.33	1.11	1.17	0.97	1.16	0.97	1.33	8	1.15	0.11	1.11	1.13	1.20	0
Cd-T	mg/L	0.000031	0.000031	0.000022	<0.000020	<0.000020	<0.000020	<0.000010	<0.000020	0.0000161	<0.000010	0.000031	8	0.0000134	0.0000104	<0.000020	<0.000020	0.0000242	5
Ca-T	mg/L	298	279	281	265	233	212	141	145	231	141	298	8	223	61	195	249	279	0
Cr-T	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0020	0.00094	<0.0010	<0.0020	8	0.00092	0.00018	<0.0020	<0.0020	<0.0020	8
Co-T	mg/L	<0.00040	<0.00040	0.00077	0.00041	<0.00040	<0.00040	<0.00020	<0.00040	0.000285	<0.00020	0.00077	8	0.000237	0.000214	<0.00040	<0.00040	0.000253	6
Cu-T	mg/L	0.0026	0.0036	0.0031	0.0018	0.0017	0.0033	0.0009	<0.0010	0.00219	<0.0010	0.0036	8	0.0018	0.0011	0.0015	0.0022	0.0032	1
Hard-T	mg/L	859	823	828	781	693	622	415	425	680	415	859	8	657	178	572	737	824	0
Fe-T	mg/L	13	14	16	15	12	10	5	7	11	5	16	8	11	4	9	12	14	0
Pb-T	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00047	0.00022	<0.00040	0.000236	<0.00040	0.00047	8	0.000225	0.000095	<0.00040	<0.00040	0.000205	6
Mg-T	mg/L	27.8	30.5	30.5	29.2	26.8	22.4	15.4	15.3	24.7	15.3	30.5	8	23.9	6.3	20.6	27.3	29.5	0
Mn-T	mg/L	1.16	1.31	1.37	1.31	1.12	0.93	0.53	0.61	1.04	0.53	1.37	8	0.99	0.32	0.85	1.14	1.31	0
Hg-T	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	8	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	8
Mo-T	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0020	0.00094	<0.0010	<0.0020	8	0.00092	0.00018	<0.0020	<0.0020	<0.0020	8
Ni-T	mg/L	<0.0020	0.0036	0.003	<0.0020	<0.0020	<0.0020	<0.0010	<0.0020	0.00151	<0.0010	0.0036	8	0.00123	0.00113	<0.0020	<0.0020	0.0015	6
K-T	mg/L	6.92	7.08	7.09	6.47	6.68	6.16	5.32	5.29	6.38	5.29	7.09	8	6.34	0.73	5.95	6.57	6.96	0
S-T	mg/L	471	489	492	482	434	356	256	251	403	251	492	8	390	102	331	452	483	0
Se-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	<0.00020	0.000094	<0.00010	<0.00020	8	0.000092	0.000018	<0.00020	<0.00020	<0.00020	8
Si-T	mg/L	4.39	4.29	4.28	4.13	4.62	4.27	4.40	3.93	4.29	3.93	4.62	8	4.28	0.20	4.23	4.29	4.39	0
Ag-T	mg/L	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000020	<0.000040	0.0000188	<0.000020	<0.000040	8	0.0000183	0.0000035	<0.000040	<0.000040	<0.000040	8
Na-T	mg/L	462	498	495	492	479	449	369	369	451	369	498	8	448	53	429	470	492	0
Sr-T	mg/L	3.01	3.09	3.00	2.70	2.35	2.00	1.51	1.40	2.38	1.40	3.09	8	2.29	0.68	1.88	2.53	3.00	0
Zn-T	mg/L	0.381	0.078	0.057	<0.010	<0.010	0.037	0.00630	<0.010	0.0718	<0.010	0.381	8	0.022	0.128	<0.010	0.022	0.062	3
Al-D	mg/L	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0048	<0.0030	<0.0030	0.00285	<0.0030	0.0048	8	0.00268	0.00104	0.00263	<0.0060	<0.0060	7
As-D	mg/L	0.00459	0.00389	0.00436	0.00602	0.00713	0.00787	0.00989	0.0059	0.00621	0.00389	0.00989	8	0.00593	0.00203	0.00453	0.00596	0.00732	0
Ba-D	mg/L	0.0298	0.0270	0.0246	0.0225	0.0205	0.0195	0.0208	0.0176	0.0228	0.0176	0.0298	8	0.0225	0.0041	0.0203	0.0216	0.0252	0
B-D	mg/L	1.11	1.18	1.22	1.10	1.28	1.18	1.15	0.97	1.15	0.97	1.28	8	1.15	0.09	1.11	1.17	1.19	0
Be-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	0.000081	<0.00010	<0.00020	8	0.000077	0.000026	<0.00010	<0.00020	<0.00020	8
Cd-D	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000010	<0.000010	<0.000010	0.0000081	<0.000010	<0.000020	8	0.0000077	0.0000026	<0.000010	<0.000020	<0.000020	8
Ca-D	mg/L	284	277	278	260	235	208	143	143	228	143	284	8	220	58	191	247	277	0
Cr-D	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	0.00081	<0.0010	<0.0020	8	0.00077	0.00026	<0.0010	<0.0020	<0.0020	8
Co-D	mg/L	<0.00040	<0.00040	0.00078	<0.00040	<0.00040	0.00029	<0.00020	<0.00020	0.000259	<0.00020	0.00078	8	0.000209	0.000219	0.000175	<0.00040	0.000223	6
Cu-D	mg/L	0.00103	0.00068	0.0004	<0.00040	<0.00040	0.00033	<0.00020	<0.00020	0.00038	<0.00020	0.00103	8	0.000279	0.000324	0.000175	0.000265	0.00047	4
Hard-D	mg/L	821	817	823	765	691	611	416	418	670	416	823	8	647	172	562	728	818	0
Fe-D	mg/L	12.10	13.30	15.40	13.90	11.80	12.60	4.09	6.41	11.20	4.09	15.40	8	10.38	3.89	10.45	12.35	13.45	0
Pb-D	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00020	<0.00020	<0.00020	0.000163	<0.00020	<0.00040	8	0.000154	0.000052	<0.00020	<0.00040	<0.00040	8
Mg-D	mg/L	27.30	30.60	31.10	28.20	25.50	22.60	14.40	14.80	24.30	14.40	31.10	8	23.40	6.60	20.70	26.40	28.80	0.00
Mn-D	mg/L	1.15	1.32	1.41	1.22	1.07	0.98	0.52	0.59	1.03	0.52	1.41	8	0.98	0.33	0.88	1.11	1.25	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.0000022	<0.0000019	0.00000111	<0.0000019	0.0000022	8	0.00000106	0.00000044	<0.0000019	<0.0000019	<0.0000019	7
Mo-D	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	0.00081	<0.0010	<0.0020	8	0.00077	0.00026	<0.0010	<0.0020	<0.0020	8
Ni-D	mg/L	<0.0020	<0.0020	0.0028	<0.0020	<0.0020	0.0066	<0.0010	<0.0010	0.0018	<0.0010	0.0066	8	0.00121	0.00207	0.00088	<0.0020	0.00145	6
K-D	mg/L	6.83	7.11	6.98	6.69	6.27	6.29	5.11	5.13	6.30	5.11	7.11	8	6.26	0.79	5.98	6.49	6.87	0
S-D	mg/L	466	490	502	446	416	362	241	237	395	237	502	8	380	105	331	431	472	0
Se-D	mg/L	<0.00020	<0.00020	0.00043	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	0.000123	<0.00010	0.00043	8	0.000093	0.000127	<0.00010	<0.00020	<0.00020	7
Si-D	mg/L	4.45	4.30	4.29	3.97	4.50	4.17	4.10	3.85	4.20	3.85	4.50	8	4.20	0.23	4.07	4.23	4.34	0
Na-D	mg/L	453	501	495	491	461	456	368	360	448	360	501	8	444	55	431	458	492	0
Sr-D	mg/L	2.99	3.11	2.96	2.51	2.37	2.14	1.50	1.47	2.38	1.47	3.11	8	2.30	0.65	1.98	2.44	2.97	0
Zn-D	mg/L	0.336	0.042	0.038	0.016	<0.010	0.052	0.0068	<0.0050	0.06229	<0.0050	0.336	8	0.02101	0.11219	0.00635	0.027	0.0445	2
pH-F	pH Units	7.30	6.65	6.73		6.67	6.59	6.98	7.24	6.88	6.59	7.30	7	6.87	0.29	6.66	6.73	7.11	0
Cond-F	uS/cm	3370	4060	3860		3550	3490	1956	2650	3276	1956	4060	7	3194	732	3010	3490	3705	0
H2SEquiv	mg/L	0.0049	0.0330	0.0648	0.1170	0.0542	0.1060	0.0010	0.0542	0.0544	0.0010	0.1170	8	0.0279	0.0422	0.0260	0.0542	0.0751	0

Table 13: Water Chemistry for Flooded Underground Mine Pool (2-North)

		QU1013D					Summary Statistics									
Date		16-Mar-2021	20-May-2021	01-Sep-2021	08-Dec-2021	08-Dec-2021										
Parameter	Units						Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	1400	1400	1300	690	700	1098	690	1400	5	1042	370	700	1300	1400	0
TSS	mg/L															
Alk-T	mg/L	490	510	530	520	530	516	490	530	5	515.8	16.7	510	520	530	0
Acidity83	mg/L	44.3	20.2	4.3	<1.0	7.7	15.4	<1.0	44.3	5.0	6.8	17.8	4.3	7.7	20.2	1
Al-T	mg/L															
As-T	mg/L															
Ba-T	mg/L															
B-T	mg/L															
Cd-T	mg/L															
Ca-T	mg/L															
Cr-T	mg/L															
Co-T	mg/L															
Cu-T	mg/L															
Hard-T	mg/L															
Fe-T	mg/L															
Pb-T	mg/L															
Mg-T	mg/L															
Mn-T	mg/L															
Hg-T	mg/L															
Mo-T	mg/L															
Ni-T	mg/L															
K-T	mg/L															
S-T	mg/L															
Se-T	mg/L															
Si-T	mg/L															
Ag-T	mg/L															
Na-T	mg/L															
Sr-T	mg/L															
Zn-T	mg/L															
Al-D	mg/L	<0.0060	<0.0060	0.0031	<0.0030	<0.0030	0.002	<0.0030	0.003	5	0.002	0.001	<0.0030	<0.0060	<0.0060	4
As-D	mg/L	0.0063	0.0012	0.0011	0.0023	0.0024	0.0027	0.0011	0.0063	5	0.0022	0.0021	0.0012	0.0023	0.0024	0
Ba-D	mg/L	0.0527	0.057	0.0396	0.0268	0.0266	0.0405	0.0266	0.057	5	0.0385	0.0142	0.0268	0.0396	0.0527	0
B-D	mg/L	1.060	1.250	1.180	1.000	0.999	1.098	0.999	1.250	5	1.093	0.113	1.000	1.060	1.180	0
Be-D	mg/L	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	0.00007	<0.00010	<0.00020	5	0.000066	0.000027	<0.00010	<0.00010	<0.00020	5
Cd-D	mg/L	<0.000020	<0.000020	<0.000010	<0.000010	<0.000010	0.000007	<0.000010	<0.000020	5	0.0000066	0.0000027	<0.000010	<0.000010	<0.000020	5
Ca-D	mg/L	297	270	219	130	131	209	130	297	5	197	77	131	219	270	0
Cr-D	mg/L	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	0.0007	<0.0010	<0.0020	5	0.0007	0.0003	<0.0010	<0.0010	<0.0020	5
Co-D	mg/L	<0.00040	<0.00040	<0.00020	<0.00020	0.00021	0.000162	<0.00020	0.00021	5	0.000153	0.000057	<0.00020	<0.00040	<0.00040	4
Cu-D	mg/L	<0.00040	<0.00040	<0.00020	<0.00020	<0.00020	0.00014	<0.00020	<0.00040	5	0.000132	0.000055	<0.00020	<0.00020	<0.00040	5
Hard-D	mg/L	856	778	636	378	382	606	378	856	5	571	220	382	636	778	0
Fe-D	mg/L	11.9	7.87	6.54	4.38	4.37	7.01	4.37	11.9	5	6.51	3.11	4.38	6.54	7.87	0
Pb-D	mg/L	<0.00040	<0.00040	<0.00020	<0.00020	<0.00020	0.00014	<0.00020	<0.00040	5	0.000132	0.000055	<0.00020	<0.00020	<0.00040	5
Mg-D	mg/L	27.50	25.00	21.80	13.00	13.00	20.10	13.00	27.50	5.00	19.10	6.80	13.00	21.80	25.00	0.00
Mn-D	mg/L	1.36	1.270	1.47	0.645	0.642	1.077	0.642	1.470	5	1.010	0.402	0.645	1.27	1.36	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	5	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	5
Mo-D	mg/L	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	0.0007	<0.0010	<0.0020	5	0.00066	0.00027	<0.0010	<0.0010	<0.0020	5
Ni-D	mg/L	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	0.0007	<0.0010	<0.0020	5	0.00066	0.00027	<0.0010	<0.0010	<0.0020	5
K-D	mg/L	6.73	6.70	6.25	4.85	4.91	5.89	4.85	6.73	5	5.83	0.94	4.91	6.25	6.70	0
S-D	mg/L	447	476	414	219	221	355	219	476	5	335	125	221	414	447	0
Se-D	mg/L	<0.00020	<0.00020	0.00162	0.00026	<0.00010	0.000426	<0.00010	0.00162	5	0.000184	0.000672	<0.00020	<0.00020	0.00026	3
Si-D	mg/L	4.54	5.25	4.76	3.98	3.96	4.50	3.96	5.25	5	4.47	0.55	3.98	4.54	4.76	0
Na-D	mg/L	438	524	520	373	369	444	369	524	5	439	75	373	438	520	0
Sr-D	mg/L	3.10	2.70	2.23	1.35	1.35	2.15	1.35	3.10	5	2.02	0.79	1.35	2.23	2.70	0
Zn-D	mg/L	<0.010	<0.010	<0.0050	<0.0050	<0.0050	0.0035	<0.0050	<0.010	5	0.0033	0.00137	<0.0050	<0.0050	<0.010	5
pH-F	pH Units	6.45	6.92	6.49	6.88	6.88	6.72	6.45	6.92	5	6.72	0.23	6.49	6.88	6.88	0
Cond-F	uS/cm	2672	3540	3405	2268	2268	2831	2268	3540	5	2779	611	2268	2672	3405	0
H2SEquiv	mg/L	0.0776	0.1910	0.9140	0.1010	0.0914	0.2750	0.0776	0.9140	5	0.1657	0.3600	0.0914	0.1010	0.1910	0

Table 14: Water Chemistry for Flooded Underground Mine Pool (5-Mains 2-North)

		5M#2									Summary Statistics									
Date		25-Mar-2021	06-May-2021	02-Jun-2021	14-Jul-2021	09-Aug-2021	02-Sep-2021	02-Sep-2021	03-Nov-2021	09-Dec-2021										
Parameter	Units										Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	230	530	440	390	360	310	330	250	220	340	220	530	9	326.0	102	250	330	390	0
TSS	mg/L	1.2	1.2	6.8	1.6	<1.4					2.3	<1.4	6.8	5.0	1.6	2.5	1.2	1.2	1.6	1.0
Alk-T	mg/L	600	470	560	560	580	590	570	560	510	555	470	600	9	554	40	560	560	580	0
Acidity83	mg/L	7.3	8.5	15.0	8.1	7.0	<1.0	<1.0	<1.0	<1.0	5.3	<1.0	15.0	9	2.5	5.1	<1.0	7.0	8.1	4
Al-T	mg/L	<0.0060	<0.0030	<0.0060	<0.0030	<0.0030	<0.0030	<0.0030	0.0049	<0.0030	0.00221	<0.0030	0.0049	9	0.0020	0.0012	<0.0030	<0.0030	<0.0060	8
As-T	mg/L	0.0095	0.0113	0.0091	0.0096	0.0088	0.0076	0.0077	0.0074	0.0062	0.0086	0.0062	0.0113	9	0.0085	0.0015	0.0076	0.0088	0.0095	0
Ba-T	mg/L	0.0415	0.0383	0.0317	0.0297	0.0261	0.0281	0.0283	0.0265	0.0254	0.0306	0.0254	0.0415	9	0.0302	0.0057	0.0265	0.0283	0.0317	0
B-T	mg/L	1.27	1.03	1.01	1.08	1.05	0.92	0.95	0.92	0.83	1.01	0.83	1.27	9	1.00	0.13	0.92	1.01	1.05	0
Cd-T	mg/L	<0.000020	0.000013	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000007	<0.000010	0.000013	9	0.0000065	0.0000031	<0.000010	<0.000010	<0.000020	8
Ca-T	mg/L	67	107	100	94	78	80	83	69	64	82	64	107	9	81	15	69	80	94	0
Cr-T	mg/L	<0.0020	0.0057	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00119	<0.0010	0.0057	9	0.0	0.00171	<0.0010	<0.0010	<0.0020	8
Co-T	mg/L	<0.00040	0.00059	0.00053	0.00048	0.00034	0.00021	0.00022	0.00041	0.00037	0.000372	<0.00040	0.00059	9	0.00	0.000144	0.00022	0.0004	0.0005	1
Cu-T	mg/L	<0.0010	0.0032	0.0065	0.00333	0.0019	0.00118	0.00115	<0.00050	0.00135	0.002151	<0.00050	0.0065	9	0.00146	0.001949	0.00115	0.00135	0.0	2
Hard-T	mg/L	192	308	286	267	223	228	234	197	182	235	182	308	9	231	43	197	228	267	0
Fe-T	mg/L	0.822	0.925	1.150	1.100	0.701	2.240	2.270	0.637	0.614	1.162	0.614	2.270	9	1.033	0.647	0.701	0.925	1.150	0
Pb-T	mg/L	<0.00040	<0.00020	0.00142	0.0003	<0.00020	0.00061	0.00058	<0.00020	0.00043	0.000427	<0.00020	0.00142	9	0.00029	0.000423	<0.00020	0.00030	0.00058	4
Mg-T	mg/L	5.85	10.20	8.91	8.05	6.72	6.55	6.71	6.14	5.54	7.19	5.54	10.20	9	7.05	1.55	6.14	6.71	8.05	0
Mn-T	mg/L	0.113	0.312	0.284	0.275	0.224	0.224	0.228	0.201	0.166	0.225	0.113	0.312	9	0.217	0.061	0.201	0.224	0.275	0
Hg-T	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	9	0.0000010	0.000000	<0.0000019	<0.0000019	<0.0000019	9
Mo-T	mg/L	<0.0020	0.0069	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00132	<0.0010	0.0069	9	0.0008	0.0021	<0.0010	<0.0010	<0.0020	8
Ni-T	mg/L	<0.0020	0.0249	<0.0020	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00338	<0.0010	0.02490	9	0.00097	0.00807	<0.0010	<0.0010	<0.0020	7
K-T	mg/L	3.01	3.70	3.49	3.14	2.99	2.99	3.03	2.84	2.81	3.11	2.81	3.70	9	3.10	0.30	2.99	3.01	3.14	0
S-T	mg/L	83	191	160	145	111	110	112	81	67	118	67	191	9	112	41	83	111	145	0
Se-T	mg/L	<0.00020	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000061	<0.00010	<0.00020	9	0.00006	0.000022	<0.00010	<0.00010	<0.00010	9
Si-T	mg/L	3.74	3.30	3.28	3.31	3.45	3.63	3.63	3.72	3.16	3.47	3.16	3.74	9	3.46	0.22	3.30	3.45	3.63	0
Ag-T	mg/L	<0.000040	<0.000020	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000122	<0.000020	<0.000040	9	0.0000117	0.0000044	<0.000020	<0.000020	<0.000020	9
Na-T	mg/L	316	367	345	329	301	311	316	265	253	311	253	367	9	309	35	301	316	329	0
Sr-T	mg/L	0.802	1.310	1.060	1.050	0.806	0.853	0.863	0.745	0.673	0.907	0.673	1.310	9	0.889	0.198	0.802	0.853	1.050	0
Zn-T	mg/L	0.1130	0.0326	0.0440	0.0171	0.0104	0.5460	0.5520	0.0091	0.0119	0.1485	0.0091	0.5520	9	0.0461	0.2294	0.0119	0.0326	0.1130	0
Al-D	mg/L	<0.0060	<0.0060	<0.0030	<0.0030	0.0031	<0.0030	<0.0030	<0.0030	<0.0030	0.0020	<0.0030	0.0031	9	0.0019	0.0008	<0.0030	<0.0030	<0.0060	8
As-D	mg/L	0.00861	0.01090	0.00961	0.00934	0.00871	0.00674	0.00666	0.00804	0.00725	0.00843	0.00666	0.01090	9	0.00832	0.00141	0.00725	0.00861	0.00934	0
Ba-D	mg/L	0.0379	0.0377	0.0300	0.0287	0.0287	0.0272	0.0272	0.0264	0.0252	0.0299	0.0252	0.0379	9	0.0296	0.0047	0.0272	0.0287	0.0300	0
B-D	mg/L	1.16	1.11	1.02	0.95	1.10	1.00	1.06	0.96	0.91	1.03	0.91	1.16	9	1.03	0.08	0.96	1.02	1.10	0
Be-D	mg/L	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000061	<0.00010	<0.00020	9	0.000058	0.000022	<0.00010	<0.00010	<0.00010	9
Cd-D	mg/L	<0.000020	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000061	<0.000010	<0.000020	9	0.00000580	0.0000022	<0.000010	<0.000010	<0.000010	9
Ca-D	mg/L	62	111	95	88	78	80	82	71	65	81	62	111	9	80	15	71	80	88	0
Cr-D	mg/L	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00061	<0.0010	<0.0020	9	0.00058	0.00022	<0.0010	<0.0010	<0.0010	9
Co-D	mg/L	<0.00040	0.00058	0.00050	0.00044	0.00034	<0.00020	<0.00020	0.00040	0.00056	0.00036	<0.00020	0.00058	9	0.00030	0.00019	<0.00040	0.00040	0.00050	3
Cu-D	mg/L	<0.00040	0.00073	0.00052	0.00030	0.00037	0.00023	0.00032	<0.00020	0.00024	0.00033	<0.00020	0.00073	9	0.00029	0.00019	0.00023	0.00030	0.00037	2
Hard-D	mg/L	177	319	272	253	223	227	233	203	186	232	177	319	9	228	44	203	227	253	0
Fe-D	mg/L	0.709	0.904	0.945	0.974	0.632	0.065	0.055	0.644	0.592	0.613	0.055	0.974	9	0.430	0.344	0.592	0.644	0.904	0
Pb-D	mg/L	<0.00040	<0.00040	0.00072	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000191	<0.00020	0.00072	9	0.000145	0.000203	<0.00020	<0.00020	<0.00040	8
Mg-D	mg/L	5.37	10.20	8.54	7.90	6.79	6.71	6.62	5.98	5.70	7.09	5.37	10.20	9	6.95	1.54	5.98	6.71	7.90	0
Mn-D	mg/L	0.103	0.310	0.276	0.254	0.209	0.217	0.217	0.198	0.170	0.217	0.103	0.310	9	0.208	0.060	0.198	0.217	0.254	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	9	0.0000010	0	<0.0000019	<0.0000019	<0.0000019	9
Mo-D	mg/L	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00061	<0.0010	<0.0020	9	0.00058	0.00022	<0.0010	<0.0010	<0.0010	9
Ni-D	mg/L	<0.0020	<0.0020	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0021	0.00087	<0.0010	0.00210	9	0.00075	0.00054	<0.0010	<0.0010	<0.0020	7
K-D	mg/L	2.77	3.67	3.22	3.2	2.91	3.1	3.03	2.79	2.82	3.06	2.77	3.67	9	3.05000	0.29	2.82	3.03000	3.20000	0
S-D	mg/L	75	191	163	136	110	111	110	79	68	116	68	191	9	110	41	79	110	136	0
Se-D	mg/L	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000061	<0.00010	<0.00020	9	0.000058	0.000022	<0.00010	<0.00010	<0.00010	9
Si-D	mg/L	3.41	3.50	3.17	2.96	3.40	3.64	3.72	3.57	3.29	3.41	2.96	3.72	9	3.40	0.24	3.29	3.41	3.57	0
Na-D	mg/L	282	366	325	325	301	318	316	270	258	306	258	366	9	305	33	282	316	325	0
Sr-D	mg/L	0.731	1.240	1.090	0.959	0.843	0.897	0.884	0.768	0.689	0.900	0.689	1.240	9	0.886	0.176	0.768	0.884	0.959	0
Zn-D	mg/L	0.0930	0.0240	0.0370	0.0146	0.0091	0.1550	0.1580	0.0080	0.0104	0.0566	0.0080	0.1580	9	0.0304	0.0625	0.0104	0.0240	0.0930	0
pH-F	pH Units	7.48	6.91	7.33		7.36	7.31		7.26	7.60	7.32	6.91	7.60	7	7.32	0.22	7.29	7.33	7.42	0
Cond-F	uS/cm	1586	2360	2250		1684	2000		1328	1697	1844	1328	2360	7	1811	373	1635	1697	2125	0
H2SEquiv	mg/L	0.02550	0.00096	0.01170	0.00914	0.01590	0.11700	0.11700	0.00978	0.01280	0.03553	0.00096	0.11700	9	0.01606	0.04664	0.00978	0.01280	0.02550	0

Table 15: Water Chemistry for Flooded Underground Mine Pool (3-Mains 2-North)

