SNC·LAVALIN

Subject Matter Expert Report: Hydrogeological Stressors Evaluation of Cause – Decline in Upper Fording River Westslope Cutthroat Trout Population

Prepared for:

Teck Coal Limited

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Executive Summary

SNC-Lavalin Inc. (SNC-Lavalin) was retained by Teck Coal Limited (Teck Coal) to act as Subject Matter Expert (SME) in an evaluation of cause of a recently observed decline in the abundance of Westslope Cutthroat Trout (WCT) in the upper Fording River (UFR). This report presents an evaluation of the potential for groundwater to act as a stressor in the UFR that may have contributed to the WCT population decline, where stressors are defined as any biological, chemical, or physical factor causing adverse effects in the environment. Teck Coal has engaged multiple SMEs to evaluate potential stressors to WCT habitat, and this report has been generated for discussion purposes amongst SMEs and Teck Coal.

The evaluation was completed within three localized study areas along the UFR, including:

i) The S6 Study Area, corresponding to a reach from the South Tailings Pond (STP) to Chauncey Creek;

ii) The S8 Study Area, corresponding to a reach from the area of the Clode Creek settling ponds to the north end of the North Tailings Pond (NTP); and

iii) The S10 Study Area, corresponding to Henretta Creek in the vicinity of Henretta Lake.

Each of the localised study areas above were selected because they are located within or downstream of mining operations, are known to discharge groundwater to the UFR or major fish-bearing tributaries (i.e., Henretta Creek), and coincide with WCT spawning and overwintering habitat. Therefore, groundwater in these areas has the potential to indirectly influence the WCT population through discharge to surface water. The analyses done in these areas also supports the understanding of groundwater for other studies being performed by SMEs.

Objectives

The overall objective of this investigation was to evaluate the contribution of groundwater, if any, to the population decline of WCT in the UFR. Specific objectives included:

- To spatially and temporally characterize groundwater quantity and its influence on surface water flows in the UFR, including identification and quantification of groundwater recharge and discharge zones; and
- To spatially and temporally characterize groundwater quality and its influence on surface water quality in the UFR valley.

Approach

There is no direct exposure of WCT to groundwater since their habitat constitutes the surface water courses in the UFR as well as numerous other tributaries, side or braided channels, and oxbow lakes. However, groundwater discharge sustains surface water flow during baseflow periods and groundwater quality locally influences surface water quality in areas where it discharges to surface water. Therefore, both groundwater quantity and quality were evaluated in this report as potential stressors to surface water quantity and quality. The approach to this evaluation was to present hydrogeological conceptual models of each localized study area to provide the appropriate context within which to evaluate the stressors. The conceptual models were based on review of the available data and identify sources of mine-influenced constituents of interest (CI), interpreted transport pathways, travel times, and groundwater-surface water interactions (recharge and discharge zones).

The following impact hypotheses were evaluated in order to investigate the potential for groundwater to act as a stressor in relation to the objectives above:

1. A change in upgradient groundwater levels influenced the groundwater flow regime causing a change to surface water flows and/or to the spatial distribution of groundwater discharge zones.
2. A change in upgradient groundwater quality influenced downstream surface water quality.

The approach to evaluate both impact hypotheses was similar, and included review of the historical hydrogeological data from upgradient monitoring wells in order to determine whether any conditions unique to the decline window were likely to have been present. The review was focused on monitoring wells located upgradient of the discharge zones due to a lack of monitoring wells within the discharge zones of each study area. For areas where data were limited or not available, the evaluation was restricted to commentary on whether groundwater could potentially be a stressor given the current understanding. Review of water quality focused on parameters most indicative of mining influence including selenium, nitrate, and sulphate, as well as pH.

Brief description of the conceptual models and findings are described below.

Findings: S6 Study Area

Conceptual Model

Groundwater flows in the down-valley (southeast) direction under a lateral hydraulic gradient similar to that of the topography, with little seasonal variability. Kilmarnock Creek loses water to ground (i.e., infiltrates) over its alluvial fan, while the Fording River loses water to ground after the South Tailings Pond (STP) for an approximate 5 km reach with the exception of localized and seasonal discharge zones. A regional groundwater discharge zone is present in the Fording River after this losing reach, which is interpreted to coincide with a shallowing of the bedrock/low permeability surface. Three primary pathways for mine-influenced water to reach surface water by groundwater transport were identified:

i) Groundwater recharged by Kilmarnock Creek is transported along the east side of the Fording River valley and discharges in the Greenhouse Side Channel and the main stem between the confluence of the Greenhouse Side Channel and surface water station FR_FRRD. This discharge is part of the larger regional groundwater discharge zone;

ii) Groundwater recharged by Kilmarnock Creek is seasonally transported across the valley along a shallow preferential flow pathway in a former channel. Discharge to the Fording River is seasonal between late winter (February and March) and early summer (June and July) at a bend in the Fording River located between surface water stations FR_FR4 and FR_FRCP1; and

iii) Groundwater recharged by the Fording River between the STP and the Greenhouse Side Channel confluence that discharges in the regional groundwater discharge zone in Side Channel 2 and the main stem between surface water stations FR_FRRD and GH_PC2.

The majority of flow gains in the regional groundwater discharge zone are considered to have been made through the third (Fording River) transport pathway above. Groundwater along this transport pathway is considered to be well mixed. As a result, the surface water quality in the majority of the discharge zone appears to vary less by season. The first and second transport pathways (Kilmarnock Creek) are more discrete and localized, and groundwater and resulting surface water quality in discharge areas will be less mixed and more seasonally variable.

Evaluation of Stressors

There were no indications in the historical water level records that would suggest the spatial distribution of discharge zones or discharge rates were unique to the decline window, including accounting for groundwater travel times. Therefore, there is no strong evidence to suggest that changes in groundwater quantity (flow) played a role in the WCT population decline in the S6 Study Area.

There were also no indications in the historical analytical results of upgradient groundwater to suggest that downstream surface water quality would have been unique to the decline window, including accounting for groundwater travel times. However, groundwater quality along the transport pathways i and ii showed greater mine-influence than the nearest surface water stations downstream of the discharge zones, indicating surface water quality may have been locally affected during the decline window. WCT may also have preferentially migrated to these areas of warmer groundwater discharge during the unusually cold winter conditions in February 2019; however, there are no data related to fish migration in these areas during the decline window. Based on the concentrations of nitrate-N and selenium in groundwater along the flow path compared to recommended screening criteria for juvenile and adult fish, water quality in discharge zones is considered unlikely to have affected the WCT population during the decline window. Therefore, there is no strong evidence that groundwater quality played a role in the WCT population decline in the S6 Study Area.

Findings: S8 Study Area

Conceptual Model

The groundwater flow direction in the upland areas is towards the Fording River valley bottom, and flow in the valley bottom aquifer is in the down-valley direction. A number of seeps with considerable flow emerge from the base of the spoils on the east side of the valley, resultant from drainage of the mining disturbed Clode Creek and Eagle Creek watersheds. Flow from these seeps either enter the Clode Creek settling ponds or infiltrate to the valley-bottom aquifer. A groundwater discharge zone is present within the Fording River downstream of the Clode Creek settling ponds generally between FR_FRDSCC1 and Lake Mountain Creek, but the zone can vary by season. Groundwater flow in the vicinity of Clode Creek settling ponds is south or southeast towards this discharge zone.

There are considered to be three primary transport pathways for mine influenced water to reach the Fording River from the Clode Creek watershed, including:

i) Decanting of surface water from the Clode Creek settling ponds, which receive drainage from the Clode Creek watershed, groundwater discharge, and seepage water that has daylighted from the base of the spoils;

ii) Leakage of groundwater from the Clode Creek settling ponds, which discharges either to the Fording River or to Grassy Creek (and ultimately the Fording River); and

iii) Groundwater from the spoiled portion of the watershed that underflows the Clode Creek settling ponds.

Surface water data upstream and downstream of the inferred groundwater discharge zone as well as from upstream of the Clode Creek settling ponds indicate that constituent loading to the Fording River from groundwater is minimal. The minimal loading is attributed to surface water contributions from the Clode Creek settling ponds and Grassy Creek, corresponding to pathways i (decanting from the ponds) and ii (leakage from the ponds and discharge to Grassy Creek) above.

Evaluation of Stressors

Groundwater quantity cannot be evaluated as a potential stressor as there are insufficient historical data to establish whether the locations of discharge zones or discharge rates were unique to the decline window. There is no strong evidence to suggest that groundwater quality played a role in the WCT population decline in the S8 Study Area because it does not appear to affect surface water quality in the groundwater discharge zone.

S10 Study Area

Conceptual Model

Groundwater flow in the spoils and backfilled pits in the vicinity of Henretta Lake is inferred to be south-southwest towards the lake. Groundwater quality in the spoils and backfilled pits is mine influenced; however, surface water quality above and below Henretta Lake is similar, suggesting no constituent loading from groundwater input to the lake. This may be an indication of attenuation along the groundwater flow path or within Henretta Lake, or due to underflow of the lake.

Evaluation of Stressors

There were no indications in the historical groundwater level data that discharge rates to Henretta Lake or the locations of discharge zones were unique to the decline window; therefore, there is no strong evidence to suggest that groundwater quantity played a role in the WCT population decline. There is also no strong evidence to suggest that groundwater quality played a role in the WCT population decline due to the minimal contaminant loading in Henretta Creek upstream and downstream or Henretta Lake. However, the lack of water quality data at depth within Henretta Lake during the decline window is a key data gap given that dissolved selenium concentrations within the spoils north of Henretta Lake increased throughout the decline window and that groundwater flow is directed towards the lake, which could potentially cause stratification of CI. The potential chronic effects to fish are also uncertain due to the lack of water quality data at depth in Henretta Lake and in valley-bottom groundwater downgradient of the spoils.

Operational Influences on Groundwater

A review of operational factors that have the potential to affect flows in the Fording River, including groundwater extraction, pit development, and water usage from Points of Diversion (POD), was also completed. The results of the review suggest that there is no strong evidence that any of the operational influences were likely to have played a significant role in the decline of the WCT population when considered on an individual basis. However, several data gaps were identified related to the effects of groundwater withdrawals from the FR_POTWELLS and Greenhouse Wells, the potential for preferential flow pathways in bedrock through structural discontinuities, and the impact of cumulative effects of water use from POD's and pit dewatering.

A recommendation has been made (Recommendation 1) in the Evaluation of Cause report to consider developing an integrated watershed-scale model of groundwater and surface water to better understand the cumulative effects of these operational influences, including water use, water diversion, and water storage (Evaluation of Cause Team, 2021).

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Acronyms and Abbreviations

$^{15}N_{nitrate}$	Nitrate stable isotope
AMP	Adaptive Management Plan
asl	above sea level
AW	Aquatic Life
AWTF	Active Water Treatment Facility
BCM	Bank Cubic Metres
BCWQG	British Columbia Approved Water Quality Guidelines
bgs	below ground surface
British Columbia	BC
CCME	Canadian Council of Ministers of the Environment
CI	Constituents of Interest
CMO	Coal Mountain Operations
CPX2	Cougar Pit Phase 2 Expansion Project
CSR	Contaminated Sites Regulation
D. Se	Dissolved Selenium
DEM	Digital Elevation Model
Didymo	Didymosphenia geminate
DO	Dissolved Oxygen
DW	Drinking Water
Ecofish	Ecofish Research Ltd.
ENV	Ministry of Environment & Climate Change Strategy
ERT	Electrical Resistivity Tomography
EVO	Elkview Operations
EVWQP	Elk Valley Water Quality Plan
FRO	Fording River Operations
GHO	Greenhills Operations
GWG	Groundwater Working Group
IFR	Instream Flow Requirement
KWL	Kerr Wood Leidal Associates Ltd.
LCO	Line Creek Operations
LiDAR	Light Detection and Ranging
LOEC	Lowest Observed Effect Concentration
Lotic	Lotic Environmental
MATC	Maximum Allowable Toxicant Concentration
MBI	Mass Balance Investigation

Minnow	Minnow Environmental Inc.
Nitrate-S; NO_3^--N	Nitrate as Nitrogen
NTP	North Tailings Pond
OHGE	O’Neill Hydro-Geotechnical Engineering
ORP	Oxidation-Reduction Potential
POD	Point of Diversion
Q1, Q2, Q3, Q4	First, Second, Third, Fourth Quarter
RGMP	Regional Groundwater Monitoring Program
RWQM	Regional Water Quality Model
SKP1	South Kilmarnock Phase 1 Settling Pond
SKP2	South Kilmarnock Phase 2 Secondary Settling Pond
SME	Subject Matter Expert
SNC-Lavalin	SNC-Lavalin Inc.
SRB	Sulphate Reducing Bacteria
SRF	Saturated Rock Fill
SRK	SRK Consulting Inc.
SSGMP	Site-Specific Groundwater Monitoring Program
STP	South Tailings Pond
Sulphate-S; SO_4^{2-}-S	Sulphate as Sulphur
Teck Coal	Teck Coal Limited
UFR	Upper Fording River
WCT	Westslope Cutthroat Trout
WED	West Exfiltration Ditch

READER'S NOTE

What is the Evaluation of Cause and what is its purpose?

The Evaluation of Cause is the process used to investigate, evaluate and report on the reasons the Westslope Cutthroat Trout population declined in the upper Fording River between fall 2017 and fall 2019.

Background

The Elk Valley is located in the southeast corner of British Columbia (BC), Canada. It contains the main stem of the Elk River (220 km long) and many tributaries, including the Fording River (70 km long). This report focuses on the upper Fording River, which starts 20 km upstream from its confluence with the Elk River at Josephine Falls. The Ktunaxa First Nation has occupied lands in the region for more than 10,000 years. Rivers and streams of the region provide culturally important sources of fish and plants.

The upper Fording River watershed is at a high elevation and is occupied by only one fish species, a genetically pure population of Westslope Cutthroat Trout *(Oncorhynchus clarkii lewisi)* — an iconic fish species that is highly valued in the area. This population is physically isolated because Josephine Falls is a natural barrier to fish movement. The species is protected under the federal Fisheries Act and the Species at Risk Act. In BC, the Conservation Data Center categorized Westslope Cutthroat Trout as "*imperiled or of special concern, vulnerable to extirpation or extinction."* Finally, it has been identified as a priority sport fish species by the Province of BC.

The upper Fording River watershed is influenced by various human-caused disturbances including roads, a railway, a natural gas pipeline, forest harvesting and coal mining. Teck Coal Limited (Teck Coal) operates the three surface coal mines within the upper Fording River watershed, upstream of Josephine Falls: Fording River Operations, Greenhills Operations and Line Creek Operations.

Evaluation of Cause

Following identification of the decline in the Westslope Cutthroat Trout population, Teck Coal initiated an Evaluation of Cause process. The overall results of this process are reported in a separate document (Evaluation of Cause Team, 2021) and are supported by a series of Subject Matter Expert reports.

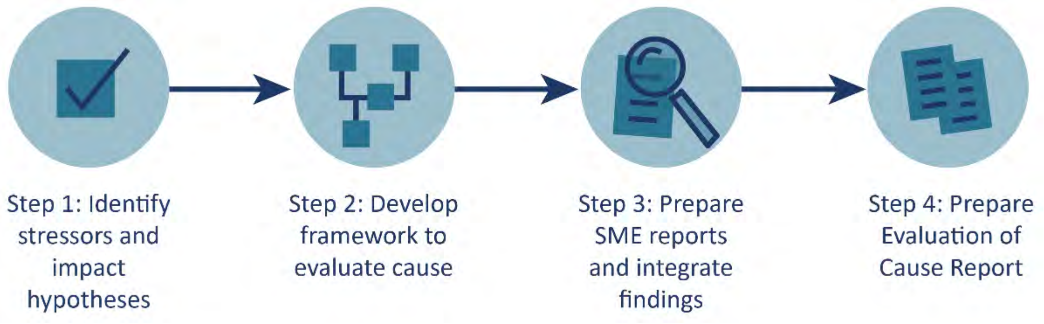
The report that follows this Reader's Note is one of those Subject Matter Expert Reports.

Monitoring conducted for Teck Coal in the fall of 2019 found that the abundance of Westslope Cutthroat Trout adults and sub-adults in the upper Fording River had declined significantly since previous sampling in fall 2017. In addition, there was evidence that juvenile fish density had decreased. Teck Coal initiated an *Evaluation of Cause* process. The overall results of this process are reported separately (Evaluation of Cause Team, 2021) and are supported by a series of Subject Matter Expert reports such as this one. The full list of SME reports follows at the end of this Reader's Note.

Building on and in addition to the Evaluation of Cause, there are ongoing efforts to support fish population recovery and implement environmental improvements in the upper Fording River.

How the Evaluation of Cause was approached

When the fish decline was identified, Teck Coal established an *Evaluation of Cause Team* (the Team), composed of *Subject Matter Experts* and coordinated by an Evaluation of Cause *Team Lead.* Further details about the Team are provided in the Evaluation of Cause report. The Team developed a systematic and objective approach (see figure below) that included developing a Framework for Subject Matter Experts to apply in their specific work. All work was subjected to rigorous peer review.



Conceptual approach to the Evaluation of Cause for the decline in the upper Fording River Westslope Cutthroat Trout population.

With input from representatives of various regulatory agencies and the Ktunaxa Nation Council, the Team initially identified potential stressors and impact hypotheses that might explain the cause(s) of the population decline. Two overarching hypotheses (essentially, questions for the Team to evaluate) were used:

- Overarching Hypothesis #1: The significant decline in the upper Fording River Westslope Cutthroat Trout population was a result of a single acute stressor[1] or a single chronic stressor[2].
- Overarching Hypothesis #2: The significant decline in the upper Fording River Westslope Cutthroat Trout population was a result of a combination of acute and/or chronic stressors, which individually may not account for reduced fish numbers, but cumulatively caused the decline.

The Evaluation of Cause examined numerous stressors in the UFR to determine if and to what extent those stressors and various conditions played a role in the Westslope Cutthroat Trout's decline. Given

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[1] Implies September 2017 to September 2019.

[2] Implies a chronic, slow change in the stressor (using 2012–2019 timeframe, data dependent).

that the purpose was to evaluate the cause of the decline in abundance from 2017 to 2019[3], it was important to identify stressors or conditions that changed or were different during that period. It was equally important to identify the potential stressors or conditions that did not change during the decline window but may, nevertheless, have been important constraints on the population with respect to their ability to respond to or recover from the stressors. Finally, interactions between stressors and conditions had to be considered in an integrated fashion. Where an *impact hypothesis* depended on or may have been exacerbated by interactions among stressors or conditions, the interaction mechanisms were also considered.

The Evaluation of Cause process produced two types of deliverables:

1. **Individual Subject Matter Expert (SME) reports** (such as the one that follows this Note): These reports mostly focus on impact hypotheses under Overarching Hypothesis #1 (see list, following). A Framework was used to align SME work for all the potential stressors, and, for consistency, most SME reports have the same overall format. The format covers: (1) rationale for impact hypotheses, (2) methods, (3) analysis and (4) findings, particularly whether the requisite conditions[4] were met for the stressor(s) to be the sole cause of the fish population decline, or a contributor to it. In addition to the report, each SME provided a summary table of findings, generated according to the Framework. These summaries were used to integrate information for the Evaluation of Cause report. Note that some SME reports did not investigate specific stressors; instead, they evaluated other information considered potentially useful for supporting SME reports and the overall Evaluation of Cause, or added context (such as in the SME report that describes climate (Wright et al., 2021).