		3M2N								Summary Statistics									
Date		09-Feb-2021	15-Mar-2021	24-Mar-2021	06-Apr-2021	02-Jun-2021	12-Jul-2021	02-Sep-2021	14-Dec-2021										
Parameter	Units									Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	690	1200	840	720	720	830	820	670	811	670	1200	8	797	170	712	770	832	0
TSS	mg/L			27.0	3.6	4.0	6.4			10.2	3.6	27.0	4.0	7.1	11.2	3.9	5.2	11.6	0.0
Alk-T	mg/L	430	430	380	410	420	400	410	370	406	370	430	8	406	22	395	410	423	0
Acidity83	mg/L	<1.0	32.80	12.60	8.80	13.50	8.30	<1.0	2.40	9.93	<1.0	32.80	8	4.72	10.57	1.92	8.55	12.82	2
Al-T	mg/L	0.0136	0.0656	0.0311	<0.0030	0.0060	0.0375	0.0083	0.0308	0.0243	<0.0030	0.0656	8	0.0149	0.0214	0.0077	0.0222	0.0327	1
As-T	mg/L	0.00049	0.00213	0.00123	0.00039	0.00021	0.00052	0.00038	0.00016	0.00069	0.00016	0.00213	8	0.00049	0.00067	0.00034	0.00044	0.00070	0
Ba-T	mg/L	0.0129	0.0178	0.0154	0.0137	0.0142	0.0136	0.0145	0.0136	0.0145	0.0129	0.0178	8	0.0144	0.0015	0.0136	0.0140	0.0147	0
B-T	mg/L	0.770	1.050	0.824	0.760	0.810	0.797	0.840	0.726	0.822	0.726	1.050	8	0.817	0.099	0.768	0.804	0.828	0
Cd-T	mg/L	0.00	0.000106	0.000047	<0.000010	<0.000020	0.000014	<0.000020	<0.000010	0.0000281	<0.000010	0.000106	8	0.0000163	0.0000345	0.0000088	0.000012	0.0000327	4
Ca-T	mg/L	109	203	163	127	136	135	148	123	143	109	203	8	141	29	126	136	152	0
Cr-T	mg/L	<0.0020	<0.0020	<0.0010	<0.0010	<0.0020	<0.0010	<0.0020	<0.0010	0.00075	<0.0010	<0.0020	8	0.00071	0.00027	<0.0010	0.00075	<0.0020	8
Co-T	mg/L	0.00070	0.12600	0.07370	0.00049	0.00076	0.00387	0.00179	0.00050	0.02598	0.00049	0.12600	8	0.00309	0.04770	0.00065	0.00128	0.02133	0
Cu-T	mg/L	0.00210	0.01250	0.00539	<0.00050	<0.0010	0.00219	<0.0010	0.00060	0.00300	<0.00050	0.01250	8	0.00136	0.00420	<0.0010	0.00135	0.00299	3
Hard-T	mg/L	338	615	501	392	421	422	455	250	424	250	615	8	411	108	378	421	466	0
Fe-T	mg/L	0.20	24.00	14.00	0.24	0.93	1.76	1.68	0.19	5.38	0.19	24.00	8	1.31	8.85	0.23	1.30	4.82	0
Pb-T	mg/L	<0.00040	<0.00040	<0.00020	<0.00020	<0.00040	<0.00020	<0.00040	<0.00020	0.00015	<0.00020	<0.00040	8	0.000141	0.000053	<0.00020	0.00015	<0.00040	8
Mg-T	mg/L	15.7	26.6	22.7	18.1	20.0	20.7	20.6	17.1	20.2	15.7	26.6	8	19.9	3.4	17.9	20.3	21.2	0
Mn-T	mg/L	0.136	2.1	1.28	0.184	0.239	0.246	0.229	0.0853	0.5624	0.0853	2.1	8	0.3062	0.7317	0.172	0.234	0.5045	0
Hg-T	mg/L	<0.0000019	0.0000022	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000111	<0.0000019	0.0000022	8	0.00000106	0.00000044	<0.0000019	<0.0000019	<0.0000019	7
Mo-T	mg/L	<0.0020	<0.0020	<0.0010	<0.0010	<0.0020	<0.0010	<0.0020	<0.0010	0.00075	<0.0010	<0.0020	8	0.00071	0.00027	<0.0010	0.00075	<0.0020	8
Ni-T	mg/L	<0.0020	0.157	0.0918	0.0011	<0.0020	0.0065	0.0026	0.0022	0.0329	<0.0020	0.157	8	0.00526	0.05913	0.00108	0.0024	0.02783	2
K-T	mg/L	3.21	4.43	3.83	3.50	4.01	3.810	4.02	3.730	3.82	3.21	4.43	8	3.8	0.36	3.67	3.82	4.01	0
S-T	mg/L	223	392	334	238	251	266	273	232	276	223	392	8	271	58	236	258	288	0
Se-T	mg/L	<0.00020	<0.00020	<0.00010	<0.00010	<0.00020	<0.00010	<0.00020	<0.00010	0.000075	<0.00010	<0.00020	8	0.000071	0.000027	<0.00010	0.000075	<0.00020	8
Si-T	mg/L	2.87	3.71	3.29	3.13	3.20	3.03	3.44	3.49	3.27	2.87	3.71	8	3.26	0.27	3.10	3.25	3.45	0
Ag-T	mg/L	<0.000040	<0.000040	<0.000020	<0.000020	<0.000040	<0.000020	<0.000040	<0.000020	0.000015	<0.000020	<0.000040	8	0.0000141	0.0000053	<0.000020	0.000015	<0.000040	8
Na-T	mg/L	304	436	358	317	344	353	358	303	346	303	436	8	344	42	313	348	358	0
Sr-T	mg/L	1.14	1.92	1.52	1.27	1.38	1.47	1.48	1.27	1.43	1.14	1.92	8	1.42	0.24	1.27	1.42	1.49	0
Zn-T	mg/L	<0.010	0.0320	0.0163	<0.0050	<0.010	<0.0050	<0.010	0.0115	0.00997	<0.0050	0.0320	8	0.00682	0.0101	0.00438	<0.010	0.0127	5
Al-D	mg/L	<0.0030	0.0093	<0.0060	<0.0030	<0.0030	0.0058	0.0037	0.0086	0.00436	<0.0030	0.0093	8	0.0034	0.0032	<0.0030	0.0034	0.0065	4
As-D	mg/L	0.00044	0.00167	0.00094	0.00117	0.00020	0.00012	0.00019	0.00012	0.00061	0.00012	0.00167	8	0.00038	0.00059	0.00017	0.00032	0.00100	0
Ba-D	mg/L	0.0140	0.0165	0.0155	0.0140	0.0130	0.0126	0.0133	0.0131	0.0140	0.0126	0.0165	8	0.0139	0.0014	0.0131	0.0136	0.0144	0
B-D	mg/L	0.73	1.17	1.04	0.77	0.79	0.87	0.87	0.73	0.87	0.73	1.17	8	0.86	0.16	0.76	0.83	0.92	0
Be-D	mg/L	<0.00010	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000063	<0.00010	<0.00020	8	0.0001	0.0000	<0.00010	<0.00010	0.0001	8
Cd-D	mg/L	0.00002	<0.000020	<0.000020	<0.000010	<0.000010	0.000014	<0.000010	<0.000010	0.0000097	<0.000010	0.000024	8	0.0000082	0.0000067	<0.000010	0.0000075	0.000011	6
Ca-D	mg/L	110	201	164	128	123	144	145	120	142	110	201	8	140	29	122	136	150	0
Cr-D	mg/L	<0.0010	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00063	<0.0010	<0.0020	8	0.00059	0.00023	<0.0010	<0.0010	0.00063	8
Co-D	mg/L	0.00063	0.122	0.0773	0.0005	0.0007	0.00427	0.00184	0.00051	0.02597	0.00049	0.122	8	0.00308	0.04704	0.0006	0.00127	0.02253	0
Cu-D	mg/L	0.0016	0.00197	0.00253	<0.00020	<0.00020	0.00055	0.00032	<0.00020	0.000909	<0.00020	0.00253	8	0.00044	0.000976	<0.00020	0.000435	0.001692	3
Hard-D	mg/L	340	612	505	395	384	450	447	244	422	244	612	8	408	110	373	421	463	0
Fe-D	mg/L	0.07	22.90	13.30	0.01	0.25	0.22	0.04	0.10	4.61	0.01	22.90	8	0.28	8.71	0.07	0.16	3.51	0
Pb-D	mg/L	<0.00020	<0.00040	<0.00040	0.00036	<0.00020	<0.00020	<0.00020	<0.00020	0.000158	<0.00020	0.00036	8	0.00014	0.000093	<0.00020	<0.00020	<0.00040	7
Mg-D	mg/L	15.60	27.00	22.90	18.20	18.30	21.70	20.70	16.90	20.20	15.60	27.00	8	19.90	3.70	17.90	19.50	22.00	0
Mn-D	mg/L	0.133	2.030	1.350	0.192	0.221	0.263	0.229	0.082	0.563	0.082	2.030	8	0.306	0.722	0.177	0.225	0.535	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	8	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	8
Mo-D	mg/L	<0.0010	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00063	<0.0010	<0.0020	8	0.00059	0.00023	<0.0010	<0.0010	0.00063	8
Ni-D	mg/L	0.0014	0.1500	0.0975	0.0020	0.0011	0.0071	0.0026	0.0022	0.0330	0.0011	0.1500	8	0.0061	0.0578	0.0019	0.0024	0.0297	0
K-D	mg/L	3.43	4.40	3.86	3.52	3.61	3.95	3.96	3.62	3.79	3.43	4.40	8	3.78	0.32	3.59	3.74	3.95	0
S-D	mg/L	223	398	320	238	248	274	265	224	273	223	398	8	268	59	234	256	285	0
Se-D	mg/L	<0.00010	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000063	<0.00010	<0.00020	8	0.000059	0.000023	<0.00010	<0.00010	0.000063	8
Si-D	mg/L	2.94	3.62	3.57	3.17	2.96	2.90	3.24	3.38	3.22	2.90	3.62	8	3.21	0.28	2.96	3.21	3.43	0
Na-D	mg/L	301	445	357	314	319	376	355	294	345	294	445	8	342	49	310	337	361	0
Sr-D	mg/L	1.36	1.89	1.58	1.29	1.40	1.64	1.49	1.23	1.49	1.23	1.89	8	1.47	0.21	1.34	1.44	1.59	0
Zn-D	mg/L	<0.0050	0.023	0.016	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00675	<0.0050	0.023	8	0.00416	0.00809	<0.0050	<0.0050	0.00588	6
pH-F	pH Units	7.28	6.85	7.15	7.06		7.24	7.35	7.16	7.16	6.85	7.35	7	7.15	0.16	7.11	7.16	7.26	0
Cond-F	uS/cm	2003	2071	1401	1882		2760	2380	2050	2078	1401	2760	7	2040	420	1942	2050	2225	0
H2SEquiv	mg/L		0.00393					0.00096	0.00096	0.00195	0.00096	0.00393	3	0.00153	0.00172	0.00096	0.00096	0.00244	0

Table 16: Water Chemistry for Flooded Underground Mine Pool (5-South)

		5SMW					Summary Statistics									
Date		18-Feb-2021	23-Mar-2021	13-Oct-2021	03-Nov-2021	09-Dec-2021										
Parameter	Units						Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	410	390	350	330	270	350	270	410	5	346	54	330	350	390	0
TSS	mg/L		49	29			39	29	49	2	38	14	34	39	44	0
Alk-T	mg/L	240	260	320	350	300	294	240	350	5	291	44	260	300	320	0
Acidity83	mg/L	14.2	10.9	4.7	3.5	10.2	8.7	3.5	14.2	5	7.6	4.5	4.7	10.2	10.9	0
Al-T	mg/L	0.1130	0.0767	0.0173	0.0345	0.0383	0.0560	0.0173	0.1130	5	0.0456	0.0386	0.0345	0.0383	0.0767	0
As-T	mg/L	0.00387	0.00460	0.00142	0.02400	0.00418	0.00761	0.00142	0.02400	5	0.00480	0.00924	0.00387	0.00418	0.00460	0
Ba-T	mg/L	0.0343	0.0346	0.0293	0.0501	0.0276	0.0352	0.0276	0.0501	5	0.0344	0.0089	0.0293	0.0343	0.0346	0
B-T	mg/L	0.884	0.807	0.951	0.808	0.683	0.827	0.683	0.951	5	0.822	0.100	0.807	0.808	0.884	0
Cd-T	mg/L	0.000123	0.000069	0.000012	0.000011	0.000012	0.000045	0.000011	0.000123	5	0.000027	0.00005	0.000012	0.000012	0.000069	0
Ca-T	mg/L	72.9	78.3	70.2	66.2	55.8	68.70	55.8	78.3	5	68.2	8.4	66.2	70.2	72.9	0
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.00062	<0.0010	0.0011	5	0.00059	0.00027	<0.0010	<0.0010	<0.0010	4
Co-T	mg/L	0.0396	0.0311	0.006	0.00554	0.00328	0.02	0.00328	0.0396	5	0.01061	0.01696	0.00554	0.01	0.03	0
Cu-T	mg/L	0.00975	0.00666	0.00179	0.00465	0.00395	0.00536	0.00179	0.00975	5	0.00463	0.00301	0.00395	0.00465	0.00666	0
Hard-T	mg/L	237	249	215	210	173	217	173	249	5	215	29	210	215	237	0
Fe-T	mg/L	21.50	21.60	14.30	8.63	6.14	14.43	6.14	21.60	5	12.86	7.14	8.63	14.30	21.50	0
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00010	<0.00020	<0.00020	5	0.0001	0	<0.00020	<0.00020	<0.00020	5
Mg-T	mg/L	13.3	13.0	9.7	10.9	8.2	11.0	8.2	13.3	5	10.8	2.2	9.7	10.9	13.0	0
Mn-T	mg/L	0.528	0.541	0.354	0.273	0.203	0.380	0.203	0.541	5	0.355	0.151	0.273	0.354	0.528	0
Hg-T	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.0000010	<0.0000019	<0.0000019	5	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	5
Mo-T	mg/L	<0.0010	<0.0010	0.0018	0.0018	0.0011	0.00114	<0.0010	0.0018	5	0.00098	0.00065	<0.0010	0.0011	0.0018	2
Ni-T	mg/L	0.0632	0.0502	0.0090	0.0261	0.0057	0.0308	0.0057	0.0632	5	0.0212	0.0253	0.0090	0.0261	0.0502	0
K-T	mg/L	4.84	4.92	4.66	4.75	4.69	4.77	4.66	4.92	5	4.77	0.11	4.69	4.75	4.84	0
S-T	mg/L	143	129	116	99	81	114	81	143	5	111	25	99	116	129	0
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	5	0.00005	0.00000	<0.00010	<0.00010	<0.00010	5
Si-T	mg/L	3.25	3.27	3.19	4.15	3.09	3.39	3.09	4.15	5	3.37	0.43	3.19	3.25	3.27	0
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00001	<0.000020	<0.000020	5	0.00001	0	<0.000020	<0.000020	<0.000020	5
Na-T	mg/L	175	165	193	170	162	173	162	193	5	173	12	165	170	175	0
Sr-T	mg/L	0.881	0.936	0.867	0.882	0.692	0.852	0.692	0.936	5	0.847	0.093	0.867	0.881	0.882	0
Zn-T	mg/L	0.0687	0.0409	0.0062	0.0068	<0.0050	0.0250	<0.0050	0.0687	5	0.0124	0.0290	0.0062	0.0068	0.0409	1
Al-D	mg/L	0.023	0.018	0.005	0.003	0.018	0.013	0.003	0.023	5	0.010	0.009	0.005	0.018	0.018	0
As-D	mg/L	0.00322	0.00414	0.00136	0.00944	0.00406	0.00444	0.00136	0.00944	5	0.00370	0.00301	0.00322	0.00406	0.00414	0
Ba-D	mg/L	0.0350	0.0344	0.0302	0.0465	0.0261	0.0344	0.0261	0.0465	5	0.0338	0.0076	0.0302	0.0344	0.0350	0
B-D	mg/L	0.867	0.782	0.925	0.833	0.766	0.835	0.766	0.925	5	0.833	0.065	0.782	0.83	0.867	0
Be-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	5	0.00005	0	<0.00010	<0.00010	<0.00010	5
Cd-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	<0.000010	<0.000010	5	0.000005	0	<0.000010	<0.000010	<0.000010	5
Ca-D	mg/L	77	78	70	68	55	70	55	78	5	69	9	68	70	77	0
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	<0.0010	<0.0010	5	0.0005	0	<0.0010	<0.0010	<0.0010	5
Co-D	mg/L	0.043	0.032	0.006	0.001	0.003	0.017	0.001	0.043	5	0.00804	0.01913	0.00341	0.00612	0.0323	0
Cu-D	mg/L	0.00067	0.0005	0.00034	<0.00020	0.00	0.00046	<0.00020	0.00069	5	0.00038	0.00025	0.00034	0.00050	0.00067	1
Hard-D	mg/L	250	249	216	213	172	220	172	250	5	218	32	213	216	249	0
Fe-D	mg/L	22.60	21.30	14.60	7.36	5.98	14.37	5.98	22.60	5	12.53	7.67	7.36	14.60	21.30	0
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000100	<0.00020	<0.00020	5	0.0001	0	<0.00020	<0.00020	<0.00020	5
Mg-D	mg/L	13.90	13.20	9.73	10.20	8.31	11.07	8.31	13.90	5	10.86	2.38	9.73	10.20	13.20	0
Mn-D	mg/L	0.561	0.535	0.362	0.261	0.204	0.385	0.204	0.561	5	0.357	0.160	0.261	0.362	0.535	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.0000010	<0.0000019	<0.0000019	5	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	5
Mo-D	mg/L	<0.0010	<0.0010	0.0019	0.0015	0.0011	0.0011	<0.0010	0.0019	5	0.0010	0.0006	<0.0010	0.0011	0.00150	2
Ni-D	mg/L	0.0686	0.0502	0.0089	0.0093	0.0057	0.0285	0.0057	0.0686	5	0.0175	0.0289	0.0089	0.0093	0.0502	0
K-D	mg/L	5.05	5.02	4.75	4.52	4.64	4.80	4.52	5.05	5	4.79	0.23	4.64	4.75	5.02	0
S-D	mg/L	141	132	116	93	78	112	78	141	5	109	26	93	116	132	0
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	5	0.00005	0	<0.00010	<0.00010	<0.00010	5
Si-D	mg/L	3.23	3.29	3.27	3.99	3.06	3.37	3.06	3.99	5	3.35	0.36	3.23	3.27	3.29	0
Na-D	mg/L	184	170	199	167	165	177	165	199	5	177	14	167	170	184	0
Sr-D	mg/L	0.882	0.962	0.874	0.875	0.685	0.856	0.685	0.962	5	0.850	0.102	0.874	0.875	0.882	0
Zn-D	mg/L	0.0109	<0.0050	<0.0050	<0.0050	<0.0050	0.00418	<0.0050	0.0109	5	0.00336	0.00376	<0.0050	<0.0050	<0.0050	4
pH-F	pH Units	7.40	6.87	7.08	7.32	7.35	7.20	6.87	7.40	5	7.20	0.22	7.08	7.32	7.35	0
Cond-F	uS/cm	1427	1353	1207	1024	1301	1262	1024	1427	5	1254	156	1207	1301	1353	0
H2SEquiv	mg/L	0.02230	0.03930	0.02760	0.00744	0.02440	0.02421	0.00744	0.03930	5	0.02131	0.01145	0.02230	0.02440	0.02760	0

Table 17: Water Chemistry for Flooded Underground Mine Pool (4-South)

		QU1101				Summary Statistics									
Date		28-Jan-2021	28-Jan-2021	22-Jun-2021	22-Jun-2021										
Parameter	Units					Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	1600	1600	1500	1500	1550	1500	1600	4	1549	57	1500	1550	1600	0
TSS	mg/L														
Alk-T	mg/L	73	74	100	64	78	64	100	4	77	16	71	74	81	0
Acidity83	mg/L	108	111	208	164	147	108	208	4	142	47	110	137	175	0
Al-T	mg/L														
As-T	mg/L														
Ba-T	mg/L														
B-T	mg/L														
Cd-T	mg/L														
Ca-T	mg/L														
Cr-T	mg/L														
Co-T	mg/L														
Cu-T	mg/L														
Hard-T	mg/L														
Fe-T	mg/L														
Pb-T	mg/L														
Mg-T	mg/L														
Mn-T	mg/L														
Hg-T	mg/L														
Mo-T	mg/L														
Ni-T	mg/L														
K-T	mg/L														
S-T	mg/L														
Se-T	mg/L														
Si-T	mg/L														
Ag-T	mg/L														
Na-T	mg/L														
Sr-T	mg/L														
Zn-T	mg/L														
Al-D	mg/L	<0.015	0.035	<0.015	<0.015	0.0144	<0.015	0.035	4	0.0	0.0138	<0.015	<0.015	0.0	3
As-D	mg/L	0.116	0.114	0.107	0.107	0.111	0.107	0.116	4	0.111	0.005	0.107	0.111	0.115	0
Ba-D	mg/L	0.0117	0.0114	0.0119	0.0118	0.0117	0.0114	0.0119	4	0.0117	0.0002	0.0116	0.0118	0.0118	0
B-D	mg/L	1.12	1.05	1.10	1.06	1.08	1.05	1.12	4	1.08	0.03	1.06	1.08	1.10	0
Be-D	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00025	<0.00050	<0.00050	4	0.00025	0.00000	<0.00050	<0.00050	<0.00050	4
Cd-D	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	0.000025	<0.000050	<0.000050	4	0.000025	0.000000	<0.000050	<0.000050	<0.000050	4
Ca-D	mg/L	379	371	343	342	359	342	379	4	358	19	343	357	373	0
Cr-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	<0.0050	<0.0050	4	0.0025	0.0000	<0.0050	<0.0050	<0.0050	4
Co-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	<0.0010	<0.0010	4	0.00050	0.00000	<0.0010	<0.0010	<0.0010	4
Cu-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	<0.0010	<0.0010	4	0.0005	0.0000	<0.0010	<0.0010	<0.0010	4
Hard-D	mg/L	1180	1160	1070	1060	1117	1060	1180	4	1116	61	1067	1115	1165	0
Fe-D	mg/L	176	175	153	153	164	153	176	4	164	13	153	164	175	0
Pb-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	<0.0010	<0.0010	4	0.0005	0.0000	<0.0010	<0.0010	<0.0010	4
Mg-D	mg/L	56.6	55.8	51.8	51.0	53.8	51.0	56.6	4	53.7	2.8	51.6	53.8	56.0	0
Mn-D	mg/L	2.52	2.52	2.44	2.39	2.47	2.39	2.52	4	2.47	0.06	2.43	2.48	2.52	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	4	0.0000010	0	<0.0000019	<0.0000019	<0.0000019	4
Mo-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	<0.0050	<0.0050	4	0.0025	0	<0.0050	<0.0050	<0.0050	4
Ni-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	<0.0050	<0.0050	4	0.0025	0	<0.0050	<0.0050	<0.0050	4
K-D	mg/L	6.33	6.38	6.22	6.21	6.29	6.21	6.38	4	6.28	0.08	6.22	6.28	6.34	0
S-D	mg/L	508	501	478	477	491	477	508	4	491	16	478	490	503	0
Se-D	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00025	<0.00050	<0.00050	4	0.00025	0.00000	<0.00050	<0.00050	<0.00050	4
Si-D	mg/L	5.90	5.70	5.49	5.46	5.64	5.46	5.90	4	5.63	0.20	5.48	5.60	5.75	0
Na-D	mg/L	138	137	129	131	134	129	138	4	134	4	131	134	137	0
Sr-D	mg/L	1.93	1.89	1.86	1.96	1.91	1.86	1.96	4	1.91	0.04	1.88	1.91	1.94	0
Zn-D	mg/L	<0.025	<0.025	<0.025	<0.025	0.0125	<0.025	<0.025	4	0.0125	0	<0.025	<0.025	<0.025	4
pH-F	pH Units	6.45	6.45	6.92	6.92	6.69	6.45	6.92	4	6.68	0.27	6.45	6.69	6.92	0
Cond-F	uS/cm	1943	1943	2305	2305	2124	1943	2305	4	2116	209	1943	2124	2305	0
H2SEquiv	mg/L	0.02340	0.02340	0.00957	0.00957	0.01648	0.00957	0.02340	4	0.01496	0.00798	0.00957	0.01648	0.02340	0

Table 18: Water Chemistry for Flooded Underground Mine Pool (2 - 3 South)

		MW004								Summary Statistics					
Date		3-Feb-21	13-May-21	22-Jul-21	17-Aug-21	27-Sep-21	7-Oct-21	12-Oct-21	29-Nov-21						
Paramete	Units									Average	Min	Max	Geo.Mean	STDV	Count <DL
SO4-D	mg/L	340	410		430				292	368	292	430	363	63	0
H2SEquiv	mg/L	0	0		0				0	0	0	0	0	0	0
Cond-F	uS/cm	592	1029		1058				731	853	592	1058	829	228	0
pH-F	pH Units	6.39	7.22		7.25				7.09	6.99	6.39	7.25	6.98	0.40	0
Turb	NTU	1.800	0.460		0.630				0.001	0.723	0.001	1.800	0.165	0.766	0
Alk-T	mg/L	91	130		170				90	120	90	170	116	38	0
Acidity83	mg/L	2.0	9.5		5.5				5.9	5.7	2.0	9.5	5	3.1	0
N-D	mg/L	0.219	0.197		0.104					0.173	0.104	0.219	0.165	0.061	0
Hydrox	mg/L	<1.0	<1.0		<1.0					0.5	<1.0	<1.0	0.5	0	3
Bicarb	mg/L	110	160		210					160	110	210	154	50	0
Carb	mg/L	<1.0	<1.0		<1.0					0.5	<1.0	<1.0	0.5	0	3
Cl-D	mg/L	<1.0	<1.0		<1.0				0.53	0.51	<1.0	0.53	0.51	0.01	3
F-D	mg/L	0.064	0.081		0.120				0.120	0.096	0.064	0.120	0.093	0.028	0
Br-D	mg/L	0.074	0.046		0.058				<0.10	0.057	0.046	0.074	0.056	0.012	1
DOC	mg/L	2.0			1.7				2.6	2.1	1.7	2.6	2.1	0.5	0
P-D	mg/L	<0.0030	<0.0030		<0.0030				0.00960	0.00352	<0.0030	0.0096	0.00239	0.00405	3
TSS	mg/L														
Al-D	mg/L	0.0055	0.0049		0.0057				0.0144	0.0076	0.0049	0.0144	0.0069	0.0045	0
Ag-D	mg/L	<0.000020	<0.000020		<0.000020				<0.00001	0.0000088	<0.00001	<0.000020	0.0000084	0.0000025	4
As-D	mg/L	0.00030	0.00025		0.00066				0.00026	0.00037	0.00025	0.00066	0.00034	0.00020	0
Ba-D	mg/L	0.0209	0.0268		0.0393				0.0175	0.0261	0.0175	0.0393	0.0249	0.0096	0
B-D	mg/L	0.181	0.204		0.252				0.171	0.202	0.171	0.252	0.200	0.036	0
Be-D	mg/L	<0.00010	<0.00010		<0.00010				<0.00001	0.000039	<0.00001	<0.00010	0.000028	0.000022	4
Bi-D	mg/L	<0.0010	<0.0010		<0.0010				<0.00001	0.00038	<0.00001	<0.0010	0.00016	0.00025	4
Cd-D	mg/L	<0.000010	0.000025		<0.000010				0.0000053	0.0000101	<0.000010	0.000025	0.0000076	0.0000100	2
Ca-D	mg/L	131	149		170				116	142	116	170	140	23	0
Cr-D	mg/L	<0.0010	<0.0010		<0.0010				0.00017	0.00042	0.00017	<0.0010	0.00038	0.00017	3
Co-D	mg/L	0.00023	<0.00020		0.00038				0.00027	0.00025	<0.00020	0.00038	0.00022	0.00012	1
Cu-D	mg/L	0.00162	0.00134		0.00068				0.00126	0.00122	0.00068	0.00162	0.00117	0.00039	0
Fe-D	mg/L	0.0090	<0.0050		0.0236				0.0032	0.0096	<0.0050	0.0236	0.0064	0.0098	1
Hard-D	mg/L	391	442		496					443	391	496	440	52	0
Pb-D	mg/L	<0.00020	<0.00020		<0.00020				<0.00005	0.000081	<0.00005	<0.00020	0.000071	0.000037	4
Mg-D	mg/L	15.7	17.1		17.5				14.6	16.2	14.6	17.5	16.2	1.3	0
Mn-D	mg/L	0.0253	0.0128		0.0526				0.0124	0.0258	0.0124	0.0526	0.0214	0.0189	0
Hg-D	mg/L	<0.0000019	<0.0000019		<0.0000019				<0.000005	0.00000134	<0.0000019	<0.000005	0.00000121	0.00000078	4
Na-D	mg/L	26.4	33.1		41.4				26.1	31.8	26.1	41.4	31.2	7.2	0
Mo-D	mg/L	<0.0010	<0.0010		<0.0010				0.000206	0.00043	0.000206	<0.0010	0.00040	0.00015	3
Ni-D	mg/L	0.0019	<0.0010		0.0013				0.00211	0.00145	<0.0010	0.00211	0.00127	0.00072	1
K-D	mg/L	1.33	1.58		1.65				1.27	1.46	1.27	1.65	1.45	0.19	0
S-D	mg/L	120	125		148				110	126	110	148	125	16	0
Sb-D	mg/L	<0.00050	<0.00050		<0.00050				<0.00005	0.000194	<0.00005	<0.00050	0.000141	0.000113	4
Se-D	mg/L	<0.00010	<0.00010		<0.00010				<0.0001	0.000050	<0.0001	<0.00010	0.000050	0.000000	4
Si-D	mg/L	3.63	3.06		2.90				3.51	3.27	2.90	3.63	3.26	0.35	0
Sr-D	mg/L	1.00	1.18		1.59				0.77	1.13	0.77	1.59	1.10	0.35	0
Tl-D	mg/L	<0.000010	<0.000010		<0.000010				<0.000004	0.0000043	<0.000004	<0.000010	0.0000040	0.0000015	4
Ti-D	mg/L	<0.0050	<0.0050		<0.0050				<0.0002	0.00190	<0.0002	<0.0050	0.00112	0.00120	4
U-D	mg/L	<0.00010	<0.00010		<0.00010				0.0000166	0.000042	0.0000166	<0.00010	0.000038	0.000017	3
V-D	mg/L	<0.0050	<0.0050		<0.0050				<0.0002	0.0019	<0.0002	<0.0050	0.0011	0.0012	4
Zn-D	mg/L	0.0188	0.0100		0.0065				0.0039	0.0098	0.0039	0.0188	0.0083	0.0065	0

Table 19: Water Chemistry for Flooded Underground Mine Pool (242)