2. **The Evaluation of Cause report** (prepared by a subset of the Team, with input from SMEs): This overall report summarizes the findings of the SME reports and further considers interactions between stressors (Overarching Hypothesis #2). It describes the reasons that most likely account for the decline in the Westslope Cutthroat Trout population in the upper Fording River.

Participation, Engagement & Transparency

To support transparency, the Team engaged frequently throughout the Evaluation of Cause process. Participants in the Evaluation of Cause process, through various committees, included:

- Ktunaxa Nation Council;

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[3] Abundance estimates for adults/sub-adults are based on surveys in September of each year, while estimates for juveniles are based on surveys in August.

[4] These are the conditions that would need to have occurred for the impact hypothesis to have resulted in the observed decline of Westslope Cutthroat Trout population in the upper Fording River.

- BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development;
- BC Ministry Environment & Climate Change Strategy;
- Ministry of Energy, Mines and Low Carbon Innovation; and
- Environmental Assessment Office.

Citation for the Evaluation of Cause Report

When citing the Evaluation of Cause Report use:

Evaluation of Cause Team, (2021). *Evaluation of Cause — Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited by Evaluation of Cause Team.

Citations for Subject Matter Expert Reports

Focus	Citation for Subject Matter Expert Reports
Climate, temperature, and streamflow	Wright, N., Greenacre, D., & Hatfield, T. (2021). Subject Matter Expert Report: Climate, Water Temperature, Streamflow and Water Use Trends. *Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Ecofish Research Ltd.
Ice	Hatfield, T., & Whelan, C. (2021). *Subject Matter Expert Report: Ice. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Ltd. Report Prepared by Ecofish Research Ltd.
Habitat availability (instream flow)	Healey, K., Little, P., & Hatfield, T. (2021). *Subject Matter Expert Report: Habitat availability. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited by Ecofish Research Ltd.

Focus	Citation for Subject Matter Expert Reports
Stranding – ramping	Faulkner, S., Carter, J., Sparling, M., Hatfield, T., & Nicholl, S. (2021). Subject Matter Expert Report: Ramping and stranding. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited by Ecofish Research Ltd.
Stranding – channel dewatering	Hatfield, T., Ammerlaan, J., Regehr, H., Carter, J., & Faulkner, S. (2021). Subject Matter Expert Report: Channel dewatering. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited by Ecofish Research Ltd.
Stranding – mainstem dewatering	Hocking M., Ammerlaan, J., Healey, K., Akaoka, K., & Hatfield T. (2021). Subject Matter Expert Report: Mainstem dewatering. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Ltd. by Ecofish Research Ltd. and Lotic Environmental Ltd. Zathey, N., & Robinson, M.D. (2021). Summary of ephemeral conditions in the upper Fording River Watershed. In Hocking et al. (2021). Subject Matter Expert Report: Mainstem dewatering. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Ltd. by Ecofish Research Ltd. and Lotic Environmental Ltd.
Calcite	Hocking, M., Tamminga, A., Arnett, T., Robinson M., Larratt, H., & Hatfield, T. (2021). Subject Matter Expert Report: Calcite. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Ltd. by Ecofish Research Ltd., Lotic Environmental Ltd., and Larratt Aquatic Consulting Ltd.
Total suspended solids	Durston, D., Greenacre, D., Ganshorn, K & Hatfield, T. (2021). Subject Matter Expert Report: Total suspended solids. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by Ecofish Research Ltd.
Fish passage (habitat connectivity)	Harwood, A., Suzanne, C., Whelan, C., & Hatfield, T. (2021). Subject Matter Expert Report: Fish passage. Evaluation of Cause – Decline in upper Fording

Focus	Citation for Subject Matter Expert Reports
Fish passage (habitat connectivity)	River Westslope Cutthroat Trout population. Report prepared for Teck Coal Ltd. by Ecofish Research Ltd. Akaoka, K., & Hatfield, T. (2021). Telemetry Movement Analysis. In Harwood et al. (2021). Subject Matter Expert Report: Fish passage. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Ltd. by Ecofish Research Ltd.
Cyanobacteria	Larratt, H., & Self, J. (2021). Subject Matter Expert Report: Cyanobacteria, periphyton and aquatic macrophytes. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by Larratt Aquatic Consulting Ltd.
Algae / macrophytes	
Water quality (all parameters except water temperature and TSS [Ecofish])	Costa, EJ., & de Bruyn, A. (2021). Subject Matter Expert Report: Water quality. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by Golder Associates Ltd. Healey, K., & Hatfield, T. (2021). Calculator to assess Potential for cryoconcentration in upper Fording River. In Costa, EJ., & de Bruyn, A. (2021). Subject Matter Expert Report: Water quality. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by Golder Associates Ltd.

Focus	Citation for Subject Matter Expert Reports
Industrial chemicals, spills and unauthorized releases	Van Geest, J., Hart, V., Costa, EJ., & de Bruyn, A. (2021). Subject Matter Expert Report: Industrial chemicals, spills and unauthorized releases. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by Golder Associates Ltd. Branton, M., & Power, B. (2021). Stressor Evaluation – Sewage. In Van Geest et al. (2021). Industrial chemicals, spills and unauthorized releases. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by Golder Associates Ltd.
Wildlife predators	Dean, D. (2021). Subject Matter Expert Report: Wildlife predation. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by VAST Resource Solutions Inc.
Poaching	Dean, D. (2021). Subject Matter Expert Report: Poaching. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by VAST Resource Solutions Inc.
Food availability	Orr, P., & Ings, J. (2021). Subject Matter Expert Report: Food availability. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by Minnow Environmental Inc.
Fish handling	Cope, S. (2020). Subject Matter Expert Report: Fish handling. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by Westslope Fisheries Ltd.
	Korman, J., & Branton, M. (2021). Effects of capture and handling on Westslope Cutthroat Trout in the upper Fording River: A brief review of Cope (2020) and additional calculations. Report prepared for Teck Coal Limited. Prepared by Ecometric Research and Azimuth Consulting Group.

Focus	Citation for Subject Matter Expert Reports
Infectious disease	Bollinger, T. (2021). Subject Matter Expert Report: Infectious disease. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by TKB Ecosystem Health Services Ltd.
Pathophysiology	Bollinger, T. (2021). Subject Matter Expert Report: Pathophysiology of stressors on fish. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by TKB Ecosystem Health Services Ltd.
Coal dust and sediment quality	DiMauro, M., Branton, M., & Franz, E. (2021). Subject Matter Expert Report: Coal dust and sediment quality. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population. Report prepared for Teck Coal Limited. Prepared by Azimuth Consulting Group Inc.
Groundwater quality and quantity	Henry, C., & Humphries, S. (2021). Subject Matter Expert Report: Hydrogeological stressors. Evaluation of Cause - Decline in upper Fording River Westslope Cutthroat Trout population. Report Prepared for Teck Coal Limited. Prepared by SNC-Lavalin Inc.

1 Introduction

SNC-Lavalin Inc. (SNC-Lavalin) has been retained by Teck Coal Limited (Teck Coal) to act as Subject Matter Experts (SME) to evaluate potential causes for a recently observed decline in the abundance of Westslope Cutthroat Trout (WCT) in the upper Fording River (UFR). This report presents an evaluation of potential hydrogeological stressors to the WCT population decline, where stressors are defined as any biological, chemical, or physical factor causing adverse effects in the environment. SNC-Lavalin is part of a broader group of SME's across multiple disciplines evaluating stressors that may have contributed to the decline of the WCT population, and this report has been prepared to generate discussion amongst SMEs and Teck Coal.

1.1 Background

1.1.1 Overall Background

This document is one of a series of Subject Matter Expert (SME) reports that support the overall Evaluation of Cause into the upper Fording River Westslope Cutthroat Trout population decline (Evaluation of Cause Team, 2021). For general information, see the preceding Reader's Note.

1.1.2 Report-Specific Background

This report describes an evaluation of potential hydrogeological stressors including groundwater quantity and quality that may have contributed to the population decline of WCT in the UFR. However, the evaluation is different from those of other SME's as there is no direct exposure of WCT to groundwater. WCT habitat in the UFR encompasses the river itself as well as numerous other tributaries, side or braided channels, and oxbow lakes in the Fording River valley. However, groundwater discharge sustains surface water flow during baseflow periods and, where groundwater quality is affected by mining, it can locally influence surface water quality in discharge areas. Therefore, groundwater is herein considered a potential stressor because of these influences on receiving water flows and quality. Details on specific influences for areas of interest to the WCT decline window are presented in subsequent sections.

This report evaluates hydrogeological stressors through the presentation of a hydrogeological conceptual model for certain sections of the UFR that may locally influence receiving surface water and therefore indirectly influence WCT habitat. The conceptual model describes interaction between groundwater and surface waters and the potential transport pathways from mine influenced areas to aquatic receptors. The stressor evaluation encompasses potential changes in flow or quality that may locally affect receiving waters to assess whether changes in groundwater quantity or quality may have been a contributing factor.

It is recognized that conditions in the UFR are a result of complex interactions between groundwater, surface water, surrounding land usage, and water management practices. These interactions influence the environmental factors that are being individually evaluated as stressors in the SME reports, including surface water quality (Golder), climate, hydrology, instream flow, ice cover, habitat connectivity, stranding, and calcification (all by Ecofish), and biological stressors such as periphyton, cyanobacteria, and macrophytes (Larrat). Integration of these interconnected factors is provided in the Evaluation of Cause.

SNC-Lavalin has extensive experience working with Teck Coal on groundwater and surface water monitoring programs at their Elk Valley mines, both at individual mine sites as well as regional scale projects. SNC-Lavalin has worked most extensively with Teck Coal on groundwater programs, including development and refinement of the Regional Groundwater Monitoring Plan (RGMP), completion and updating the Site-Specific Groundwater Monitoring Programs (SSGMP) at Fording River Operations (FRO), Greenhills Operations (GHO), Elkview Operations (EVO), and Coal Mountain Operations (CMO), the ongoing Mass Balance Investigation (MBI) program, and dozens of investigations at individual mine-sites.

Mr. Chris Henry is a hydrogeologist with a Master of Earth Sciences degree specializing in hydrogeology from Simon Fraser University who has 9 years experience working in the environmental consulting industry with SNC-Lavalin. His experience within that time has included extensive interpretation of geochemical environments and evaluation of groundwater-surface water interactions and at industrial sites across British Columbia (BC), including at mine sites, landfills, railyards, and upstream and downstream oil and gas operations, amongst others. In his capacity as a hydrogeologist his work includes site characterization and development of conceptual site models, 3-D numerical flow modeling, contaminant fate and transport assessments, groundwater resource evaluation, and the planning and execution of various site investigations. Chris' prior experience working on Teck Coal mine sites in the Elk Valley includes support on the RGMP and SSGMP programs, the ongoing MBI program, and completing the Water Quantity Investigation at Line Creek Operations (LCO).

Mr. Stefan Humphries is a senior hydrogeologist in our Nelson, BC office, and has over 18 years of experience in environmental consulting and two years of academics at the University of Waterloo. His BSc. was from the University of Victoria and his BSc. honours thesis was on the regional groundwater geochemistry of British Columbia. His MSc. degree was on geochemistry and hydrogeology from the department of Earth Sciences at the University of Waterloo, a world recognized institution for groundwater sciences. He has worked on domestic and international projects specializing in groundwater and surface water assessment of current and former mine sites, groundwater resource evaluation, contaminated sites and project management. Stefan has assisted numerous clients in meeting regulatory requirements including permitting. He has extensive experience with the BC regulators overseeing the Teck Coal operating mines and has facilitated a number of workshops and presentations with regulators and Ktunaxa Nation Council.

Stefan has practical and theoretical knowledge of mine sites in various complex geological and hydrogeological settings in Canada. He has performed hydrogeological and geochemical assessments at numerous current and former mining sites with water management, metals and acid rock drainage issues. He has extensive experience in the design and implementation of groundwater and seepage monitoring networks and programs, as well as designed of several groundwater remediation and mitigation measures. His most recent projects have included: director for the hydrogeology discipline for the GHO Cougar Pit Phase 2 Expansion Project (CPX2) and Turnbull East/Castle projects; numerous hydrogeological assessments and monitoring program development for Teck Coal mine sites (FRO, GHO and EVO); RGMP development and implementation in the Elk Valley; seepage and surface water assessments for Sparwood Ridge; regional-scale groundwater and surface water assessments of the former Sullivan mine in Kimberley BC; tailings and acid rock drainage/metal leaching assessments at a number of former mines in BC; and, the groundwater lead for the Teck Coal's Adaptive Management Plan (AMP). He has facilitated several technical meetings involving groundwater, both internal to Teck Coal and external stakeholders such as the

Groundwater Working Group (GWG). He has also performed numerous presentations on the regional groundwater program on behalf of Teck Coal.

1.1.3 Study Area

The Fording River is a major tributary of the Elk River and is located in the Elk Valley, BC (Drawing 1). The broader study area encompasses the habitat of the genetically pure UFR WCT population, from Josephine Falls in the south to the headwaters in the north. The focus of this report is on three localized areas where groundwater is known to discharge to surface waters important to the life cycle of the WCT, including the S6 Study Area, the S8 Study Area, and the S10 Study Area. The names of the study areas are drawn from the ongoing Upper Fording River Westslope Cutthroat Trout Population Monitoring Project, and correspond to sites where population surveys are completed (Cope, 2020). These areas are shown on Drawings 2, 3 and 4 with locations of groundwater monitoring wells, surface water monitoring stations, surface flow and load accretion study stations, seepage sampling stations, and shallow groundwater (drivepoint) sampling stations. Topography on the site plans is shown as a shaded Digital Elevation Model (DEM) based on Light Detection and Ranging LiDAR data.

1.1.3.1 Local Study Areas

The Study Area for S6 is shown on Drawing 2 and extends from the area south of the South Tailings Pond (STP), where mine influenced water from Kilmarnock and Swift Creeks join the Fording River, to the confluence with Chauncey Creek near the surface water monitoring station FR_FRABCH. Drawing 2 also shows the S7 area because it is an area where surface water recharge to groundwater is known to occur and where the long-term groundwater monitoring wells are installed. The S6 area is important to consider for groundwater because telemetry data indicate an approximate 2 km to 3 km reach that constitutes WCT spawning and overwintering habitat in the vicinity of and downstream of an important regional groundwater discharge zone that is mine-influenced. Features of interest in the S6 Study Area include Fording River and its tributaries, the ‘Greenhouse Side Channel’, ‘Side Channel 2’, and the ‘Fording River Oxbow’.

The S8 Study Area is shown on Drawing 3 and extends from the area in the vicinity of the Clode Creek settling ponds to surface water station FR_MULTIPLATE and the north end of the North Tailings Pond (NTP). Notable features of the valley bottom within the S8 Study Area includes settling ponds of the Clode Creek, Lake Mountain Creek, and Eagle Creek watersheds, as well as a number of ditches and diversions including the West Exfiltration Ditch (WED), Grassy Creek, and the North Greenhills Diversion. Similar to the S6 Study Area, the S8 Study Area is of interest because it constitutes WCT spawning and overwintering habitat that coincides with a groundwater discharge zone in the vicinity of Clode Creek settling ponds and numerous seepage faces in the adjacent waste rock dumps. As with the S6 Study Area, groundwater and surface water are mine-influenced in the S8 Study Area.

The S10 Study Area is shown on Drawing 4 and comprises Henretta Creek in the vicinity of Henretta Lake. The area is of interest as it is mine-influenced and is an area previously identified as high density spawning and fry rearing habitat as well as preferred juvenile rearing habitat with high fry and juvenile densities (Cope, 2020).

1.1.4 Definitions

Groundwater refers to water within the saturated zone of the sub-surface, which is the zone beneath which all interstitial pore-space and fractures within soil and rock are completely occupied by water. Included within that definition herein is water flowing through coarse layers of waste rock placed at the base of spoils in former surface-water channels, since the same physical principles of fluid flow within the sub-surface apply. Flow within these channels is sometimes referred to as flow within rock drains, or flow within buried or sub-surface tributaries. Groundwater within these former channels is often discontinuous from the regional water table within native soils beneath the waste rock piles.

The hyporheic zone refers to the zone of sediment and pore-space beneath and alongside stream-beds where exchanges between surface water and the sub-surface occur.

1.2 Objectives

1.2.1 Report-Specific Objectives

The overall objective of this investigation is to evaluate the contribution of groundwater, if any, to the population decline of WCT in the UFR. As discussed in Section 1.1.2 above, groundwater is not considered a stressor in the traditional sense; however, it can influence WCT habitat in areas within and downgradient of groundwater discharge zones. Therefore, specific objectives of the stressor evaluation include:

- Spatially and temporally characterize groundwater quantity and its influence on surface water flows in the UFR, including identification and quantification of groundwater recharge and discharge zones; and
- Spatially and temporally characterize groundwater quality and its influence on surface water quality in the UFR valley.

1.3 Approach

1.3.1 Report-Specific Approach

The approach to this report is to present the hydrogeological conceptual models of the localized study areas defined above to provide the appropriate context within which to subsequently evaluate stressors. The conceptual models are based on review of the available groundwater level, quality, hydraulic conductivity, surface water quality and discharge, and flow and load accretion data. The conceptual models identify sources of mine-influenced constituents of interest (CI), interpreted transport pathways, travel times, and groundwater-surface water interactions (recharge and discharge zones). It is noted that the conceptual models are considered ‘living’ as they are constantly refined through additional investigations and monitoring; as such, these conceptual models should be considered representative of current knowledge and subject to refinement.

To investigate the potential for groundwater to act as a stressor and possible contributor to the WCT population decline, this report evaluates the following impact hypotheses in relation to the objectives described above:

1. A change in upgradient groundwater levels influenced the groundwater flow regime causing a change to surface water flows and/or to the spatial distribution to discharge zones.
2. A change in upgradient groundwater quality influenced downstream surface water quality.

The approach to evaluate the first impact hypothesis is to review historical groundwater levels and flow patterns in upgradient monitoring wells that may have resulted in corresponding changes to the flows or locations of downstream groundwater discharge zones. Similarly, the approach to evaluate the second impact hypothesis is to review historical groundwater quality data in upgradient monitoring wells to determine whether there are any anomalies or trends that may have resulted in a corresponding change to surface water quality downstream.

The approach to the hydrogeological evaluation was to focus on data from overburden wells as the alluvial aquifers have the greatest potential to influence on surface water quantity and quality on the timeframes relevant to the WCT decline. Groundwater flow and transport in the bedrock aquifers is typically over a longer timeframe, and, as such, groundwater quantity and quality in bedrock aquifers have been excluded in the stressor evaluations below. However, a discussion of operational factors which have the potential to influence the groundwater flow regime and potentially influence baseflow in the Fording River, including water use and pit development, is included in Section 8 of this report.

The focus of the hydrogeological stressor evaluations was on existing data from groundwater monitoring wells that are interpreted to have an influence on downstream surface water quality. The evaluations rely on existing data; where data were not available, the evaluation was limited to a commentary on whether groundwater could potentially be a stressor given the current understanding. Due to a general lack of monitoring wells in the vicinity of inferred groundwater discharge zones, inferences of downstream hydrogeological conditions such as contributions to baseflow, water quality, and in-stream thermal regulations should be regarded as zeroth order approximations, and are largely based on surface water observations in the areas of inferred discharge.

2 Regulatory Criteria

2.1 Primary Screening Criteria

Analytical results of historical groundwater samples have been compared to the BC Ministry of Environment & Climate Change Strategy[1] (ENV) *Contaminated Sites Regulation* (CSR; BC ENV, 2021) standards for the protection of freshwater aquatic life (AW). Drinking water (DW) standards were not applied since the focus of this report is related to the decline of the WCT population.

Surface water, seepage water, and shallow groundwater samples collected via drivepoint piezometers as part of the MBI program were compared to the *British Columbia Approved Water Quality Guidelines* (BCWQG; BC ENV, 2021), also for protection of freshwater AW. The shallow groundwater analytical results were conservatively screened against the BCWQG AW guidelines because the samples were collected from shallow depths in an area where groundwater is inferred to be upwelling and discharging nearby. This is in accordance with BC CSR Technical Guidance Document 15 (TG15; BC ENV, 2017), which states that the BCWQG apply to groundwater samples collected from within 10 m of the high water mark of a surface water body. Although the BCWQG apply predominantly for total metals constituents (with exception of aluminum, cadmium, copper and iron), the guidelines were conservatively applied to both total and dissolved metals constituents for ease of comparison to the groundwater data (to which CSR standards are applicable for dissolved metals only and therefore analyses of total metals are often run).

2.2 Secondary Screening Criteria

Analytical results of samples that exceeded the primary screening criteria were compared to secondary screening criteria. The secondary screening criteria were the level 1 chronic-effects values applied by Golder in their Water Quality SME report (Costa and de Bruyn, 2021). The secondary screening criteria for CI cadmium, selenium, sulphate, and nitrate were the level 1 fish benchmarks derived in the Elk Valley Water Quality Plan (EVWQP). These level 1 benchmarks were derived from site-specific and published chronic testing relevant to the Elk Valley, with a focus on endpoints such as growth or reproduction for sensitive fish species (Costa and de Bruyn, 2021). The level 1 benchmarks for all other constituents were literature based, where the most conservative relevant and reliable chronic effects values for the most sensitive fish species and life stages of fish were applied (Costa and de Bruyn, 2021).

The secondary screening criteria were applied directly to the analytical results of the surface water, seepage water, and shallow groundwater samples collected. Since the screening criteria are applicable to surface water (except where groundwater is within 10 m of the high water mark of a surface water body), the secondary screening criteria values were multiplied by ten for comparison to the groundwater analytical results of samples not collected within 10 m of the high water mark of a surface water body following in accordance with TG15.

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[1] Formerly known as Ministry of Environment (MoE).

3 Hydrogeological Conceptual Model for S6 Study Area

A detailed description of site geology, physical hydrogeology, chemical hydrogeology, and groundwater-surface water interactions is provided below. The hydrogeological conceptual model is illustrated in the 3D block diagrams provided in Drawings 5 (transport pathways and groundwater-surface water interactions) and 6 (concentrations of Cl).

3.1 Setting and Physical Geography

The Fording River runs for approximately 60 km in a predominantly southern direction from its headwaters in the Rocky Mountains near Fording River Pass and the border with Alberta to its confluence with the Elk River approximately 17 km north of Sparwood. It runs through Teck Coal's FRO where mining activities are focused along the lower eastern slopes of the Greenhills Range, the High Rock Range, and in the Fording River Valley bottom.

The S6 Study Area is an approximate 8 km reach of the UFR between the STP and Chauncey Creek. The Fording River valley along this reach is relatively flat and varies between approximately 500 m to 800 m in width. The valley-bottom topography varies between approximately 1,610 m above sea level (asl) south of the STP to 1,565 m asl at the confluence with Chauncey Creek, corresponding to a topographic gradient of approximately 0.006 m/m (or 0.6%). Steep mountainous terrain with grades up to 0.25 m/m (25%) to elevations up to 2,400 m asl in the undisturbed portions of the tributary watersheds are present on either side of the valley.

The geomorphology and land use history of the UFR are described further in the Evaluation of Cause report (Evaluation of Cause Team, 2021). The climate of the UFR is described by Ecofish Research Ltd. (Wright et al, 2021).

3.2 Hydrology

The Fording River flows within a broad, flat floodplain along the valley bottom throughout the study area. A number of braided channels are present between Cataract Creek and the Fording River Oxbow, and transitions to a meandering stream in the downstream portion of the S6 Study Area. Data from Environment Canada and Teck Coal surface water monitoring stations indicate a nival flow regime with base flow in winter and peak flows between May and July driven by snowmelt, with low-flow conditions that return in late summer and fall.

Numerous tributaries flow into the Fording River within the study area, including (from north to south): Kilmarnock Creek, Swift Creek, Cataract Creek, Porter Creek, several creeks emanating from Castle Mountain, and Chauncey Creek (Drawing 2). The hydrology of the UFR system is discussed in detail by Wright et. Al (2021).

3.3 Geology

3.3.1 Bedrock Geology

Bedrock geology of the study area is shown on Drawing 7 and summarized in Table A. Bedrock in the area consists predominantly of Carboniferous to Lower Cretaceous siliciclastic sedimentary rock. The coal-bearing Kootenay Group Mist Mountain Formation hosts economic coal seams and is the dominant formation east of the Fording River valley bottom. The Mist Mountain Formation is underlain by the Moose Mountain Member of the Morrissey Formation, and overlain by the Elk Formation, which caps select ridges at FRO (Kaiser, 1980). Bedrock underlying the Fording River valley-bottom sediments in the study area consists of the Fernie Formation and the Spray River Group. The Rocky Mountain Supergroup comprises the bedrock east of the Fording River valley in the S6 Study Area.

Table A: Bedrock Geology of Upper Fording River

Geologic Period / Epoch	Lithostratigraphic Unit			Principle Rock Types
Lower Cretaceous	Blairmore Group			Massive bedded sandstone and conglomerate
Upper Jurassic to Lower Cretaceous	Kootenay Group	Elk Formation		Sandstone, siltstone, shale, mudstone, chert pebble conglomerate, minor coal
		Mist Mountain Formation		Sandstone, siltstone, shale, mudstone, thick coal seams
		Morrissey Formation	Moose Mountain Member	Medium- to coarse-grained quartz-chert sandstone
			Weary Ridge Member	Fine- to coarse-grained, slightly ferruginous quartz-chert sandstone
Jurassic	Fernie Formation			Shale, siltstone, fine-grained sandstone
Triassic	Spray River Group			Sandy shale, shale quartzite
Carboniferous (Pennsylvanian) and Permian	Rocky Mountain Supergroup			Quartzite, calcareous sandstone
Carboniferous (Mississippian)	Rundle Group			Limestone and shale

After Golder, 2013; Monahan, 2000.

3.3.2 Surficial Geology

Surficial geology of the study area is shown on Drawing 8, and is characteristic of a post-glacial Cordilleran mountain setting that was shaped by a single advance of valley glaciers during the Wisconsin Glaciation (George et al., 1987). Sediments in the valley consist primarily of fluvial deposits between the STP and Porter Creek. Fluvial deposits are also coincident with the larger tributaries of Kilmarnock and Chauncey Creeks, where alluvial fans composed of fluvial and glaciofluvial deposits spread where the tributaries join the valley as shown in the Site Plan included in Drawing 2. The fluvial deposits comprise medium- to coarse-grained sediment. Organic floodplain deposits comprising fine- to medium-grained sediment are present between approximately Porter Creek and Chauncey Creek. These sediments are shallow (1 m to 2 m) and underlain by fluvial or glaciofluvial deposits, and are coincident with a wetland type environment where numerous oxbow lakes are present. Minor till and colluvium are locally present along the edges of the valley throughout the study area. Upland areas are dominated by colluvial veneers and blankets with exposed bedrock in higher peaks. Lower mountain slopes and valley flanks are predominantly till with thick colluvium deposits (e.g., talus piles) in some of the steeper valleys.

Drawing 9 presents a geological cross-section of the S6 Study Area between the STP in the north to an area south of Porter Creek. The section shows that sediment thickness increases from approximately 10 m below ground surface (bgs) immediately south of the STP to approximately 25 m to 30 m bgs in the area of the Kilmarnock Creek alluvial fan. The bedrock dips further to a depth of 68 m bgs in the vicinity of the South Kilmarnock Phase 2 Secondary Settling Pond (SKP2). No boreholes have been drilled sufficiently deep to confirm bedrock depth within the valley downstream of this point (monitoring wells FR_MW-FRRD and GH_MW-PC where bedrock was encountered at 11.9 m bgs and 5.5 m bgs, respectively, are located on the edges of the valley where bedrock is considered to be considerably shallower). Geophysical investigations including electrical resistivity tomography (ERT) surveys across the entire valley in the vicinity of FR_MW-FRRD and another location approximately 350 m north completed as part of the MBI program in 2019 suggested that the bedrock surface may be approximately 25 m bgs to 30 m bgs in the center of the valley. This would suggests a considerable decrease in sediment thickness between SKP2 and the area where the geophysical surveys were completed, which is also an area of inferred (and observed, on the eastern side of the valley) groundwater discharge (discussed below in Section 3.5). However, results of a more recent (September 2020) drilling investigation indicate that the feature previously interpreted as the bedrock surface from the geophysical investigation is actually a low permeability unconsolidated unit, interpreted as till interbedded with glaciolacustrine layers of silt and/or clay. These recent drilling results suggest the discharge area coincides with a shallowing of the valley-bottom aquifer due to a thickening till/glaciolacustrine aquitard.

3.4 Physical Hydrogeology

3.4.1 Hydraulic Conductivity and Groundwater Flow Velocity

A summary of hydraulic conductivity estimates derived from slug and pumping tests within the Kilmarnock alluvial fan and Upper Fording River valley within the study area is provided in Table B below. The hydraulic conductivity values range from 1.0 x 10^{-7} m/s at FR_KB-6PW to 4.0 x 10^{-3} m/s at FR_KB-8PW. The majority of hydraulic conductivity values are relatively high (i.e., greater than 1.0 x 10^{-4} m/s). It is recognized that the hydraulic conductivity data presented here may be biased high as the monitoring well installations tend to be preferentially completed in zones of high permeability to investigate contaminant transport pathways. Therefore, the bulk hydraulic conductivity of the valley bottom aquifer may be lower.

Table B: Summary of Hydraulic Testing Results in Kilmarnock Creek Alluvial Fan and Fording River Valley Bottom

Well IDs	Hydrostratigraphic Unit	Screened Interval (m bgs)	Hydraulic Conductivity (K) (m/s)	Source
FR_09-01-A	***Sandy gravel***	***3.8 – 6.9***	***1.0 x 10^{-3}***	SNC-Lavalin, 2019a
FR_09-01-B	***Gravel***	***17.2 – 18.7***	***1.5 x 10^{-4}***	
FR_09-02-A	***Sandy gravel***	***8.3 – 11.4***	***1.0 x 10^{-3}***	
FR_09-02-B	Gravel	20.8 – 22.3	9.9 x 10^{-5}	
FR_09-03-A	***Gravely sand***	***2.2 – 5.2***	***3.0 x 10^{-3}***	
FR_09-03-B	Gravel	9.2 – 10.7	2.6 x 10^{-5}	
FR_09-04-A	***Sandy gravel***	***1.1 – 4.7***	***3.0 x 10^{-3}***	
FR_09-04-B	***Gravel***	***5.1 – 6.6***	***9.6 x 10^{-5}***	
FR_GH_WELL4[a]	Sand, some Gravel	25.9 – 29.0	1.4 x 10^{-2}[b]	Piteau, 2012b
FR_KB-1A	***Silty gravel and Sand and Gravel***	***5.2 – 8.2***	***3.0 x 10^{-4}***	Golder, 2020a
FR_KB-2A	Silty sand and bedrock	13.1 – 16.2	6.0 x 10^{-6}	
FR_KB-3A	Sand	35.4 – 38.4	3.0 x 10^{-4}	
FR_KB-3B	***Gravel***	***18.3 – 21.3***	***3.0 x 10^{-4}***	
FR_KB-4MW	Silty gravel	10.7 – 13.7	8.0 x 10^{-7}	
FR_KB-5PW[a]	***Sand and Gravel***	***11.6 – 13.4***	***3.0 x 10^{-3}***	
FR_KB-6PW[a]	Silty gravel and gravel	27.1 – 33.2	1.0 x 10^{-7}	
FR_KB-7PW[a]	**Silty gravel**	***13.1 – 19.2***	***9.0 x 10^{-5}***	
FR_KB-8PW[a]	Silty gravel and Gravel	41.1 – 47.2	4.0 x 10^{-3}	
FR_MW_SK1-A	***Sand and gravel***	***15.0 – 16.5***	***9.3 x 10^{-4}***	SNC-Lavalin, 2019b
FR_MW_SK1-B	Sand and gravel, silty	65.5 – 67.0	4.4 x 10^{-5}	
FR_MW_FRRD1	Sand	8.8 – 9.3	4.7 x 10^{-5}	SNC-Lavalin, 2020a
FR_MW_CASW6-A	Silty gravel and silt	8.8 – 10.3	9.8 x 10^{-6}	
FR_MW_CASW6-B	Sand and silt	2.5 – 4.0	8.8 x 10^{-7}	
Geometric Mean			**7.3 x 10^{-4}**	
Upper 95th %tile			**4.0 x 10^{-3}**	
Lower 95th %tile			**1.3 x 10^{-4}**	

Note: All hydraulic conductivity tests completed as slug tests unless otherwise stated.

Bold Italic Font: Estimate is considered representative of groundwater transport pathways in the Kilmarnock Creek alluvial fan and Fording River valley bottom, and was included in the summary statistics.

a – Hydraulic conductivity estimate from constant rate pumping test.

b – Based on estimated transmissivity of 0.3 m^2/s and aquifer thickness of 21 m.

A sub-set of hydraulic conductivity values were selected in order to estimate average linear groundwater flow velocities and travel times representative of transport pathways within the S6 Study Area. These are shown as italicized in Table B. Values were considered for wells screened in the upper 20 m as lateral groundwater flow is expected to dominate. Values from wells near the valley edges were excluded since fluvial or glaciofluvial sediments on the edges of the valley are thin or sometimes not present. Three wells that meet this criteria (i.e., are shallow and not located along the valley edges) were also excluded from the sub-set due to anomalously low hydraulic conductivity values: FR_09-03-B, FR-KB-2, and FR_KB-MW4.

The hydraulic conductivity estimate at Greenhouse water supply well FR_GH_WELL4 was also excluded due to an exceptionally high value. This result is considered only a qualitative indication that the hydraulic conductivity is high because the pumping test did not sufficiently stress the aquifer (less than 3% of the available drawdown). Nonetheless, the result does suggest the presence of a locally high permeability zone at the Greenhouse Wells location.

The range in the 95th percentile confidence intervals of the hydraulic conductivities in the subset is 1.3×10^{-4} m/s to 4.0×10^{-3} m/s, with a geometric mean of 7.3×10^{-4} m/s.

Average linear groundwater flow velocity estimates are presented below in Table C based on the range of the 95th percentile confidence intervals and geometric mean of the subset of estimates, as well as gradients representative of seasonally high and low groundwater levels in the upgradient monitoring wells. The velocities were calculated according to:

$$V = Ki/n_e$$

Where:

V = the average linear groundwater flow velocity

K = hydraulic conductivity

i = hydraulic gradient

n_e = effective porosity

The groundwater velocity estimates range from approximately 0.12 m/d to 9.2 m/d, or 83 m/yr to 3,357 m/yr.

Table C: Summary of Average Linear Groundwater Flow Velocities in Upper Fording River Valley

Scenario	Hydraulic Conductivity (m/s)	Gradient (m/m)	Effective Porosity	Velocity (m/d)	Velocity (m/yr)
Lower 95th Percentile K/Low Gradient	1.3×10^{-4}	0.006	0.3[a]	0.23	83
Lower 95th Percentile K/High Gradient	1.3×10^{-4}	0.008		0.30	111
Upper 95th Percentile K/Low Gradient	4.0×10^{-3}	0.006		6.9	2,519
Upper 95th Percentile K/High Gradient	4.0×10^{-3}	0.008		9.2	3,357
Geomean K/Low Gradient	7.3×10^{-4}	0.006		1.3	458
Geomean K/High Gradient	7.3×10^{-4}	0.008		1.7	610

a – Effective porosity (n_e) for coarse granular materials may vary between approximately 0.2 and 0.3; the high end of this range was assumed for the purposes of this travel time calculation.

3.4.2 Groundwater Flow Regime

There are no groundwater monitoring data within the S6 study area as the monitoring wells in the Fording River valley are situated to the north closer to FRO[2]. Conceptually, groundwater flow in main stem valley-bottom aquifers can be generally described as:

- Groundwater predominantly flows through coarse-grained fluvial and glaciofluvial deposits. Flow converges toward the valley bottom from the valley flanks and transitions to down-valley flow, either parallel or sub-parallel to the river or creek depending on local hydraulic gradients, permeability and surface water interaction. Groundwater ultimately discharges to the Fording River. Groundwater pathways are tortuous due to variations in permeability of overburden materials (SNC-Lavalin 2017a; Teck Coal, 2017).

The limited available data in the S6 Study Area support the above description. Groundwater elevations and inferred groundwater flow direction in the study area in the first quarter (Q1) and July 2019 are shown on Drawings 10 and 11, respectively. To supplement measurements made in the monitoring wells, the ground surface elevation in the seepage area that feeds the Greenhouse Side Channel was also used to interpret the contours shown on Drawings 10 and 11. Groundwater flow from Kilmarnock Creek area flows under a steep gradient in the southwest direction parallel to the creek, before turning in a down-valley direction where the gradient dissipates in high permeability fluvial and glaciofluvial sediments of the Kilmarnock Fan. The hydraulic gradient in the Kilmarnock Creek area between monitoring wells FR_KB-1, FR_KB-2, and FR_KB-3A was estimated to be approximately 0.08 m/m towards the southwest during both the Q1 and July 2019 monitoring events.

Groundwater flow in the Fording River valley in the S6 Study Area is in the down-valley (southeast) direction from Kilmarnock alluvial fan area towards a discharge zone that is inferred to occur over an approximate 1.8 km reach between the seepage area feeding the Greenhouse Side Channel and surface water station GH_PC2, as shown on Drawing 5. It is suspected that either a shallowing of the bedrock surface or a thickening till/glaciolacustrine aquitard between SKP2 and the downstream area cause upwelling of groundwater and discharge into low-lying areas, which include the Fording River but also former channels. There are several areas of groundwater-surface water interactions within the study area, including areas where groundwater is recharged by surface-water bodies and those where groundwater discharges to surface-water bodies, which are discussed in further detail below in Section 3.5.

The hydraulic gradients between monitoring wells FR_09-01-A, FR-09-02-A, and the seepage area that feeds the Greenhouse Side Channel were approximately 0.006 m/m and 0.008m/m in Q1 and July 2019. Because the water table elevation at the seepage area does not fluctuate meaningfully (i.e., it flows all year at a constant elevation), the gradient fluctuates seasonally according to the magnitude of water level fluctuations upgradient.

Hydrographs showing water level fluctuations in upgradient monitoring wells in the Kilmarnock fan and SKP2 areas are shown on Figure 1 and Figure 2 below. Seasonal water level elevations in the Kilmarnock alluvial fan varied between approximately 1.3 m at FR_KB-1 and FR_KB-2 to 3.1 m at FR_KB-3A and FR_KB-3B in 2019 (Figure 1). Seasonal water level fluctuations in the vicinity of SKP2 since 2015 have varied between 4.8 m and 7.2 m at FR_09-02A in 2018 (Figure 2).

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[2] Monitoring well FR_MW_FRRD1 is located upslope and screened above the elevation of the valley bottom and therefore does not inform hydrogeological conditions in the valley bottom.