		242MW			Summary Statistics									
Date		23-Feb-21	27-May-21	23-Sep-21										
Parameter	Units				Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	41	41	43	42	41	43	3	42	1	41	41	42	0
TSS	mg/L													
Alk-T	mg/L	120	91	93	101	91	120	3	101	16	92	93	107	0
Acidity83	mg/L	8.0	8.2	2.5	6.2	2.5	8.2	3.0	5.5	3.2	5.2	8.0	8.1	0
Al-T	mg/L													
As-T	mg/L													
Ba-T	mg/L													
B-T	mg/L													
Cd-T	mg/L													
Ca-T	mg/L													
Cr-T	mg/L													
Co-T	mg/L													
Cu-T	mg/L													
Hard-T	mg/L													
Fe-T	mg/L													
Pb-T	mg/L													
Mg-T	mg/L													
Mn-T	mg/L													
Hg-T	mg/L													
Mo-T	mg/L													
Ni-T	mg/L													
K-T	mg/L													
S-T	mg/L													
Se-T	mg/L													
Si-T	mg/L													
Ag-T	mg/L													
Na-T	mg/L													
Sr-T	mg/L													
Zn-T	mg/L													
Al-D	mg/L	<0.0030	<0.0030	<0.0030	0.0015	<0.0030	<0.0030	3	0.0015	0	<0.0030	<0.0030	<0.0030	3
As-D	mg/L	0.0680	0.0763	0.0886	0.0776	0.0680	0.0886	3	0.0772	0.0104	0.0722	0.0763	0.0824	0
Ba-D	mg/L	0.0697	0.0677	0.0709	0.0694	0.0677	0.0709	3	0.0694	0.0016	0.0687	0.0697	0.0703	0
B-D	mg/L	0.057	0.054	0.062	0.058	0.054	0.062	3	0.058	0.004	0.056	0.057	0.059	0
Be-D	mg/L	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	3	0.00005	0	<0.00010	<0.00010	<0.00010	3
Cd-D	mg/L	<0.000010	<0.000010	<0.000010	0.000005	<0.000010	<0.000010	3	0.000005	0	<0.000010	<0.000010	<0.000010	3
Ca-D	mg/L	38.8	40.5	45.8	41.7	38.8	45.8	3	41.6	3.7	39.6	40.5	43.1	0
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	0.00050	<0.0010	<0.0010	3	0.0005	0.0000	<0.0010	<0.0010	<0.0010	3
Co-D	mg/L	0.00184	0.00173	0.00175	0.00177	0.00173	0.00184	3	0.00177	0.00006	0.00174	0.00175	0.00180	0
Cu-D	mg/L	0.002	<0.00020	<0.00020	0.001	<0.00020	0.00159	3	0.000251	0.00086	<0.00020	<0.00020	0.000845	2
Hard-D	mg/L	111	114	129	118	111	129	3	118	10	113	114	122	0
Fe-D	mg/L	11.9	12.6	14.4	13.0	11.9	14.4	3	12.9	1.3	12.2	12.6	13.5	0
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	0.000100	<0.00020	<0.00020	3	0.0001	0	<0.00020	<0.00020	<0.00020	3
Mg-D	mg/L	3.32	3.20	3.53	3.35	3.20	3.53	3	3.35	0.17	3.26	3.32	3.42	0
Mn-D	mg/L	0.657	0.613	0.693	0.654	0.613	0.693	3	0.654	0.040	0.635	0.657	0.675	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	3	0.00000095	0.00000000	<0.0000019	<0.0000019	<0.0000019	3
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	0.00050	<0.0010	<0.0010	3	0.0005	0.0000	<0.0010	<0.0010	<0.0010	3
Ni-D	mg/L	0.0012	0.0011	0.0014	0.001200	0.0011	0.0014	3	0.0012	0.0002	0.0011	0.001200	0.001300	0
K-D	mg/L	0.454	0.471	0.482	0.46900	0.454	0.482	3	0.469	0.014	0.463	0.47100	0.47600	0
S-D	mg/L	12.0	11.9	11.6	11.8	11.6	12.0	3	11.8	0.2	11.8	11.9	11.9	0
Se-D	mg/L	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	3	0.00005	0	<0.00010	<0.00010	<0.00010	3
Si-D	mg/L	3.41	3.48	3.94	3.61	3.41	3.94	3	3.60	0.29	3.45	3.48	3.71	0
Na-D	mg/L	2.26	2.15	2.40	2.27	2.15	2.40	3	2.27	0.13	2.21	2.26	2.33	0
Sr-D	mg/L	0.0663	0.0669	0.0698	0.0677	0.0663	0.0698	3	0.0676	0.0019	0.0666	0.0669	0.0683	0
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	0.0025	<0.0050	<0.0050	3	0.0025	0	<0.0050	<0.0050	<0.0050	3
pH-F	pH Units	6.16	7.40	6.35	6.64	6.16	7.40	3	6.61	0.67	6.25	6.35	6.88	0
Cond-F	uS/cm	205	351	305	287	205	351	3	280	75	255	305	328	0
H2SEquiv	mg/L	0.00096	0.00096	0.00829	0.00340	0.00096	0.00829	3	0.00197	0.00423	0.00096	0.00096	0.00462	0

Table 20: Water Chemistry for Mine Sump (1-Mains 7-South with Area 5)

		1M7SA5				Summary Statistics									
Date		7-Apr-21	2-Jun-21	12-Jul-21	14-Dec-21										
Parameter	Units					Average	Min	Max	Count	Geo.Mean	STDV	1st Quar.	Med	3rd Quart	Count <DL
SO4-D	mg/L	64	84	170	160	119	64	170	4	109	53	79	122	162	0
TSS	mg/L	1.6	2.0	4.0		2.5	1.6	4.0	3	2.3	1.3	1.8	2.0	3.0	0
Alk-T	mg/L	160	150	150	150	153	150	160	4	152	5	150	150	153	0
Acidity83	mg/L	<1.0	<1.0	<1.0	<1.0	0.5	<1.0	<1.0	4	0.5	0	<1.0	<1.0	<1.0	4
Al-T	mg/L	0.0106	0.0399	0.0404	0.0243	0.0288	0.0106	0.0404	4	0.0254	0.0143	0.0209	0.0321	0.0400	0
As-T	mg/L	0.1720	0.0801	0.0266	0.1210	0.0999	0.0266	0.1720	4	0.0816	0.0617	0.0667	0.1006	0.1337	0
Ba-T	mg/L	0.264	0.259	0.185	0.189	0.224	0.185	0.264	4	0.221	0.043	0.188	0.224	0.260	0
B-T	mg/L	0.474	0.490	0.537	0.425	0.481	0.425	0.537	4	0.480	0.046	0.462	0.482	0.502	0
Cd-T	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.00	<0.000010	<0.000010	4	0.00	0.00	<0.000010	<0.000010	<0.000010	4
Ca-T	mg/L	47	55	69	74	61	47	74	4	60	13	53	62	71	0
Cr-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	<0.0010	<0.0010	4	0.0005	0.0000	<0.0010	<0.0010	<0.0010	4
Co-T	mg/L	<0.00020	0.00051	0.00137	0.00085	0.00071	<0.00020	0.00137	4	0.00049	0.00054	0.00041	0.00068	0.00098	1
Cu-T	mg/L	0.00062	0.00085	0.00102	0.00065	0.00078	0.00062	0.00102	4	0.00077	0.00019	0.00064	0.00075	0.00089	0
Hard-T	mg/L	159	188	246	377	242	159	377	4	229	96	180	217	278	0
Fe-T	mg/L	0.086	0.585	0.378	0.259	0.327	0.086	0.585	4	0.265	0.210	0.216	0.319	0.430	0
Pb-T	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.0001	<0.00020	<0.00020	4	0.0001	0	<0.00020	<0.00020	<0.00020	4
Mg-T	mg/L	10.2	12.5	17.6	15.8	14.0	10.2	17.6	4	13.7	3.3	11.9	14.2	16.2	0
Mn-T	mg/L	0.0046	0.0254	0.0585	0.0422	0.0327	0.0046	0.0585	4	0.0232	0.0231	0.0202	0.0338	0.0463	0
Hg-T	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.0000010	<0.0000019	<0.0000019	4	0.00000095	0	<0.0000019	<0.0000019	<0.0000019	4
Mo-T	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	<0.0010	<0.0010	4	0.0005	0	<0.0010	<0.0010	<0.0010	4
Ni-T	mg/L	<0.0010	0.0018	0.0042	0.0023	0.0022	<0.0010	0.0042	4	0.0017	0.0015	0.0015	0.0021	0.0028	1
K-T	mg/L	2.06	2.36	2.34	2.26	2.25	2.06	2.36	4	2.25	0.14	2.21	2.30	2.34	0
S-T	mg/L	16.0	26.3	50.2	48.2	35.2	16.0	50.2	4	31.8	16.8	23.7	37.2	48.7	0
Se-T	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	4	0.00005	0.00000	<0.00010	<0.00010	<0.00010	4
Si-T	mg/L	4.30	4.37	3.93	4.38	4.25	3.93	4.38	4	4.24	0.21	4.21	4.33	4.37	0
Ag-T	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	0.00001	<0.000020	<0.000020	4	0.00001	0.00000	<0.000020	<0.000020	<0.000020	4
Na-T	mg/L	20.6	21.7	21.4	18.6	20.6	18.6	21.7	4	20.5	1.4	20.1	21.0	21.5	0
Sr-T	mg/L	0.495	0.598	0.681	0.651	0.606	0.495	0.681	4	0.602	0.082	0.572	0.625	0.659	0
Zn-T	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	<0.0050	<0.0050	4	0.0025	0.0000	<0.0050	<0.0050	<0.0050	4
Al-D	mg/L	<0.0030	0.0080	0.0104	0.0050	0.0062	<0.0030	0.0104	4	0.0050	0.0039	0.0041	0.0065	0.0086	1
As-D	mg/L	0.1650	0.0465	0.0166	0.1070	0.0838	0.0166	0.1650	4	0.0608	0.0659	0.0390	0.0767	0.1215	0
Ba-D	mg/L	0.266	0.251	0.178	0.192	0.222	0.178	0.266	4	0.219	0.043	0.189	0.222	0.255	0
B-D	mg/L	0.486	0.515	0.552	0.436	0.497	0.436	0.552	4	0.495	0.049	0.473	0.500	0.524	0
Be-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	4	0.00005	0.00000	<0.00010	<0.00010	<0.00010	4
Cd-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000005	<0.000010	<0.000010	4	0.000005	0.000000	<0.000010	<0.000010	<0.000010	4
Ca-D	mg/L	49	52	72	72	61	49	72	4	60	13	51	62	72	0
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	<0.0010	<0.0010	4	0.0005	0.0000	<0.0010	<0.0010	<0.0010	4
Co-D	mg/L	<0.00020	0.00047	0.00142	0.00074	0.000682	<0.00020	0.00142	4	0.000471	0.000557	0.000378	0.000605	0.00091	1
Cu-D	mg/L	0.00048	0.00049	0.00074	0.00035	0.00051	0.00035	0.00074	4	0.0005	0.0002	0.00045	0.00048	0.00055	0
Hard-D	mg/L	167	175	260	369	242	167	369	4	230	94	173	217	287	0
Fe-D	mg/L	<0.0050	0.1380	0.1100	0.1040	0.0886	<0.0050	0.1380	4	0.0446	0.0593	0.0786	0.1070	0.1170	1
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.0001	<0.00020	<0.00020	4	0.0001	0.0000	<0.00020	<0.00020	<0.00020	4
Mg-D	mg/L	10.7	11.3	19.2	15.5	14.2	10.7	19.2	4	13.8	4.0	11.2	13.4	16.4	0
Mn-D	mg/L	0.0055	0.0244	0.0624	0.0388	0.0328	0.0055	0.0624	4	0.0239	0.0240	0.0197	0.0316	0.0447	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	4	0.00000095	0.00000000	<0.0000019	<0.0000019	<0.0000019	4
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	<0.0010	<0.0010	4	0.0005	0.0000	<0.0010	<0.0010	<0.0010	4
Ni-D	mg/L	0.0011	0.0017	0.0043	0.0021	0.0023	0.0011	0.0043	4	0.0020	0.0014	0.0015	0.0019	0.0027	0
K-D	mg/L	2.19	2.18	2.42	2.19	2.25	2.18	2.42	4	2.24	0.12	2.19	2.19	2.25	0
S-D	mg/L	17.8	24.7	51.0	46.2	34.9	17.8	51.0	4	31.9	16.2	23.0	35.5	47.4	0
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	4	0.00005	0	<0.00010	<0.00010	<0.00010	4
Si-D	mg/L	4.54	4.20	3.72	4.38	4.21	3.72	4.54	4	4.20	0.35	4.08	4.29	4.42	0
Na-D	mg/L	23.2	20.0	23.3	18.7	21.3	18.7	23.3	4	21.2	2.3	19.7	21.6	23.2	0
Sr-D	mg/L	0.520	0.566	0.729	0.650	0.616	0.520	0.729	4	0.611	0.092	0.554	0.608	0.670	0
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	<0.0050	<0.0050	4	0.0025	0	<0.0050	<0.0050	<0.0050	4
pH-F	pH Units	8.19		7.84	8.36	8.13	7.84	8.36	3	8.13	0.27	8.02	8.19	8.27	0
Cond-F	uS/cm	430		542	644	538	430	644	3	531	107	486	542	593	0
H2SEquiv	mg/L				0.000957	0.000957	0.000957	0.000957	1	0.000957	0.000000	0.000957	0.000957	0.000957	0

Table 20: Water Chemistry for Mine Sump (7-South Area 5)

		7SA5						Summary Statistics					
Date		5-Jan-21	23-Mar-21	7-Apr-21	2-Jun-21	12-Jul-21	2-Sep-21						
Parameter	Units							Average	Min	Max	Geo.Mean	STDV	Count <DL
SO4-D	mg/L	27	37	24	44	62	100	49	24	100	43.2	28.5	0
H2SEquiv	mg/L		0.000957				0.000957	0.00096	0.000957	0.000957	0.00096	0.00000	0
Cond-F	uS/cm	393	436	432		448	492	440	393	492	439	35.6	0
pH-F	pH Units	7.95	7.94	7.98		7.98	7.50	7.87	7.50	7.98	7.87	0.21	0
Turb	NTU	1.40					0.74	1.07	0.74	1.40	1.02	0.47	0
Alk-T	mg/L	170	160	170	160	160	140	160	140	170	160	11	0
Acidity83	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.50	<1.0	<1.0	0.50	0.00	6
N-D	mg/L		0.264		0.167	0.229	0.316	0.244	0.167	0.316	0.238	0.063	0
Hydrox	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.5	<1.0	<1.0	0.5	0.0	6
Bicarb	mg/L	200	200	210	190	200	170	195	170	210	194.60	13.80	0
Carb	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.5	<1.0	<1.0	0.5	0	6
Cl-D	mg/L	1.5	1.8		1.5	1.7	2.1	1.7	1.5	2.1	1.7	0.2	0
F-D	mg/L	0.52	0.56		0.61	0.53	0.54	0.55	0.52	0.61	0.55	0.04	0
Br-D	mg/L	<0.010	0.01		<0.010	<0.010	0.013	0.0078	<0.010	0.013	0.0071	0.0039	3
DOC	mg/L		0.67		0.99	0.83	0.65	0.79	0.65	0.99	0.77	0.16	0
P-D	mg/L		0.0087		<0.0030	0.0082	0.011	0.0074	<0.0030	0.0110	0.0059	0.0041	1
TSS	mg/L		7.2	19.0	4.0	1.2		7.8	1.2	19.0	5.1	7.8	0
Al-D	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0015	<0.0030	<0.0030	0.0015	0.00000	6
Ag-D	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000100	<0.000020	<0.000020	0.0000100	0.0000000	6
As-D	mg/L	0.233	0.255	0.233	0.223	0.199	0.215	0.226	0.199	0.255	0.226	0.019	0
Ba-D	mg/L	0.153	0.165	0.367	0.164	0.329	0.143	0.22	0.143	0.367	0.204	0.100	0
B-D	mg/L	0.505	0.519	0.476	0.556	0.517	0.567	0.523	0.476	0.567	0.522	0.033	0
Be-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	<0.00010	<0.00010	0.000050	0.000000	6
Bi-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	<0.0010	<0.0010	0.00050	0.00000	6
Cd-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	<0.000010	<0.000010	0.0000050	0.0000000	6
Ca-D	mg/L	41.2	41.9	42.7	41.4	48.0	54.5	44.9	41.2	54.5	44.7	5.3	0
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00050	<0.0010	<0.0010	0.00050	0.00000	6
Co-D	mg/L	<0.00020	<0.00020	<0.00020	0.00032	0.00062	0.00026	0.00025	<0.00020	0.00062	0.000193	0.000205	3
Cu-D	mg/L	<0.00020	<0.00020	0.00074	0.00027	0.00032	<0.00020	0.000272	<0.00020	0.00074	0.0002	0.000249	3
Fe-D	mg/L	<0.0050	<0.0050	<0.0050	0.0177	0.009	0.0075	0.00695	<0.0050	0.0177	0.00515	0.00599	3
Hard-D	mg/L	140	141	142	141	165	191	153	140	191	152	21	0
Pb-D	mg/L	<0.00020	<0.00020	0.00054	<0.00020	<0.00020	<0.00020	0.000173	<0.00020	0.00054	0.000132	0.000180	5
Mg-D	mg/L	8.95	8.86	8.61	9.09	11.00	13.30	9.97	8.61	13.30	9.84	1.85	0
Mn-D	mg/L	0.0086	0.0097	0.0140	0.0116	0.0213	0.0110	0.0127	0.0086	0.0213	0.0121	0.0046	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	<0.0000019	<0.0000019	0.00000095	0.0000	6
Na-D	mg/L	23.1	23.5	23	23.4	23.4	25.4	23.6	23	25.4	23.6	0.9	0
Mo-D	mg/L	0.00120	0.00110	<0.0010	0.00120	<0.0010	0.00170	0.00103	<0.0010	0.00170	0.00094	0.00046	2
Ni-D	mg/L	<0.0010	<0.0010	0.1620	<0.0010	0.0021	0.0013	0.0278	<0.0010	0.1620	0.0020	0.0657	3
K-D	mg/L	2.05	2.10	2.18	2.07	2.25	2.27	2.15	2.05	2.27	2.15	0.09	0
S-D	mg/L	12.4	11.0	7.2	14.7	18.8	31.8	16.0	7.2	31.8	14.3	8.7	0
Sb-D	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000250	<0.00050	<0.00050	0.000250	0.000000	6
Se-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00005	<0.00010	<0.00010	0.00005	0	6
Si-D	mg/L	4.85	5.34	4.84	4.79	4.26	5.02	4.85	4.26	5.34	4.84	0.35	0
Sr-D	mg/L	0.526	0.551	0.5	0.533	0.548	0.649	0.551	0.5	0.649	0.549	0.051	0
Tl-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000050	<0.000010	<0.000010	0.0000050	0.0000000	6
Ti-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	<0.0050	<0.0050	0.00250	0.00000	6
U-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000050	<0.00010	<0.00010	0.000050	0.000000	6
V-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	<0.0050	<0.0050	0.00250	0.00000	6
Zn-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00250	<0.0050	<0.0050	0.00250	0.00000	6

Table 22: Water Chemistry for Flooded Mine Pool (2-South)

		2-South Flooded Mine Pool (QU11-11)												Summary Statistics					
Date		4-Jan-21	1-Feb-21	1-Mar-21	6-Apr-21	10-May-21	1-Jun-21	5-Jul-21	9-Aug-21	27-Sep-21	4-Oct-21	1-Nov-21	7-Dec-21						
Parameter	Units													Average	Min	Max	Geo.Mean	STDV	Count <DL
SO4-D	mg/L	600	570	630	640	670	740	470	600	670	670	540	580	615	470	740	611	71.3	0
H2SEquiv	mg/L	0.0029	0.0010	0.0045	0.0035	0.0010	0.0010	0.0563	0.0010	0.0010	0.0010	0.0010	0.0010	0.0042	0.0010	0.0563	0.0018	0.0105	0
Cond-F	uS/cm	1656	1229	1612	1637	2000	1884	1555	1469	1650	1536	1422	1638	1662	1229	2220	1648	226	0
pH-F	pH Units	7.20	6.53	7.19	7.04	7.11	7.06	7.70	7.17	7.17	6.99	6.87	7.32	7.19	6.26	7.72	7.19	0.30	0
Turb	NTU																		
Alk-T	mg/L	250	310	310	270	270	260	240	280	280	290	280	240	273.3	240	310	272.4	23.5	0
Acidity83	mg/L	19.5	9.5	17.6	11.4	15.3	17.3	14.6	19.1	18.6	13.2	14.5	20.9	16.0	9.5	20.9	15.6	3.5	0
N-D	mg/L																		
Hydrox	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.5	<1.0	<1.0	0.5	0.0	12
Bicarb	mg/L	300	370	380	320	330	320	290	340	340	350	340	290	331	290	380	330	29	0
Carb	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.5	<1.0	<1.0	0.5	0	12
Cl-D	mg/L													0.50	<1.0	<1.0	0.50	0.00	3
F-D	mg/L																		
Br-D	mg/L													0.12	0.11	0.14	0.12	0.02	0
DOC	mg/L					1				<0.50				0.625	<0.50	1	0.5	0.53	1
P-D	mg/L									<0.0030				0.0015	<0.0030	<0.0030	0.0015	0	1
TSS	mg/L	9.2	6.4	7.2	7.2	8.4			10	6.4	7.2	5.6	7.2	7.5	5.6	10	7.4	1.3	0
Al-D	mg/L	0.0041	0.0033	<0.0030	<0.0030	<0.0060	<0.0060	0.0038	<0.0030	<0.0030	<0.0030	0.0116	<0.0030	0.00315	<0.0030	0.0116	0.00251	0.0029	8
Ag-D	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000040	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.0000117	<0.000020	<0.000040	0.0000112	0.0000039	12
As-D	mg/L	0.00462	0.00348	0.00393	0.00323	0.00368	0.0037	0.00426	0.00488	0.00471	0.00476	0.00434	0.0027	0.00402	0.0027	0.00488	0.00397	0.00069	0
Ba-D	mg/L	0.0214	0.0219	0.0222	0.0232	0.0215	0.0211	0.0187	0.0233	0.0221	0.0218	0.021	0.0194	0.0215	0.0187	0.0233	0.0214	0.0013	0
B-D	mg/L	0.587	0.666	0.586	0.654	0.680	0.700	0.684	0.717	0.700	0.705	0.670	0.585	0.661	0.585	0.717	0.659	0.049	0
Be-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000058	<0.00010	<0.00020	0.000056	0.000019	12
Bi-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00058	<0.0010	<0.0020	0.00056	0.00019	12
Cd-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000058	<0.000010	<0.000020	0.0000056	0.0000019	12
Ca-D	mg/L	220	225	226	231	253	245	187	236	245	244	233	204	229	187	253	228	19	0
Cr-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00058	<0.0010	<0.0020	0.00056	0.00019	12
Co-D	mg/L	0.00169	0.00099	0.0006	0.00048	0.00051	<0.00040	<0.00020	0.00075	0.00067	0.00068	0.00106	0.00098	0.000726	<0.00020	0.00169	0.000589	0.000423	2
Cu-D	mg/L	<0.00020	0.00036	<0.00020	<0.00020	<0.00040	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000138	<0.00020	0.00036	0.000125	0.000080	11
Fe-D	mg/L	3.99	3.20	3.28	3.34	3.71	3.70	9.47	3.48	4.09	3.92	4.04	2.47	4.06	2.47	9.47	3.84	1.77	0
Hard-D	mg/L	606	619	617	641	703	683	532	653	675	670	645	561	633	532	703	631	50	0
Pb-D	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00040	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000117	<0.00020	<0.00040	0.000112	0.000039	12
Mg-D	mg/L	13.5	13.6	12.9	15.8	17.3	17.1	15.5	15.7	15.1	15.0	15.5	12.7	15.0	12.7	17.3	14.9	1.5	0
Mn-D	mg/L	0.429	0.360	0.356	0.369	0.414	0.384	0.367	0.398	0.428	0.425	0.439	0.309	0.390	0.309	0.439	0.388	0.039	0
Hg-D	mg/L	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	9.5E-07	<0.0000019	<0.0000019	9.5E-07	0	12
Na-D	mg/L	100	114	101	112	114	112	116	113	114	112	116	98.2	110	98	116	110	6.5	0
Mo-D	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00058	<0.0010	<0.0020	0.00056	0.00019	12
Ni-D	mg/L	0.0025	0.0016	0.0011	<0.0010	<0.0020	<0.0020	<0.0010	0.0012	0.001	0.0011	0.0019	0.0016	0.00125	<0.0010	0.0025	0.00113	0.00057	4
K-D	mg/L	1.71	1.85	1.77	1.92	1.94	2.00	2.29	1.94	1.90	1.88	1.99	1.67	1.91	1.67	2.29	1.90	0.16	0
S-D	mg/L	199	212	202	219	239	233	198	219	223	216	218	183	213	183	239	212.9	15.7	0
Sb-D	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000292	<0.00050	<0.0010	0.000281	0.000097	12
Se-D	mg/L	0.00069	<0.00010	<0.00010	0.00015	<0.00020	<0.00020	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.000131	<0.00010	0.00069	0.000088	0.00018	8
Si-D	mg/L	3.54	3.56	3.46	3.10	3.34	3.18	2.85	3.28	3.45	3.54	3.39	3.40	3.34	2.85	3.56	3.33	0.21	0
Sr-D	mg/L	2.04	2.22	2.30	2.18	2.37	2.29	2.17	2.15	2.18	2.26	2.09	1.93	2.18	1.93	2.37	2.18	0.12	0
Tl-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000058	<0.000010	<0.000020	0.0000056	0.0000019	12
Ti-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00292	<0.0050	<0.010	0.00281	0.00097	12
U-D	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000058	<0.00010	<0.00020	0.000056	0.000019	12
V-D	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00292	<0.0050	<0.010	0.00281	0.00097	12
Zn-D	mg/L	<0.0050	0.0054	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00316	<0.0050	0.0054	0.00299	0.0012	11

Table 23: Water Chemistry for Mine Water (2-South Mine Pool at Long Lake Seep)

EMS ID			E292131															
Station Description			Seep into Long Lake (Smaller Seep)												Summary Statistics			
Stn.Code			LLS															
Date		WQG-Max (M)	4-Jan-21	1-Feb-21	1-Mar-21	6-Apr-21	10-May-21	1-Jun-21	5-Jul-21	9-Aug-21	1-Sep-21	4-Oct-21	1-Nov-21	7-Dec-21				
Parameter	Unit														Average	Count	Min	Max
pH-F	pH Units	6.5 - 9.0	7.08	7.16	7.2	6.8	7.1	6.99	7.33	6.91	6.69	6.92	6.86	7.17	7.01	12	6.69	7.33
Cond-F	uS/cm		1322	1649	1653	1660	1733	1677	1609	1382	1505	1305	1323	1625	1537	12	1305	1733
SO4-D	mg/L		420	660.0000	700.0000	650	620	600	650	540	580	530	650	660	605	12	420	700
TSS	mg/L	25	4.4	4.0	5.2	5.2	4.0	3.2	4.0	4.0	1.6	4.8	1.6	4.8	3.9	12	1.6	5.2
Alk-T	mg/L		140	270	270	240	240	240	260	260	260	260	250	200	240	12	140	270
Acidity83	mg/L		9.1	1.9	16.1	12.9	17.5	12.7	14.6	16.2	3.3	9.5	4.9	23.0	11.8	12	1.9	23
Al-T	mg/L		0.1030	0.0048	0.0031	<0.0030	0.0039	0.0045	0.0053	<0.0030	<0.0030	<0.0030	0.0210	0.0097	0.0134	12	<0.0030	0.1030
As-T	mg/L	0.005	0.0026	0.0055	0.0055	0.0038	0.0038	0.0041	0.0046	0.0023	0.0022	0.0027	0.0038	0.0040	0.0037	12	0.0022	0.0055
Ba-T	mg/L	5	0.017	0.019	0.019	0.017	0.018	0.018	0.019	0.017	0.017	0.019	0.018	0.019	0.018	12	0.017	0.019
B-T	mg/L		0.364	0.548	0.611	0.560	0.553	0.591	0.615	0.574	0.527	0.508	0.610	0.466	0.544	12	0.364	0.615
Cd-T	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000046	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000084	12	<0.000010	0.000046
Ca-T	mg/L		153	242	245	228	221	224	231	199	206	212	223	204	216	12	153	245
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	0.0005	12	<0.0010	<0.0010
Co-T	mg/L	0.11	0.0015	0.0013	0.0016	0.0017	0.0013	0.0011	0.0010	0.0010	0.0009	0.0010	0.0016	0.0009	0.0012	12	0.0009	0.0017
Cu-T	mg/L	0.00482	0.00146	<0.00050	0.00096	<0.00050	<0.00050	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000431	12	<0.00050	0.00146
Hard-T	mg/L		442	696	697	651	629	638	663	573	584	601	640	583	616	12	442	697
Fe-T	mg/L	1	1.38	2.3	2.46	2.09	1.66	1.72	1.85	1.46	1.38	1.82	2.23	1.54	1.82	12	1.38	2.46
Pb-T	mg/L	0.01763	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0001	12	<0.00020	<0.00020
Mg-T	mg/L		14.3	22.6	20.5	19.9	18.4	19.2	21.0	18.5	17	17.2	20.5	18.1	18.9	12	14.3	22.6
Mn-T	mg/L	0.8706	0.187	0.53	0.511	0.458	0.439	0.467	0.466	0.399	0.391	0.454	0.469	0.328	0.425	12	0.187	0.529
Hg-T	mg/L	0.00001	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	12	<0.0000019	<0.0000019
Mo-T	mg/L	2	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	12	<0.0010	<0.0010
Ni-T	mg/L	0.025	0.0042	0.0031	0.0033	0.0038	0.0026	0.0021	0.0019	0.0018	0.0016	0.0018	0.0034	0.0025	0.0027	12.00	0.0016	0.0042
K-T	mg/L		1.81	2.65	2.27	2.3	2.34	2.44	2.56	2.28	2.31	2.37	2.52	2.09	2.33	12	1.81	2.65
S-T	mg/L		144	249	232	214	200	211	215	178	171	184	214	191	200.0	12	144	249
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	<0.00010	0.00005	12.00	<0.00010	<0.00010
Si-T	mg/L		2.91	3.10	2.89	2.91	2.70	2.92	2.77	2.45	2.72	2.89	3.35	3.01	2.88	12	2.45	3.35
Ag-T	mg/L	0.0001	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00001	12	<0.000020	<0.000020
Na-T	mg/L		54	103	96	90	86	90	105	87	85	88	96	74	88	12	54	105
Sr-T	mg/L		1.34	2.31	2.37	2.06	2.20	2.19	2.23	1.80	1.94	2.04	2.02	1.80	2.02	12	1.34	2.37
Zn-T	mg/L	0.033	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0025	12	<0.0050	<0.0050
Al-D	mg/L	0.1	0.0116	<0.0030	0.0034	<0.0030	<0.0030	<0.0060	<0.0030	<0.0030	<0.0030	<0.0030	0.0033	<0.0030	0.00278	12	<0.0030	0.0116
As-D	mg/L		0.00124	0.00578	0.00508	0.00348	0.00352	0.00382	0.00436	0.00225	0.00204	0.00258	0.00339	0.00263	0.00335	12	0.00124	0.00578
Ba-D	mg/L		0.0159	0.0196	0.0188	0.0181	0.0174	0.0179	0.0180	0.0173	0.0171	0.0178	0.0182	0.0192	0.0179	12	0.0159	0.0196
B-D	mg/L		0.373	0.565	0.515	0.559	0.535	0.580	0.576	0.547	0.555	0.542	0.552	0.470	0.531	12	0.373	0.580
Cd-D	mg/L	0.00017	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000058	12	<0.000010	0.00001
Ca-D	mg/L		154	249	244	235	226	226	215	198	214	205	220	208	216	12	154	249
Cr-D	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00054	12	<0.0010	<0.0020
Co-D	mg/L		0.0015	0.0012	0.0015	0.0018	0.0013	0.0011	0.0009	0.0010	0.0010	0.0010	0.0016	0.0009	0.0012	12	0.0009	0.0018
Cu-D	mg/L	0.00385	0.00042	<0.00020	0.00026	<0.00020	<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00015	12.0	<0.00020	0.00042
Hard-D	mg/L		444	708	688	674	646	647	615	569	609	584	631	597	617	12	444	708
Fe-D	mg/L	0.35	0.74	2.27	2.28	2.06	1.60	1.78	1.71	1.47	1.39	1.72	2.09	1.03	1.68	12	0.74	2.28
Pb-D	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.000108	12	<0.00020	<0.00040
Mg-D	mg/L		14.5	21.1	19.3	21.2	19.5	19.8	19	18.2	18.4	17.3	19.6	18.7	18.9	12	14.5	21.2
Mn-D	mg/L		0.187	0.497	0.495	0.463	0.445	0.448	0.436	0.399	0.408	0.447	0.451	0.320	0.416	12	0.187	0.497
Hg-D	mg/L		<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	12	<0.0000019	<0.0000019
Mo-D	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00054	12	<0.0010	<0.0020
Ni-D	mg/L		0.0043	0.0028	0.0031	0.0038	0.0025	0.0021	0.0018	0.0018	0.0017	0.0017	0.0032	0.0024	0.0026	12	0.0017	0.0043
K-D	mg/L		1.91	2.53	2.49	2.43	2.43	2.46	2.40	2.29	2.41	2.31	2.51	2.21	2.36	12	1.91	2.53
S-D	mg/L		146	236	233	227	214	209	202	179	184	175	207	193	200	12	146	236
Se-D	mg/L		0.00022	<0.00010	<0.00010	<0.00010	0.00011	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000073	12	<0.00010	0.00022
Si-D	mg/L		2.84	3.23	3.16	2.84	2.85	2.92	2.74	2.54	2.65	2.90	2.95	3.00	2.88	12	2.54	3.23
Na-D	mg/L		55	97	91	96	91	93	93	87	92	87	94	79	88	12	55	97
Sr-D	mg/L		1.38	2.43	2.46	2.17	2.18	2.10	2.23	1.80	1.91	1.91	1.94	1.88	2.03	12	1.38	2.46
Zn-D	mg/L		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00271	12	<0.0050	<0.010

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

Table 24: Water Chemistry for Mine Water (2-South Mine Pool at Long Lake Seep)

EMS ID			**E292131**															
Station Description			**Seep into Long Lake (Larger Seep)**												**Summary Statistics**			
Stn.Code			**LLSM**															
Date		**WQG-Max (M)**	**4-Jan-21**	**11-Jan-21**	**1-Feb-21**	**1-Mar-21**	**6-Apr-21**	**10-May-21**	**1-Jun-21**	**5-Jul-21**	**9-Aug-21**	**1-Sep-21**	**1-Nov-21**	**7-Dec-21**				
Parameter	**Unit**														**Average**	**Count**	**Min**	**Max**
pH-F	pH Units	6.5 - 9.1	7.3	7.34	7.3	7.58	7.12	8.19	7.36	7.65	7.29	7.2	7.18	7.66	7.43	12	7.12	8.19
Cond-F	uS/cm		1052	1342	1382	1296	1443	1217	1487	1467	1210	1356	976.2	1420	1304	12	976.2	1487
SO4-D	mg/L		310	490	560	500	440	440	450	540	450	490	370	510	462	12	310	560
TSS	mg/L	25	3.2	1.6	3.6	2	2	1.2	<1.0	2.4	2	2	2	<1.0	1.9	12	<1.0	3.6
Alk-T	mg/L		110	170	240	230	210	200	220	240	250	230	150	170	201	12	110	250
Acidity83	mg/L		7.1	2.6	<1.0	7.4	5.5	9.4	7.1	7.5	9.1	1.8	1.8	10.4	5.9	12	<1.0	10.4
Al-T	mg/L		0.264	0.029	0.0074	0.029	0.0056	0.0038	0.0104	<0.0030	<0.0030	<0.0030	0.154	0.0084	0.04301	12	<0.0030	0.264
As-T	mg/L	0.005	0.00159	0.00043	0.00127	0.0013	0.001	0.00112	0.00153	0.00176	0.0009	0.00081	0.00117	0.00046	0.00111	12	0.00043	0.00176
Ba-T	mg/L	5	0.0174	0.0207	0.0176	0.0172	0.0169	0.017	0.0173	0.0174	0.0168	0.0172	0.0188	0.0192	0.0178	12	0.0168	0.0207
B-T	mg/L		0.277	0.383	0.464	0.441	0.456	0.438	0.463	0.494	0.495	0.471	0.402	0.41000	0.43300	12	0.277	0.495
Cd-T	mg/L		<0.000010		<0.000010	<0.000010	<0.000010	<0.000010	0.000135	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	0.0000175	11	<0.000010	0.000135
Ca-T	mg/L		119	170	202	176	184	175	185	190	171	184	157	174	174	12	119	202
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	0.0005	12	<0.0010	<0.0010
Co-T	mg/L	0.11	0.00118	0.0007	0.0007	0.00112	0.0009	0.00091	0.00099	0.00095	0.00096	0.00094	0.00239	0.00046	0.00102	12	0.00046	0.00239
Cu-T	mg/L	0.00482	0.00254	0.00058	<0.00050	<0.00050	<0.00050	<0.00050	0.0	<0.00050	<0.00050	<0.00050	0.0	<0.00050	0.000739	12	<0.00050	0.00254
Hard-T	mg/L		351	490	578	508	531	501	527	548	498	526	460	503	501	12	351	578.000
Fe-T	mg/L	1	1.41	0.254	0.635	0.685	0.512	0.617	0.733	0.952	0.774	0.694	0.84	0.167	0.689	12	0.167	1.41
Pb-T	mg/L	0.01763	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0001	12	<0.00020	<0.00020
Mg-T	mg/L		12.8	16.1	17.6	16.6	17.2	15.5	15.8	17.8	17	15.8	16.1	16.5	16.2	12	12.8	17.8
Mn-T	mg/L	0.8706	0.0692	0.0782	0.1880	0.1980	0.2110	0.2320	0.2950	0.3500	0.3420	0.3620	0.2240	0.0836	0.2194	12	0.0692	0.362
Hg-T	mg/L	0.00001	<0.0000019		<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	11	<0.0000019	<0.0000019
Mo-T	mg/L	2	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0005	12	<0.0010	<0.0010
Ni-T	mg/L	0.025	0.0031	0.0027	0.0027	0.0031	0.0027	0.0022	0.0022	0.0021	0.0019	0.0019	0.0068	0.0017	0.0028	12.00	0.0017	0.01
K-T	mg/L		1.61	1.98	2.02	1.89	2.06	1.92	2.07	2.25	2.08	2.18	1.95	1.98	2	12	1.61	2.25
S-T	mg/L		112	154	184	168	171	156	157	171	145	153	155	162	157	12	112	184
Se-T	mg/L		<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.000061	12.00	<0.00010	0.00012
Si-T	mg/L		2.73	2.39	2.77	2.48	2.57	2.35	2.52	2.3	2.14	2.39	3.35	2.82	2.57	12	2.14	3.35
Ag-T	mg/L	0.0001	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00001	12	<0.000020	<0.000020
Na-T	mg/L		41.8	65.8	78.6	70	72.9	65.2	69.1	82.3	72.5	74.7	56.5	66.7	68	12	41.8	82.3
Sr-T	mg/L		1.04	1.52	1.8	1.67	1.71	1.67	1.67	1.79	1.54	1.73	1.35	1.56	1.59	12	1.04	1.8
Zn-T	mg/L	0.033	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0058	<0.0050	0.00277	12	<0.0050	0.0058
Al-D	mg/L	0.1	0.0223		0.0040	0.0056	0.0041	<0.0030	0.0030	<0.0030	<0.0030	<0.0030	0.019	0.0353	0.0090	11	<0.0030	0.0353
As-D	mg/L		0.00021		0.00143	0.00130	0.00100	0.00104	0.00133	0.00166	0.00091	0.00074	0.00083	0.00063	0.00101	11	0.00021	0.00166
Ba-D	mg/L		0.0168		0.0191	0.0177	0.0174	0.0173	0.0172	0.0175	0.0171	0.0172	0.0183	0.0191	0.0177	11	0.0168	0.0191
B-D	mg/L		0.289		0.487	0.396	0.432	0.431	0.458	0.477	0.491	0.503	0.374	0.415	0.43200	11	0.289	0.503
Cd-D	mg/L	0.00017	<0.000010		<0.000010	<0.000010	0.000018	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000062	11	<0.000010	0.000018
Ca-D	mg/L		121		221	173	188	179	191	187	179	196	154	179	178	11	121	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	0.0005	11	<0.0010	<0.0010
Co-D	mg/L		0.00092		0.00073	0.001	0.00092	0.00093	0.0009	0.00094	0.00098	0.00097	0.00238	0.00043	0.00101	11	0.00043	0.00238
Cu-D	mg/L	0.00385	0.00099		0.00022	0.00095	0.00042	0.00024	0.00021	<0.00020	<0.00020	<0.00020	0.00148	0.00057	0.000489	11.0	<0.00020	0.0
Hard-D	mg/L		355.0000		628	495	543	514	548	537	517	559	448	517	514	11	355	628
Fe-D	mg/L	0.35	0.107		0.571	0.563	0.481	0.562	0.706	0.869	0.712	0.664	0.567	0.384	0.562	11	0.107	0.869
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	0.0001	11	<0.00020	<0.00020
Mg-D	mg/L		12.8		18.4	15.3	17.9	16.5	17.2	17.1	16.9	16.8	15.7	16.7	16.5	11	12.8	18.4
Mn-D	mg/L		0.0431		0.209	0.192	0.215	0.249	0.286	0.350	0.350	0.369	0.223	0.079	0.233	11	0.043	0.369
Hg-D	mg/L		<0.0000019		<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	0.00000095	11	<0.0000019	<0.0000019
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	0.0005	11	<0.0010	<0.0010
Ni-D	mg/L		0.0027		0.0027	0.0028	0.0028	0.0021	0.0019	0.002	0.002	0.0019	0.0067	0.0016	0.00	11	0.0016	0.01
K-D	mg/L		1.65		2.22	2.03	2.10	2.13	2.16	2.26	2.13	2.26	1.96	2.01	2.08	11	1.65	2.26
S-D	mg/L		113		194	164	176	164	169	173	155	160	150	163	162	11	113	194
Se-D	mg/L		0.00023		<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.00013	0.000084	11	<0.00010	0.00023
Si-D	mg/L		2.7		3.05	2.70	2.51	2.47	2.55	2.42	2.31	2.39	2.84	2.87	2.62	11	2.31	3.05
Na-D	mg/L		41.7		81.8	64.7	75.6	69.8	72.2	79.6	76.0	81.8	56.0	67.4	69.7	11	41.7	81.8
Sr-D	mg/L		1.07		2.01	1.76	1.70	1.69	1.73	1.88	1.61	1.72	1.29	1.60	1.64	11	1.07	2.01
Zn-D	mg/L		<0.0050		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0057	<0.0050	0.00279	11	<0.0050	0.0057

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

Table 25: Summary Statistics for Settling Pond #1 (SP1/SPD) EMS ID: E218582

Parameter	Unit	Permit Limit	Count	Average	Minimum	Maximum	Geometric Mean	Count of less-than results	Standard Deviation	1st Quartile	Median	Count above Permit Limit	3rd Quartile	% of Results Exceeding Permit Limit
SO4-D	**mg/L**		45	286.1	67.5	490	250.3	0	132	160	270	0	410	0.0
TSS	**mg/L**	25	45	1.23	<1.0	2.8	1.01	20	0.76	<1.0	1.2	0	2	0.0
Alk-T	**mg/L**		13	93.4	44	110	89.6	0	24.2	82	110	0	110	0.0
Acidity83	**mg/L**		13	3.22	<1.0	12.2	2.27	2	3.06	1.7	2.4	0	3.8	0.0
Al-T	**mg/L**		7	0.01584	<0.0030	0.0526	0.00753	2	0.01878	0.00230	0.0083	0	0.02195	0.0
As-T	**mg/L**		7	0.00109	0.00074	0.00175	0.00105	0	0.00033	0.00091	0.00103	0	0.00114	0.0
Ba-T	**mg/L**		7	0.0136	0.0072	0.0179	0.0129	0	0.0042	0.0102	0.0155	0	0.0169	0.0
B-T	**mg/L**		7	0.21	0.093	0.307	0.19	0	0.09	0.138	0.226	0	0.284	0.0
Cd-T	**mg/L**		7	0.0000073	<0.000010	0.000021	0.0000061	6	0.000006	0.000005	<0.000010	0	0.000005	0.0
Ca-T	**mg/L**		7	120.9	49.6	159	110.7	0	46.1	94.7	145	0	151.5	0.0
Cr-T	**mg/L**		7	0.0005	<0.0010	<0.0010	0.0005	7	0.00000	0.0005	<0.0010	0	0.0005	0.0
Co-T	**mg/L**		7	0.00015	<0.00020	0.00045	0.000124	6	0.000132	0.0001	<0.00020	0	0.0001	0.0
Cu-T	**mg/L**		7	0.000359	<0.00050	0.00075	0.000324	5	0.000198	0.00025	<0.00050	0	0.000380	0.0
Hard-T	**mg/L**		7	372	153	490	341	0	143	288	442	0	474	0.0
Fe-T	**mg/L**		7	0.214	0.106	0.517	0.185	0	0.144	0.131	0.156	0	0.229	0.0
Pb-T	**mg/L**		7	0.000100	<0.00020	<0.00020	0.000100	7	0.000000	0.0001	<0.00020	0	0.0001	0.0
Mg-T	**mg/L**		7	17.11	7.05	23.2	15.56	0	6.92	12.37	19.4	0	22.7	0.0
Mn-T	**mg/L**		7	0.037	0.0209	0.0662	0.0341	0	0.0170	0.0260	0.0308	0	0.0444	0.0
Hg-T	**mg/L**		7	0.00000095	<0.0000019	<0.0000019	0.00000095	7	0	0.00000095	<0.0000019	0	0.00000095	0.0
Mo-T	**mg/L**		7	0.00050	<0.0010	<0.0010	0.00050	7	0.00000	0.0005	<0.0010	0	0.0005	0.0
Ni-T	**mg/L**		7	0.0006	<0.0010	0.0012	0.00057	6	0.00026	0.0005	<0.0010	0	0.0005	0.0
K-T	**mg/L**		7	1.368	0.552	1.98	1.241	0	0.572	0.964	1.52	0	1.8	0.0
S-T	**mg/L**		7	114.5	43.9	157	103.3	0	47.4	82.8	136	0	149.5	0.0
Se-T	**mg/L**		7	0.000061	<0.00010	0.00013	0.000057	6	0.000030	0.00005	<0.00010	0	0.00005	0.0
Si-T	**mg/L**		7	3.85	0.95	6.95	3.3	0	1.98	2.69	3.83	0	4.92	0.0
Ag-T	**mg/L**		7	0.0000100	<0.000020	<0.000020	0.0000100	7	0.0000000	0.00001	<0.000020	0	0.00001	0.0
Na-T	**mg/L**		7	26.3	12.8	38.3	24.4	0	10.30	18.6	25.4	0	35.2	0.0
Sr-T	**mg/L**		7	0.8	0.29	1.13	0.716	0	0.338	0.58	0.968	0	1.025	0.0
Zn-T	**mg/L**		7	0.00957	<0.0050	0.0204	0.00671	3	0.00771	0.0025	0.0092	0	0.01495	0.0
Al-D	**mg/L**	0.5	13	0.01349	<0.0030	0.0496	0.00546	6	0.01706	<0.0030	0.00330	0	0.0193	0.0
As-D	**mg/L**		13	0.00094	0.00029	0.00172	0.00084	0	0.00046	0.00066	0.00075	0	0.00103	0.0
Ba-D	**mg/L**		13	0.013	0.0051	0.0184	0.0122	0	0.0042	0.0098	0.0145	0	0.0161	0.0
B-D	**mg/L**		13	0.194	0.08	0.293	0.175	0	0.084	0.105	0.205	0	0.287	0.0
Be-D	**mg/L**		13	0.000050	<0.00010	<0.00010	0.000050	13	0.000000	<0.00010	<0.00010	0	<0.00010	0.0
Cd-D	**mg/L**		13	0.0000050	<0.000010	<0.000010	0.0000050	13	0.0000000	<0.000010	<0.000010	0	<0.000010	0.0
Ca-D	**mg/L**		13	112.7	50.2	154	103.7	0	42.8	62.1	141	0	146	0.0
Cr-D	**mg/L**		13	0.00050	<0.0010	<0.0010	0.00050	13	0.00000	<0.0010	<0.0010	0	<0.0010	0.0
Co-D	**mg/L**		13	0.000167	<0.00020	0.00064	0.000134	10	0.000156	<0.00020	<0.00020	0	<0.00020	0.0
Cu-D	**mg/L**	0.02	13	0.000324	<0.00020	0.00093	0.000273	2	0.000217	0.00022	0.00025	0	0.00038	0.0
Hard-D	**mg/L**		13	347	151	481	318	0	133	191	434	0	455	0.0
Fe-D	**mg/L**	0.5	13	0.1399	0.0241	0.343	0.1195	0	0.0788	0.0879	0.1270	0	0.172	0.0
Pb-D	**mg/L**	0.05	13	0.000100	<0.00020	<0.00020	0.000100	13	0.000000	<0.00020	<0.00020	0	<0.00020	0.0
Mg-D	**mg/L**		13	15.92	6.3	23.4	14.44	0	6.52	8.77	19.2	0	21.7	0.0
Mn-D	**mg/L**		13	0.0355	0.005	0.073	0.0259	0	0.0265	0.0146	0.0238	0	0.0643	0.0
Hg-D	**mg/L**		13	0.00000095	<0.0000019	<0.0000019	0.00000095	13	0	<0.0000019	<0.0000019	0	<0.0000019	0.0
Mo-D	**mg/L**		13	0.00050	<0.0010	<0.0010	0.00050	13	0.00000	<0.0010	<0.0010	0	<0.0010	0.0
Ni-D	**mg/L**		13	0.00050	<0.0010	<0.0010	0.00050	13	0.00000	<0.0010	<0.0010	0	<0.0010	0.0
K-D	**mg/L**		13	1.284	0.525	1.86	1.166	0	0.518	0.65	1.53	0	1.69	0.0
S-D	**mg/L**		13	107.9	44.1	153	97.6	0	44.6	57.9	133	0	143	0.0
Se-D	**mg/L**		13	0.000067	<0.00010	0.0002	0.000060	11	0.000044	<0.00010	<0.00010	0	<0.00010	0.0
Si-D	**mg/L**		13	3.710000	0.99	7.81	3.190000	0	2.030000	2.84	3.37	0	4.72	0.0
Na-D	**mg/L**		13	24.100000	10.8	37.1	22.300000	0	9.200000	15.8	24.6	0	32.1	0.0
Sr-D	**mg/L**		13	0.740000	0.291	1.04	0.665000	0	0.315000	0.371	0.942	0	1.02	0.0
Zn-D	**mg/L**	0.2	13	0.01071	<0.0050	0.0633	0.00601	6	0.01638	<0.0050	0.01	0	0.0121	0.0
pH-F	**pH Units**		53	7.52	6.72	8.88	7.5	0	0.49	7.16	7.59	0	7.81	0.0
Cond-F	**uS/cm**		53	786	138.2	1220	697.2	0	313	507	884	0	1005	0.0
O&G	**mg/L**	10	6	0.50000	<1.0	<1.0	0.50000	6	0.00000	0.5	0.5	0	0.5	0.0

Notes:

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

Table 26 : Summary Statistics for Settling Pond #4 (SP4/WD) EMS ID: E207409

Date Parameter	Unit	Permit Limit	Count	Average	Minimum	Maximum	Geometric Mean	Count of less-than results	Standard Deviation	1st Quartile	Median	Count above Permit Limit	3rd Quartile	% of Results Exceeding Permit Limit
SO4-D	**mg/L**		54	768	340	1300	742	0	197	602	770	0	935	0.0
TSS	**mg/L**	25	69	6.9	1.0	65.0	3.8	7.0	10.7	2.0	3.4	4	5.4	5.8
Alk-T	**mg/L**		27	434	140	510	423	0	81	415	460	0	490	0.0
Acidity83	**mg/L**		27	8.58	<1.0	18.8	6.66	1	5.03	4.3	8.6	0	11.1	0.0
Al-T	**mg/L**		26	0.01083	<0.0060	0.0405	0.00672	10	0.01214	0.003	0.0044	0	0.01195	0.0
As-T	**mg/L**		26	0.00123	0.00021	0.00193	0.00107	0	0.00053	0.00076	0.00133	0	0.00164	0.0
Ba-T	**mg/L**		26	0.0212	0.0108	0.0306	0.0205	0	0.0051	0.0169	0.0217	0	0.0252	0.0
B-T	**mg/L**		26	0.989	0.419	1.22	0.972	0	0.164	0.925	1.03	0	1.078	0.0
Cd-T	**mg/L**		26	0.000017	<0.000010	0.000061	0.0000127	18	0.0000156	0.00001	0.0000100	0	0.000016	0.0
Ca-T	**mg/L**		26	184.8	130	222	182.4	0	29.2	172.0	195.5	0	205	0.0
Cr-T	**mg/L**		26	0.00134	<0.0010	0.0138	0.00089	25	0.00255	0.0005	0.001	0	0.001	0.0
Co-T	**mg/L**		26	0.011340	<0.00040	0.116	0.001526	2	0.025204	0.000455	0.000555	0	0.009935	0.0
Cu-T	**mg/L**		26	0.00144	<0.0010	0.0036	0.00128	3	0.00074	0.00101	0.00125	0	0.00175	0.0
Hard-T	**mg/L**		26	546	384	659	539	0	85	510	575	0	599	0.0
Fe-T	**mg/L**		26	2.008	0.022	14.6	1.184	0	2.715	0.922	1.665	0	1.99	0.0
Pb-T	**mg/L**		26	0.000169	<0.00020	<0.00040	0.000162	26	0.000047	0.0001	0.0002	0	0.000200	0.0
Mg-T	**mg/L**		26	20.6	13.3	31.8	20.3	0	3.9	19.7	20.9	0	21.9	0.0
Mn-T	**mg/L**		26	0.5500	0.1100	2.4	0.431	0	0.457	0.297	0.512	0	0.5530	0.0
Hg-T	**mg/L**		21	0.00000095	<0.0000019	<0.0000019	0.00000095	21	0	<0.0000019	<0.0000019	0	<0.0000019	0.0
Mo-T	**mg/L**		26	0.00147	<0.0010	0.0171	0.0009	25	0.0032	0.0005	0.001	0	0.001	0.0
Ni-T	**mg/L**		26	0.01993	<0.0020	0.1490	0.00437	11	0.03473	0.001	0.00165	0	0.02622	0.0
K-T	**mg/L**		26	4.28	2.02	5.29	4.18	0	0.86	3.61	4.79	0	4.98	0.0
S-T	**mg/L**		26	302	163	423	294	0	65	285	328	0	332	0.0
Se-T	**mg/L**		26	0.000088	<0.00010	0.00013	0.000084	25	0.000024	0.000063	0.0001	0	0.0001	0.0
Si-T	**mg/L**		26	3.24	2.35	3.63	3.22	0	0.3	3.08	3.27	0	3.48	0.0
Ag-T	**mg/L**		26	0.0000169	<0.000020	<0.000040	0.0000162	26	0.0000047	0.00001	0.00002	0	0.0000200	0.0
Na-T	**mg/L**		26	351	147	427	343	0	66	308	379	0	395	0.0
Sr-T	**mg/L**		26	1.782	0.95	2.25	1.74	0	0.362	1.573	1.92	0	2.045	0.0
Zn-T	**mg/L**		26	0.01542	<0.0050	0.066	0.01039	10	0.01489	0.005	0.0119	0	0.01775	0.0
Al-D	**mg/L**	0.5	29	0.005	<0.0030	0.0225	0.00355	20	0.00539	<0.0060	<0.0060	0	0.0034	0.0
As-D	**mg/L**		29	0.000662	<0.00020	0.00156	0.000549	2	0.000365	0.00036	0.0006	0	0.00085	0.0
Ba-D	**mg/L**		29	0.0194	0.0101	0.0281	0.0189	0	0.0048	0.015	0.02	0	0.0226	0.0
B-D	**mg/L**		29	0.94	0.367	1.18	0.92	0	0.171	0.87	0.96	0	1.03	0.0
Be-D	**mg/L**		29	0.000076	<0.00010	<0.00020	0.000072	29	0.000025	<0.00010	<0.00020	0	<0.00020	0.0
Cd-D	**mg/L**		29	0.0000086	<0.000010	0.00002	0.000008	26	0.0000034	<0.000010	<0.000020	0	<0.000020	0.0
Ca-D	**mg/L**		29	180.2	122	208	177.7	0	28.9	168	195	0	202	0.0
Cr-D	**mg/L**		29	0.00076	<0.0010	<0.0020	0.00072	29	0.00025	<0.0010	<0.0020	0	<0.0020	0.0
Co-D	**mg/L**		29	0.009533	<0.00020	0.11	0.001201	4	0.022564	0.00044	0.00057	0	0.0016	0.0
Cu-D	**mg/L**	0.02	29	0.000408	<0.00020	0.00146	0.000302	15	0.000341	<0.00040	<0.00040	0	0.00067	0.0
Hard-D	**mg/L**		29	532	369	639	524	0	84	496	575	0	592	0.0
Fe-D	**mg/L**	0.3	29	0.3961	<0.010	9.82	0.021	4	1.8185	0.0085	0.013	3	0.019	10.3
Pb-D	**mg/L**	0.05	29	0.000152	<0.00020	<0.00040	0.000143	29	0.000051	<0.00020	<0.00040	0	<0.00040	0.0
Mg-D	**mg/L**		29	20	14.2	30.8	19.7	0	3.6	18.4	20.2	0	22	0.0
Mn-D	**mg/L**		29	0.4989	0.0993	2.39	0.3804	0	0.4408	0.215	0.461	0	0.541	0.0
Hg-D	**mg/L**		24	0.00000095	<0.0000019	<0.0000019	0.00000095	24	0.00000000	0.00000095	0.00000095	0	0.00000095	0.0
Mo-D	**mg/L**		29	0.00076	<0.0010	<0.0020	0.00072	29	0.00025	<0.0010	<0.0020	0	<0.0020	0.0
Ni-D	**mg/L**		29	0.01562	<0.0010	0.149	0.0034	11	0.03192	<0.0020	0.0017	0	0.0063	0.0
K-D	**mg/L**		29	4.16	1.74	5.1	4.07	0	0.8	3.6	4.56	0	4.85	0.0
S-D	**mg/L**		29	294	144	407	287	0	59	278	321	0	333	0.0
Se-D	**mg/L**		29	0.000076	<0.00010	<0.00020	0.000072	29	0.000025	<0.00010	<0.00020	0	<0.00020	0.0
Si-D	**mg/L**		29	3.16	2.8	3.58	3.16	0	0.22	2.98	3.16	0	3.31	0.0
Na-D	**mg/L**		29	337.9	88.7	431	327.2	0	70	308	368	0	388	0.0
Sr-D	**mg/L**		29	1.714	0.856	2.04	1.679	0	0.323	1.58	1.85	0	1.97	0.0
Zn-D	**mg/L**	0.1	29	0.00969	<0.0050	0.033	0.00666	17	0.00916	<0.0050	<0.010	0	0.012	0.0
pH	**pH Units**	6.5 to 8.5	55	7.64	7.2	8.49	7.64	0	0.3	7.44	7.58	0	7.79	0.0
Cond-F	**uS/cm**		55	2288.6	1084	3040	2224.3	0	517.4	1940	2210	0	2755	0.0
O&G	**mg/L**	10	6	0.5	<1.0	<1.0	0.5	6	0	0.5	0.5	0	0.5	0.0

Notes:

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

Table 27: Water Chemistry - Passive Treatment System (2-South Mine Pool)