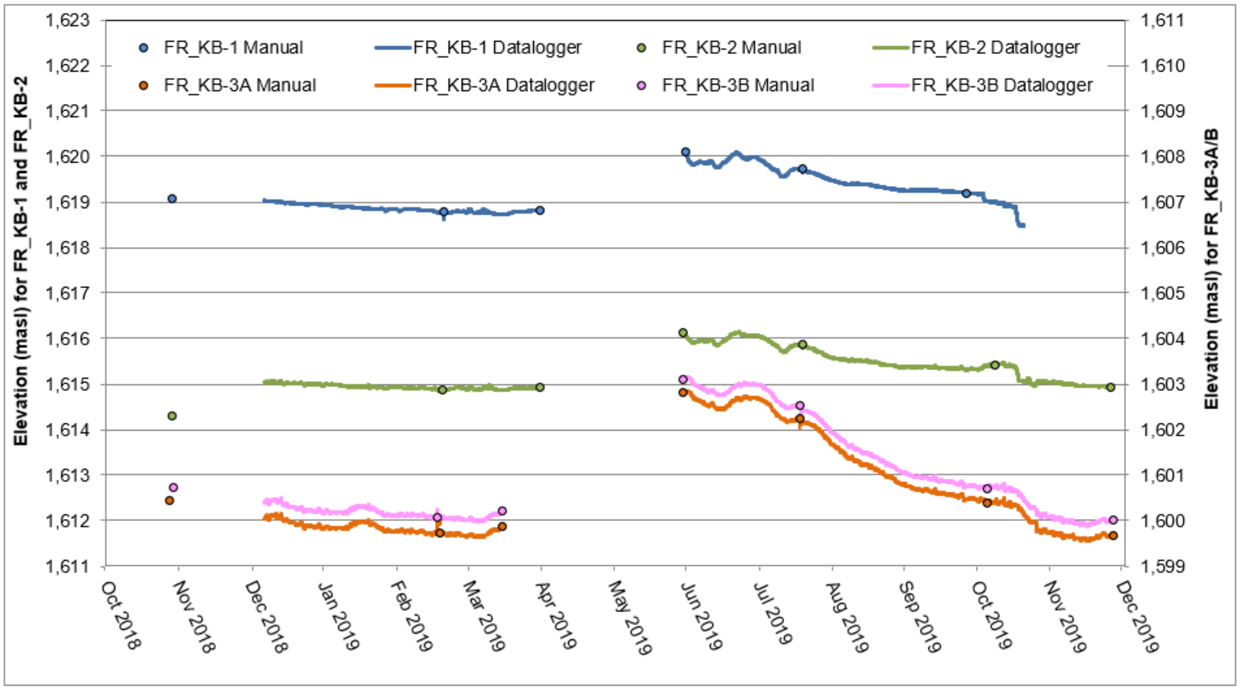

Figure 1: Hydrographs of Monitoring Wells in the Kilmarnock Creel Alluvial Fan Area

Water levels fluctuated by approximately 3.6 m and 3.1 m in 2019 at wells FR_MW-SK1A and FR_MW-SK1B, respectively (Figure 2). The hydrographs of all wells show similar seasonal trends, with highest groundwater levels after freshet in June and a decline throughout the remainder of the year. Lowest groundwater levels occur in late winter prior to freshet. Seasonal mounding of groundwater beneath SKP2 is also known to occur during freshet as water from the pond infiltrates to ground (SNC-Lavalin, 2019c), which would cause a temporary hydraulic flow barrier and radial flow from the pond until the mound dissipates.

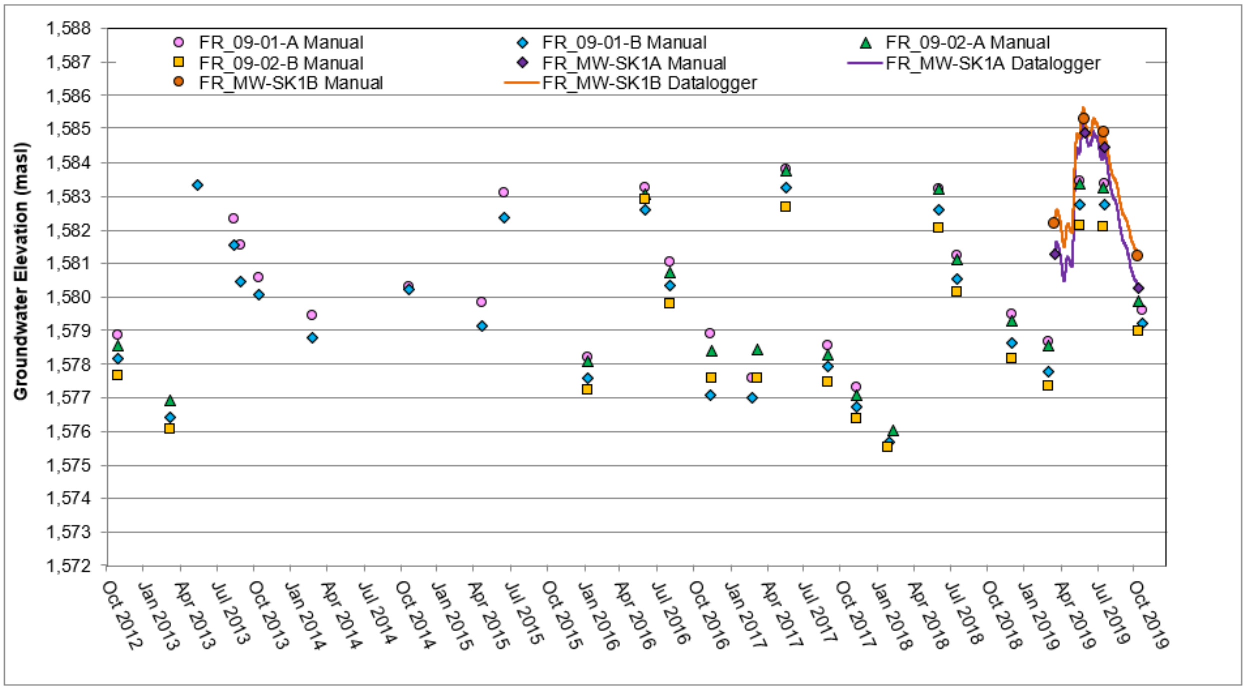

Figure 2: Hydrographs of Monitoring Wells in the Fording River Valley Bottom

Vertical hydraulic gradients within the Kilmarnock alluvial fan and in the vicinity of SKP2 are consistently downward between shallow and deep monitoring well pairs, except at well pair FR_MW-SK1A/B, where the gradient has been consistently upward (Figure 1 and Figure 2). In 2019, downward vertical gradients varied between 0.017 m/m at FR_KB-3A/B in June and July to 0.104 m/m at FR_09-02A/B in May. The variation in vertical gradients within well pairs suggests that the lateral component may be more important at times when the vertical gradient is lower. The upward vertical gradients at FR_MW-SK1A/B varied between 0.008 m/m in June to 0.02 m/m in October. The hydraulic gradient is inferred to be upward downstream where it is suspected that either the bedrock shallows or an aquitard that underlies the valley-bottom aquifer thickness causing groundwater discharge between the Greenhouse Side Channel and GH_PC2, although the magnitude of the gradient is not known due to a lack of monitoring wells.

3.5 Groundwater-Surface Water Interactions

Groundwater-surface water interactions in the S6 Study Area are transient. Groundwater-surface water interactions in the S6 Study Area are characterized below in terms of ‘regional-scale’ (i.e., on the order of kilometres) and ‘local-scale’.

3.5.1 Regional Groundwater-Surface Water Interactions

A number of lines of evidence are used to characterize the regional groundwater-surface water interactions in the S6 Study Area, including flow accretion surveys, drying surveys, and continuous surface flow data.

3.5.1.1 Flow Accretion Studies

The results of flow accretion studies completed along the Fording River and select tributaries in October 2019 and in the Greenhouse Side Channel in February 2020 are shown on Drawing 12. Flows measured in October 2019 are also shown below in Figure 3. The results show that the Fording River loses water to ground between near the STP at RG_FLA_FR14 and RG_FLA_FR11 approximately 4.5 km downstream. Considerable gains were made between station RG_FLA_FR11 and RG_FLA_FR09, while minimal gains or losses in flow were detected between RG_FLA_FR09 and RG_FLA_FR06 just downstream of Chauncey Creek.

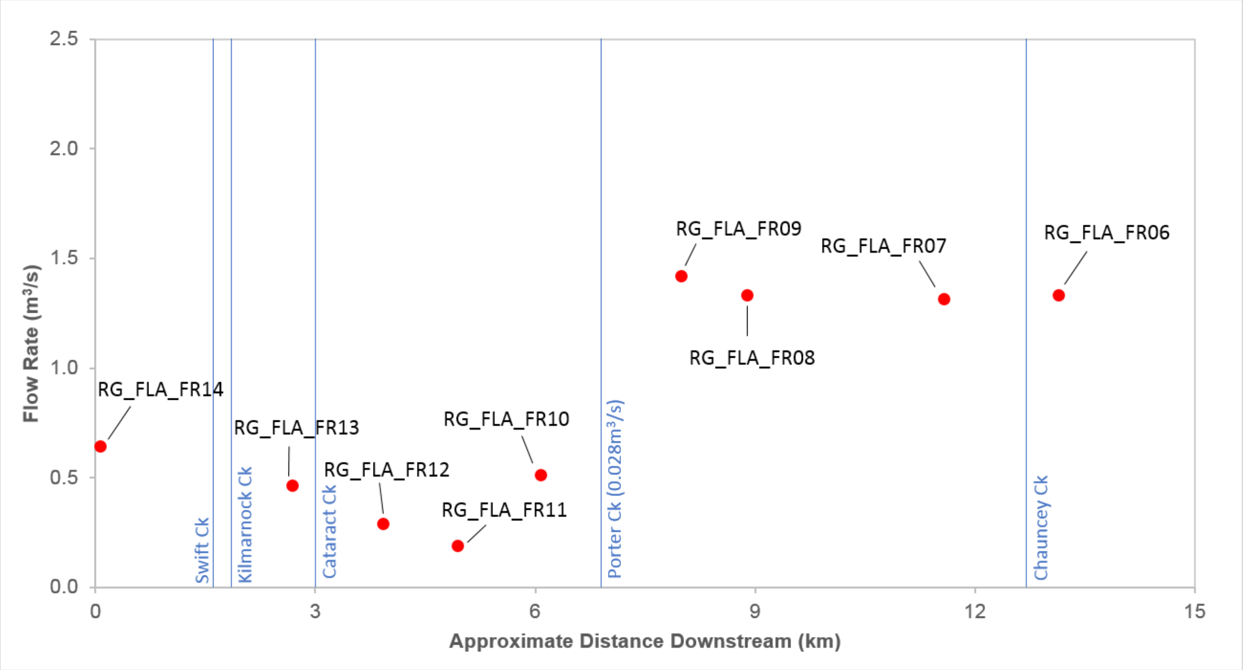

Figure 3: Measured Flows in the Fording River in October 2019

Flow accretion studies along this reach of the Fording River were completed by Kerr Wood Leidal Associates Ltd. (KWL) in September and October 2018 with similar results, shown on Drawings 13 and 14, respectively. In both studies, losses were measured between FR_FR2 and a station located between FR_FRCP1 and FR_FRRD, while gains were made from the station between FR_FRCP1 and FR_FRRD and a station downstream of Porter Creek (Teck Coal, 2019). The September and October 2018 flow accretion studies by KWL also included measurements made along Kilmarnock Creek which showed that the creek loses water to ground over the alluvial fan (Teck Coal, 2019). Similar results were also observed during flow accretion studies on Kilmarnock Creek in February and April 2019 (Teck Coal, 2019), which are shown on Drawings 15 and 16, respectively. A study completed in May 2019 showed Kilmarnock Creek gained flow in a short reach upstream of the new Active Water Treatment Facility (AWTF) intake, and lost flow over the alluvial fan downstream (Drawing 17; Teck Coal, 2019).

The Greenhouse Side Channel gained in flow by a factor of approximately four between the seepage area across the majority of its length, before losing approximately 15% of its flow over the final reach between RG_FRSC2 and RG_FRSC1. It was noted by SNC-Lavalin field personnel during the field work in February 2020 that the main stem of the Fording River was dry above the confluence with the Greenhouse Side Channel, and that the side channel was supporting flow in the main stem downstream.

3.5.1.2 Drying Surveys

Monthly drying surveys completed by Minnow Environmental Inc. (Minnow) and Lotic Environmental (Lotic) since 2017 support the observations in the flow accretion surveys. The surveys are completed between August and March as flow in the Fording River main channel between April and July are sufficient to sustain flow (Minnow and Lotic, 2019). The surveys are included in the mainstem dewatering SME report prepared by Ecofish (Hocking et. al, 2021). The surveys showed that an approximate 1.5 km long reach between an area just downstream of FR_FRCP1 and the confluence of the Fording River and the Greenhouse Side Channel was dry between December 2017 and March 2018 (Minnow and Lotic, 2018). In October 2018, an approximate 280 m reach terminating at the confluence of the main Fording River channel and the Greenhouse Side Channel was noted to be dry; however, water level data at a station (FR_FRCP1SW) located in the vicinity of RG_FLA_FR11 suggested that this reach likely started to dry in September 2018 (Minnow and Lotic, 2019). The dry reach extended to approximately 1,200 m in length in November 2018 and 1,650 m in length in December 2018 (Minnow and Lotic, 2019). Shorter dry sections were identified upstream of the Cataract Creek confluence in November 2018 (approximately 170 m long) and December 2018 (approximately 480 m long). Another dry reach approximately 630 m long between the outlet of SKP2 and FR_FR4 in December 2018 was also identified in December 2018 (Minnow and Lotic, 2019).

3.5.1.3 Continuous Flow Data

Continuous flow data collected at four surface water stations (FR_FRCP1, FR_FRCP1SW, FR_FRRD, and GH_PC2) since 2017 was provided by Lotic. The difference in discharge between successive stations is plotted on Figures 4 through 6 to illustrate the temporal variability of gaining or losing reaches, where a positive difference indicates gaining flow along the reach and negative indicates losses to ground[3]. The flow data indicate the reach between FR_FRCP1SW and FR_FRRD was consistently losing during low-flow, except for a period in September and early October 2018 when it was gaining (Figure 4). This gaining reach in September and October 2018 corresponds to the time that the channel went dry at FR_FRCP1SW, and the gain is therefore attributed to input from the Greenhouse Side Channel upstream of FR_FRRD.

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[3] It is noted that since stage-discharge curves could not be established at high flows, the data are considered reliable only during low-flow periods (Mike Robinson, pers. comm.).

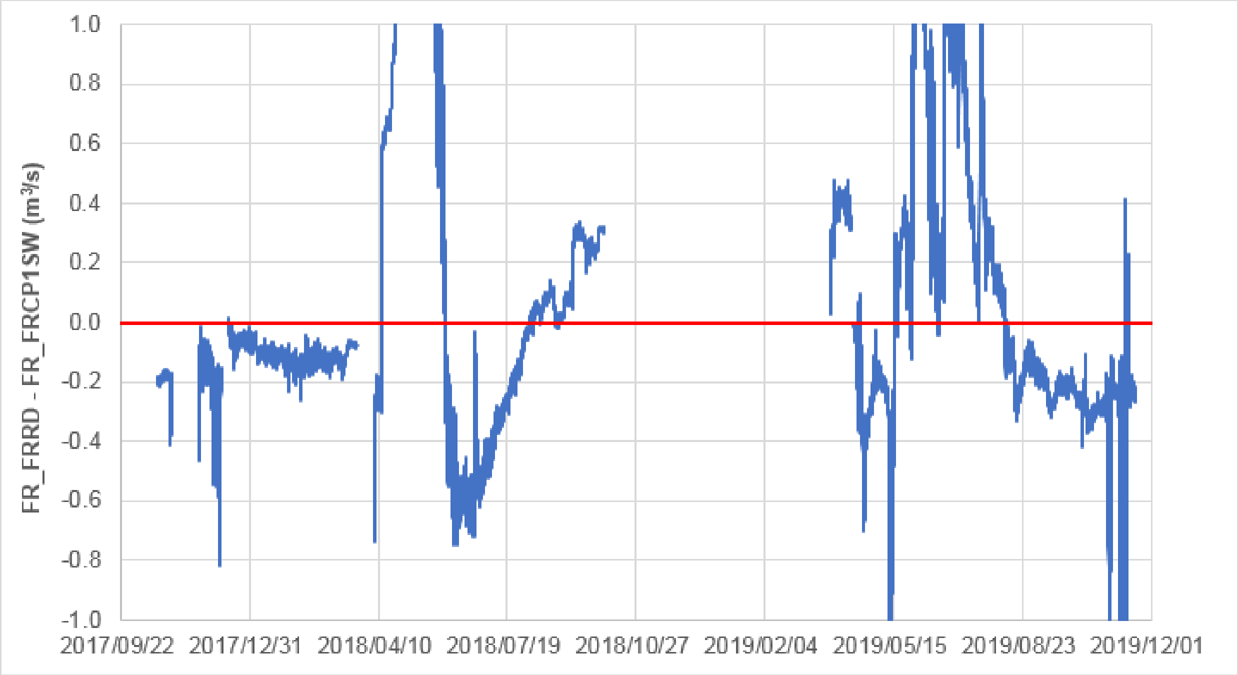

Figure 4: Discharge Difference between Stations FR_FRRD and FR_FRCP1SW

The reach between FR_FRRD and GH_PC2 (i.e., downstream of the Greenhouse Side Channel) was consistently gaining, except during periods of very high flow when flows at FR_FRRD are considerably higher than those at GH_PC2 (Figure 5). This may result from a large portion of these flows being diverted to the Fording River oxbow upstream of GH_PC2. The gaining reaches between FR_FRCP1SW and FR_FRRD and between FR_FRRD and GH_PC2 both support the evidence of the flow accretion studies and drying surveys.

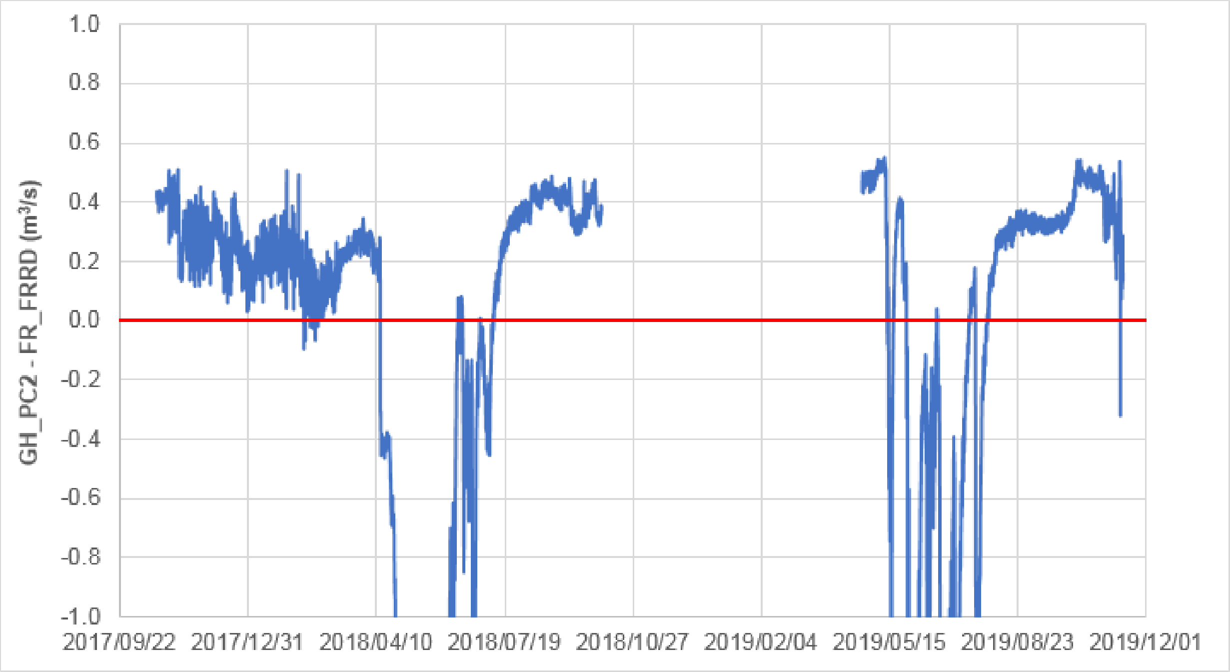

Figure 5: Discharge Difference between Stations GH_PC2 and FR_FRRD

However, there was a reach between FR_FRCP and FR_FRCP1SW that was gaining at times during low-flow (sporadically between October 2017 and March 2018 and between August and November 2019) (Figure 6). This is in contrast to both the flow accretion studies (which showed losses over this reach) and the drying surveys (which showed FR_FRCP1SW to be frequently dry during winter months). The data supported the flow accretion studies and drying surveys at other periods of low flow, showing losses or indicating FR_FRCP1SW was dry. Therefore, the gaining flows observed between FR_FRCP1 and FR_FRCP1SW are likely seasonal and localized.

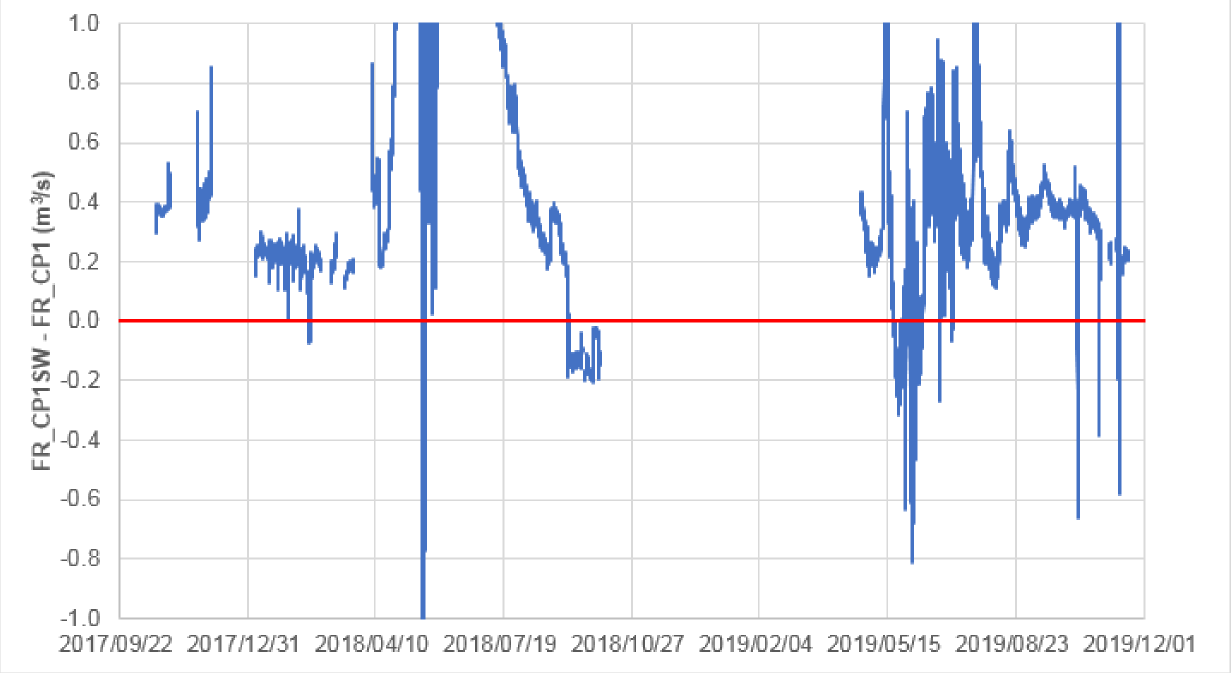

Figure 6: Discharge Difference between Stations FR_FRCP1SW and FR_FRCP1

3.5.1.4 Summary

Overall, the drying surveys and flow data suggest the reach of the Fording River between FR_FRCP1 and the confluence with the Greenhouse Channel frequently dries during the winter months, beginning at the downstream location and progressing upstream throughout the winter, with localized dry areas upstream of the compliance point that can also develop in late winter. There is also a localized reach of between FR_FRCP1 and FR_FRCP1SW which periodically and temporarily gains flow along this reach; however, the water gained in this portion of the channel is lost back to groundwater upstream of the Greenhouse confluence. There is evidence from analytical chemistry results of surface water and groundwater that there is another localized reach of groundwater discharge to the Fording River between FR_FR4 and FR_FRCP1 that occurs between late winter (February and March) and early summer (June and July). This is discussed further below in Section 3.6.4. The losing reaches over the Kilmarnock Creek alluvial fan and Fording River between the STP and the confluence with the Greenhouse Side Channel (and particularly the frequently dry reach between the compliance point and the confluence with the Greenhouse Side Channel) are considered noteworthy zones of groundwater recharge by streams.

The drying surveys also help to refine interpretation of the flow accretion studies, which broadly identified gaining flow over a reach both upstream and downstream of the confluence with the Greenhouse Side Channel. The information indicates that all gains made along this reach due to groundwater discharge occur after the confluence with the Greenhouse Side Channel, while upstream the main stem is generally considered to lose water to ground with localized exceptions noted above. Gains in flow may still be made upstream of the Greenhouse confluence at high flow, although this is considered more likely to come from surface runoff in the braided channels instead of groundwater discharge.

Therefore, a zone of regionally important groundwater discharge is considered to occur between the seepage area that feeds the Greenhouse Side Channel and station RG_ FLA_FR 09 (Drawing 5). This groundwater discharge zone has been noted to sustain flow in the main stem in the winter months. However, the discharge only occurs on the east side of the valley upstream of the confluence with the Greenhouse Side Channel. It is also noted that bedrock and/or the till/glaciolacustrine aquitard appeared to be shallower on the eastern side of the northernmost ERT survey (Line 3 on Drawing 9), approximately 350 m north of the Greenhouse Side Channel. Shallower bedrock or aquitard surface on the eastern side of the valley could explain why groundwater discharges further up-valley at the Greenhouse Side Channel compared to the rest of rest of the regional groundwater discharge zone.

Accounting for input from Porter Creek, the gain in flow during the October 2019 flow accretion event between stations RG_FLA_FR11 and RG_FLA_FR09 was 1.201 m^3/s, all of which is considered to have occurred downstream of the confluence with the Greenhouse Side Channel. With the caveat that the flow measurements in the Greenhouse Side Channel were made at another date (February 2020, but still during a low flow period), a summary where the flow gains were made is provided in Table D below. The table shows that the vast majority of flow gained in the regional groundwater discharge zone occurred in Side Channel 2 (45%) and in the main Fording River channel between the Greenhouse Side Channel confluence and RG_FLA_FR09 (49%), while the Greenhouse Side Channel itself only accounted for 6% of the flow gained.

Table D: Summary of Flow Gains in the Regional Groundwater Discharge Zone During October 2019 Study

Reach	Gain (m^3/s)	Percentage of Gain (%)
RG_FLA_FR11 to RG_FLA_FR09	1.201	100
Greenhouse Side Channel	0.0721	6.0
Greenhouse Confluence to RG_FLA_FR10(Upstream of Side Channel 2 Confluence)	0.2509	20.9
Side Channel 2	0.541	45.0
RG_FLA_FR10 to RG_FLA_FR09 (Main Stem only)	0.337	28.1

Analytical data for surface water samples collected from FR_FRABCH and station GH_PC2, located downstream of Porter Creek between the confluence with Side Channel 2 and RG_FLA_FR09, were reviewed to confirm the interpretations of flow contributions above. Concentrations of CI including dissolved selenium, sulphate, and nitrate as nitrogen (nitrate-N) were similar between the two stations, as were the ratios of nitrate-N to sulfate-S (discussed below in Section 3.6.5). This is an indication that the majority of the regional groundwater discharge occurs upstream of GH_PC2.

3.5.2 Local Scale Groundwater-Surface Interactions

There are additional local scale exchanges that occur within the Fording River valley, including between the regional discharge zone and WCT overwintering area in the vicinity of FR_FRABCH where no large scale interactions are known to occur. These interactions include bank storage effects and exchanges in the hyporheic zone. Bank storage refers to water stored in the banks of surface water channels. Recharge to the banks occurs during the freshet or flood stage when the hydraulic gradient is from the channel towards the banks. After the surface water levels in the channel have receded post-freshet, water stored in the banks will continue to be released and contribute flow to the channel for some time due to the gradient reversal towards the channel. The time period over which this occurs depends on the amount of water stored in the banks, the gradient, and the hydraulic conductivity of the channel banks, although the effects are typically most prevalent during the recession limb of a hydrograph (Kondolf et al., 1987). However, it has been found to be a significant contributor to baseflow in some lowland river systems (Rhodes et al., 2017).

Conceptual local scale exchanges are illustrated on Figure 7 and include meander, bedform, and bar driven exchanges. These exchanges have a high degree spatial and temporal variability as they are dependent on a number of variables including surface water and groundwater levels, river morphology, river gradient, and hydraulic properties of the streambed and valley-bottom deposits.

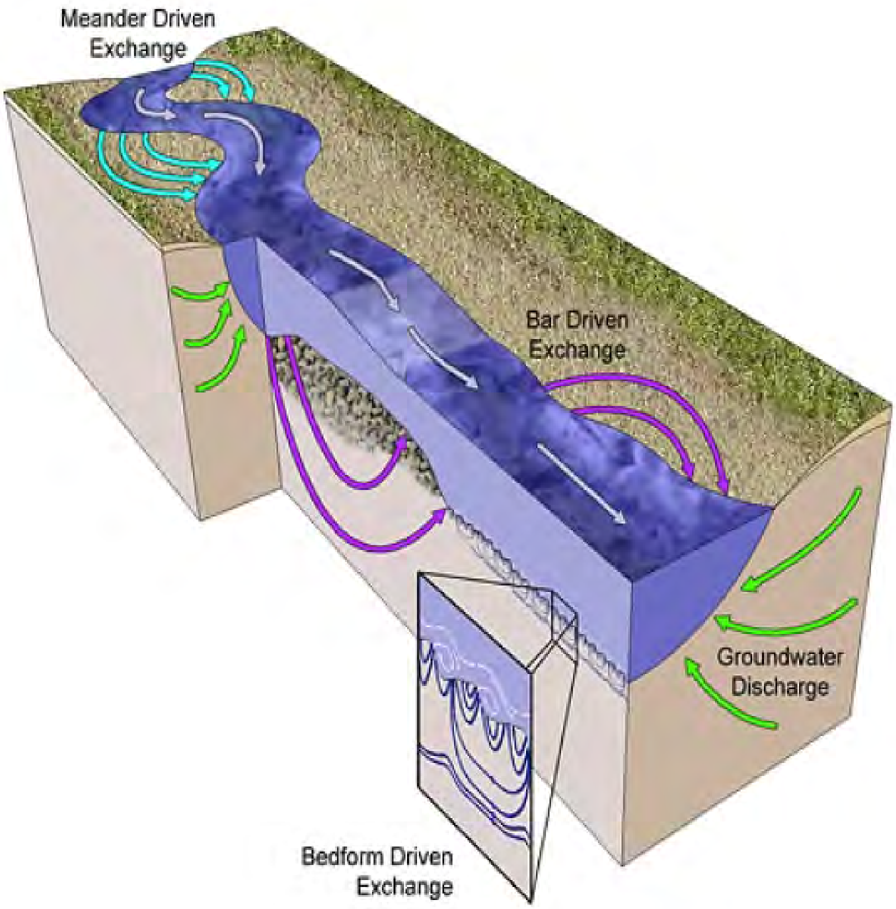

Figure 7: **Local-Scale Groundwater-Surface Water Interactions in the Hyporheic Zone (from Stonedahl et al., 2010)**

3.6 Groundwater Quality and Transport Pathways

Analytical results of groundwater samples collected from upgradient monitoring wells compared to the screening criteria are included in Table 1, while results of surface water samples, seepage water samples, and shallow groundwater samples collected in 2019 as part of the MBI are shown in Table 2.

3.6.1 Major Ion Chemistry

A piper plot showing major ion chemistry of upgradient groundwater, shallow groundwater, seepage water, and Greenhouse Side Channel surface water is included in Figure 8, while Figure 9 shows major ion chemistry in Kilmarnock Creek and the Fording River at FR_FRCP1 in 2019 along with samples collected from the Fording River during the flow accretion study in October 2019. Data shown on the plots are from 2019 rather than from across the entire span of the decline window (September 2017 to September 2019) since the 2019 data are more robust (and include data collected in support of the MBI program), and therefore are more appropriate to identify groundwater transport pathways of mine-influenced water.

The piper plots show that all surface water and groundwater samples collected are mixed calcium-magnesium-sulphate-bicarbonate water types. They also show that all groundwater, seepage water, and water from the Greenhouse Side Channel are within range of the compositions of surface water in Kilmarnock Creek at FR_KC1 and the Fording River at FR_FRCP1, and that the major ion chemistries of Kilmarnock Creek and the Fording River are similar. The plots highlight the strong relationship between surface water and groundwater in the S6 Study Area, which supports the strong linkages noted above in Section 3.5. However, due to differences in travel times, groundwater is expected to influence surface water quality in discharge areas, which is relevant when considering mine-influenced waters.

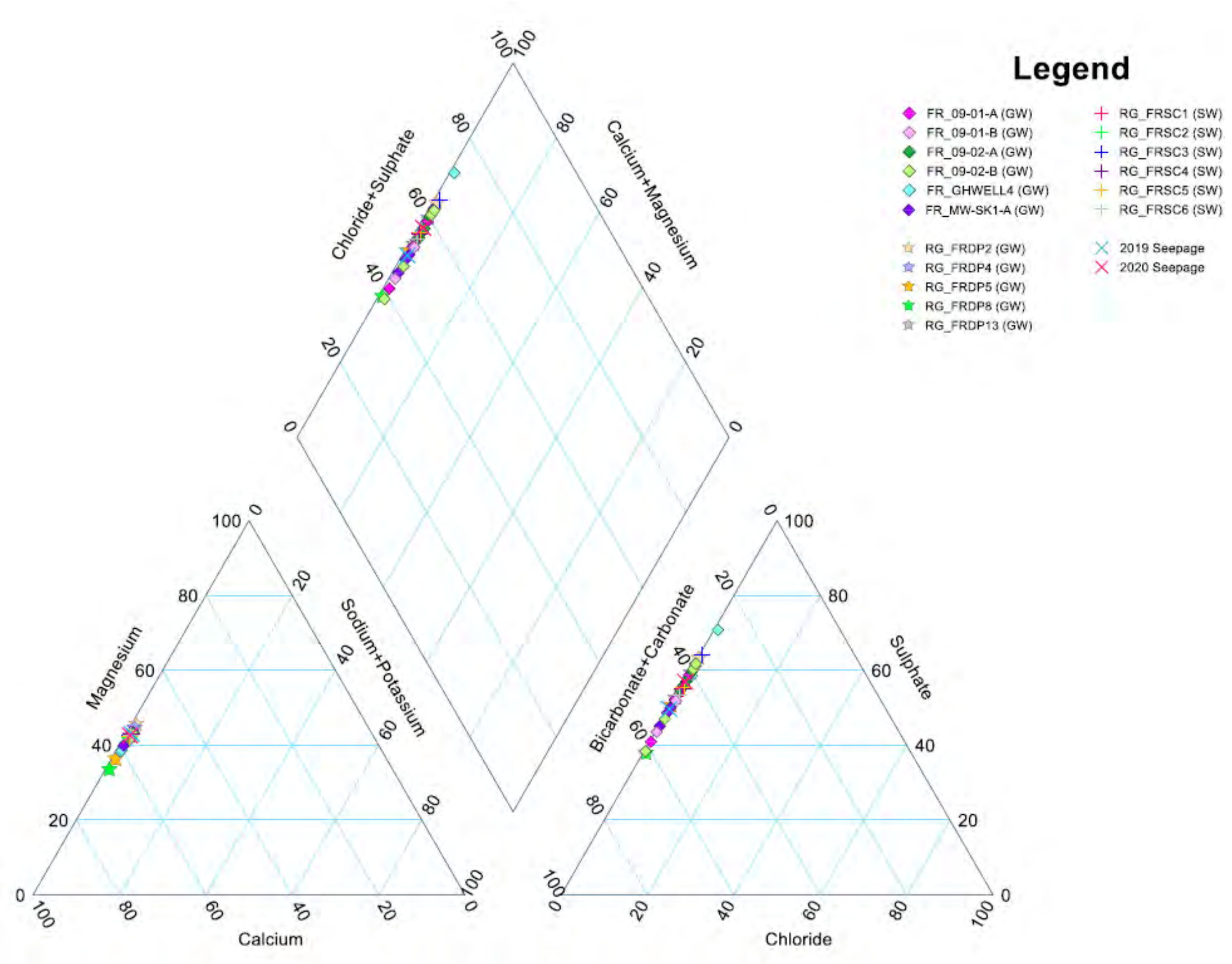

Figure 8: Major Ion Chemistry of Upgradient Monitoring Wells in 2019 as well as Shallow Groundwater, Seepage Water, and Surface Water in the Greenhouse Side Channel Collected in Support of the MBI.