Station Description **2 South Mine Pool Well Pump**

Stn.Code INF

Parameter	Unit	Count	Average	Minimum	Maximum	Geometric Mean	Count <DL	Standard Deviation	1st Quartile	Median	3rd Quartile
pH-F	pH Units	44	7.19	6.26	7.72	7.19	0	0.3	7.06	7.18	7.38
Cond-F	uS/cm	44	1661.6	1228.6	2220.0	1647.6	0	225.8	1542.1	1627.5	1722.5
SO4-D	mg/L	43	620	470	760	617	0	62.00	580	620	670
TSS	mg/L	10	7.5	5.6	10.0	7.4	0	1.3	6.6	7.2	8.1
Alk-T	mg/L	12	273	240	310	272	0	24	258	275	283
Al-T	mg/L	12	0.0079	<0.0030	0.0365	0.00438	5	0.01001	<0.0030	0.0042	0.0104
As-T	mg/L	12	0.00434	0.00319	0.00615	0.00425	0	0.00090	0.00362	0.00435	0.00489
Ba-T	mg/L	12	0.0217	0.0195	0.0238	0.0217	0	0.0012	0.0212	0.0217	0.0223
B-T	mg/L	12	0.674	0.579	0.760	0.672	0	0.054	0.653	0.671	0.694
Cd-T	mg/L	12	0.0000183	<0.000010	0.000164	0.0000067	11	0.0000459	<0.000010	<0.000010	<0.000010
Ca-T	mg/L	12	229	193	261	229	0	20	218	230	246
Cr-T	mg/L	12	0.00063	<0.0010	0.0015	0.00058	11	0.00031	<0.0010	<0.0010	<0.0010
Co-T	mg/L	12	0.000762	<0.00020	0.00171	0.000649	1	0.000393	0.00056	0.000675	0.00098
Cu-T	mg/L	12	0.000532	<0.00050	0.0016	0.000397	8	0.00	<0.00050	<0.00050	0.000628
Hard-T	mg/L	12	634	545	714	632	0	52	601	638	679
Fe-T	mg/L	12	4.58	2.69	15.2	4.04	0	3.38	3.28	3.69	4.13
Pb-T	mg/L	12	0.000108	<0.00020	<0.00040	0.000106	12	0.000029	<0.00020	<0.00020	<0.00020
Mg-T	mg/L	12	15.0	13.0	17.0	14.9	0	1.3	13.8	15.3	15.9
Mn-T	mg/L	12	0.392	0.328	0.440	0.390	0	0.041	0.353	0.404	0.428
Hg-T	mg/L	12	0.00000095	<0.0000019	<0.0000019	0.00000095	12	2E-14	<0.0000019	<0.0000019	<0.0000019
Mo-T	mg/L	12	0.00068	<0.0010	0.0021	0.0006	11	0.00047	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	12	0.0018	<0.0010	0.0070	0.0014	3	0.0018	0.0011	0.0011	0.0019
K-T	mg/L	12	1.88	1.68	2.22	1.87	0	0.16	1.71	1.90	1.95
S-T	mg/L	12	212.4	185.0	233.0	211.8	0	16.2	199.2	213.5	225.5
Se-T	mg/L	12	0.000054	<0.00010	<0.00020	0.000053	12	0.000014	<0.00010	<0.00010	<0.00010
Si-T	mg/L	12	3.36	3.00	3.86	3.35	0	0.28	3.12	3.26	3.58
Ag-T	mg/L	12	0.0000108	<0.000020	<0.000040	0.0000106	12	0.0000029	<0.000020	<0.000020	<0.000020
Na-T	mg/L	12	111	99	119	111	0	6	107	112	116
Sr-T	mg/L	12	2.20	1.90	2.48	2.19	0	0.18	2.07	2.19	2.31
Zn-T	mg/L	12	0.0031	<0.0050	0.0071	0.0029	11	0.00145	<0.0050	<0.0050	<0.0050
Al-D	mg/L	12	0.00315	<0.0030	0.0116	0.00251	8	0.00285	<0.0030	0.00225	0.00343
As-D	mg/L	12	0.00402	0.00270	0.00488	0.00397	0	0.00069	0.00363	0.00409	0.00464
Ba-D	mg/L	12	0.0215	0.0187	0.0233	0.0214	0	0.0013	0.0211	0.0216	0.0221
B-D	mg/L	12	0.661	0.585	0.717	0.659	0	0.049	0.637	0.675	0.700
Cd-D	mg/L	12	0.0000058	<0.000010	<0.000020	0.0000056	12	0.0000019	<0.000010	<0.000010	<0.000010
Ca-D	mg/L	12	229	187	253	228	0	19	224	232	244
Cr-D	mg/L	12	0.00058	<0.0010	<0.0020	0.00056	12	0.00019	<0.0010	<0.0010	<0.0010
Co-D	mg/L	12	0.000726	<0.00020	0.00169	0.000589	2	0.000423	0.000503	0.000675	0.000982
Cu-D	mg/L	12	0.000138	<0.00020	0.00036	0.000125	11	0.00008	<0.00020	<0.00020	0.000125
Hard-D	mg/L	12	633	532	703	631	0	50	614	643	671
Fe-D	mg/L	12	4.06	2.47	9.47	3.84	0	1.77	3.32	3.71	4.00
Pb-D	mg/L	12	0.000117	<0.00020	<0.00040	0.000112	12	0.000039	<0.00020	<0.00020	<0.00020
Mg-D	mg/L	12	15.0	12.7	17.3	14.9	0	1.5	13.6	15.3	15.7
Mn-D	mg/L	12	0.390	0.309	0.439	0.388	0	0.039	0.365	0.391	0.426
Hg-D	mg/L	12	0.00000095	<0.0000019	<0.0000019	0.00000095	12	2E-14	<0.0000019	<0.0000019	<0.0000019
Mo-D	mg/L	12	0.00058	<0.0010	<0.0020	0.00056	12	0.00019	<0.0010	<0.0010	<0.0010
Ni-D	mg/L	12	0.00125	<0.0010	0.00250	0.00113	4	0.00057	<0.0020	0.0011	0.0016
K-D	mg/L	12	1.91	1.67	2.29	1.90	0	0.16	1.83	1.91	1.95
S-D	mg/L	12	213	183	239	213	0	16	201	217	220
Se-D	mg/L	12	0.000131	<0.00010	0.00069	0.000088	8	0.00018	<0.00010	0.000075	0.000112
Si-D	mg/L	12	3.34	2.85	3.56	3.33	0	0.21	3.25	3.40	3.48
Na-D	mg/L	12	110	98	116	110	0	7	109	113	114
Sr-D	mg/L	12	2.18	1.93	2.37	2.18	0	0.12	2.13	2.18	2.27
Zn-D	mg/L	12	0.00316	<0.0050	0.0054	0.00	11	0.0012	<0.0050	<0.0050	0.00313
DOC	mg/L	2	0.63	<0.50	1.00	0.50	1	0.53	0.44	0.63	0.81
H2S	mg/L	28	0.00399	<0.0020	0.05600	0.00181	19	0.01032	<0.0020	<0.0020	0.00360
P-T	mg/L	11	0.0026	<0.0030	0.0140	0.0018	10	0.0038	<0.0030	<0.0030	<0.0030

Notes:

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

Table 28: Water Chemistry - Passive Treatment System (Biochemical Reactor)

Station Description **Biochemical Reactor**

Stn.Code BCR

Parameter	Unit	Count	Average	Minimum	Maximum	Geometric Mean	Count <DL	Standard Deviation	1st Quartile	Median	3rd Quartile
pH-F	pH Units	43	7.26	6.16	8.36	7.25	0	0.37	7.02	7.25	7.54
Cond-F	uS/cm	43	1616	1181	3055	1593	0	312	1459	1529	1678
SO4-D	mg/L	43	526	250	692	521	0	69	500	540	565
TSS	mg/L	10	2.4	<1.0	8.4	1.2	6	2.9	<1.0	<1.0	3.5
Alk-T	mg/L	12	360	270	570	352	0	83	305	335	402
Al-T	mg/L	12	0.0071	0.0048	0.0131	0.0068	0	0.0025	0.0058	0.0066	0.0070
As-T	mg/L	12	0.000313	<0.00010	0.00100	0.000219	2	0.000273	0.000148	0.000205	0.000485
Ba-T	mg/L	12	0.0293	0.0250	0.0342	0.0291	0	0.0034	0.0265	0.0290	0.0319
B-T	mg/L	12	0.678	0.521	0.870	0.671	0	0.102	0.617	0.656	0.741
Cd-T	mg/L	12	0.0000097	<0.000010	0.000062	0.0000062	11	0.0000165	<0.000010	<0.000010	<0.000010
Ca-T	mg/L	12	221	201	242	220	0	15	207	221	234
Cr-T	mg/L	12	0.00054	<0.0010	<0.0020	0.00053	12	0.00014	<0.0010	<0.0010	<0.0010
Co-T	mg/L	12	0.000108	<0.00020	<0.00040	0.000106	12	0.000029	<0.00020	<0.00020	<0.00020
Cu-T	mg/L	12	0.000271	<0.00050	<0.0010	0.000265	12	0.000072	<0.00050	<0.00050	<0.00050
Hard-T	mg/L	12	611	556	669	610	0	41	570	614	644
Fe-T	mg/L	12	0.0075	<0.010	0.017	0.0067	9	0.0040	<0.010	<0.010	0.0103
Pb-T	mg/L	12	0.000108	<0.00020	<0.00040	0.000106	12	0.000029	<0.00020	<0.00020	<0.00020
Mg-T	mg/L	12	14.6	12.7	16.5	14.6	0	1.3	13.5	14.8	15.6
Mn-T	mg/L	12	0.233	0.148	0.271	0.230	0	0.035	0.229	0.239	0.253
Hg-T	mg/L	12	0.00001140	<0.0000019	<0.000038	0.00000624	12	0.00000848	<0.0000019	0.00001425	<0.000038
Mo-T	mg/L	12	0.00054	<0.0010	<0.0020	0.00053	12	0.00014	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	12	0.00075	<0.0010	0.0030	0.00062	11	0.00072	<0.0010	<0.0010	<0.0010
K-T	mg/L	12	1.90	1.54	2.21	1.89	0	0.24	1.75	1.88	2.12
S-T	mg/L	12	168.6	101.0	192.0	166.5	0	24.6	162.5	174.0	181.5
Se-T	mg/L	12	0.000054	<0.00010	<0.00020	0.000053	12	0.000014	<0.00010	<0.00010	<0.00010
Si-T	mg/L	12	4.19	3.20	6.21	4.11	0	0.87	3.50	4.11	4.55
Ag-T	mg/L	12	0.0000108	<0.000020	<0.000040	0.0000106	12	0.0000029	<0.000020	<0.000020	<0.000020
Na-T	mg/L	12	108.4	94.5	121.0	108.1	0	8.2	103.2	106.0	116.2
Sr-T	mg/L	12	2.14	1.94	2.42	2.13	0	0.18	1.99	2.09	2.29
Zn-T	mg/L	12	0.00271	<0.0050	<0.010	0.00265	12	0.00072	<0.0050	<0.0050	<0.0050
Al-D	mg/L	12	0.00596	<0.0060	0.0084	0.00571	3	0.00169	0.00475	0.00630	0.00735
As-D	mg/L	12	0.000282	0.00010	0.00085	0.000208	2	0.000247	0.000122	0.00014	0.000455
Ba-D	mg/L	12	0.0287	0.0234	0.0334	0.0286	0	0.0031	0.0267	0.0281	0.0314
B-D	mg/L	12	0.689	0.562	0.890	0.681	0	0.114	0.595	0.661	0.775
Cd-D	mg/L	12	0.0000100	<0.000010	<0.000050	0.0000082	12	0.0000074	<0.000010	0.0000075	<0.000020
Ca-D	mg/L	12	218	196	241	218	0	13	209	218	225
Cr-D	mg/L	12	0.00100	<0.0010	<0.0050	0.00082	12	0.00074	<0.0010	0.00075	<0.0020
Co-D	mg/L	12	0.000200	<0.00020	<0.0010	0.000165	12	0.000148	<0.00020	0.000150	<0.00040
Cu-D	mg/L	12	0.000302	<0.00020	0.00143	0.000194	11	0.000385	<0.00020	0.000150	0.000275
Hard-D	mg/L	12	606	546	666	605	0	34	577	612	628
Fe-D	mg/L	12	0.00845	<0.0050	0.0150	0.00747	6	0.00413	<0.010	0.00720	<0.025
Pb-D	mg/L	12	0.000200	<0.00020	<0.0010	0.000165	12	0.000148	<0.00020	0.000150	<0.00040
Mg-D	mg/L	12	14.7	12.1	16.0	14.6	0	1.2	13.9	15.1	15.6
Mn-D	mg/L	12	0.235	0.153	0.278	0.231	0	0.040	0.214	0.244	0.263
Hg-D	mg/L	12	0.00000990	<0.0000019	<0.000038	0.00000486	12	0.00000861	<0.0000019	<0.000019	<0.000038
Mo-D	mg/L	12	0.00100	<0.0010	<0.0050	0.00082	12	0.00074	<0.0010	0.00075	<0.0020
Ni-D	mg/L	12	0.00122	<0.0010	0.00510	0.00087	11	0.00135	<0.0010	0.00075	<0.0020
K-D	mg/L	12	1.92	1.51	2.22	1.91	0	0.23	1.81	1.86	2.15
S-D	mg/L	12	253	170	505	241	0	91	194	234	264
Se-D	mg/L	12	0.02274	0.00217	0.0982	0.01096	0	0.03203	0.00492	0.00825	0.01988
Si-D	mg/L	12	4.11	3.13	5.65	4.05	0	0.79	3.54	3.88	4.48
Na-D	mg/L	12	109	94	121	108	0	8	104	108	113
Sr-D	mg/L	12	2.11	1.82	2.43	2.10	0	0.18	2.00	2.08	2.18
Zn-D	mg/L	12	0.00500	<0.0050	<0.025	0.00412	12	0.00369	<0.0050	0.00375	<0.010
DOC	mg/L	2	2.1	1.8	2.5	2.1	0	0.5	2.0	2.1	2.3
H2S	mg/L	28	34.14	2.89	90.00	28.21	0	20.19	17.75	32.00	43.25
P-T	mg/L	11	0.0382	0.0059	<0.30	0.0198	4	0.0554	0.0115	<0.030	0.0195

Notes:

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

Table 29: Water Chemistry - Passive Treatment System (Sulphide Polishing Cell)

Station Description Sulphide Polishing Cell

Stn.Code SPCEFF

Parameter	Unit	Count	Average	Minimum	Maximum	Geometric Mean	Count <DL	Standard Deviation	1st Quartile	Median	3rd Quartile
pH-F	pH Units	41	7.64	6.21	8.25	7.63	0	0.38	7.51	7.7	7.88
Cond-F	uS/cm	41	1581	968	5200	1503	0	687	1355	1457	1563
SO4-D	mg/L	41	444	250	550	436	0	78	420	450	500
TSS	mg/L	10	3.80	<1.0	19.00	2.12	2	5.50	1.30	2.00	3.70
Alk-T	mg/L	12	364	260	550	355	0	91	322	340	372
Al-T	mg/L	12	0.0097	0.0049	0.0207	0.0087	0	0.0050	0.0060	0.0072	0.0123
As-T	mg/L	12	0.00304	0.00016	0.00911	0.00174	0	0.00290	0.00095	0.00147	0.00488
Ba-T	mg/L	12	0.0346	0.0278	0.0457	0.0342	0	0.0057	0.0307	0.0333	0.0396
B-T	mg/L	12	0.662	0.481	0.871	0.653	0	0.112	0.575	0.640	0.746
Cd-T	mg/L	12	0.0000050	<0.000010	<0.000010	0.0000050	12	0.0000000	<0.000010	<0.000010	<0.000010
Ca-T	mg/L	12	207	180	233	206	0	18	192	209	218
Cr-T	mg/L	12	0.00050	<0.0010	<0.0010	0.00050	12	0.00000	<0.0010	<0.0010	<0.0010
Co-T	mg/L	12	0.00027	<0.00020	0.00073	0.00021	5	0.00019	<0.00020	0.00027	0.00037
Cu-T	mg/L	12	0.001897	<0.00050	0.00944	0.000759	6	0.002915	<0.00050	0.000515	0.001625
Hard-T	mg/L	12	574	502	652	572	0	48	538	576	607
Fe-T	mg/L	12	0.555	0.017	1.330	0.392	0	0.358	0.318	0.515	0.786
Pb-T	mg/L	12	0.000100	<0.00020	<0.00020	0.000100	12	0.000000	<0.00020	<0.00020	<0.00020
Mg-T	mg/L	12	14.2	12.2	17.1	14.1	0	1.4	13.1	14.1	14.8
Mn-T	mg/L	12	0.1356	0.0223	0.3950	0.1011	0	0.1095	0.0770	0.0887	0.1985
Hg-T	mg/L	12	0.00000618	<0.0000019	<0.000038	0.00000243	12	0.00000811	<0.0000019	<0.0000019	0.00001188
Mo-T	mg/L	12	0.00050	<0.0010	<0.0010	0.00050	12	0.00000	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	12	0.00063	<0.0010	0.0020	0.00056	11	0.00043	<0.0010	<0.0010	<0.0010
K-T	mg/L	12	1.91	1.41	2.35	1.88	0	0.35	1.65	1.80	2.29
S-T	mg/L	12	151.7	75.9	193.0	147.1	0	34.6	144.0	157.5	174.2
Se-T	mg/L	12	0.000050	<0.00010	<0.00010	0.000050	12	0.000000	<0.00010	<0.00010	<0.00010
Si-T	mg/L	12	3.89	2.01	6.11	3.75	0	1.09	3.24	3.90	4.30
Ag-T	mg/L	12	0.0000100	<0.000020	<0.000020	0.0000100	12	0.0000000	<0.000020	<0.000020	<0.000020
Na-T	mg/L	12	107.2	92.9	129.0	106.6	0	11.9	97.1	104.0	115.8
Sr-T	mg/L	12	2.06	1.83	2.47	2.05	0	0.19	1.94	2.02	2.15
Zn-T	mg/L	12	0.00275	<0.0050	0.0055	0.00267	11	0.00087	<0.0050	<0.0050	<0.0050
Al-D	mg/L	12	0.00623	<0.0030	0.0116	0.00518	2	0.00348	0.00413	0.00555	0.00860
As-D	mg/L	12	0.00207	0.00015	0.00607	0.00121	0	0.00202	0.00061	0.00096	0.00313
Ba-D	mg/L	12	0.0334	0.0281	0.0446	0.0331	0	0.0052	0.0293	0.0319	0.0364
B-D	mg/L	12	0.640	0.503	0.803	0.632	0	0.103	0.544	0.625	0.710
Cd-D	mg/L	12	0.0000050	<0.000010	<0.000010	0.0000050	12	0.0000000	<0.000010	<0.000010	<0.000010
Ca-D	mg/L	12	206	182	229	205	0	16	192	207	219
Cr-D	mg/L	12	0.00050	<0.0010	<0.0010	0.00050	12	0.00000	<0.0010	<0.0010	<0.0010
Co-D	mg/L	12	0.000215	<0.00020	0.00038	0.000187	5	0.000111	<0.00020	0.000225	0.000295
Cu-D	mg/L	12	0.000610	<0.00020	0.00578	0.000169	9	0.001631	<0.00020	<0.00020	0.000132
Hard-D	mg/L	12	572	510	634	570	0	43	537	574	609
Fe-D	mg/L	12	0.0790	0.0092	0.376	0.0419	0	0.1071	0.0196	0.0421	0.0743
Pb-D	mg/L	12	0.000100	<0.00020	<0.00020	0.000100	12	0.000000	<0.00020	<0.00020	<0.00020
Mg-D	mg/L	12	14.0	12.0	16.3	14.0	0	1.1	13.5	14.1	14.5
Mn-D	mg/L	12	0.1319	0.0215	0.3800	0.0981	0	0.1064	0.0748	0.0840	0.1933
Hg-D	mg/L	12	0.00000627	<0.0000019	<0.000038	0.00000260	11	0.00000805	<0.0000019	<0.0000019	0.00001188
Mo-D	mg/L	12	0.00050	<0.0010	<0.0010	0.00050	12	0.00000	<0.0010	<0.0010	<0.0010
Ni-D	mg/L	12	0.00050	<0.0010	<0.0010	0.00050	12	0.00000	<0.0010	<0.0010	<0.0010
K-D	mg/L	12	1.90	1.47	2.29	1.88	0	0.30	1.73	1.81	2.13
S-D	mg/L	12	166.3	132.0	220.0	164.7	0	25.2	149.2	159.5	182.5
Se-D	mg/L	12	0.0025	<0.00010	0.0144	0.0005	4	0.00411	<0.00010	0.00073	0.00359
Si-D	mg/L	12	3.84	2.06	5.65	3.71	0	1.02	3.20	3.81	4.33
Na-D	mg/L	12	105.8	88.8	123.0	105.4	0	10.1	100.4	106.5	112.2
Sr-D	mg/L	12	2.03	1.75	2.55	2.02	0	0.21	1.91	1.98	2.11
Zn-D	mg/L	12	0.00250	<0.0050	<0.0050	0.00250	12	1E-10	<0.0050	<0.0050	<0.0050
DOC	mg/L	2	2.7	2.3	3.1	2.7	0	0.6	2.5	2.7	2.9
H2S	mg/L	27	4.18	<0.0020	17.00	0.19	3	5.92	0.01	0.11	8.70
P-T	mg/L	11	0.0190	0.0061	0.0500	0.0147	0	0.0152	0.0078	0.0140	0.0210

Notes:

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

Table 30: Water Chemistry - Passive Treatment System (2-South Pit Inflow from PTS)

Station Description 2 South Inflow from Passive Treatment System

Stn.Code 2SI

Parameter	Unit	Count	Average	Minimum	Maximum	Geometric Mean	Count <DL	Standard Deviation	1st Quartile	Median	3rd Quartile
pH-F	pH Units	44	7.62	6.60	8.18	7.62	0	0.31	7.42	7.67	7.85
Cond-F	uS/cm	44	1166	479	2000	1106	0	365	930	1142	1408.2
SO4-D	mg/L	44	387	130	640	362	0	134	310	355	495
TSS	mg/L	8	2.62	<1.0	9.20	1.69	2	2.89	1.02	1.60	2.80
Alk-T	mg/L	12	207	82	340	193	0	77	155	195	265
Al-T	mg/L	12	0.0145	<0.0030	0.0569	0.0091	1	0.0161	0.0041	0.0100	0.0134
As-T	mg/L	12	0.00036	0.00013	0.00086	0.00030	0	0.00023	0.00019	0.00026	0.00047
Ba-T	mg/L	12	0.0268	0.0148	0.0447	0.0255	0	0.0092	0.0195	0.0241	0.0338
B-T	mg/L	12	0.438	0.157	0.637	0.405	0	0.167	0.323	0.402	0.610
Cd-T	mg/L	12	0.0000050	<0.000010	<0.000010	0.0000050	12	0.0000000	<0.000010	<0.000010	<0.000010
Ca-T	mg/L	12	155	83	213	149	0	45	121	149	202
Cr-T	mg/L	12	0.00050	<0.0010	<0.0010	0.00050	12	0.00000	<0.0010	<0.0010	<0.0010
Co-T	mg/L	12	0.000438	<0.00020	0.00200	0.000301	3	0.000513	0.000235	0.000305	0.000423
Cu-T	mg/L	12	0.000467	<0.00050	0.00134	0.000379	8	0.000355	<0.00050	<0.00050	0.000730
Hard-T	mg/L	12	437	243	597	421	0	123	342	420	559
Fe-T	mg/L	12	0.394	0.094	2.000	0.263	0	0.519	0.150	0.268	0.345
Pb-T	mg/L	12	0.000100	<0.00020	<0.00020	0.000100	12	0.000000	<0.00020	<0.00020	<0.00020
Mg-T	mg/L	12	12.34	8.71	16.90	12.06	0	2.75	10.15	12.15	14.38
Mn-T	mg/L	12	0.3288	0.0395	1.6200	0.1746	0	0.4543	0.0814	0.1410	0.3558
Hg-T	mg/L	12	0.00000095	<0.0000019	<0.0000019	0.00000095	12	2E-14	<0.0000019	<0.0000019	<0.0000019
Mo-T	mg/L	12	0.00050	<0.0010	<0.0010	0.00050	12	0.00000	<0.0010	<0.0010	<0.0010
Ni-T	mg/L	12	0.00064	<0.0010	0.0012	0.00060	9	0.00026	<0.0010	<0.0010	0.00063
K-T	mg/L	12	1.336	0.640	2.370	1.233	0	0.557	0.859	1.215	1.695
S-T	mg/L	12	133.6	71.7	184.0	127.6	0	40.1	108.1	128.0	173.5
Se-T	mg/L	12	0.000050	<0.00010	<0.00010	0.000050	12	0.000000	<0.00010	<0.00010	<0.00010
Si-T	mg/L	12	4.31	2.99	5.66	4.24	0	0.82	3.73	4.22	4.84
Ag-T	mg/L	12	0.0000100	<0.000020	<0.000020	0.0000100	12	0.0000000	<0.000020	<0.000020	<0.000020
Na-T	mg/L	12	70.3	24.2	116.0	63.9	0	29.8	49.9	66.1	94.9
Sr-T	mg/L	12	1.347	0.595	1.980	1.264	0	0.482	1.020	1.235	1.857
Zn-T	mg/L	12	0.00336	<0.0050	0.01280	0.00286	11	0.00297	<0.0050	<0.0050	<0.0050
Al-D	mg/L	12	0.00649	<0.0030	0.0278	0.00381	6	0.00767	<0.0030	0.00310	0.00825
As-D	mg/L	12	0.00030	0.00012	0.00068	0.00027	0	0.00016	0.00018	0.00025	0.00038
Ba-D	mg/L	12	0.0268	0.0141	0.0458	0.0254	0	0.0092	0.0208	0.0236	0.0337
B-D	mg/L	12	0.437	0.153	0.758	0.399	0	0.185	0.298	0.390	0.591
Cd-D	mg/L	12	0.0000050	<0.000010	<0.000010	0.0000050	12	0.0000000	<0.000010	<0.000010	<0.000010
Ca-D	mg/L	12	154.6	81.7	214.0	148.0	0	45.5	117.2	150.0	197.8
Cr-D	mg/L	12	0.00050	<0.0010	<0.0010	0.00050	12	0.00000	<0.0010	<0.0010	<0.0010
Co-D	mg/L	12	0.000458	<0.00020	0.00215	0.000310	3	0.000551	0.000258	0.000325	0.000423
Cu-D	mg/L	12	0.000343	<0.00020	0.00073	0.000289	2	0.000197	0.000208	0.000285	0.000508
Hard-D	mg/L	12	437	239	599	420	0	124	333	425	559
Fe-D	mg/L	12	0.1422	0.0209	0.6450	0.0899	0	0.1725	0.0601	0.0771	0.1668
Pb-D	mg/L	12	0.000100	<0.00020	<0.00020	0.000100	12	0.000000	<0.00020	<0.00020	<0.00020
Mg-D	mg/L	12	12.44	8.57	16.10	12.17	0	2.69	10.14	12.30	14.80
Mn-D	mg/L	12	0.3505	0.0422	1.8000	0.1788	0	0.5020	0.0810	0.1425	0.4027
Hg-D	mg/L	12	0.00000095	<0.0000019	<0.0000019	0.00000095	12	2E-14	<0.0000019	<0.0000019	<0.0000019
Mo-D	mg/L	12	0.00050	<0.0010	<0.0010	0.00050	12	0.00000	<0.0010	<0.0010	<0.0010
Ni-D	mg/L	12	0.00056	<0.0010	0.0012	0.00054	11	0.00020	<0.0010	<0.0010	<0.0010
K-D	mg/L	12	1.359	0.611	2.35	1.253	0	0.559	0.902	1.255	1.715
S-D	mg/L	12	135.4	71.5	186	128.9	0	41.9	104.6	130.5	177.2
Se-D	mg/L	12	0.000050	<0.00010	<0.00010	0.000050	12	0.000000	<0.00010	<0.00010	<0.00010
Si-D	mg/L	12	4.22	2.89	5.74	4.15	0	0.79	3.76	4.04	4.64
Na-D	mg/L	12	71.0	23.8	118	64.4	0	30.1	48.9	69.7	98.0
Sr-D	mg/L	12	1.350	0.582	2.05	1.260	0	0.499	0.991	1.235	1.795
Zn-D	mg/L	12	0.00250	<0.0050	<0.0050	0.00250	12	1E-10	<0.0050	<0.0050	<0.0050
DOC	mg/L	2	2.9	2.0	3.7	2.7	0	1.2	2.4	2.9	3.3
H2S	mg/L	27	0.03359	<0.0020	0.12	0.01395	7	0.03179	0.00345	0.029	0.05150
P-T	mg/L	8	0.00216	<0.0030	0.0042	0.00193	6	0.00123	<0.0030	<0.0030	0.00215

Notes:

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

Table 31: Water Chemistry - 2-South Water Seepage from Under the Pit liner and Overflow