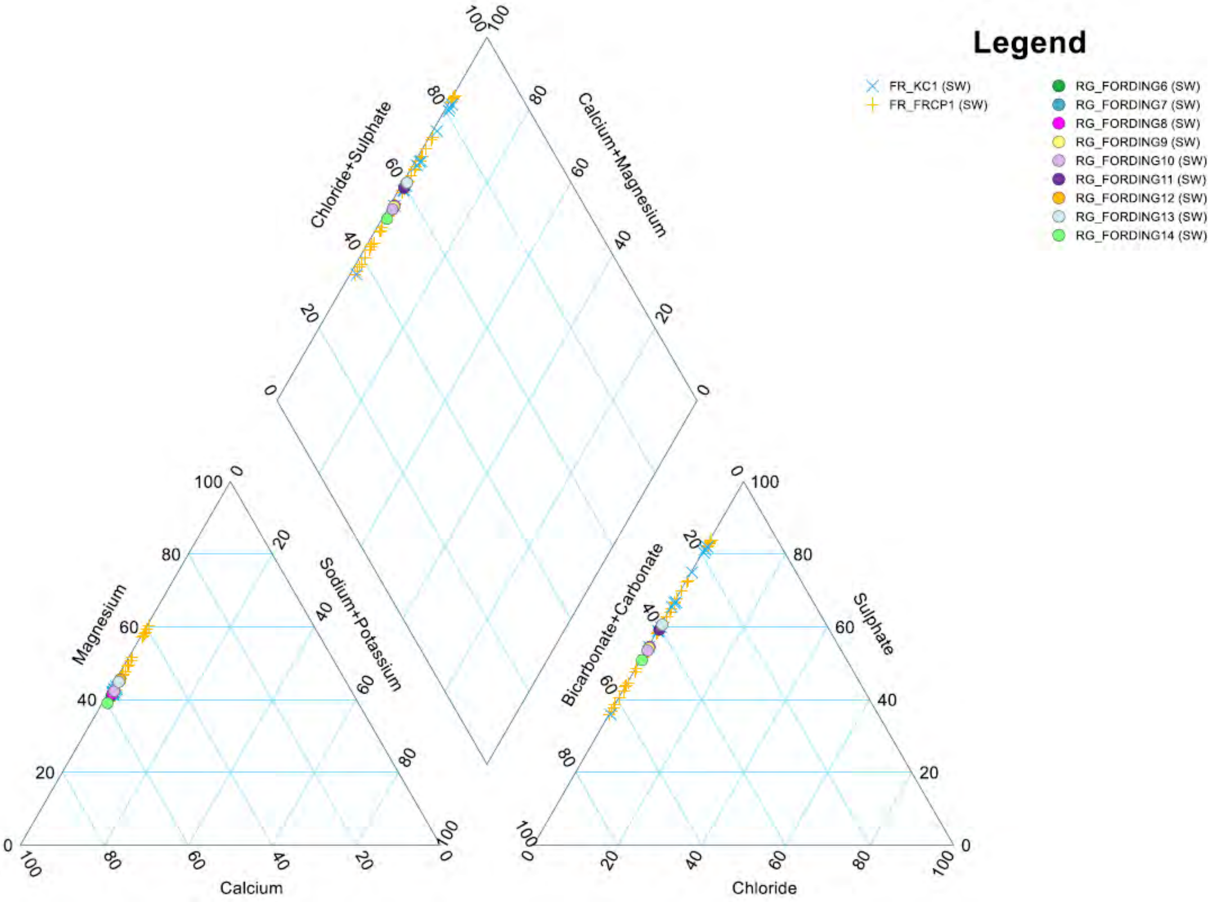

Figure 9: **Major ion Chemistry of Surface Water in Kilmarnock Creek at FR_KC1 and the Fording River at FR_FRCP1 in 2019, as well as of Surface Water in Samples Collected from the Fording River during the Flow Accretion Study in October 2019**

3.6.2 Mine-Influenced Waters in the S6 Study Area

Drawing 6 shows the ranges in concentrations of dissolved selenium in surface water and groundwater in 2019. Dissolved selenium was selected to be presented on Drawing 6 as it is considered to be the best indicator of mine influence in groundwater based on SNC-Lavalin's experience in the Elk Valley.

Mine influenced surface water enters the S6 Study Area via Kilmarnock Creek (FR_KC1), Swift Creek (GH_SC1), and Cataract Creek[4] (GH_CC1), as well as from inputs upstream of the S6 Study Area (captured at station FR_FR2). Groundwater quality in the Kilmarnock alluvial fan (FR_KB-1, FR_KB-2, and FR_KB-3A/B) is similar to that of Kilmarnock Creek as the creek loses water to ground over the thick permeable sediments of the alluvial fan.

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[4] Cataract Creek was diverted to Swift Creek in August 2019.

Groundwater quality in the vicinity of SKP2 (FR_09-01A/B and FR_09-02A/B) is influenced by Kilmarnock Creek seasonally during and post freshet (May to July). This is considered to be caused both by infiltration from SKP2 during freshet and due to a preferential flow path from Kilmarnock Creek along a former channel (discussed below in Section 3.6.4.).

Groundwater quality at FR_MWSK1A (located on the eastern side of SKP2) and FR_GH_WELL4 (located downstream on the central-eastern side of the valley) shows consistent influence of Kilmarnock Creek, suggesting a transport pathway of mine-influenced groundwater from the Kilmarnock alluvial fan down the eastern side of the Fording River valley. Groundwater quality at deep well FR_MWSK1B is not mine-influenced.

The presence of a pathway on the eastern side of the valley transporting mine-influenced groundwater from the Kilmarnock alluvial fan is also supported by the water quality of shallow groundwater at RG_FRDP_13, the Greenhouse Side Channel and the seepage area that feeds it. Shallow groundwater quality in the centre of the valley (RG_FRDP_2, RG_FRDP_4, RG_FRDP_5, RG_FRDP_8) also appears to be mine-influenced, although there is evidence that the Fording River below Swift and Cataract Creeks is a larger influence in the centre of the valley than Kilmarnock Creek (discussed below in Section 3.6.5).

Upgradient of Kilmarnock Creek and south of the STP (monitoring wells FR_09-04A/B), concentrations of CI (particularly selenium and nitrate-N) are influenced by the STP, and are attenuated by reduction. Groundwater quality on the eastern edge of the valley downgradient of the Greenhouse Side Channel at FR_MW_FRRD1 is also not mine-influenced, which is considered attributable to its location on the edge of the valley at higher elevation (the elevation of the well screen assembly is higher than the adjacent Fording River channel). Mine-influenced groundwater with lower CI concentrations is present on the western valley flank (GH_MW-PC), and is influenced by Porter Creek and the Porter Creek settling pond.

3.6.3 Transport Pathway Indicators

To investigate transport pathways of mine-influenced water from source areas in recharge zones to groundwater discharge zones, the ratios between nitrate-N and sulphate as S(NO_3^--N/SO_4^{2-}-S) in surface water and groundwater samples were reviewed. Inferred transport pathways are shown on Drawing 18, while the ranges and averages of NO_3^--N/$SO_4^{2—}$S are shown spatially on Drawing 19.

Figure 10 shows the NO_3^--N/SO_4^{2-}-S ratios in surface water in Kilmarnock Creek, Swift Creek, Cataract Creek, and several stations within the Fording River above and below SKP2, each of which are considered to influence groundwater quality through infiltration over losing reaches. The figure shows that water in Kilmarnock Creek (FR_KC1) is elevated in NO_3^--N/SO_4^{2-}-S ratios (range of 0.34 to 0.54) compared to other surface waters, while Swift Creek (GH_SC1; range of 0.04 to 0.07) and Cataract Creek (GH_CC1; range of 0.04 to 0.05) are much lower compared to Fording River water.

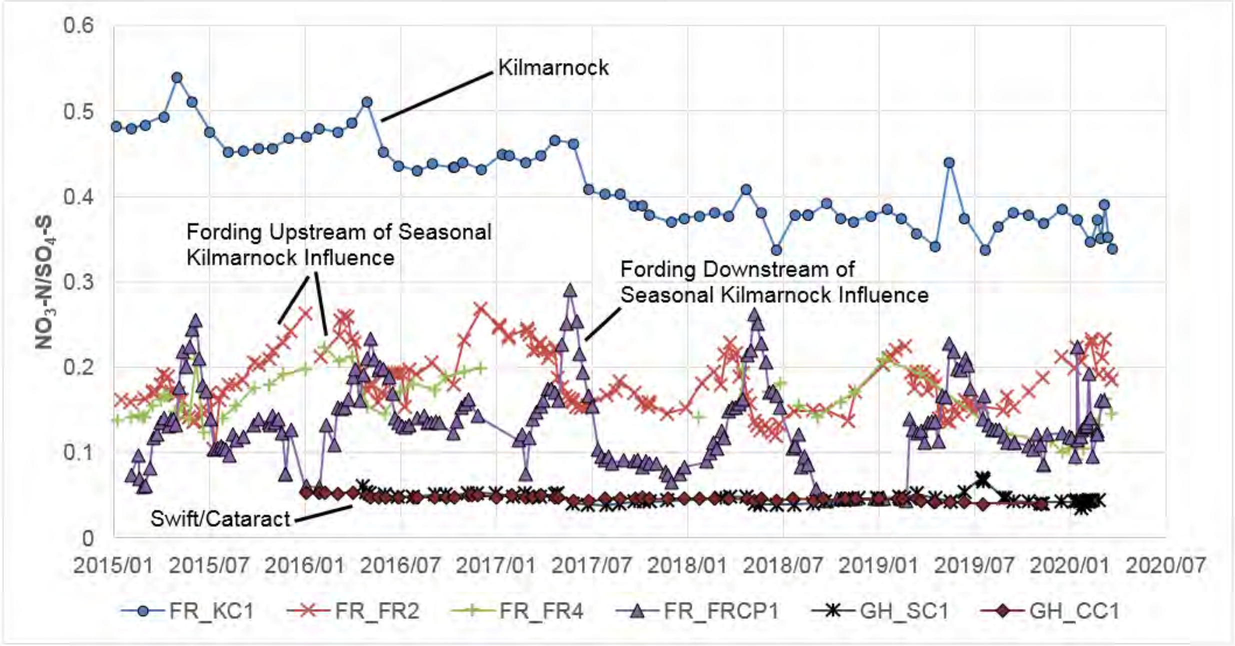

Figure 10: NO_3^--N/SO_4^{2-}-S ratios in Surface Water in Kilmarnock Creek, Swift Creek, Cataract Creek, and the Fording River above and below SKP2. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

Water in the Fording River above Kilmarnock, Swift, and Cataract Creeks (FR_FR2) shows a seasonal pattern where the NO_3^--N/SO_4^{2-}-S ratios are highest in winter and lowest during or after freshet in May and June. The opposite seasonal trend is observed in the Fording River below Swift and Cataract Creeks at FR_FRCP1, with elevated NO_3^--N/SO_4^{2-}-S ratios during and post freshet and lower ratios during winter. This is interpreted to result of the relative influences from Swift and Cataract Creeks during the winter months (between October 2018 and March 2019 the signature is entirely that of Swift and Cataract Creeks) and of Kilmarnock Creek between late winter (February and March) to early summer (June and July). The NO_3^--N/SO_4^{2-}-S ratios in the Fording River below SKP2 at FR_FR4 were similar to those upstream at FR_FR2 except for data after the summer of 2019, when the signature more closely resembled that of FR_FRCP1. This is noted to coincide with the diversion of Cataract Creek to Swift Creek.

3.6.4 Groundwater Transport of Kilmarnock Creek Influenced Water

It is interpreted that mine-influenced water from Kilmarnock Creek reaches the Fording River through groundwater via two pathways, including a longer pathway along the eastern side of the valley and a shorter pathway across the valley (Drawing 18). Evidence for the first pathway is presented on Figure 11, which shows the NO_3^--N/SO_4^{2-}-S ratios in surface water from Kilmarnock Creek, the Fording River at FR_CP1 and FR_FRRD, the Greenhouse Side Channel and seepage area, and groundwater in select monitoring wells along the inferred flow path.

The figure shows that groundwater at the Greenhouse wells (FR_GHHW) and the east side of SKP2 (FR_MW-SK1A) are strongly influenced by Kilmarnock Creek at all times. Groundwater in the Kilmarnock alluvial fan (FR_KB-3A) is similarly consistently influenced by Kilmarnock Creek[5], supporting the results from flow accretion studies. All seepage samples and surface water collected from the Greenhouse Side Channel, and a shallow groundwater sample (RG_FRDP13) collected near the seepage area showed the same ratio as Kilmarnock Creek. Water in the Fording River downstream of the Greenhouse Side Channel (FR_FRRD) shows seasonally elevated NO_3^--N/SO_4^{2-}-S ratios in the winter months, and lower ratios more representative of upstream Fording River water at other times when flows are higher. The elevated NO_3^--N/SO_4^{2-}-S ratios during winter months at FR_FRRD are considerably higher than the seasonal winter highs upstream at FR_FR2, and are interpreted to be due to a strong influence of groundwater transport originating from Kilmarnock Creek in the Greenhouse Side Channel.

The interpreted groundwater discharge zone(s) for groundwater recharged by Kilmarnock Creek and transported down the eastern side of the valley is the Greenhouse Side Channel, the seepage area feeding it, as well as the Fording River main channel on the eastern side of the valley before it crosses west downstream of FR_FRRD (Drawing 18). The minimal seasonality of the NO_3^--N/SO_4^{2-}-S signature in groundwater as well as the baseflow influence evident at FR_FRRD suggests that this pathway is continual and discharge occurs in this area year-round.

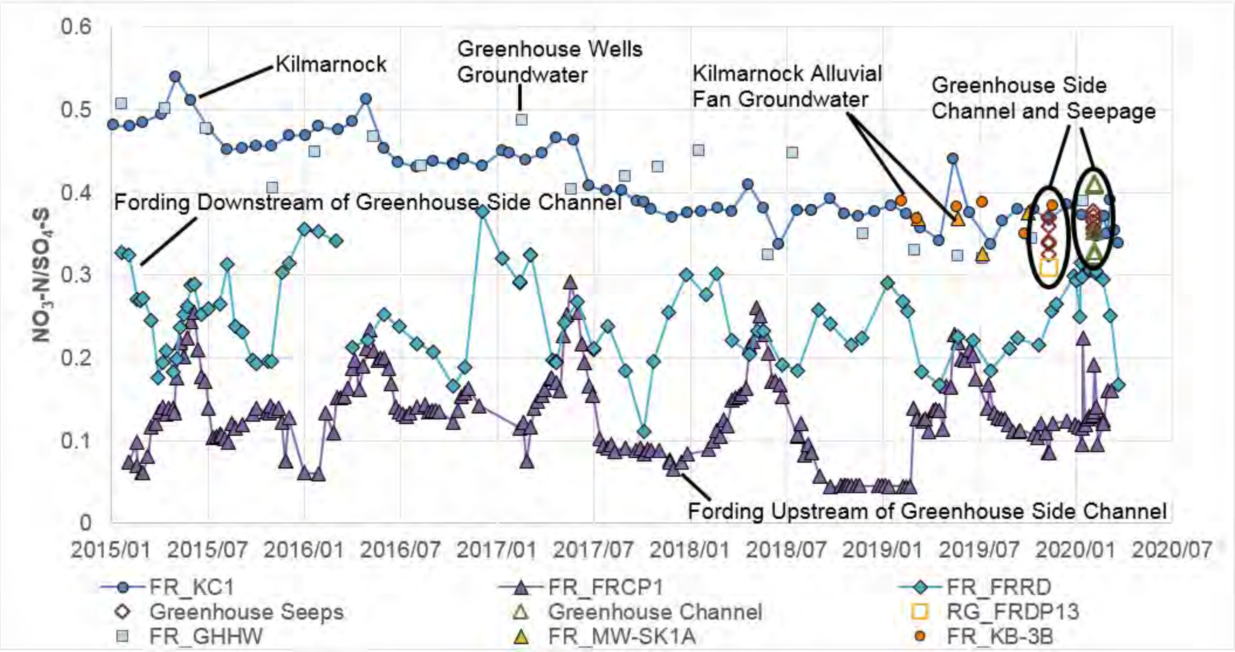

Figure 11: **NO_3^--N/SO_4^{2-}-S Ratios Indicative of the Eastern Transport Pathway between Kilmarnock Creek and the Greenhouse Side Channel. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data**

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[5] Although not shown on the plot, the NO_3^--N/SO_4^{2-}-S ratios of the other monitoring wells in the Kilmarnock Creek alluvial fan (FR_KB-1, FR-KB-2, FR-KB-3A) showed the same influence.

Evidence for the second groundwater pathway from Kilmarnock Creek across the valley to the Fording River is shown on Figure 12, which shows the NO_3^--N/SO_4^{2-}-S ratios in Kilmarnock Creek at FR_KC1, the Fording River at FR_FRCP1 and FR_FR4, and two monitoring wells (FR_09-01A/B) along the inferred flow path. The figure shows the seasonal influence of Kilmarnock Creek at Fording River station FR_FRCP1 described above, which begins in late winter and continues through early summer. This release is not considered attributable to direct release from the South Kilmarnock Phase 1 Settling Pond (SKP1) or SKP2, as water is released from these ponds only for a short duration around freshet. Also, no water was released from these ponds in 2016 or 2019, yet peaks in NO_3^--N/SO_4^{2-}-S ratios were still observed at FR_FRCP1. Moreover, the beginning of the rise in ratios in late winter follows a period of months when the ponds are dry and/or frozen, and the same rise is not observed in the Fording River at station FR_FR4 (which is also located downstream of SKP2). It is therefore concluded that the seasonal peaks in NO_3^--N/SO_4^{2-}-S ratios at FR_FRCP1 are due to seasonal groundwater discharge to the Fording River.

Further evidence of groundwater transport along this flow path is observed in the analytical results from groundwater monitoring wells FR_09-01A and 09-01B, where peaks in NO_3^--N/SO_4^{2-}-S ratios are observed coincident to those at FR_FRCP1[6]. These wells show peak NO_3^--N/SO_4^{2-}-S ratios which are close to that of the presumed source (FR_KC1) or intermediate in value between the FR_KC1 and FR_FRCP1.

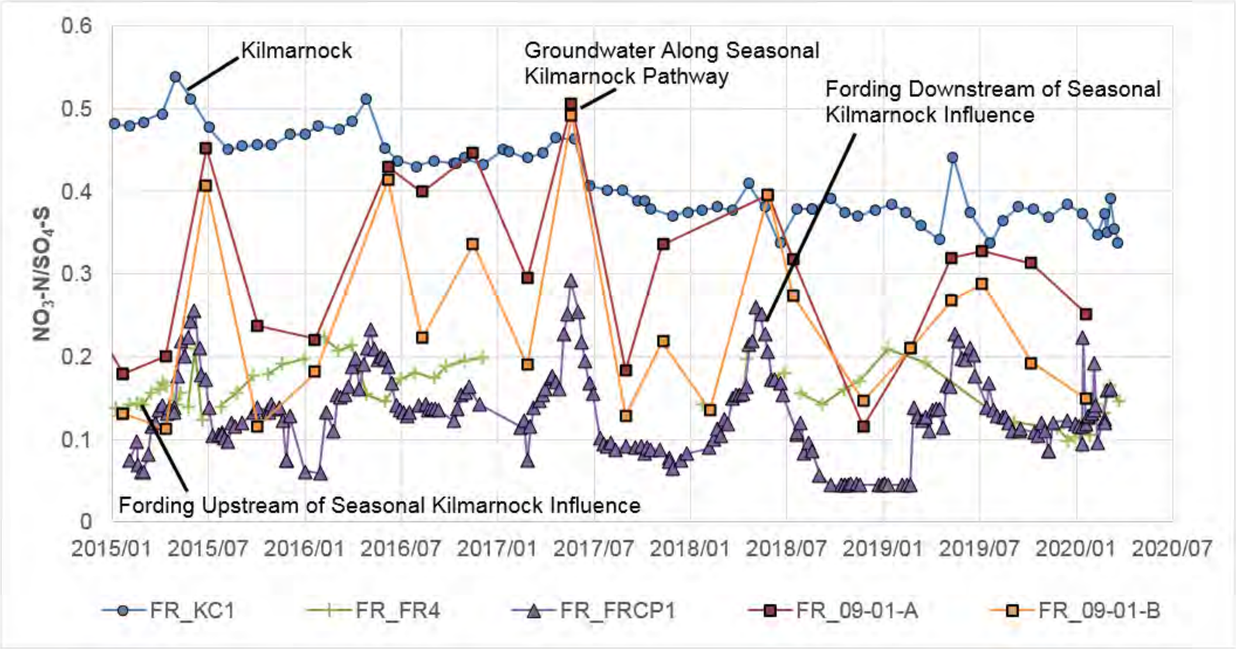

Figure 12: **NO_3^--N/SO_4^{2-}-S Ratios Indicative of a Cross Valley Pathway from Kilmarnock Creek to the Fording River. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data**

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[6] In most years the peaks in NO_3^--N/SO_4^{2-}-S ratios in the monitoring wells occur slightly after those observed at FR_FRCP1, which is inferred to be due to the lower sampling frequency of groundwater relative to surface water.