Station Description **2 South flow into 3-South Pit**

Stn.Code 2SC

Parameter	Unit	Count	Average	Minimum	Maximum	Geometric Mean	Count <DL	Standard Deviation	1st Quartile	Median	3rd Quartile
pH-F	pH Units	11	7.82	7.27	8.12	7.81	0	0.28	7.71	7.90	7.99
Cond-F	uS/cm	11	1573	1187	2700	1537	0	402	1421	1473	1537
SO4-D	mg/L	11	613	480	740	609	0	77	560	610	640
TSS	mg/L										
Alk-T	mg/L	11	207	150	240	206	0	23	200	210	220
Al-T	mg/L	11	0.00427	<0.0030	0.0170	0.00287	7	0.00478	<0.0030	<0.0030	0.00505
As-T	mg/L	11	0.00049	0.00026	0.00157	0.00043	0	0.00036	0.00035	0.00040	0.00044
Ba-T	mg/L	11	0.0142	0.0122	0.0173	0.0141	0	0.0015	0.0132	0.0141	0.0147
B-T	mg/L	11	0.317	0.245	0.370	0.314	0	0.047	0.279	0.334	0.356
Cd-T	mg/L	11	0.0000064	<0.000010	<0.000020	0.0000060	11	0.0000023	<0.000010	<0.000010	0.0000075
Ca-T	mg/L	11	239	181	283	238	0	28	227	241	250
Cr-T	mg/L	11	0.00086	<0.0010	0.00350	0.00068	10	0.00090	<0.0010	<0.0010	0.00075
Co-T	mg/L	11	0.000127	<0.00020	<0.00040	0.000121	11	0.000047	<0.00020	<0.00020	0.000150
Cu-T	mg/L	11	0.000318	<0.00050	<0.0010	0.000302	11	0.000117	<0.00050	<0.00050	0.000375
Hard-T	mg/L	11	714	540	842	709	0	84	679	715	742
Fe-T	mg/L	11	0.0255	<0.010	0.0910	0.0181	2	0.0246	0.0125	0.0180	0.0245
Pb-T	mg/L	11	0.000127	<0.00020	<0.00040	0.000121	11	0.000047	<0.00020	<0.00020	0.000150
Mg-T	mg/L	11	28.1	21.4	33.7	27.9	0	3.5	25.9	28.5	29.6
Mn-T	mg/L	11	0.0141	0.0025	0.0601	0.0089	0	0.0174	0.0061	0.0066	0.0110
Hg-T	mg/L	7	0.00000095	<0.0000019	<0.0000019	0.00000095	7	0.00000000	<0.0000019	<0.0000019	<0.0000019
Mo-T	mg/L	11	0.00064	<0.0010	<0.0020	0.00060	11	0.00023	<0.0010	<0.0010	0.00075
Ni-T	mg/L	11	0.00064	<0.0010	<0.0020	0.00060	11	0.00023	<0.0010	<0.0010	0.00075
K-T	mg/L	11	2.16	1.57	2.63	2.14	0	0.31	1.96	2.29	2.40
S-T	mg/L	11	206	163	256	205	0	25	196	204	219
Se-T	mg/L	11	0.000188	<0.00010	0.00040	0.000163	2	0.000106	0.000125	0.00015	0.000225
Si-T	mg/L	11	2.55	2.20	2.94	2.53	0	0.26	2.35	2.53	2.69
Ag-T	mg/L	11	0.0000127	<0.000020	<0.000040	0.0000121	11	0.0000047	<0.000020	<0.000020	0.0000150
Na-T	mg/L	11	39.9	26.8	56.2	38.9	0	9.2	32.0	40.5	46.3
Sr-T	mg/L	11	1.44	1.15	1.61	1.43	0	0.12	1.40	1.41	1.52
Zn-T	mg/L	11	0.00318	<0.0050	<0.010	0.00302	11	0.00117	<0.0050	<0.0050	0.00375
Al-D	mg/L	11	0.00247	<0.0030	0.0060	0.00220	9	0.00140	<0.0030	<0.0030	<0.0060
As-D	mg/L	11	0.000418	<0.00020	0.00120	0.000362	1	0.000273	0.00034	0.00035	0.00040
Ba-D	mg/L	11	0.0140	0.0127	0.0166	0.0140	0	0.0011	0.0132	0.0142	0.0145
B-D	mg/L	11	0.307	0.250	0.370	0.304	0	0.045	0.267	0.305	0.342
Cd-D	mg/L	11	0.0000064	<0.000010	<0.000020	0.0000060	11	0.0000023	<0.000010	<0.000010	0.0000075
Ca-D	mg/L	11	242	188	280	241	0	28	227	241	260
Cr-D	mg/L	11	0.00064	<0.0010	<0.0020	0.00060	11	0.00023	<0.0010	<0.0010	0.00075
Co-D	mg/L	11	0.000127	<0.00020	<0.00040	0.000121	11	0.000047	<0.00020	<0.00020	0.000150
Cu-D	mg/L	11	0.000262	<0.00020	0.00079	0.000192	7	0.000249	<0.00020	<0.00040	0.000240
Hard-D	mg/L	11	721	559	834	717	0	82	672	717	776
Fe-D	mg/L	11	0.00531	<0.0050	0.0137	0.00457	7	0.00332	<0.0050	<0.010	0.00585
Pb-D	mg/L	11	0.000127	<0.00020	<0.00040	0.000121	11	0.000047	<0.00020	<0.00020	0.000150
Mg-D	mg/L	11	28.4	22.1	32.7	28.2	0	3.2	26.8	27.7	31.1
Mn-D	mg/L	11	0.0122	0.0023	0.0471	0.0079	0	0.0143	0.0052	0.0059	0.0106
Hg-D	mg/L	7	0.00000095	<0.0000019	<0.0000019	0.00000095	7	0.00000000	<0.0000019	<0.0000019	<0.0000019
Mo-D	mg/L	11	0.00064	<0.0010	<0.0020	0.00060	11	0.00023	<0.0010	<0.0010	0.00075
Ni-D	mg/L	11	0.00068	<0.0010	0.0010	0.00064	10	0.00025	<0.0010	<0.0010	<0.0020
K-D	mg/L	11	2.20	1.64	2.53	2.18	0	0.26	2.07	2.34	2.36
S-D	mg/L	11	210	172	258	208	0	23	195	207	221
Se-D	mg/L	11	0.000207	<0.00010	0.00045	0.000172	3	0.000134	0.000115	0.00018	0.000240
Si-D	mg/L	11	2.57	2.27	2.95	2.56	0	0.21	2.47	2.55	2.70
Na-D	mg/L	11	40.4	27.0	54.0	39.4	0	9.0	33.3	41.8	45.6
Sr-D	mg/L	11	1.45	1.17	1.60	1.45	0	0.12	1.40	1.50	1.50
Zn-D	mg/L	11	0.00318	<0.0050	<0.010	0.00302	11	0.00117	<0.0050	<0.0050	0.00375

Notes:

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

Table 32

Groundwater Wells - Description

Area	Groundwater ID	In-situ / Ex-situ	Screened Interval	Comment
2-3 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
	3- Mains 2-North (3M2N)	In-situ	No.1 Seam	Dewatering system from the old 3-Mains mine.
	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 downgradient 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, measures water quality and hydraulic head downgradient 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	1M7SA5	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
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

Table 33: BC CSR Aquatic Life 2019 - Lowest Level Exceedances for Ex-situ Groundwater

2 - 3 North			**QU0821GD**	**QU0821GD**	**QU0821GD**	**QU0821GD**	**QU0821GS**	**QU0821GS**	**QU0821GS**	**QU0821GS**	**QU0821GS**	
		Freshwater Aquatic Life (CSR-AW)	9-Feb-21	26-May-21	26-May-21	5-Aug-21	9-Feb-21	9-Feb-21	26-May-21	5-Aug-21	5-Aug-21	
				QA/QC			QA/QC			QA/QC		
Parameter	**Units**											
H2SEquiv	**mg/L**	**0.02**	0.0797	0.0532	0.0489	0.0585	0.159	0.106		0.0298	0.0361	
As-D	**mg/L**	**0.05**	0.186	0.167	0.165	0.142	0.227	0.219	0.111	0.183	0.185	
2 - 3 North			**QU1010D**	**QU1010D**	**QU1010D**	**QU1010S**	**QU1010S**	**QU1011D**	**QU1011D**	**QU1011D**		
Parameter	**Units**		18-May-21	18-May-21	2-Sep-21	19-May-21	2-Sep-21	17-May-21	24-Aug-21	24-Aug-21		
			QA/QC						QA/QC			
H2SEquiv	**mg/L**	**0.02**				0.085	0.574	0.17	0.0861	0.0744		
Cl-D	**mg/L**	**1500**	3200	3400	3100							
As-D	**mg/L**	**0.05**				0.105	0.0957	0.0458				
River Barrier Pillar			**QU1105D**	**QU1105D**	**QU1105D**	**QU1105D**	**QU1105D**	**QU1105D**	**QU1105S**	**QU1105S**	**QU1105S**	**QU1105S**
			16-Mar-21	19-May-21	23-Aug-21	23-Aug-21	4-Nov-21	4-Nov-21	16-Mar-21	19-May-21	23-Aug-21	4-Nov-21
					QA/QC		QA/QC					
Parameter	**Units**											
H2SEquiv	**mg/L**	**0.02**	13.8	24.4	42.5	41.5	54.2	52.1	0.0404	0.138	0.067	0.0606
As-D	**mg/L**	**0.05**							0.115	0.133	0.104	0.0589
Se-D	**mg/L**	**0.01**			0.0209	0.0154	0.0158	0.0132				
River Barrier Pillar			**QU1109S**	**QU1109S**	**QU1109S**	**QU1109S**	**QU1109S**	**QU1109S**	**QU1109S**			
			15-Jun-21	15-Jun-21	19-Aug-21	19-Aug-21	27-Sep-21	3-Nov-21	3-Nov-21			
	Units		QA/QC		QA/QC			QA/QC				
H2SEquiv	**mg/L**	**0.02**	2.66	2.87	1.59	1.59	0.0202	1.81	1.81			
As-D	**mg/L**	**0.05**	0.0873	0.0879	0.085	0.0926	0.0982	0.102	0.0953			
7-South			**QU0813A**	**QU0813A**	**QU0813A**	**QU0813A**	**QU0813A**	**QU0813B**	**QU0813B**	**QU0813B**		
			10-Feb-21	12-May-21	16-Aug-21	16-Aug-21	30-Nov-21	10-Feb-21	12-May-21	30-Nov-21		
Parameter	**Units**				QA/QC							
H2SEquiv	**mg/L**	**0.02**	0.223	0.223	0.17	0.234	0.181	0.0521	0.0627	0.0213		
As-D	**mg/L**	**0.05**	0.417	0.446	0.378	0.373	0.374	0.459	0.458	0.533		
4-South			**QU1008D**	**QU1008D**	**QU1009S**	**QU1009S**	**QU1009D**	**QU1009D**				
			21-Jan-21	22-Jun-21	11-May-21	28-Oct-21	11-May-21	28-Oct-21				
Parameter	**Units**											
H2SEquiv	**mg/L**	**0.02**	0.0404	0.255		0.0223	0.0861	0.0819				
As-D	**mg/L**	**0.05**	0.151	0.147	0.0832	0.0941	0.11	0.104				

Table 34: Ex-situ Groundwater 2 / 3 North

Ex-situ			**2 - 3 North**								
Well ID			**QU0821GD**	**QU0821GD**	**QU0821GD**	**QU0821GD**	**QU0821GS**	**QU0821GS**	**QU0821GS**	**QU0821GS**	**QU0821GS**
Date			9-Feb-21	26-May-21	26-May-21	5-Aug-21	9-Feb-21	9-Feb-21	26-May-21	5-Aug-21	5-Aug-21
				QA/QC			QA/QC			QA/QC	
Parameter	**Units**	**CSR-AW**									
SO4-D	**mg/L**	1280	<1.0	<1.0	<1.0	3	<1.0	<1.0	<1.0	2.3	1.7
H2SEquiv	**mg/L**	0.02	0.0797	0.0532	0.0489	0.0585	0.159	0.106	0.017	0.0298	0.0361
Turb	**NTU**		5.8	6.8	7.2	4.8	0.7	0.6	4.0	4.6	4.5
Alk-T	**mg/L**		200	210	210	200	190	190	210	200	180
Acidity83	**mg/L**		<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0
N-D	**mg/L**		0.386	0.498	0.515	0.424	0.289	0.189	0.476	0.200	0.217
DOC	**mg/L**		3.20	<13	<13	6.40	1.40	0.68	<5.0	2.10	0.59
Hydrox	**mg/L**		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarb	**mg/L**		250	260	250	250	230	220	250	240	220
Carb	**mg/L**		<1.0	<1.0	<1.0	<1.0	3.1	2.1	<1.0	<1.0	<1.0
Cl-D	**mg/L**	1500	680	910	910	1100	53	56	620	250	240
F-D	**mg/L**		1.4	1.2	1.2	1.0	1.7	1.7	1.3	1.5	1.5
Br-D	**mg/L**		0.94	1.30	1.30	1.50	0.08	0.08	0.87	0.36	0.36
P-D	**mg/L**		0.014	0.027	0.026	0.024	0.024	0.022	0.0088	0.029	0.034
Al-D	**mg/L**		<0.015	<0.015	<0.015	<0.015	0.0041	0.0037	<0.015	<0.0060	<0.0060
Ag-D	**mg/L**		<0.00010	<0.00010	<0.00010	<0.00010	<0.000020	<0.000020	<0.00010	<0.000040	<0.000040
As-D	**mg/L**	0.05	0.186	0.167	0.165	0.142	0.227	0.219	0.111	0.183	0.185
Ba-D	**mg/L**	10	1.74	2.03	1.99	2.41	0.286	0.277	1.400	0.669	0.673
B-D	**mg/L**	50	2.89	2.69	2.66	3.04	1.87	1.85	2.32	2.10	2.11
Be-D	**mg/L**	0.053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00050	<0.00020	<0.00020
Bi-D	**mg/L**		<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050	<0.0020	<0.0020
Cd-D	**mg/L**		<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000050	<0.000020	<0.000020
Ca-D	**mg/L**		71	89	91	114	13	13	63	32	31
Cr-D	**mg/L**	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050	<0.0020	<0.0020
Co-D	**mg/L**	0.04	<0.0010	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.0010	<0.00040	<0.00040
Cu-D	**mg/L**		<0.0010	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.0010	0.00055	<0.00040
Fe-D	**mg/L**		0.610	0.884	0.915	1.030	0.246	0.234	0.306	0.345	0.333
Hard-D	**mg/L**	1	228	278	281	347	48	47	196	104	102
Pb-D	**mg/L**		<0.0010	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.0010	<0.00040	<0.00040
Mg-D	**mg/L**		12.6	13.4	13.3	15.0	3.7	3.5	9.7	5.8	5.6
Mn-D	**mg/L**		0.0624	0.07	0.0693	0.0998	0.0299	0.0286	0.06	0.0603	0.0599
Hg-D	**mg/L**	0.001	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Na-D	**mg/L**		414	464	463	567	100	95	332	185	185
Mo-D	**mg/L**	10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050	<0.0020	<0.0020
Ni-D	**mg/L**		<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0010	<0.0050	<0.0020	<0.0020
K-D	**mg/L**		7.84	8.59	8.31	9.00	3.87	3.69	6.75	4.84	4.79
S-D	**mg/L**		<15	<15	<15	<15	<3.0	<3.0	<15	<6.0	<6.0
Sb-D	**mg/L**	0.2	<0.0025	<0.0025	<0.0025	<0.0025	<0.00050	<0.00050	<0.0025	<0.0010	<0.0010
Se-D	**mg/L**	0.01	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00050	<0.00020	<0.00020
Si-D	**mg/L**		3.95	4.08	4.09	4.09	3.56	3.37	3.83	3.52	3.43
Sr-D	**mg/L**		1.66	1.97	1.93	2.33	0.41	0.40	1.36	0.76	0.74
Tl-D	**mg/L**	0.003	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000050	<0.000020	<0.000020
Ti-D	**mg/L**	1.00	<0.025	<0.025	<0.025	<0.025	<0.0050	<0.0050	<0.025	<0.010	<0.010
U-D	**mg/L**	3	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00050	<0.00020	<0.00020
V-D	**mg/L**		<0.025	<0.025	<0.025	<0.025	<0.0050	<0.0050	<0.025	<0.010	<0.010
Zn-D	**mg/L**		<0.025	<0.025	<0.025	<0.025	<0.0050	<0.0050	<0.025	<0.010	<0.010
Temp-F	**C**		6.90	9.90	9.90	14.35	8.40	8.40	9.90	13.15	
pH-F	**pH Units**		7.10	8.02	8.02	7.36	8.75	8.75	8.09	7.59	
Cond-F	**uS/cm**		1897	3630	3630	3481	482	482	2500	1154	
DO-F	**mg/L**			0.70	0.70	0.47			1.10	0.52	
ORP-F	**mV**			-90.8	-90.8	-113.1			-60.1	-90.1	

Ex-situ			Table 35: Ex-situ Groundwater 2 / 3 North 2 - 3 North										
Well ID			QU1010D	QU1010D	QU1010D	QU1010S	QU1010S	QU1011D	QU1011D	QU1011D	QU1011S	QU1011S	QU1011S
Date			18-May-21	18-May-21	2-Sep-21	19-May-21	2-Sep-21	17-May-21	24-Aug-21	24-Aug-21	17-May-21	17-May-21	24-Aug-21
			QA/QC						QA/QC		QA/QC		
Parameter	Units	CSR-AW											
SO4-D	mg/L	1280	<1.0	<1.0	2.3	29	7.1	1.5	<1.0	<1.0	3.3	3.1	7.7
H2SEquiv	mg/L	0.02	0.0010	0.000957	0.000957	0.085	0.574	0.17	0.0861	0.0744	0.000957	0.000957	0.000957
Turb	NTU		60	54	59	25	1300	290.0	4.4	4.2	2.4	2.5	0.9
Alk-T	mg/L		91	90	85	310	210	340	340	350	150	150	140
Acidity83	mg/L		13.4	13.0	7.1	2.5	<1.0	5.1	9.1	9.7	4.3	3.3	1.3
N-D	mg/L		0.788	0.785	0.808	0.390	0.400	0.341	0.370	0.374	0.110	0.117	0.135
DOC	mg/L		10.0	12.0	42.0	4.6	<2.5	1.7	1.8	2.6	1.2	1.2	<0.50
Hydrox	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarb	mg/L		110	110	100	380	250	420	410	420	180	180	180
Carb	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cl-D	mg/L	1500	3200	3400	3100	640	440	190	340	350	10	10	4
F-D	mg/L		<0.050	<0.050	<0.050	0.85	0.86	0.67	0.46	0.46	0.15	0.15	0.26
Br-D	mg/L		4.300	4.400	4.300	0.830	0.700	0.340	0.600	0.590	0.016	0.017	<0.010
P-D	mg/L		0.043	0.045	0.039	0.034	0.010	0.048	0.054	0.058	0.010	0.008	0.010
Al-D	mg/L		<0.015	<0.015	0.0058	0.0179	0.0057	<0.0060	0.0153	0.0086	<0.0030	<0.0030	<0.0030
Ag-D	mg/L		<0.00010	<0.00010	<0.000020	<0.000040	<0.000020	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
As-D	mg/L	0.05	0.0115	0.0112	0.0117	0.105	0.0957	0.0458	0.0271	0.0272	0.00424	0.00424	0.00695
Ba-D	mg/L	10	1.35	1.33	1.35	1.07	0.76	0.23	0.34	0.33	0.19	0.19	0.20
B-D	mg/L	50	0.35	0.34	0.33	3.11	1.59	2.23	1.43	1.42	0.38	0.38	0.48
Be-D	mg/L	0.053	<0.00050	<0.00050	<0.00010	<0.00020	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bi-D	mg/L		<0.0050	<0.0050	<0.0010	<0.0020	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cd-D	mg/L		<0.000050	<0.000050	<0.000010	<0.000020	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Ca-D	mg/L		576	568	631	77	61	32	55	53	26	26	29
Cr-D	mg/L	0.010	<0.0050	<0.0050	<0.0010	<0.0020	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	0.04	<0.0010	<0.0010	0.00033	<0.00040	<0.00020	<0.00040	<0.00020	<0.00020	0.00021	0.00022	<0.00020
Cu-D	mg/L		<0.0010	<0.0010	<0.00020	<0.00040	<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Fe-D	mg/L		5.74	5.74	6.56	0.50	0.21	1.19	2.20	2.15	0.44	0.43	0.60
Hard-D	mg/L	1	1490	1470	1620	243	191	95	157	153	89	89	98
Pb-D	mg/L		<0.0010	<0.0010	<0.00020	<0.00040	<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	mg/L		12.00	11.90	11.70	12.40	9.61	3.62	4.89	4.86	5.97	6.01	6.18
Mn-D	mg/L		0.381	0.376	0.447	0.182	0.151	0.148	0.234	0.237	0.075	0.076	0.101
Hg-D	mg/L	0.001	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Na-D	mg/L		1360	1330	1370	447	272	215	300	299	28	28	23
Mo-D	mg/L	10	<0.0050	<0.0050	<0.0010	<0.0020	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ni-D	mg/L		<0.0050	<0.0050	<0.0010	<0.0020	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
K-D	mg/L		8.24	8.13	8.07	7.80	5.97	3.81	4.58	4.51	1.70	1.73	2.39
S-D	mg/L		<15	<15	<3.0	9.1	5.1	<6.0	<3.0	<3.0	<3.0	<3.0	<3.0
Sb-D	mg/L	0.2	<0.0025	<0.0025	<0.00050	<0.0010	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Se-D	mg/L	0.01	<0.00050	<0.00050	<0.00010	<0.00020	0.00159	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Si-D	mg/L		3.73	3.67	3.97	5.07	4.30	4.69	5.90	5.77	3.49	3.41	3.75
Sr-D	mg/L		6.050	6.010	6.350	1.540	1.230	0.483	0.858	0.864	0.302	0.307	0.376
Tl-D	mg/L	0.003	<0.000050	<0.000050	<0.000010	<0.000020	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Ti-D	mg/L	1.00	<0.025	<0.025	<0.0050	<0.010	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
U-D	mg/L	3	<0.00050	<0.00050	<0.00010	0.00023	0.00011	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
V-D	mg/L		<0.025	<0.025	<0.0050	<0.010	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Zn-D	mg/L		<0.025	<0.025	0.0052	<0.010	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Temp-F	C		9.00	9.00	10.51	5.80	9.93	8.00	8.77		8.80	8.80	10.68
pH-F	pH Units		7.42	7.42	7.00	7.95	7.71	7.29	6.87		7.02	7.02	7.05
Cond-F	uS/cm		11278	11278	10146	3058	1936	1418	181		363	363	319
DO-F	mg/L		0.31	0.31	0.33	0.17	0.30	1.18	0.36		1.11	1.11	0.35
ORP-F	mV		-87.6	-87.6	-93.8	-173.1	-194.9	-168.9	-91.8		-99	-99	-79.8

Ex-situ

Table 36: Ex-situ Groundwater River Barrier Pillar

River Barrier Pillar

Well ID			QU1105D	QU1105D	QU1105D	QU1105D	QU1105D	QU1105D	QU1105S	QU1105S	QU1105S	QU1105S
Date			16-Mar-21	19-May-21	23-Aug-21	23-Aug-21	4-Nov-21	4-Nov-21	16-Mar-21	19-May-21	23-Aug-21	4-Nov-21
					QA/QC		QA/QC					
Parameter	Units	CSR-AW										
SO4-D	mg/L	1280	430	420	350	280	250	240	510	570	71	210
H2SEquiv	mg/L	0.02	13.8	24.4	42.5	41.5	54.2	52.1	0.0404	0.138	0.067	0.0606
Turb	NTU		55.0	3.0	0.5	0.4	170.0	170.0	27.0	17.0	5.6	7.1
Alk-T	mg/L		270	260	320	310	350	340	470	460	120	330
Acidity83	mg/L		3.6	5.4	<1.0	<1.0	<1.0	<1.0	7.7	3.1	<1.0	9.3
N-D	mg/L		0.454	0.397	0.398	0.407	0.367	0.372	0.386	0.372	0.154	0.237
DOC	mg/L		<2.0	23	30	32	<5.0	<5.0	0.96	0.59	<0.50	2.1
Hydrox	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarb	mg/L		330	310	390	380	420	420	580	560	150	400
Carb	mg/L		<1.0	<1.0	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cl-D	mg/L	1500	1300	1300	1300	1300	1300	1400	23	20	2	2
F-D	mg/L		<0.050	<0.050	<0.050	<0.050	0.05	<0.050	0.37	0.48	0.31	0.18
Br-D	mg/L		2.100	2.200	2.000	2.000	2.000	2.000	0.085	0.097	<0.010	0.035
P-D	mg/L		0.0460	0.0540	<0.10	<0.10	0.2800	0.2800	0.0075	0.0150	0.0066	0.0034
Al-D	mg/L		<0.015	<0.015	<0.015	<0.015	0.0132	0.0125	<0.0030	<0.0060	<0.0030	<0.0030
Ag-D	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.000040	<0.000040	<0.000020	<0.000040	<0.000020	<0.000020
As-D	mg/L	0.05	0.0010	0.0014	0.0031	0.0032	0.0048	0.0049	0.1150	0.1330	0.1040	0.0589
Ba-D	mg/L	10	0.1190	0.1050	0.1630	0.1620	0.1610	0.1540	0.1120	0.0496	0.0367	0.0983
B-D	mg/L	50	0.43	0.46	0.45	0.47	0.51	0.52	1.28	1.79	0.45	1.22
Be-D	mg/L	0.053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00010	<0.00020	<0.00010	<0.00010
Bi-D	mg/L		<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020	<0.0010	<0.0020	<0.0010	<0.0010
Cd-D	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000020	<0.000020	<0.000010	<0.000020	<0.000010	<0.000010
Ca-D	mg/L		161	164	150	145	138	135	99	105	13	59
Cr-D	mg/L	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020	<0.0010	<0.0020	<0.0010	<0.0010
Co-D	mg/L	0.04	<0.0010	<0.0010	<0.0010	<0.0010	<0.00040	<0.00040	<0.00020	<0.00040	<0.00020	<0.00020
Cu-D	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.00040	<0.00040	<0.00020	<0.00040	<0.00020	<0.00020
Fe-D	mg/L		<0.025	<0.025	<0.025	0.038	<0.010	<0.010	2.23	2.7	0.141	1.09
Hard-D	mg/L	1	423	430	395	384	362	353	311	329	41	189
Pb-D	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.00040	<0.00040	<0.00020	<0.00040	<0.00020	<0.00020
Mg-D	mg/L		5.25	5.35	5.11	5.11	4.35	4.20	15.20	16.10	2.25	10.40
Mn-D	mg/L		0.0656	0.0603	0.0816	0.0812	0.1120	0.1080	0.2180	0.2520	0.0283	0.2330
Hg-D	mg/L	0.001	<0.0000019	<0.0000019	<0.000019	<0.000019	<0.000019	<0.000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Na-D	mg/L		900	928	909	899	866	831	321	348	64	158
Mo-D	mg/L	10	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020	<0.0010	<0.0020	<0.0010	<0.0010
Ni-D	mg/L		<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020	<0.0010	<0.0020	<0.0010	<0.0010
K-D	mg/L		4.84	5.09	5.09	5.06	4.68	4.53	6.62	6.49	2.15	3.42
S-D	mg/L		155	142	140	135	293	294	186	204	22	75
Sb-D	mg/L	0.2	<0.0025	<0.0025	<0.0025	<0.0025	<0.0010	<0.0010	<0.00050	<0.0010	<0.00050	<0.00050
Se-D	mg/L	0.01	<0.00050	<0.00050	0.0209	0.0154	0.0158	0.0132	<0.00010	<0.00020	0.00063	<0.00010
Si-D	mg/L		4.00	4.40	4.56	4.48	6.26	6.04	5.01	5.05	3.03	3.47
Sr-D	mg/L		2.01	1.78	1.78	1.79	1.68	1.61	1.69	1.55	0.185	0.688
Tl-D	mg/L	0.003	<0.000050	<0.000050	<0.000050	<0.000050	<0.000020	<0.000020	<0.000010	<0.000020	<0.000010	<0.000010
Ti-D	mg/L	1.00	<0.025	<0.025	<0.025	<0.025	<0.010	<0.010	<0.0050	<0.010	<0.0050	<0.0050
U-D	mg/L	3	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00010	<0.00020	<0.00010	<0.00010
V-D	mg/L		<0.025	<0.025	<0.025	<0.025	<0.010	<0.010	<0.0050	<0.010	<0.0050	<0.0050
Zn-D	mg/L		<0.025	<0.025	<0.025	<0.025	<0.010	<0.010	<0.0050	<0.010	<0.0050	<0.0050
Temp-F	C		6.204	7.800	10.127		9.695	9.695	7.423	8.500	10.421	9.734
pH-F	pH Units		7.14	7.51	7.70		7.82	7.82	7.06	7.22	7.96	6.98
Cond-F	uS/cm		4439	5520	5278		4967	4967	1676	2106	394	993
DO-F	mg/L			0.52	0.32		0.36	0.36		3.14	0.34	0.39
ORP-F	mV			-326.8	-351.7		-354.4	-354.4		-159.1	-285.3	-235.1