The pathway is interpreted to follow what appears to be a former Kilmarnock Creek channel (Figure 13). The former channel appears to extend approximately 1,700 m from Kilmarnock Creek alluvial fan, beneath the SKP2 to a small bend in the Fording River downstream of FR_FR4. A recent investigation by Golder (2020a) characterized a zone of high permeability gravelly sediments within the Kilmarnock Creek alluvial fan that likely representing preserved channel deposits, with progressively lower hydraulic conductivities in surrounding alluvial materials moving away from channel deposits. While this feature was only characterized on the alluvial fan portion of Kilmarnock Creek, it is probable that the higher permeability zone is extends along the entire length of former channels, including the one identified above, creating a preferential flow pathway from Kilmarnock Creek to the bend in the Fording River downstream of FR_FR4. The timing of the inferred discharge (i.e., beginning in late winter) suggests that the source of the groundwater discharge is Kilmarnock Creek rather than SKP2, which is dry and/or frozen in the months prior to discharge.

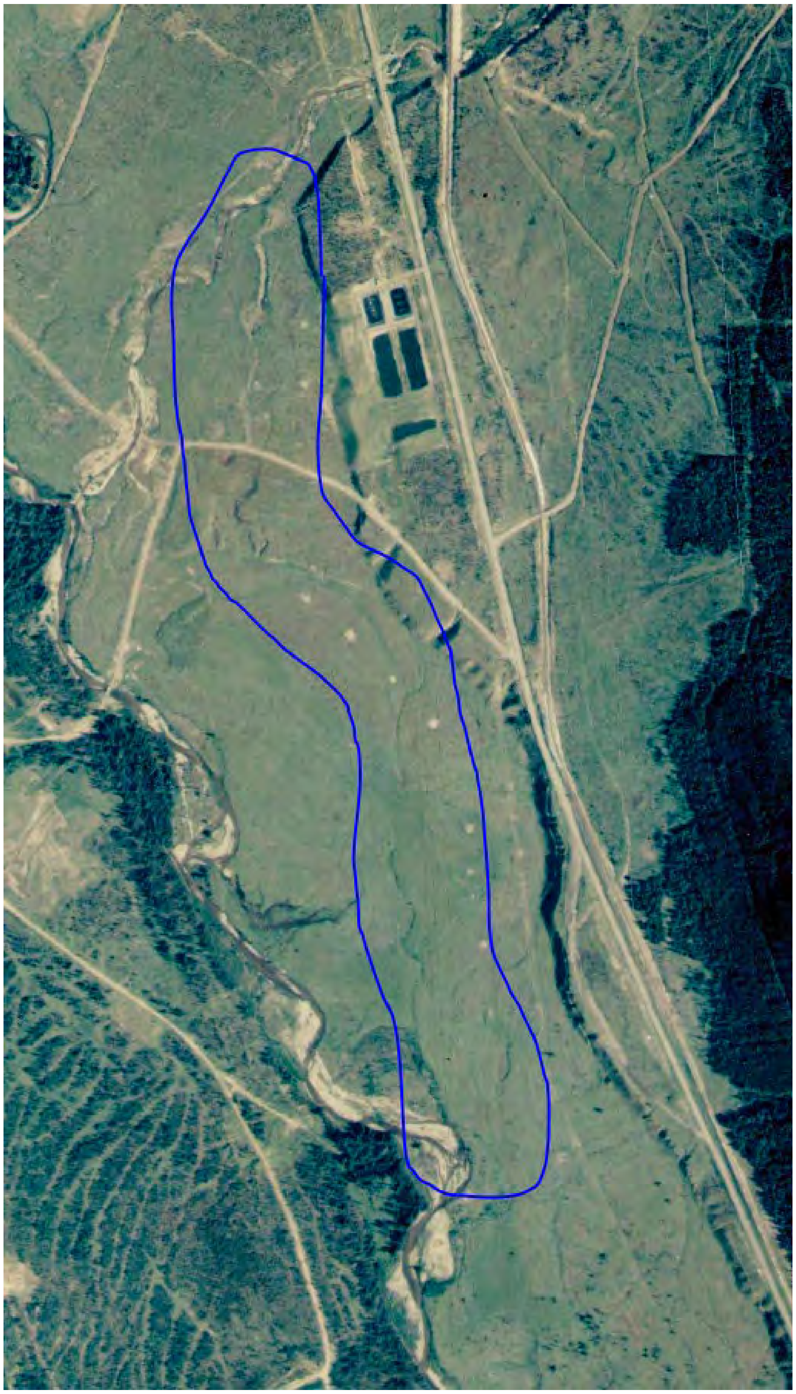

Figure 13: Former Channel believed to be that of Kilmarnock Creek Prior to Development of the Sediment Ponds. Air Photo Taken in 1990

3.6.5 Groundwater Transport of Fording River Mine-Influenced Water

Figure 14 shows the NO_3^--N/SO_4^{2-}-S ratios in surface water from Kilmarnock Creek (FR_KC1), the Fording River at upstream (FR_FRCP1) and downstream of the regional groundwater discharge zone (GH_PC2 and FR_FRABCH), the Fording River at three locations in the vicinity of the regional discharge zone, and shallow groundwater samples collected from the central valley. The NO_3^--N/SO_4^{2-}-S ratios in shallow groundwater in the central area of the valley upgradient of where the Fording River crosses from west to east were very low and similar to those observed in the Fording River at FR_FRCP1 during winter months. Nitrate stable isotope ($^{15}N_{nitrate}$) analytical results indicated two of the samples (RG_FRDP5 and RG_FRDP8) were enriched in $\delta^{15}N_{nitrate}$, suggesting that the nitrate-N n these samples may have been attenuated by denitrification. Field measured parameters support reducing conditions at these locations, with low oxidation-reduction potential (ORP) values of 5.9 mV and -89.6 mV at RG_FRDP5 and RG_FRDP8, respectively, and a low dissolved oxygen (DO) value of 0.43 mg/L measured at RG_FRDP5 (Table 2).

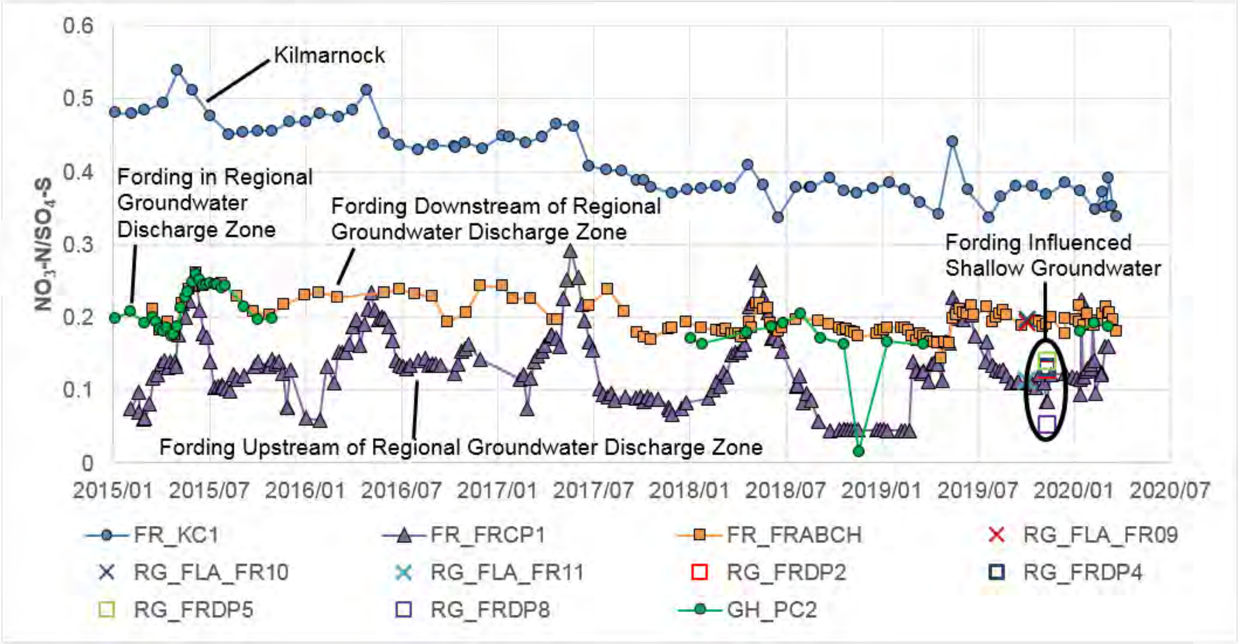

Figure 14: **NO_3^--N/SO_4^{2-}-S Ratios Indicative of the Influence of Groundwater Recharged by the Fording River on Fording River Surface Water Downstream of the Regional Groundwater Discharge Zone. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data.**

However, the stable isotope results and field redox indicators of the samples collected from RG_FRDP2 and RG_FRDP4 indicate that no denitrification occurred. This suggests that the low NO_3^--N/SO_4^{2-}-S ratios at these locations show influence of Swift and Cataract Creeks, and it is interpreted that the source of this water is the Fording River where it loses to ground (i.e., characteristic of recharging water at FR_FRCP1 in winter).

The NO_3^--N/SO_4^{2-}-S ratio in the sample collected from RG_FLA_FR11 is similar to that at FR_FRCP1 around the time of the decline, which is located upstream of RG_FLA_FR11. The NO_3^--N/SO_4^{2-}-S ratios in the samples collected at RG_FLA_FR10 and RG_FLA_FR09 are similar to those detected downstream at FR_FRABCH around the time of the event. The NO_3^--N/SO_4^{2-}-S ratios downstream at FR_FRABCH shows less seasonality (range of 0.14 to 0.26) than the other stations in the Fording River, including FR_FR2, FR_FR4, FR_FRCP1, and FR_FRRD. The water at FR_FRABCH is considered an integrated signal of all inputs, including those of the Fording River upstream as well as of the regional groundwater discharge zone.

During the low flow season, the NO_3^--N/SO_4^{2-}-S signature at FR_FRABCH is entirely representative of the regional groundwater discharge zone as the Fording River dries upstream of the discharge zone. The NO_3^--N/SO_4^{2-}-S ratios at FR_FRABCH between October and March range from 0.17 to 0.24 with an average of 0.19, indicating that the Fording River (average NO_3^--N/SO_4^{2-}-S ratio of 0.13 at FR_FRCP1) transport pathway rather than Kilmarnock Creek (average NO_3^--N/SO_4^{2-}-S ratio of 0.41 at FR_KC1) is the dominant source of discharge in the regional groundwater discharge zone. The restricted range in NO_3^--N/SO_4^{2-}-S ratios at FR_FRABCH compared to FR_FRCP1 (range of 0.04 to 0.29) is an indication that water is well mixed along the flow path between the Fording River and the discharge zone.

With the exception of one result in December 2018, the NO_3^--N/SO_4^{2-}-S ratios at GH_PC2 are very similar to those of FR_FRABCH. The similar signatures are an indication that there are minimal mine-influenced inputs along the Fording River between GH_PC2 and FR_FRABCH. They also support the flow data, suggesting the majority of the regional groundwater flow discharges upstream of GH_PC2 and gains between GH_PC2 and RG_FLA_FR09 or in the oxbow channel due to groundwater discharge are minimal. The major discharge zones groundwater recharged by the Fording River transport flow path is interpreted to be in Side Channel 2 and in the Fording River main channel between FR_FRRD and GH_PC2, as shown on Drawing 18.

3.6.6 Estimated Travel Times

Travel times were estimated for the pathways described above for groundwater recharged by Kilmarnock Creek or the Fording River to the receiving environment, including:

i) From the Kilmarnock Creek alluvial fan to Greenhouse Side Channel seepage area (approximate distance of 3,100 m);

ii) From the Kilmarnock Creek alluvial fan to the bend in the Fording River between FR_FR4 and FR_FRCP1 (approximate distance of 1,700 m); and

iii) From the Fording River channel to Side Channel 2 at the nearest point (approximate distance of 150 m), and from where the Fording River begins to lose in the vicinity of FR_FR2 to Side Channel 2 (approximate distance of 4,400 m).

Travel times were calculated using the following version of the Darcy Equation:

$$T = dn_e/Ki$$

Where:

T = travel time
i = hydraulic gradient
d = distance
K = hydraulic conductivity
n_e = effective porosity

For pathways i) and ii), the range of observed hydraulic gradients (0.006 m/m to 0.008 m/m) and hydraulic conductivities equivalent to the geometric mean (7.3×10^{-4} m/s) and upper 95th percentile confidence interval (4.0×10^{-3} m/s) were used. For pathway ii), the observed hydraulic gradient in the vicinity of SKP2 of 0.007 m/m and hydraulic conductivities ranging from 2.0×10^{-3} m/s to 4.0×10^{-3} m/s were used. An effective porosity of 0.3 representative of sands and gravels was used in all travel time estimates. The range in hydraulic conductivities used for pathway ii) are based on the range detected by Golder (2020a) representative of the channels within the Kilmarnock Creek alluvial fan, since the pathway is considered to be within a former channel.

The travel time estimates are shown on Drawing 18. The upper end of the ranges (6.8 years between the Kilmarnock alluvial fan and Greenhouse Side Channel, and 120 days to 9.6 years from the Fording River to Side Channel 2) are considered estimates of the average groundwater transport time through the valley-bottom aquifer. These average transport times through the valley-bottom may be biased high based on the tendency for monitoring wells to be completed in zones of higher permeability, as noted above in Section 3.4.1. However, there also exists the potential for one or more higher-velocity, preferential pathways to exist. Sediments within the valley-bottom aquifer comprise a combination of high energy/high permeability sand and gravel deposits interspersed with lower energy/lower permeability deposits of silts and sands from overbank flooding, crevasse splays and abandonments. Over time, as the main river channel migrated within the meander belt of the valley-bottom aquifer, most older channel deposits are likely to have been eroded and re-worked. Some of these high energy channel deposits may have been preserved within the sediment column, however. This may occur following an extreme flooding event leading to a sudden shift in the location of the main river channel. A preserved channel deposit is likely to act as a preferential flow path along which groundwater can travel at a much higher velocity.

There are some indications that such preferential pathways are present in the valley, including the pumping test result at FR_GHWELL4 described above in Section 3.4.1 and the hydraulic conductivity estimates of channel deposits described from pumping tests in the Kilmarnock alluvial fan (Golder, 2020a). Golder developed a numerical model in support of AWTF-South application at FRO, in which the final calibrated hydraulic conductivity for the valley-bottom aquifer was 2.0×10^{-3} m/s (Golder, 2019b). The model derived travel time using particle tracking from Kilmarnock Creek to an area roughly corresponding to the confluence of the Fording River and the Fording River Oxbow was slightly less than one year. It is considered likely that transport within the valley occurs both preferentially through preserved high permeability channel deposits and as representative of average aquifer conditions.

The travel time estimates from the Kilmarnock Creek alluvial fan across the valley to the Fording River between FR_FR4 and FR_FRCP1 ranged from 211 to 410 days. There is a strong degree of seasonal variability in the NO_3^--N/SO_4^{2-}-S ratios of groundwater along this flow path and in surface water downstream of the discharge point. The temporary nature and timing of the discharge suggests that the source is a pulse of water from Kilmarnock Creek during freshet of the preceding year, which takes approximately 9 to 10 months to travel the length of the former channel and reach the discharge point at the bend in the Fording River.

4 Stressor 1 – Groundwater Quantity in the S6 Study Area

4.1 Impact Hypothesis and Rationale

Although groundwater cannot be a stressor that directly contributed to the WCT population decline because it does not constitute WCT habitat, groundwater discharge does affect surface water flows within WCT habitat. With that in mind, the impact hypothesis to evaluate groundwater quantity as a potential stressor states:

- A change in the upgradient groundwater flow regime influenced surface water flows and spatial distribution of discharge zones.

The rationale for investigating upgradient groundwater conditions is that there is limited information available downstream in the inferred area of regional groundwater discharge and the S6 area in general. A lack of monitoring wells in the S6 area prevents direct evaluation of the downstream groundwater flow and discharge estimates. However, downstream effects can be inferred from observations made in upgradient groundwater. Historical groundwater level data in upgradient monitoring wells were therefore reviewed to assess whether any corresponding changes to groundwater discharge rates or locations were considered likely during the decline window.

4.2 Analyses

Historical hydrographs of monitoring wells completed in the Kilmarnock Creek alluvial fan since 2018 and in the vicinity of SKP2 since 2012 are shown above on Figures 1 and 2 in Section 3.4.2, respectively. These hydrographs comprise the entire historical record of groundwater levels in these areas. Potentiometric elevations and inferred contours during low-water (Q1 2019) and high water (July 2019) are shown are Drawings 8 and 9, respectively. The year 2019 was selected to produce contour maps as the monitoring event datasets are more comprehensive (the monitoring wells in the Kilmarnock alluvial fan were installed in late 2018). Potentiometric elevations and inferred groundwater flow maps from previous events during fall 2016 (SNC-Lavalin 2017b, fourth quarter Q4 of 2017 (SNC-Lavalin 2018), and Q4 of 2018 (SNC-Lavalin 2019d) were also reviewed and the flow regime in 2019 was consistent with previous years.

4.3 Findings

The hydrographs show that seasonal water level fluctuations have remained consistent throughout the monitoring period at all wells. Water levels are highest in June post-freshet and decline throughout the remainder of the year and into the next, with the lowest water levels in late winter or early spring prior to freshet. Although the records of monitoring wells east of SKP2 and within the Kilmarnock Creek alluvial fan only extend to late 2018 and early 2019, water levels were measured continuously with dataloggers and the seasonal patterns observed were consistent with those observed historically at monitoring wells FR_09-01A/B and FR_09-02A/B where the historical record is more extensive.

South of the SKP2, the lowest water levels were measured in February 2018, while the highest were measured in late May (May 30) 2013 and early June (June 1) 2017. Peak and low water levels observed over the decline window between September 2017 and September 2019 at these wells were within the historical range, except for the low water levels noted in February 2018 which were marginally lower than other late winter monitoring events. There is nothing unique to the decline window about the groundwater levels that would result in a hydraulic gradient down-valley that would abnormally affect discharge rates, and it is noted that discharge at FR_FRABCH was slightly higher over the winter of 2017/2018 than 2018/2019 (discussed below in Section 4.4.1) despite the minimum water levels observed in February 2018. Similarly, there are no historical anomalies in the record that would result in an expected change in groundwater flow directions. Inferred groundwater flow directions of all events reviewed between 2016 and 2019 were consistent.

However, a number of data gaps during the evaluation of Impact Hypothesis 1, including:

- Interpretations of down-valley groundwater flow are limited by the spatial distribution of the monitoring well network throughout the S6 Study Area, as transects of monitoring wells in the cross-valley direction are not present. In particular, there is a gap in the down-valley direction where there is known transport of mine-influenced groundwater and also where groundwater extraction occurs from the Greenhouse Wells. The limited monitoring well network also results in a lack of groundwater level data in the inferred regional groundwater discharge zone and downgradient of it, which is an area of key WCT habitat;
- The effects of groundwater extraction from the Greenhouse Wells on the groundwater flow regime and flows in the Fording River are not known, as there are a lack of water-level data in the area. Groundwater extraction from the Greenhouse Wells is discussed further below in Section 8.1.2;
- The monitoring periods for wells in the Kilmarnock Creek alluvial fan and east of the SKP2 are short and extend only to Q4 of 2018 or Q1 of 2019; and
- Datalogger data are not available to supplement manual measurements in the wells south of the SKP2, and therefore historical minimum or maximum elevations or anomalous events may have been missed. However, it is noted that the same seasonal variability was noted for the short period of time where logger data are available at the wells in the Kilmarnock Creek alluvial fan and FR_MW-SK1A/B.