Table 37: Ex-situ Groundwater River Barrier Pillar

Ex-situ			River Barrier Pillar						
Well ID			**QU1109S**	**QU1109S**	**QU1109S**	**QU1109S**	**QU1109S**	**QU1109S**	**QU1109S**
Date			15-Jun-21	15-Jun-21	19-Aug-21	19-Aug-21	27-Sep-21	3-Nov-21	3-Nov-21
			QA/QC		QA/QC			QA/QC	
Parameter	**Units**	**CSR-AW**							
SO4-D	**mg/L**	1280	440	430	290	300	240	280	240
H2SEquiv	**mg/L**	0.02	2.66	2.87	1.59	1.59	0.02	1.81	1.81
Turb	**NTU**		23.0	25.0	3.6	2.6	2.8	3.3	3.2
Alk-T	**mg/L**		500	490	480	490	480	470	470
Acidity83	**mg/L**		9.6	9.3	<1.0	<1.0	<1.0	<1.0	<1.0
N-D	**mg/L**		0.489	0.543	0.381	0.379	0.422	0.383	0.363
DOC	**mg/L**		0.92	1.1	<0.50	<0.50	1.2	<0.50	<0.50
Hydrox	**mg/L**		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarb	**mg/L**		600	590	590	590	560	520	540
Carb	**mg/L**		3.8	5.8	<1.0	2.9	13.0	25.0	17.0
Cl-D	**mg/L**	1500	52	53	45	45	41	31	35
F-D	**mg/L**		0.43	0.44	0.56	0.56	0.62	0.60	0.61
Br-D	**mg/L**		0.13	0.12	0.10	0.10	0.09	0.09	0.09
P-D	**mg/L**		0.009	0.007	0.013	0.012	0.013	0.017	0.017
Al-D	**mg/L**		<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0030	<0.0060
Ag-D	**mg/L**		<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000020	<0.000040
As-D	**mg/L**	0.05	0.0873	0.0879	0.0850	0.0926	0.0982	0.1020	0.0953
Ba-D	**mg/L**	10	0.0319	0.0325	0.0303	0.0313	0.0310	0.0342	0.0341
B-D	**mg/L**	50	2.00	2.06	1.93	1.94	1.93	1.85	1.80
Be-D	**mg/L**	0.053	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	<0.00020
Bi-D	**mg/L**		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0020
Cd-D	**mg/L**		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000010	<0.000020
Ca-D	**mg/L**		40	39	25	26	22	22	22
Cr-D	**mg/L**	0.010	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0020
Co-D	**mg/L**	0.04	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00020	<0.00040
Cu-D	**mg/L**		<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00020	<0.00040
Fe-D	**mg/L**		0.862	0.867	0.251	0.257	0.151	0.121	0.128
Hard-D	**mg/L**	1	135	134	87	90	75	77	77
Pb-D	**mg/L**		<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00020	<0.00040
Mg-D	**mg/L**		8.80	8.77	5.80	5.95	4.94	5.39	5.28
Mn-D	**mg/L**		0.0725	0.0727	0.0349	0.0351	0.0275	0.0257	0.0269
Hg-D	**mg/L**	0.001	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Na-D	**mg/L**		387	382	331	334	293	310	307
Mo-D	**mg/L**	10	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0020
Ni-D	**mg/L**		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0020
K-D	**mg/L**		5.05	5.08	4.18	4.20	3.91	4.07	4.08
S-D	**mg/L**		150	149	93	94	83	102	93
Sb-D	**mg/L**	0.2	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00050	<0.0010
Se-D	**mg/L**	0.01	<0.00020	<0.00020	0.00122	<0.00020	0.0023	0.00182	0.00136
Si-D	**mg/L**		5.62	5.58	5.39	5.57	5.67	5.67	5.85
Sr-D	**mg/L**		0.722	0.735	0.469	0.468	0.41	0.417	0.411
Tl-D	**mg/L**	0.003	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000010	<0.000020
Ti-D	**mg/L**	1.00	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.010
U-D	**mg/L**	3	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00010	<0.00020
V-D	**mg/L**		<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.010
Zn-D	**mg/L**		<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.010
Temp-F	**C**		10.550	10.550	11.771		9.572	8.974	8.974
pH-F	**pH Units**		7.58	7.58	7.50		7.62	7.77	7.77
Cond-F	**uS/cm**		1703	1703	1578		1457	1388	1388
DO-F	**mg/L**		0.44	0.44	0.37		0.39	0.51	0.51
ORP-F	**mV**		-194.9	-194.9	-176.0		-228.7	-181.3	-181.3

Table 38: Ex-situ Groundwater Below Plant 2-North

Ex-situ			Below Plant 2-North					
Well ID			MW001D	MW001S	MW001S	MW006D	MW006S	MW006S
Date			17-Jun-21	17-Jun-21	17-Jun-21	21-Jun-21	21-Jun-21	21-Jun-21
				QA/QC			QA/QC	
Parameter	Units	CSR-AW						
SO4-D	mg/L	1280	620	580	560	13	600	560
H2SEquiv	mg/L	0.02	0.01700	0.00372	0.000957	0.000957	0.000957	0.000957
Turb	NTU		49.0	7.7	7.9	0.1	0.2	0.3
Alk-T	mg/L		340	300	280	80	160	150
Acidity83	mg/L		38.4	40.4	37.7	<1.0	4.0	2.7
N-D	mg/L		0.150	0.145	0.126	0.154	0.219	0.237
DOC	mg/L		2.7	2.2	2.3	<0.50	1.4	1.3
Hydrox	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarb	mg/L		420	360	350	98	190	180
Carb	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cl-D	mg/L	1500	2	2	2	2	4	4
F-D	mg/L		<0.050	<0.050	<0.050	0.099	0.066	0.061
Br-D	mg/L		0.069	0.078	0.077	<0.010	0.076	0.100
P-D	mg/L		0.0064	<0.0030	<0.0030	0.1500	0.0460	0.0480
Al-D	mg/L		<0.0030	<0.0030	<0.0030	0.0164	<0.0030	<0.0030
Ag-D	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
As-D	mg/L	0.05	0.0028	0.0010	0.00102	0.0293	0.00152	0.00155
Ba-D	mg/L	10	0.0503	0.0237	0.0233	0.0115	0.0313	0.0314
B-D	mg/L	50	0.33	0.35	0.35	0.05	0.16	0.16
Be-D	mg/L	0.053	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bi-D	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cd-D	mg/L		0.00004	0.000072	0.000072	<0.000010	0.000018	0.000018
Ca-D	mg/L		229	231	234	16	134	133
Cr-D	mg/L	0.010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	0.04	0.00216	0.00217	0.00218	0.0005	<0.00020	<0.00020
Cu-D	mg/L		<0.00020	<0.00020	<0.00020	0.00042	0.00073	0.00071
Fe-D	mg/L		3.600	0.769	0.770	0.017	<0.0050	<0.0050
Hard-D	mg/L	1	719	741	747	43	388	385
Pb-D	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	mg/L		35.6	40.1	39.6	0.5	12.9	12.7
Mn-D	mg/L		1.9600	1.6200	1.5900	0.0906	0.0301	0.0259
Hg-D	mg/L	0.001	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Na-D	mg/L		79.6	81.1	81.8	19.3	133.0	131.0
Mo-D	mg/L	10	<0.0010	<0.0010	<0.0010	0.0033	0.0293	0.0294
Ni-D	mg/L		0.0027	0.0012	0.0012	<0.0010	<0.0010	<0.0010
K-D	mg/L		1.91	1.84	1.84	0.78	2.13	2.09
S-D	mg/L		186	216	217	4	190	187
Sb-D	mg/L	0.2	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Se-D	mg/L	0.01	<0.00010	<0.00010	<0.00010	<0.00010	0.00026	0.00027
Si-D	mg/L		8.25	8.49	8.43	3.22	4.41	4.54
Sr-D	mg/L		1.320	1.480	1.450	0.084	0.799	0.790
Tl-D	mg/L	0.003	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Ti-D	mg/L	1.00	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
U-D	mg/L	3	0.00181	0.00194	0.00192	0.00068	0.00609	0.006
V-D	mg/L		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Zn-D	mg/L		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Temp-F	C		10.309	11.183	11.183	13.177	11.043	11.043
pH-F	pH Units		6.50	6.65	6.65	8.85	7.76	7.76
Cond-F	uS/cm		1663	1663	1663	173	1203	1203
DO-F	mg/L		1.41	0.83	0.83	0.80	2.13	2.13
ORP-F	mV		82.7	24.8	24.8	-62.9	107.3	107.3

Table 39: Ex-situ Groundwater 7-South

Ex-situ			7-South									
Well ID			**QU0810**	**QU0810**	**QU0813A**	**QU0813A**	**QU0813A**	**QU0813A**	**QU0813A**	**QU0813B**	**QU0813B**	**QU0813B**
Date			26-Jan-21	17-May-21	10-Feb-21	12-May-21	16-Aug-21	16-Aug-21	30-Nov-21	10-Feb-21	12-May-21	30-Nov-21
							QA/QC					
Parameter	**Units**	**CSR-AW**										
SO4-D	**mg/L**	1280	530	79	42	130	67	74	76	50	170	32
H2SEquiv	**mg/L**	0.02	0.0010	0.0088	0.2230	0.2230	0.1700	0.2340	0.1810	0.0521	0.0627	0.0213
Turb	**NTU**		9.6	15.0	2.0	3.7	2.0	1.7	3.0	35.0	20.0	6.6
Alk-T	**mg/L**		210	160	190	200	200	220	210	210	270	130
Acidity83	**mg/L**		5.1	3.7	<1.0	<1.0	<1.0	2.1	<1.0	<1.0	<1.0	<1.0
N-D	**mg/L**		0.235	0.461	0.324	0.208	0.224	0.230	0.200	0.206	0.244	0.091
DOC	**mg/L**		1.40		0.92	1.30	<0.50	<0.50	0.94	0.56	0.81	0.85
Hydrox	**mg/L**		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarb	**mg/L**		260	190	230	240	240	260	250	250	330	160
Carb	**mg/L**		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.5	<1.0	<1.0
Cl-D	**mg/L**	1500	2	<1.0	20	32	21	24	17	24	34	3
F-D	**mg/L**		0.34	0.52	0.77	0.66	0.06	0.71	0.74	0.61	0.62	0.43
Br-D	**mg/L**		0.064	<0.010	0.033	0.062	0.038	0.045	0.032	0.034	0.070	<0.010
P-D	**mg/L**		0.0062	0.0100	0.0300	0.0280	0.0150	0.0180	0.0420	0.0300	0.0370	0.0440
Al-D	**mg/L**		<0.0060	0.0039	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0041	0.0127	<0.0030
Ag-D	**mg/L**		<0.000040	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
As-D	**mg/L**	0.05	0.0008	0.0006	0.4170	0.4460	0.3780	0.3730	0.3740	0.4590	0.4580	0.5330
Ba-D	**mg/L**	10	0.0611	0.0805	0.2770	0.3090	0.2180	0.2170	0.2120	0.1100	0.1550	0.0567
B-D	**mg/L**	50	0.27	0.20	0.77	0.80	0.99	0.98	0.81	1.00	1.29	0.33
Be-D	**mg/L**	0.053	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bi-D	**mg/L**		<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cd-D	**mg/L**		0.000086	0.000018	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Ca-D	**mg/L**		225	61	37	52	42	42	42	38	58	30
Cr-D	**mg/L**	0.010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	**mg/L**	0.04	0.00578	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Cu-D	**mg/L**		0.00209	0.0031	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Fe-D	**mg/L**		0.199	0.005	0.236	0.283	0.174	0.181	0.289	0.220	0.412	0.139
Hard-D	**mg/L**	1	753	206	132	180	146	147	149	126	192	98
Pb-D	**mg/L**		<0.00040	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	**mg/L**		46.3	13.1	9.3	12.4	10.1	10.1	10.5	7.7	11.6	5.5
Mn-D	**mg/L**		0.5830	0.0182	0.0425	0.0519	0.0370	0.0365	0.0601	0.0743	0.1020	0.0675
Hg-D	**mg/L**	0.001	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Na-D	**mg/L**		14	5	55	76	79	78	65	72	115	28
Mo-D	**mg/L**	10	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0	0.0023
Ni-D	**mg/L**		0.0115	0.0021	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
K-D	**mg/L**		4.90	2.78	2.30	2.57	2.60	2.55	2.60	2.11	2.84	1.47
S-D	**mg/L**		197.0	24.6	13.2	41.2	27.4	25.5	24.1	15.1	52.6	11.7
Sb-D	**mg/L**	0.2	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Se-D	**mg/L**	0.01	<0.00020	0.00016	0.00105	0.00062	0.0007	0.00066	0.00015	<0.00010	<0.00010	<0.00010
Si-D	**mg/L**		3.62	3.61	3.95	3.86	4.17	4.16	4.16	4.24	4.57	4.63
Sr-D	**mg/L**		1.880	0.584	0.568	0.805	0.717	0.724	0.619	0.459	0.762	0.261
Tl-D	**mg/L**	0.003	0.00005	0.000021	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Ti-D	**mg/L**	1.00	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
U-D	**mg/L**	3	0.00325	0.0008	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010
V-D	**mg/L**		<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Zn-D	**mg/L**		<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Temp-F	**C**		7.90	11.20	7.20	10.00	9.05		8.20	7.60	9.30	8.00
pH-F	**pH Units**		7.23	7.26	7.37	7.93	7.54		7.87	7.47	8.09	8.12
Cond-F	**uS/cm**		856	516	374	747	628		563	420	959	311
DO-F	**mg/L**		2.21	2.06		0.69	0.34		0.46		0.28	0.36
ORP-F	**mV**		73.3	190.4		-150.7	-126.3		-227.1		-179.1	-181.4

Table 40: Ex-situ Groundwater 4-South

Ex-situ			4-South					
Well ID			QU1008D	QU1008D	QU1009S	QU1009S	QU1009D	QU1009D
Date			21-Jan-21	22-Jun-21	11-May-21	28-Oct-21	11-May-21	28-Oct-21
Parameter	Units	CSR-AW						
SO4-D	mg/L	1280	2	1	120	120	75	73
H2SEquiv	mg/L	0.02	0.0404	0.2550	0.0117	0.0223	0.0861	0.0819
Turb	NTU		30.0	190.0	30.0	41.0	5.1	7.0
Alk-T	mg/L		300	290	140	150	180	180
Acidity83	mg/L		<1.0	<1.0	10.6	18.4	2.2	10.0
N-D	mg/L		0.263	0.180	0.180	0.171	0.164	0.203
DOC	mg/L		3.90	5.30	1.50	0.89	1.40	2.10
Hydrox	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarb	mg/L		350	350	170	180	220	220
Carb	mg/L		6.2	3.9	<1.0	<1.0	<1.0	<1.0
Cl-D	mg/L	1500	4	7	<1.0	<1.0	1	2
F-D	mg/L		2.00	2.30	0.06	0.08	0.25	0.24
Br-D	mg/L		<0.010	0.018	0.031	0.037	0.020	0.018
P-D	mg/L		0.1700	0.2200	0.0100	0.0110	0.0130	0.0120
Al-D	mg/L		0.0044	0.223	<0.0030	<0.0030	<0.0030	<0.0030
Ag-D	mg/L		<0.000020	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020
As-D	mg/L	0.05	0.1510	0.1470	0.0832	0.0941	0.1100	0.1040
Ba-D	mg/L	10	0.0260	0.0331	0.1240	0.1290	0.1120	0.1200
B-D	mg/L	50	2.14	2.05	0.05	0.06	0.49	0.42
Be-D	mg/L	0.053	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010
Bi-D	mg/L		<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010
Cd-D	mg/L		<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010
Ca-D	mg/L		3	3	72	74	51	56
Cr-D	mg/L	0.010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010
Co-D	mg/L	0.04	<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020
Cu-D	mg/L		<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020
Fe-D	mg/L		0.117	0.174	5.220	4.560	0.597	0.679
Hard-D	mg/L	1	7	8	221	229	170	186
Pb-D	mg/L		<0.00020	<0.00040	<0.00020	<0.00020	<0.00020	<0.00020
Mg-D	mg/L		0.3	0.3	10.2	10.9	10.0	11.3
Mn-D	mg/L		0.1560	0.1730	0.3810	0.3590	0.0540	0.0547
Hg-D	mg/L	0.001	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Na-D	mg/L		124	128	9	9	32	31
Mo-D	mg/L	10	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010
Ni-D	mg/L		<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010
K-D	mg/L		0.66	0.76	0.65	0.71	1.52	1.67
S-D	mg/L		<3.0	<6.0	35.5	34.6	23.1	26.0
Sb-D	mg/L	0.2	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050
Se-D	mg/L	0.01	0.00247	0.00117	<0.00010	0.00012	<0.00010	0.00068
Si-D	mg/L		5.23	5.45	8.79	9.20	9.63	9.70
Sr-D	mg/L		0.068	0.080	0.274	0.283	0.910	0.919
Tl-D	mg/L	0.003	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010
Ti-D	mg/L	1.00	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050
U-D	mg/L	3	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.00010
V-D	mg/L		<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050
Zn-D	mg/L		<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050
Temp-F	C		6.90	10.51	9.10	8.31	8.70	8.07
pH-F	pH Units		8.27	8.61	7.29	6.91	7.78	7.48
Cond-F	uS/cm		370	556	392	458	377	455
DO-F	mg/L		0.38	0.38	0.75	0.48	0.44	0.44
ORP-F	mV		-224.7	-261.5	-91.1	-126.4	-155.5	-179.3

Table 40: Spring 2021 Receiving Environment						
SUMMARY OF WATER QUALITY GUIDELINE OBSERVATIONS AT RECEIVING MONITORING LOCATIONS 2021						
EMS ID & Site Name	**Parameter (mg/L or pH Units)**	**Guideline Limit**	**Result**	**Date**	**Guideline**	**Sampling Events Exceeding Guideline**
E217018 - No Name Lake (NNL) 2-13 metres	pH	6.5	6.13 - 6.49	Spring 5 in 30	Min	(21/65) depths profiled during spring (2 out of 5 weeks)
NNL- 1m, 4m and 9m and 1 metre from Bottom (1MB)	Cu-D	0.0003	0.00034 (1M), 0.00034 (4M), 0.00044 (9M), 0.00034 (1MB)	Spring 5 in 30	A	Average of spring, 5 in 30 results for depths 1M, 4M, 9M and 1MB
E292118- Lower Quinsam Lake (LQL) 1M, 4M, 9M and 1MB	Cu-D	0.0003	0.00048 (1M), 0.00049 (4M), 0.00046 (9M) and 0.00047 (1MB)	Spring 5 in 30	A	Average of spring, 5 in 30 results for depths 1M, 4M, 9M and 1MB
E206619 - Long Lake Middle (LLM) (20m-21m depths)	pH	<6.5	6.45 to 6.46	Spring 5 in 30	Min	(2/105) depths profiled during spring (1 out of 5 weeks)
E217017 - No Name Lake Outlet (NNO)	Cu-D	0.0003	0.00037	Spring 5 in 30	A	5 in 30 Average
E292113 -7 South Quinsam River (7SQR)	Cu-D	0.0003	0.00043	Spring 5 in 30	A	5 in 30 Average
E299256 - Downstream of the confluence of the Iron River and Quinsam River (IRQR)	Cu-D	0.0003	0.00051	Spring 5 in 30	A	5 in 30 Average
E292130 - South end water entering Long Lake (LLE)	Fe-D	0.35	0.402 and 0.641	May and June	M	(2/3) Monthly sampling events
	Fe-T	1.00	1.04	June	M	(1/3) Monthly sampling events
	SO4	128	152 to 318	Rolling averages	A	(11/14) rolling averages < 128mg/L
E292131- Smaller seep into Long Lake (LLS)	Fe-T	1.00	2.09, 1.66 and 1.72	April though June	M	(3/3) Monthly sampling events
	Fe-D	0.35	2.06, 1.60 and 1.78	April though June	M	(3/3) Monthly sampling events
E292131- Long Lake Seep Middle (LLSM)	Fe-D	0.35	0.481, 0.562 and 0.706	April though June	M	(3/3) Monthly sampling events
Seepage from shallow groundwater	As-T	0.005	0.0245 to 0.0519	April though June	M	(9/9) Weekly samples
	Cu-D	0.0003	0.000376	Spring 5 in 30	A	Average of 9 weeks
	SO4	128	228 to 302	April though June	A	(5/9) rolling averages < 128mg/L
	B-D	1.2	1.79	April though June	A	Average of 9 weeks

***SO4 at LLE was calculated using a rolling average.**

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

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.

Table 41: Summer 2021 Receiving Environment

SUMMARY OF WATER QUALITY GUIDELINE OBSERVATIONS AT RECEIVING MONITORING LOCATIONS 2021

EMS ID & Site Name	Parameter (mg/L or pH Units)	Guideline Limit	Result	Date	Guideline	Sampling Events Exceeding Guideline
E206619 - Long Lake Middle (LLM) (13m-21m depths)	pH	<6.5	6.49 to 6.43	Summer 5 in 30	Min	pH <6.5 at 15 depths profiled (13 m to 21 m) during summer for 2 out of 5 weeks
E206619 - Long Lake Middle (LLM) (18 m-21m depths)	D.O.	<3.0 mg/L	2.97 to 0.62	Summer 5 in 30	Min	D.O. <3.00 mg/L at 9 depths profiled (18 m to 21 m) during summer for 4 out of 5 weeks
E217017 - No Name Lake Outlet (NNO)	Cu-D	0.0003	0.00043	Summer 5 in 30	A	5 in 30 Average
E292113 -7 South Quinsam River (7SQR)	Cu-D	0.0003	0.00044	Summer 5 in 30	A	5 in 30 Average
E299256 - Downstream of the confluence of the Iron River and Quinsam River (IRQR)	Cu-D	0.0003	0.00049	Summer 5 in 30	A	5 in 30 Average
E297231 -Iron River upstream of 7SA5 (IR6)	Cu-D	0.0003	0.00046	Summer 5 in 30	A	5 in 30 Average
	As-T	0.005	0.006 - 0.0117	Summer 5 in 30	M	5/5 sampling events
E297232 - Iron River Downstream of 7SA5 and 242 inputs (IR8)	Cu-D	0.0003	0.00064	Summer 5 in 30	A	5 in 30 Average
	As-T	0.005	0.0124 - 0.020	Summer 5 in 30	M	5/5 sampling events
E292130 - South end water entering Long Lake (LLE)	Fe-T	1.00	1.24	July	M	(1/3) Monthly sampling events
E292131- Smaller seep into Long Lake (LLS)	Fe-T	1.00	1.85, 1.46 and 1.38	July through September	M	(3/3) Monthly sampling events
	Fe-D	0.35	1.71, 1.47 and 1.39	July through September	M	(3/3) Monthly sampling events
E292131- Long Lake Seep Middle (LLSM)	Fe-D	0.35	0.869, 0.712 and 0.664	July through September	M	(3/3) Monthly sampling events
Seepage from shallow groundwater	As-T	0.005	0.0164 to 0.0298	July through September	M	(7/7) samples
	Fe-T	1	1.14	September 21, 2021	M	(1/7) samples

***SO4 at LLE was calculated using a rolling average.**

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

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.

Table 42: Fall 2021 Receiving Environment

SUMMARY OF WATER QUALITY GUIDELINE OBSERVATIONS AT RECEIVING MONITORING LOCATIONS Fall 2021

EMS ID & Site Name	Parameter (mg/L or pH Units)	Guideline Limit	Result	Date	Guideline	Sampling Events Exceeding Guideline
E206619 - Long Lake Middle (LLM) (17m-20m depths)	pH	<6.5	6.45 to 6.49	Week 1	Min	pH <6.5 at 4 depths profiled (17 m to 20 m) during fall for 1 out of 5 weeks
E206619 - Long Lake Middle (LLM) (1MB)	Cu-D (mg/L)	0.0002	0.0003	Fall 5 in 30	A	5 in 30 Average
	Mn-T (mg/L)	0.737	1.221	Fall 5 in 30	A	5 in 30 Average
		0.8706	1.34, 1.71 and 1.97	Weeks 2 through 4	M	3/5 sampling events
E206618 - Middle Quinsam Lake (1M)	Cu-D (mg/L)	0.0004	0.00041	Fall 5 in 30	A	5 in 30 Average
E206618 - Middle Quinsam Lake (9M)			0.00042	Fall 5 in 30	A	5 in 30 Average
E0126402 - Quinsam River at Argonaut Road (WA)	Cu-D (mg/L)	0.0005	0.00064	Fall 5 in 30	A	5 in 30 Average
E217017 - No Name Lake Outlet (NNO)	Cu-D (mg/L)	0.0003	0.00045	Fall 5 in 30	A	5 in 30 Average
E292113 -7 South Quinsam River (7SQR)	Cu-D (mg/L)	0.0005	0.00053	Fall 5 in 30	A	5 in 30 Average
E299256 - Downstream of the confluence of the Iron River and Quinsam River (IRQR)	Cu-D (mg/L)	0.0006	0.00066	Fall 5 in 30	A	5 in 30 Average
E297231 - Iron River upstream of 7SA5 (IR6)	Al-D (mg/L)	0.05	0.0612	Fall 5 in 30	A	5 in 30 Average
		0.1	0.125	Week 4	M	1/5 sampling events
E297232 - Iron River Downstream of 7SA5 and 242 inputs (IR8)	Al-D (mg/L)	0.05	0.0564	Fall 5 in 30	A	5 in 30 Average
		0.1	0.112	Week 4	M	1/5 sampling events
E292131 - Smaller seep into Long Lake (LLS)	Fe-T (mg/L)	1.00	1.82, 2.23 and 1.54	Monthly	M	(3/3) Monthly sampling events
	Fe-D (mg/L)	0.35	1.72, 2.09 and 1.03	Monthly	M	(3/3) Monthly sampling events
E292131 - Long Lake Seep Middle (LLSM)	Fe-D (mg/L)	0.35	0.57	November 1, 2021	M	(1/3) Monthly sampling events
E292109 -Stream 1 (7S)	Cu-D (mg/L)	≤ 0.0002 and ≤ 0.00241	0.00026 and 0.00040	October 4, 2021 and November 1, 2021	M	(2/3) Monthly sampling events
Seepage from shallow groundwater (S)	As-T (mg/L)	0.005	0.0138 to 0.0423	Weekly in Oct., monthly in Nov. and Dec.	M	(6/6) Sampling events

***SO4 at LLE was calculated using a rolling average.**

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

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.

Appendix 3: Invasive Plant Management Plan

Invasive Plant Management Program

For

Quinsam Coal Corporation

Prepared by:

Environmental Department

Note: This outline is a modification of a weed management template produced by the Nature Conservancy with modification based on ideas from other plans from various Canadian Provinces and U.S. States

1. Introduction

Invasive alien plant species (IAPS) are defined as "non-native plant species having the likelihood to cause adverse or damaging effects to our economy, society, and or ecosystems" (FLNR. 2014).

Invasive plants: are species that are non-native or alien to the ecosystem under consideration including those plants that are categorized as "invasive alien plants", "weeds" and "noxious weeds" (FLNR. 2014). These plants dominate and compete with the native plant species for nutrients, diminishing the biodiversity, reducing existing vegetation and habitat for wildlife and initiate major variations to the natural environment (FLNR. 2014). In B.C. the term invasive plant is synonymous with invasive alien plant.

Noxious weeds: are invasive plants that have been designated under *B.C. Weed Control Act.*
Nuisance weeds: are invasive weeds not regulated under the weed control act.

Appendix I, Tables 1 through 3, list provincially noxious weeds, regionally noxious weeds and provincially invasive plants of concern from the BC Weed Control Act.

The Coastal Invasive Species Committee (Coastal ISC) has also been referenced in this report with a more relevant list of Invasive Plant Species for the area. Coastal ISC is a registered non-profit society representing the geographic areas of Vancouver Island, the Gulf Islands and the Sunshine Coast in British Columbia.

Appendix I, Tables 5-8 provide an up to date list of the Priority Invasive Plants representative of the area categorized into these groups: Prevent, Eradicate, Contain and Control. This list was taken directly from the Coastal Invasive Species Committee website http://www.coastalisc.com/images/Plants/2016_Coastal_ISC_Priority_Plant_List_web.pdf. This list is current as of April 21, 2016.

In the context of this report, the term "invasive plant" will be used to include both invasive plants and noxious weeds.

Acts and policies have been introduced for invasive plant management on public and private land at Federal, Provincial and Municipal levels of authority. These acts and policies were introduced in efforts to control the spread of invasive plants. These include:

- The Weed Control Act and Regulation - (Prov.) require land occupiers, as defined in the Act, to control provincially listed noxious weeds on both private and public land.
- The Forest and Range Practices Act - (Prov.) require forest and range tenure holders to incorporate measures in their forest and range plans to prevent the introduction or spread of listed invasive species.
- The Integrated Pest Management Act and Regulations - (Prov.) provide the statutory authority to allow pesticide use on public lands as described in a Pest Management Plan (PMP).
- Community Charter Act - (Mun.) provides municipalities the authority to control invasive species on areas within their jurisdiction (Campbell River's city bylaws do not include regulations requiring a property owner to control invasive plants with the exception of unsightly property as described in the Public Nuisance Bylaw).
  (B.C. Weed Control Act. 2014)

The development of Quinsam Coal's Invasive Plant Management Plan (IPMP) outlines an Integrated Weed Management (IWM) approach for the control of invasive plants at the site, including prevention strategies, manual/mechanical treatment methods, and the use of herbicides.

Another approach to invasive plant management used as an alternative to herbicides is the use of a biological control of pests by interference with their ecological status, as by introducing a natural enemy or a pathogen into the environment.

Steps to develop long term goals and plans for IAPS include:

(a) Weed species of concern are identified through an inventory of the management area.
(b) Land management goals and weed management objectives are established and recorded.
(c) Priorities are assigned to the weed species and weed patches based on the severity of their impacts, while considering the ability to control them.
(d) Methods for controlling IAPS or diminishing their impacts are considered and, if necessary, reordering of priorities are based on the impacts of target and non-target species.
(e) IWM plans are developed based on this information.
(f) The IWM plans are implemented as outlined.
(g) The results of the management plans are monitored and evaluated.
(h) This information is used to modify and improve weed management objectives, control priorities and IWM plans, thereby starting the cycle over again.

The principle behind developing the IPMP is that a structured, logical approach to weed management is more effective than an ad-hoc approach where one deals with weed problems only as they arise. This principle will guide Quinsam's invasive plant species control efforts and help to address obligations imposed by the provincial Weed Control Act.

The objective of the IPMP is to prevent the establishment of new Invasive Alien Plants and the containment and control of those that are now in the area.

This Invasive Plant Management Plan includes provisions for:

1. Preventing the introduction of new invasive species.
2. Slowing or reducing the spread of existing invasive species and reducing their harmful impacts.

A **five-year action plan** following this strategic plan will be based on prioritizing a wide range of needs and the availability of resources.

Elements of the plan are included in Figure 1 below:

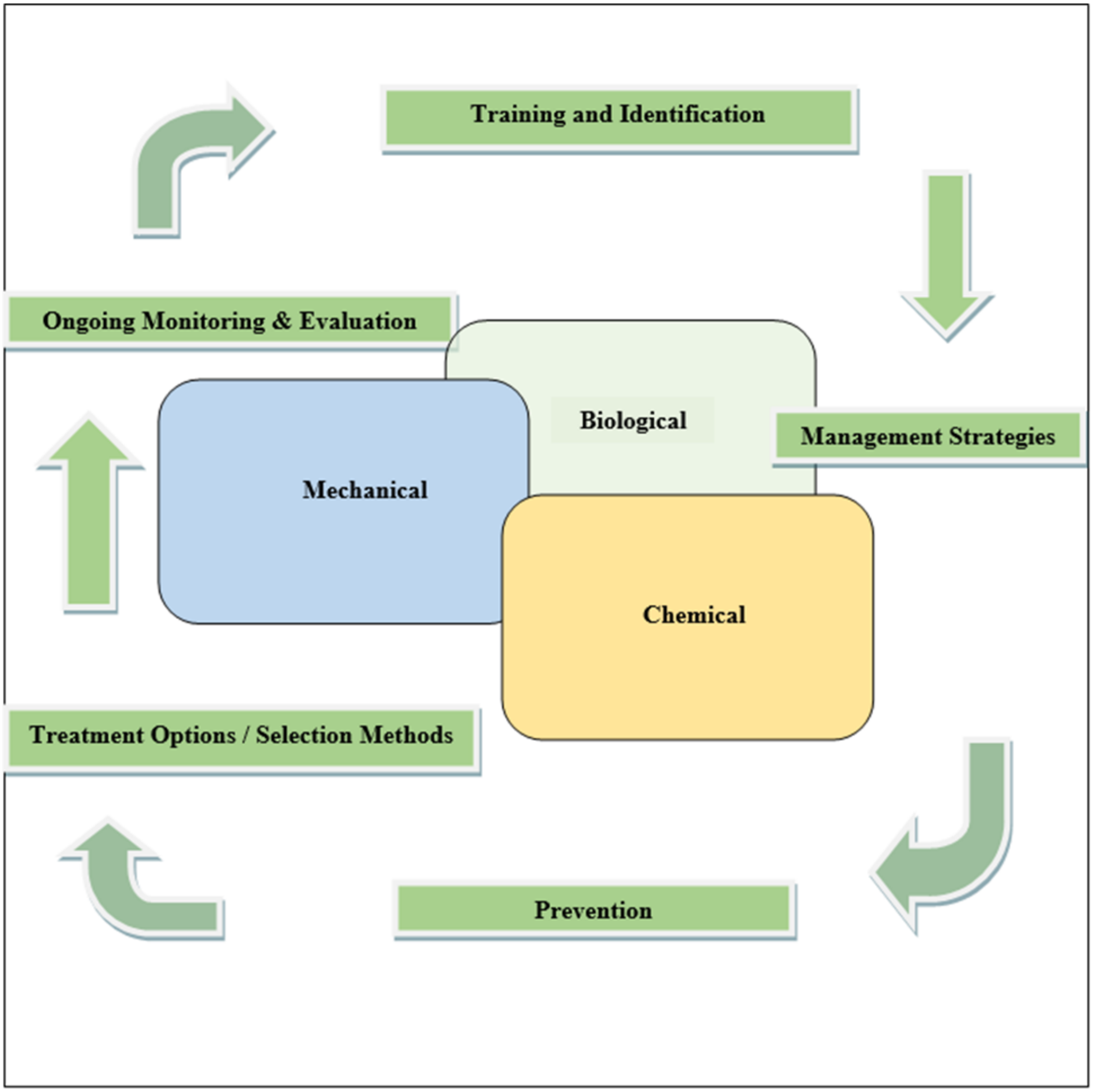

Figure 1: Elements of the Invasive Plant Management Plan

TRAINING & IDENTIFICATION OF INVASIVE ALIEN PLANT SPECIES

Specified environmental personal will conduct visual inspections for weeds consisting of a survey of all areas of the Quinsam Mine Site over the course of 5 years. All inspections will be conducted using a map and where appropriate, a GPS unit will be used to get accurate land locations for areas of all the noxious weeds and invasive plants. An up-to-date list of noxious and invasive weeds including pictures aid in the identification of the weeds for those performing the inspections. Inspections will take place during the growing season (late spring / early summer). Some suggestions for weed inspections could include:

- Various species of concern catalogued separately so approaches can be developed independently on each species, depending on population numbers and control options available.
- A brief explanation on how the survey was conducted, the areas searched, the ways in which the areas were searched, and the weed species encountered during the inventory could be included.
- An invasive plant form could be attached, which will help prioritise the actions planned for each weed.

The weed inspector should also have a copy of an up to date "*Field Guide to Noxious Weeds and Other Invasive Plants of British Columbia"* for reference.

The site map found in the most recent version of the *Annual Reclamation Report* and will continue to be updated to include locations of the various weed infestations after an inventory of these populations is complete. The boundary of each infestation will continue to be mapped by species.

The following is a suggested list of symbols that could be used on hand drawn maps in the future:

- For infestations that are larger than 0.1 acres a line will be drawn around the boundaries of the infestation.
- A solid line will be used to mark a narrow infestation along linear features such as roads, trails, streams, or lake edges
- SB, RT — Short form will be used to symbolise the various weed species (ie. Scotch Broom-SB, Russian Thistle-RT)

2. DESCRIPTION OF THE WEED MANAGEMENT AREA

Refer to Appendix (I), in the *Annual Reclamation Report* for the Quinsam mine site map and associated management boundaries. The map displays features such as water bodies (i.e. rivers, creeks and lakes), topography and roadways. The map also displays the areas where herbicide was applied.

Below is a list of contact information for the site and other relevant contacts.

Table 1: List of Contacts

List of Important Contacts	Phone	Company	e-mail
Mine Controller John McCormac	250-286-3224 (244)	QCC	John.McCormac@quinsam.com
Environmental Coordinator, Kathleen Russell	250-286-3224 (225)	QCC	Kathleen.russell@quinsam.com
Mine Geologist, Sarah Shi	250-286-3224 (263)	QCC	sarah.shi@quinsam.com
Operations Forester, Bill Grutzmacher	250-286-7345	Timberwest	grutzmacherb@timberwest.com
Environmental Coordinator, Teri Martin	250-286-5711	City of Campbell River	terri.martin@campbellriver.ca
Licensed Pesticide Applicators, Guy Milligan	250-287-6119	Blackfish Silviculture	blackfishsilviculture@shaw.ca

3. Resources Available to Manage IAPS

The Ministry of Forest and Natural Resources has a legally appointed weed inspector that inspects the site after the application of herbicides. The environmental Coordinator carries out the IAPS management plan. All chemical control activities within the mine site is contracted out to a Licensed Pesticide Applicator (Blackfish Silviculture). The Licensed Pesticide Applicator will have suitable chemicals needed for control on hand for various problematic weed species for this ecosystem.

The licenced herbicide applicator submits a list of the following to the government annually:

- Quantity of herbicide (kg/ac)
- Area
- Trade name
- Active ingredient
- PCP number

For the development of a 5-year IAPS management plan, location of the weeds is recorded on the site map with methods of treatment (biological / chemical / mechanical) denoted in the legend.

4. Present IAPS Management Activities at Quinsam Coal Mine site

With the exception of 2016 through 2017, there have been limited management programs performed previously at the mine site. Past activities include mechanical control via brush cutters, chemical control via licenced application of herbicide and most recently biological control using goats. The target species is an unregulated Invasive Plant of Concern, Scotch Broom *(Cytisus scoparius)*.

Appendix 1, Table 3 & 8, list the Unregulated Plants of Concern.

The previous program included management activities for the control and suppression of Scotch Broom *(Cytisus scoparius)*:

- Rotated grazing with goats as a trial biological control method in the 2-South West area.

5. PRIORITIES FOR WEED MANAGEMENT

Priorities are set to minimize the total long-term workload**.** All site activities have been implemented in a way that avoids or controls the introduction and extent of IAPS and supports the ability to establish desired species during site reclamation activities.

a. Prevention Strategies

The most important weed management action is to prevent weeds from becoming established in the first place. The types of measures implemented at the site that are effective in preventing IAPS from becoming established include:

- Educating employees with pictures and information on target Invasive Weeds, to provide awareness on weed identification and related problems,
- Annual weed inspections performed throughout the growing season,
- Distributing coarse woody debris on recontoured areas (where appropriate) to promote the natural ingress of native species,
- Seeding all exposed soil with either grass seed, Red alder and/or Douglas-fir; increasing competition inhibits establishment of IAPS, fixes nitrogen in the soil, and encourages rapid canopy cover,
- Seeding/planting topsoil salvage on stockpiles reducing exposed soils (used in reclamation activities),
- Maintaining/monitoring all road construction and maintenance activities that disturb sites and create exposed soil through either mechanical removal or herbicide application of IAPS,
- Specify high quality grade seed in the reclamation and interim weed control seed mixtures. Low quality grade seed may contain a higher portion of weed seed in the seed lot. At a minimum, seed used for re-vegetation will be the grade Common #1 Forage Mixture (or better) or Canada #1 Ground Cover Mixture,
- Monitor seeded sites to confirm that adequate colonization with desirable species has occurred,
- Use of hay instead of straw bales for erosion control to limit the introduction of invasive weeds.

b. Weed Species Priorities

Weed management priorities are based on the actual or potential threat that the Invasive Weed Species pose to the weed management goals, for the management area. Two factors are used to set priorities, namely the weed species and the locations of those weed infestations. Weed species are important because they vary considerably in the threat, they pose to the resource values of the weed management area. In addition, weed species vary greatly in their susceptibility to control measures. Weed species that pose the greatest threat to achieving the management goals for the area and that need to be controlled immediately are set at the highest priority for management.

The Environment Department has summarized the weed ranking information from the Invasive Species Council of British Columbia's website: http://bcinvasives.ca/invasive-species/about/regulated-invasive-species-in-bc/list-of-regulated-invasive-plants-in-bc and revised an up to date list of invasive and noxious plants of BC included in Appendix 1, Tables 1-3. Each IAPS is assigned a ranking of High, Medium, or Low by using the first letter of the ranking after each species name in the appendix. The Weed Inspection Survey Field Sheet found in Appendix I, Table 4 can aid in the description of how the weed priority ranking was determined which could include details used to determine the priority of the IAPS.

c. Weed Infestation Priorities

The location of a weed infestation will be documented and assessed for priority annually. The highest priority weed patches are those that are small and isolated from larger infestations of the same high-priority weed species and which occur on or could affect the highest valued resource such as topsoil stockpiles or other material used for final reclamation. Weed patches located in high traffic areas or in areas of frequent disturbance where weeds can easily be spread are also ranked high on the priority list.

6. Weed Management Actions

The strategies for managing invasive weeds include three objectives:

- Prevention,
- Early identification, eradication or
- Containment, control and suppression

a. Prevention

Prevention strategies that are considered and continue to be established include:

- Ensuring heavy equipment is cleaned prior to moving from site to site
- Re-establishment of vegetation following ground disturbance, through seeding and tree planting,
- Weed inspections performed during the growing season.
- Removing any IAPS through one of the following, hand / mechanical removal, biological control or application of herbicide

b. Early identification and Eradication

This objective involves the elimination of individuals of a particular species within a specified area. Monitoring plans that continue to be developed will catch IAPS in a timely manner before an infestation develops. Up to date records of new IAPS are considered essential for early detection. An immediate response continues to be executed when new IAPS are spotted.

c. Containment, Control or Suppression

This objective involves reducing current infestation density, but not necessarily reducing the total area or boundary of the infestation. This applies to many widely distributed, high-density weeds where eradication is not feasible. This method will be employed for certain areas of the mine site where broom infestations are too severe, and eradication is not feasible. Suppression methods are the only source of control which involves stopping the spread of seeds and plants until suppression or eradication can be implemented.

7. Future Monitoring Plans

Monitoring continues to be performed on an annual basis during the growing season. Control methods used in the past will be re-evaluated. Seeds of the various IAPS can remain in the soil for up to 10 years, therefore it is suggested that weed patches be monitored for at least 10 years, after the last plant is sighted. Previous herbicide control measures in small infestations or roadside spaying were successful but require continued annual application to stop the re-establish and further infestations. Larger newly established infestations where reclamation efforts were put forth require substantial and immediate control measures to slow the spread of the invasive plant, Scotch broom.

Scotch broom is not identified on the provincially or regionally noxious weed list but is identified on the unregulated invasive plants of concern in BC (Appendix 1, Table 3 & 8). Scotch Broom competes with native plants for nutrients, inhibits soil conditions that promote the growth of non-native plants and outcompetes juvenile plants and trees from becoming established.

8. Plan Re-evaluation

The Environmental Department continues to review the plan annually and update the Invasive Plant Management Plan as needed. Modifications to the plan will depend on the results of utilised control methods, which did not achieve expected results. All noxious weed sites documented will be monitored as to the effectiveness of the control measures that were taken. For those weeds found on the mine site that are listed in the Provincially Noxious Weed Control Act, records will be kept of each site, that could include information such as size, weed density, site topography, soil type and control measures used. During the growing season there were no Provincially Noxious Weeds observed where weed inspections have occurred (roadsides, stockpiles and recently reclaimed areas).

9. DISCUSSION

The areas that will be targeted as QCC'S highest priority for weed management are topsoil stockpiles, areas that have been recently revegetated / reclaimed and areas of high traffic i.e. haul roads.

The observed infestations and invasion of Scotch broom necessitate the need for herbicide applications, it will be performed as budgeted. Mechanical measures will be implemented wherever possible in areas where reclamation has recently occurred.

These control measures are successful at reducing the spread of the number of infestations on site, in certain areas, as well as controlling the infestations of Scotch broom from spreading. The roadside spraying program is deemed the most successful as this minimizes the infestations from occurring site wide.

Appendix I

TABLE 1: PROVINCIALLY NOXIOUS WEEDS

Common Name	Scientific Name
Bur Chervil	*Anthriscus caucalis*
Canada Thistle	*Cirsium arvense*
Common Reed	*Phragmites australis subsp. australis*
Cordgrass, Dense-flowered	*Spartina densiflora*
Cordgrass, English	*Spartina anglica*
Cordgrass, Saltmeadow	*Spartina patens*
Cordgrass, Smooth	*Spartina alterniflora*
Crupina	*Crupina vulgaris*
Dodder	*Cuscuta spp.*
Flowering Rush	*Butomus umbellatus*
Garlic Mustard	*Alliaria petiolata*
Giant Hogweed	*Heracleum mantegazzianum*
Giant Mannagrass /Reed Sweetgrass	*Glyceria maxima*
Gorse	*Ulex europaeus*
Hound's-tongue	*Cynoglossum officinale*
Jointed Goatgrass	*Aegilops cylindrica*
Knapweed, Diffuse	*Centaurea diffusa*
Knapweed, Spotted	*Centaurea stoebe*
Knotweed, Bohemian	*Fallopia x bohemica*
Knotweed, Himalayan	*Polygonum polystachyum*
Knotweed, Japanese	*Fallopia japonica*
Leafy Spurge	*Euphorbia esula*
Milk Thistle	*Silybum marianum*
North Africa Grass	*Ventenata dubia*
Nutsedge, Purple	*Cyperus rotundus*
Nutsedge, Yellow	*Cyperus esculentus*
Purple Loosestrife	*Lythrum salicaria*
Rush Skeleton weed	*Chondrilla juncea*
Scentless Chamomile	*Matricaria maritima*
Sow-thistle, Annual	*Sonchus oleraceus*
Sow-thistle, Perennial	*Sonchus arvensis*
Tansy Ragwort	*Senecio jacobaea*
Toadflax, Common / Yellow	*Linaria vulgaris*
Toadflax, Dalmatian	*Linaria genistifolia*
Velvetleaf	*Abutilon theophrasti*
Wild Oats	*Avena fatua*
Yellow Flag Iris	*Iris pseudacorus*
Yellow Star thistle	*Centaurea solstitialis*

TABLE 2: REGIONALLY NOXIOUS WEEDS

Common Name	Scientific Name	Region
Blueweed	*Echium vulgare*	Cariboo, Central Kootenay, Columbia, Shuswap, East Kootenay, Okanagan, Similkameen, Thompson & Nicola
Burdock	*Arctium spp.*	Bulkley, Nechako, Cariboo, Columbia, Shuswap, Fraser, Fort George, Kitimat, Similkameen, Peace River, Thompson & Nicola
Cleavers	*Galium aparine*	Peace River
Common Bugloss	*Anchusa officinalis*	Kootenay & Boundary
Common Tansy	*Tanacetum vulgare*	Bulkley, Nechako, Central Kootenay, Columbia, Shuswap, East Kootenay & North Okanagan
Field Scabious	*Knautia arvensis*	Bulkley, Nechako, Kootenay, Boundary, Thompson & Nicola
Green Foxtail	*Setaria viridis*	Peace River
Hawkweed, Orange	*Hieracium aurantiacum*	Bulkley, Nechako, Cariboo, Central Kootenay, Columbia, Shuswap, East Kootenay, Thompson & Nicola
Hoary Alyssum	*Berteroa incana*	Kootenay & Boundary
Hoary Cress	*Cardaria spp.*	Columbia, Shuswap, North Okanagan, Thompson & Nicola
Knapweed, Meadow	*Centaurea pratensis*	Columbia & Shuswap
Knapweed, Russian	*Acroptilon repens*	North Okanagan
Kochia	*Kochia scoparia*	Peace River
Marsh Plume Thistle	*Cirsium palustre*	Bulkley, Nechako, Fraser & Fort George
Night-Flowering Catchfly	*Silene noctiflora*	Peace River
Oxeye Daisy	*Chrysanthemum leucanthemum*	Cariboo, North Okanagan, Peace River, Thompson & Nicola
Perennial Pepperweed	*Lepidium latifolium*	East Kootenay, Thompson & Nicola
Puncturevine	*Tribulus terrestris*	Okanagan & Similkameen
Quackgrass	*Agropyron repens*	Peace River
Sulphur Cinquefoil	*Potentilla recta*	Columbia, Shuswap, North Okanagan, Okanagan, Similkameen, Thompson & Nicola
Thistle, Plumeless	*Carduus acanthoides*	Central Kootenay
Thistle, Russian	*Salsola kali*	Peace River
Thistle, Scotch	*Onopordum acanthium*	North Okanagan
Wild Chervil	*Anthriscus sylvestris*	Fraser Valley
Wild Mustard	*Sinapsis arvensis*	Peace River

TABLE 3: UNREGULATED INVASIVE PLANTS OF CONCERN

Common Name	Scientific Name
Baby's Breath	*Gypsophila paniculata*
Bachelor's Buttons	*Centaurea cyanus*
Bladder Campion	*Silene cucubalus*
Bull Thistle	*Cirsium vulgare*
Butterfly Bush	*Buddleja davidii*
Chicory	*Cichorium intybus*
Cluster Tarweed	*Madia glomerata*
Common Mallow	*Malva neglecta*
Common Periwinkle	*Vinca minor*
Creeping Buttercup	*Ranunculus repens*
Curled Dock	*Rumex crispus*
Daphne	*Daphne laureola*
Didymo	*Didymosphenia geminate*
English Holly	*Ilex aquifolium*
English Ivy	*Hedera helix*
Eurasian Watermilfoil	*Myriophyllum spicatum*
Field Bindweed	*Convolvulus arvensis*
Foxtail Barley	*Hordeum jubatum*
Goatsbeard - Western	*Tragopogon dublus*
Himalayan Blackberry	*Rubus discolor*
Himalayan Balsam	*Impatiens glandulifera*
Knapweed, Brown	*Centaurea jacea*
Mountain Bluet	*Centaurea montana*
Nightshade	*Solanum spp.*
Nodding Thistle	*Carduus nutans*
Russian Olive	*Elaeagnus angustifolia*
Scotch Broom	*Cytisus scoparius*
St. John's-Wort	*Hypericum perforatum*
Tamarisk	*Tamarix chinensis, T. ramosissima*
Teasel	*Dipsacus fullonum*
Water Hemlock	*Cicuta douglasii*
Yellow Archangel	*Lamium galeobdolon*

TABLE 4: WEED INSPECTION SURVEY FIELD SHEET

Name of Inspector							
Date	Method						
Site name	Risk			Location			
				Northing		Easting	
Provincially Noxious Weeds	Weed Species Found	High	Med	Low	Occurrences	Area (Ha)	Priority
Bur Chervil							
Canada Thistle							
Common Reed							
Cordgrass, Dense-flowered							
Cordgrass, English							
Cordgrass, Saltmeadow							
Cordgrass, Smooth							
Crupina							
Dodder							
Flowering Rush							
Garlic Mustard							
Giant Hogweed							
Giant Mannagrass/Reed Sweetgrass							
Gorse							
Hound’s-tongue							
Jointed Goatgrass							
Knapweed, Diffuse							
Knapweed, Spotted							
Knotweed, Bohemian							
Knotweed, Giant							
Knotweed, Himalayan							
Knotweed, Japanese							
Leafy Spurge							
Milk Thistle							
North Africa Grass							
Nutsedge, Purple							
Nutsedge, Yellow							
Purple Loosestrife							
Rush Skeletonweed							
Scentless Chamomile							
Sow-thistle, Annual							
Sow-thistle, Perennial							
Tansy Ragwort							
Toadflax, Common / Yellow							
Toadflax, Dalmatian							
Velvetleaf							
Wild Oats							
Yellow Flag Iris							
Yellow Starthistle							

Coastal ISC Priority Invasive Plant List (current to: April 21, 2016)

TABLE 5: PREVENT, ERADICATE IF FOUND, REPORT ALL SIGHTINGS.

PREVENT **These species are not known to occur in the region, but are likely to establish if introduced.** **Eradicate if found. REPORT ALL SIGHTINGS**		
Plant Species	**Status**	**Report To**
Common Crupina *Crupina vulgaris***	**Provincial EDRR**	Report A Weed BC
Cordgrass, Smooth *Spartina alterniflora***	**Provincial EDRR**	Report A Weed BC
Hawkweed, Whiplash *Hieracium flagellare*	Regional EDRR	Info@coastalisc.com
Knapweed, Russian *Acroptilon repens*	Regional EDRR	Info@coastalisc.com
Kudzu *Pueraria Montana***	**Provincial EDRR**	Report A Weed BC
Rush Skeleton weed *Chondrilla juncea*	Regional EDRR	Info@coastalisc.com
Yellow Starthistle *Centaurea solstitialis***	**Provincial EDRR**	Report A Weed BC

TABLE 6: ERADICATE IF FOUND. REPORT ALL SIGHTINGS.

ERADICATE These species are not known to occur in limited distribution and low density. Eradicate if found. REPORT ALL SIGHTINGS		
Plant Species	**Status**	**Report To**
Blueweed, *Echium vulgare*	Regional EDRR	Info@coastalisc.com
Buffalo Burr, *Solanum rostratum*	Regional EDRR	Info@coastalisc.com
Common Reed, *Phragmites australis***	**Provincial EDRR**	Report A Weed BC
Cordgrass, Dense-flowered *Spartina densiflora***	**Provincial EDRR**	Report A Weed BC
Cordgrass, English *Spartina anglica***	**Provincial EDRR**	Report A Weed BC
Cordgrass, Salt meadow *Spartina patens***	**Provincial EDRR**	Report A Weed BC
Garlic Mustard *Alliaria petiolata*	Regional EDRR	Info@coastalisc.com
Giant Hogweed *Heracleum mantegazzianum* (T) (N)	Regional EDRR	Info@coastalisc.com
Giant Reed *Arundo donax***	**Provincial EDRR**	Report A Weed BC
Hoary Alyssum *Berteroa incana*	Regional EDRR	Info@coastalisc.com
Hoary Cress, Heart-pod *Lepidium draba subsp. Draba*	Regional EDRR	Info@coastalisc.com
Lesser Celendine, *Ficaria verna*	Regional EDRR	Info@coastalisc.com
Loosestrife, Garden (Yellow) *Lysimachia vulgaris*	Regional EDRR	Info@coastalisc.com
Milk Thistle *Silybum marianum* (N)	Regional EDRR	Info@coastalisc.com
Shiney Geranium, *Geranium lucidum***	**Provincial EDRR**	Report A Weed BC
Slender False Brome, *Brachypodium sylvaticum***	**Provincial EDRR**	Report A Weed BC
Sulfur cinquefoil *Potentilla recta*	Regional EDRR	Info@coastalisc.com
Sweet Fennel *Foeniculum vulgare*	Regional EDRR	Info@coastalisc.com
Wild Chervil *Anthriscus sylvestris*	Regional EDRR	Info@coastalisc.com

TABLE 7: CONTAIN, ESTABLISHED SPECIES

CONTAIN **These species have established infestation in portions of the region.** **Contain existing infestation and prevent spread to un-infested areas.**
Plant Species
Carpet Burweed *Soliva sessilis*
Hawkweed, Orange *Hieracium aurantiacum*
Knapweed, Black *Centaurea nigra*
Knapweed, Diffuse *Centaurea diffusa* (N)
Knapweed, Meadow *Centaurea pratensis*
Knapweed, Spotted *Centaurea maculosa* (B) (N)
Knotweed, Bohemian *Fallopia x bohemica* (N)
Knotweed, Giant *Fallopia sachalinensis* (N)
Knotweed, Himalayan *Polygonum polystachum* (N)
Knotweed, Japanese *Fallopia japonica* (N)
Poison Hemlock *Conium maculatum* (T)
Policemans Helmet/Himalayan Balsam *Impatiens glandulifera*
Scotch Thistle *Onopordum acanthium*
Yellow Flag Iris *Iris pseudacorus* (N)

TABLE 8: CONTROL, ESTABLISHED INFESTATIONS COMMON & WIDESPREAD

CONTROL **Established infestations common and widespread throughout the Coastal ISC region. Focus control in high value conservation areas. Use biological control, if available, on a landscape scale.**
Plant Species
Bur Chervil *Anthriscus caucalis* (N)
Burdock Species *Arctium spp*.
Canada Thistle *Cirsium arvense* (B) (N)
Tansy, Common *Tanacetum vulgare*
Teasel, Fuller's *Dipsacus fullonum*
Dalmatian Toadflax *Linaria dalmaticab* (B) (N)
English Holly *Ilex aquifolium*
English Ivy *Hedera helix*
Giant Mannagrass *Glyceria maxima*
Hairy Cat's Ear *Hypochaeris radicata*
Himalayan Blackberry *Rubus armeniacus* (discolor)
Jimsonweed/Devil's Apple *Datura stramonium* (T)
Periwinkle Species *Vinca spp*.
Loosestrife, Purple *Lythrum salicaria* (B) (N)
Scotch Broom *Cytisus scoparius*
St. John's Wort *Hypericum perforatum* (B)
Tansy Ragwort *Senecio jacobaea* (B) (N)
Butterfly Bush *Buddleja davidii*
Daphne/Spurge-Laurel *Daphne laureola* (T)
Gorse *Ulex europaeus*
Eurasian Water-milfoil *Myriophyllum spicatum*
Yellow Archangel *Lamiastrum galiobdolon*
Hawkweed,Yellow *Hieracium caespitosum*

Supplemental Notes from Coastal ISC:

• The above lists have been approved by the Coastal ISC Board and developed in consultation with key land managers in the Coastal ISC service area A the annual operational planning meeting (February 2016).

• The above lists reflect the entire Coastal ISC area. The placement of a species into a category at the landscape level is very likely to be different from a placement of a species into a category at the local level.

• Provincial EDRR - provincially significant and are to be reported immediately to the province through Report-A-Weed.

• Regional EDRR - regionally significant species and to be reported to the Coastal ISC.

** BC Proposed Prohibited Weeds (PDF, February 2015)

(B) = Invasive plants with biological control agents available

(T) = Invasive plants which pose potential human health and safety hazards

(N) = BC Weed Control Act, Regulated Noxious Weed in BC

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Figure 26: 2-North Stockpile # 2

Figure 27: 2-North Pit and Portal

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