4.4 Other Relevant Observations and Findings

4.4.1 Discharge at FR_FRABCH

Preliminary and final average daily discharge data since 2017 at station FR_FRABCH provided by Teck Coal was also reviewed. Baseflow at FR_FRABCH is interpreted to be composed entirely of groundwater discharge of the regional groundwater discharge zone.

The discharge data are shown on Figure 9. Discharge during the winters of 2017/2018 and 2018/2019 were similar, although slightly higher in 2017-2018. Daily discharge ranged from 0.82 m^3/s to 1.44 m^3/s between November 1 and March 15 in the winter of 2017/2018 with an average of 0.96 m^3/s, compared to a range 0.67 m^3/s to 1.01 m^3/s with an average of 0.84 m^3/s over the same time period during the winter of 2018/2019. Data are missing between February 4 and March 5, 2019, which corresponds to the suspected time of the population decline (Korman in Evaluation of Cause Team, 2021). The missing data are likely attributable to the extreme cold temperatures during that time. However, based on flows observed prior to and following this data gap as well as baseflows during the previous winter, high variability of groundwater discharge (upwelling) during this time period is not considered to likely to have occurred.

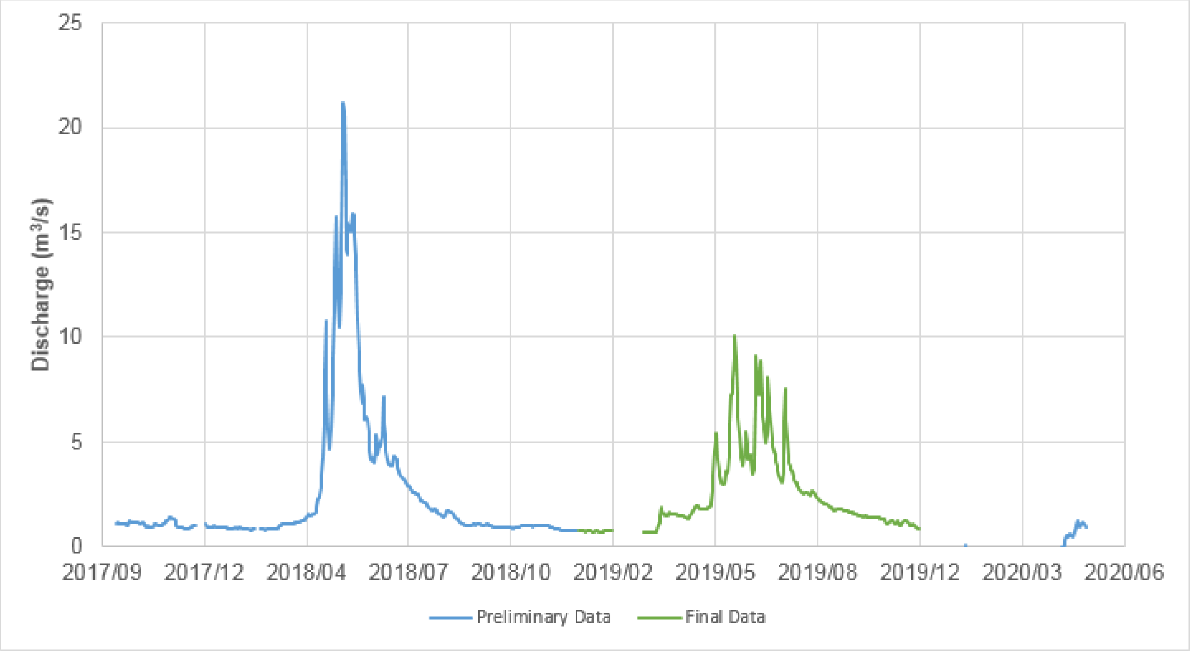

Figure 15: Discharge Data at FR_FRABCH since 2017

4.5 Effects on Surface Water Flows and Spatial Distribution of Discharge Zones

There is no evidence in the available data to suggest that groundwater discharge zones or flows have changed or would reasonably be expected to change spatially over the period of record, nor over the timeframe of the decline (2017 to 2019). Current understanding of the discharge locations that comprise the regional groundwater discharge zone is as described in the conceptual model above, and includes the Greenhouse Side Channel, Side Channel 2, and the Fording River main channel between the Greenhouse confluence and GH_PC2. The primary controls on the groundwater discharge (upwelling) area are subsurface hydraulic conductivities and bedrock/aquitard topography, both of which will be constant.

However, the rate of discharge should vary according to the seasonal change in gradient caused by water level fluctuations upgradient. In order to evaluate the amount of seasonal variability in discharge that could be expected, groundwater flows were estimated using gradients calculated from the range of water levels observed in upgradient monitoring wells according to Darcy’s Law:

$$Q = KAi$$

Where:

- Q is the Darcy flow;
- K is the hydraulic conductivity of the medium; and
- A is the cross-sectional area through which groundwater is flowing, and i is the gradient (head loss over distance).

The hydraulic conductivity used in the calculation was the geometric mean (7.3 x 10^{-4} m/s) presented in Table C above. The cross-sectional area used was 14,000 m^2 corresponding to an approximate aquifer thickness of 25 m and valley width of 560 m in the vicinity of the Greenhouse confluence. The range of gradients used were 0.005 m/m and 0.009 m/m corresponding to historical minimum and maximum water levels observed south of SKP2 in February 2018 and June 2017, respectively.

The resulting range of estimated Darcy flow is 0.051 m^3/s to 0.091 m^3/s, indicating seasonal discharge in the regional discharge zone could vary by up to a factor of 1.8. However, this estimated range is approximately an order of magnitude lower than the range of baseflows measured at FR_FRABCH in the winters of 2017/2018 and 2018/2019 (approximately 0.7 m^3/s to 1.0 m^3/s), which are considered to be attributable to discharge entirely from the regional discharge zone.

It is considered likely that the vertical component of groundwater flow will be more dominant in the zone of upwelling groundwater. It may also be that the hydraulic conductivity in the regional groundwater discharge zone is more representative of the conductivity of high permeability channel-deposits (on the order of 2.0 x 10^{-3} m/s to 4.0 x 10^{-3} m/s; Golder, 2020a) and higher than the geometric mean hydraulic conductivity of the shallow valley-bottom aquifer. If the hydraulic conductivities were in the higher range of the channel deposits, baseflows similar to the range measured at FR_FRABCH could be expected if the vertical gradient were three to five times that of the observed horizontal gradient[7]. Therefore, groundwater discharge is considered to be more highly sensitive to variability in the vertical hydraulic gradient than in variability in the lateral hydraulic gradient caused by water level fluctuations upgradient.

Based on the above, the range of observed lateral hydraulic gradients are unlikely to have critically affected downstream groundwater discharge rates over the decline period. The variation in vertical hydraulic gradient likely has a much greater influence on the amount of groundwater discharge, however, vertical gradients in the regional groundwater discharge zone are unknown. It is noted that baseflows measured at FR_FRABCH spanning the decline window in the winters of 2017/2018 and 2018/2019 were generally similar, as noted in Section 4.4.1 above. Without baseflow data prior to 2017/2018, it cannot be determined whether vertical gradients in the regional groundwater discharge area were unique to the decline window.

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[7] Discharge estimates under this scenario use a revised cross-sectional area of 8,700 m^2 determined from the approximate length of the regional discharge zone (2,900 m) and a channel width of 3 m.

4.5.1 Biological Influence

Filamentous periphyton biofilms along streambeds can also influence groundwater-surface water interactions by reducing the permeability of the riverbed. They are composed of a complex mucopolysaccharide matrix with embedded algae and bacteria (Sabater et al. 2007). In the UFR they are commonly present in areas receiving mine-influenced water due to elevated nutrients from explosives used in mining operations.

The growth of the algal blooms can reduce seepage fluxes by orders of magnitude in a matter of weeks by reducing the hydraulic conductivity due to physical clogging (Newcome et al. 2016). Periphyton growth is frequently greater in groundwater discharge zones than in losing reaches due to differing nutrient concentrations and stable water temperatures (Valett et al. 1994; Ghosh and Gaur 1998; Godillot et al. 2001). The algae blooms reduce hyporheic exchange rates which in turn alter habitat by limiting a series of bioreactor functions of the hyporheic exchange (Larratt and Self, 2021). The blooms typically develop during low-flow periods of the ice-free growing season (summer and early fall). They are not inherently detrimental to habitat and modest green filamentous blooms can be positive (Larratt and Self, 2021). However, intense blooms of Didymosphenia geminate (Didymo) can have adverse habitat effects for trout hatching by increasing the biological oxygen demand through breakdown of increased biomass (Bickel et al. 2008). A substantial amount (50-75%) of substrate was noted to be covered by Didymo algal blooms in much of the UFR mainstem in 2019 (Larratt and Self, 2021).

The occurrence, frequency, intensity, and effects of the algal blooms on hyporheic zone exchange and the WCT population in the UFR is discussed in detail in the SME report prepared by Larratt and Self (2021). It is difficult to determine whether development of algal blooms affected discharge in the regional groundwater discharge from the flows measured at FR_FRABCH presented in Figure 9. Flows during the falling limb are a result of not only groundwater discharge by also a number of other factors such as release of water stored in banks, surface water runoff, and interflow. However, it is noted that the measured discharge during summer and late fall remained above winter baseflows, and therefore a large reduction in discharge (such as an order of magnitude or more) is not considered likely. Studies in New Zealand have found that Didymo cover such as that noted throughout the UFR in 2019 had no measurable effect on hydraulic conductivity, flow into the substrate, and hyporheic oxygen concentration (Bickel et al. 2008).

5 Stressor 2 – Groundwater Quality

5.1 Impact Hypothesis and Rationale

As with groundwater quantity, groundwater quality is not considered a stressor that could directly affect the WCT population; however, groundwater quality influences receiving surface water quality in the groundwater discharge area and is therefore investigated as a potential stressor here. The impact hypothesis to evaluate groundwater quality as a potential stressor states:

- A change in upgradient groundwater quality influenced surface water quality downstream.

Since surface water quality is measured directly at a number of downstream monitoring station, the impact hypothesis above applies to those locations where surface water quality is not monitored directly. The rationale for investigating upgradient groundwater quality upgradient is similar to the rationale for Stressor 1: there is a lack of monitoring wells in the vicinity of the regional groundwater discharge zone to directly assess groundwater influence on surface water quality. Therefore, historical groundwater quality in upgradient monitoring wells was reviewed since it will influence surface water quality in downstream receiving areas. Historical water quality results were reviewed since groundwater travel times may take several or more years to reach the receiving environment down-valley, as described above in Section 3.6.6.

5.2 Analyses

Historical groundwater quality between 2011 and 2019 at upgradient monitoring wells FR_09-01A/B, FR_09-02A/B, and the Greenhouse Wells (FR_GHHW) was reviewed. Although all data were reviewed, the review was particularly focused on the constituents most commonly associated with mining influence in groundwater in the Elk Valley (i.e., nitrate-N, sulphate, and dissolved selenium). Historical water quality data from surface water stations FR_KC1, FR_FR2, and FR_FRCP1 were also evaluated since both Kilmarnock Creek and the Fording River are known to influence groundwater quality which re-emerges in in the regional groundwater discharge zone as described above in Section 3.6. These stations are the best substitute for historical groundwater recharge chemistry sources of loading of mining related constituents from Kilmarnock, Swift, and Cataract Creeks, and FR_FRCP1 is particularly important as it is representative of the water quality that infiltrates to ground over the drying reach that extends from FR_FRCP1 to the confluence with the Greenhouse Side Channel. Station FR_FR2 is considered representative of surface water that recharges groundwater upstream of the compliance point FR_FRCP1, and includes contributions of mining activities upstream of the S6 Study Area.

Mann-Kendall trend analyses were completed for the analytical results of nitrate-N, sulphate, and dissolved selenium for the monitoring wells listed above to determine whether there are any statistically significant long-term trends in upgradient groundwater. Trend analyses were also completed for field measured pH. Other field parameters to which the WCT may be sensitive, including temperature and DO, were reviewed but excluded from the analyses due to apparent atmospheric influence of some samples within the dataset. Mann-Kendall trend analyses were also completed for the same parameters for surface water at FR_FR2 (since 2012) and FR_FRCP1 (since 2015), since there are no monitoring wells along the inferred flow path between the Fording River downstream of SKP2 and the regional groundwater discharge zone. Trend analyses were not completed on surface water in Kilmarnock Creek at FR_KC1 since the Greenhouse Wells are located along the inferred flow path.

To account for seasonality in the dataset the trend analyses were performed for each quarter. The analyses for surface water at FR_FR2 and FR_FRCP1 were not completed by quarter since the sampling frequency was not consistent at this station. The analyses were instead completed for the annual maximum and minimum concentrations to account for seasonality.

5.3 Findings

5.3.1 Water Quality

Analytical results of upgradient monitoring wells in the S6 Study Area compared to the primary and secondary screening criteria, including those with long-term monitoring records (FR_09-01A/B, FR_09-02A/B, and the Greenhouse Wells), are included in Table 1. The concentrations of dissolved selenium exceeded the CSR AW standard of 20 µg/L in every sample collected from the monitoring wells identified above except for two (collected from FR_09-02A in August 2016 and from the Greenhouse Wells in June 2012). The concentrations of nitrite in two samples collected from the Greenhouse Wells in September 2017 and March 2019 also exceeded the CSR AW standards. Concentrations of all other constituents in all samples collected from the aforementioned wells met the primary screening criteria. All of the samples collected from upgradient monitoring wells in the S6 Study Area met the secondary screening criteria.

Analytical results of surface water samples, seepage water samples, and shallow groundwater samples collected in 2019 as part of the MBI compared to the primary and secondary screening criteria are shown in Table 2. All of the samples collected had concentrations of nitrate and selenium that exceeded the primary screening criteria. All of the Kilmarnock-influenced samples in the groundwater discharge zone, including the seepage samples, Greenhouse Side Channel samples, and shallow groundwater sample RG_FRDP13, had concentrations of nitrate and selenium that exceeded the secondary screening criteria. The concentrations of total dissolved solids (TDS) also exceeded the secondary screening criteria in most of the Kilmarnock-influenced samples. The concentrations of selenium in the Fording River between RG_FLA_FR13 (between Swift and Cataract Creeks) and RG_FLA_FR06 (downstream of Chauncey Creek) also exceeded the secondary screening criteria. Concentrations of other parameters sporadically exceeded the primary but not secondary screening criteria, including copper, chromium, and iron.

A summary of historical water quality in the upgradient monitoring wells, Kilmarnock Creek, and the Fording River at FR_FR2 and FR_FRCP1 is provided below in Table E. Although the concentrations met the CSR AW standards in all samples collected, nitrate-N and sulphate concentrations were generally elevated in these wells and show evidence of mining influence (Table E). For this reason, nitrate-N, sulphate, and dissolved selenium were the primary focus of this review. Temporal plots of dissolved selenium, sulphate, and nitrate-N at monitoring wells FR_09-01A/B, FR_09-02A/B, and FR_GHHW are included in Figure 16, Figure 17, and Figure 18, respectively, along with the concentrations in Kilmarnock Creek at FR_KC1 and in the Fording River at FR_FR2, FR_FRCP1 and FR_FRRD.

Discussion of the findings is framed by the groundwater flow paths identified above which are summarized here. Groundwater quality at monitoring wells FR_GHHW and FR_09-01A is most influenced by Kilmarnock Creek, which is evident from mean concentrations of nitrate-N compared to the other wells (Table E) and Figure 16. The Greenhouse Wells (FR_GHHW) are located on the eastern edge of the valley along the inferred groundwater flow path to the Greenhouse Side Channel and Fording River. Monitoring well FR_09-01A is located along the inferred flow path to the seasonal discharge area in the Fording River between FR_FR4 and FR_FRCP1, which flows seasonally and temporarily between late winter and early summer. Monitoring well FR_09-01B is located along the same flow path, but is completed deeper and shows less seasonal influence of Kilmarnock Creek. During the remainder of the year, groundwater from these wells is interpreted to flow down valley towards the regional groundwater discharge zone. The NO_3^--N/SO_4^{2-}-S ratios from monitoring wells FR_09-02A/B suggest they are similarly seasonally influenced by Kilmarnock Creek, but the concentrations of nitrate-N, selenium, and sulphate are lower (Table E). They are not geographically located along the flow path of the former channel and the seasonal Kilmarnock influence is interpreted to be due from infiltration from SKP2, with flow directed to the Fording River due to mounding beneath SKP2. Flow is inferred to be down-valley towards the regional groundwater discharge zone during the remainder of the year, similar to monitoring wells FR_09-01A/B.

Table E: Summary of Upgradient Groundwater Quality and Surface Water Quality in Kilmarnock Creek and Fording River

Constituent	Parameter	Groundwater										Surface Water					
		FR_09-01A		FR_09-01B		FR_09-02A		FR_09-02B		FR_GHHW/FR_GHWELL4[c]		FR_KC1		FR_FR2		FR_FRCP1	
Nitrate-N (mg/L)	**Sampling Period**	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2015 – 2017[a]	2017 – 2019[b]
	No. of Samples	18	9	19	10	9	10	9	10	40	10	128	28	150	45	106	90
	Range	14.6 – 68.6	11.5 – 54.3	10.2 – 43.9	12.7 – 29.6	7.7 – 39.4	9.9 – 31.0	8.2 – 40.5	8.6 – 31.9	8.5 – 68.4	22.4 – 43.1	14.8 – 126	19.4 – 104	1.6 – 24.2	2.1 – 24.2	3.54 – 35.0	3.95 – 30.6
	Calculated Average	36.3	29.2	25.3	21.1	20.8	15.4	19.7	16.6	45.0	33.7	61.8	64.5	9.4	10.7	13.6	15.8
Sulphate (mg/L)	**Sampling Period**	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2015 – 2017[a]	2017 – 2019[b]
	No. of Samples	18	9	19	10	9	10	9	10	40	10	128	28	150	45	106	90
	Range	178 – 481	215 – 486	212 – 409	201 – 407	165 – 291	158 – 296	171 – 288	130 – 319	66.7 – 438	195 – 400	85.0 – 749	155 – 863	32.9 – 296.0	45.4 – 317.0	80.1 – 1,770	78.8 – 2,070
	Calculated Average	319	314	295	292	229	233	240	238	258	275	355	514	158.7	182.9	350	618
Dissolved Selenium (µg/L)	**Sampling Period**	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2015 – 2017[a]	2017 – 2019[b]
	No. of Samples	18	9	19	10	9	10	9	10	40	10	128	28	158	45	106	93
	Range	35.6 – 159	38.1 – 166	29.7 – 126	41.8 – 97.1	20.0 – 117	33.0 – 96.3	21.0 – 117	30.6 – 111	18.7 – 160	76.9 – 147	35.0 – 279	72.5 – 356	5.8 – 55.7	6.3 – 70.3	14.8 – 508	21.6 – 798
	Average	87.6	96.4	61.7	69.0	54.7	51.9	49.7	53.9	97.5	105	127	217	28.2	36.8	95.0	190
pH	**Sampling Period**	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2012 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2011 – 2017[a]	2017 – 2019[b]	2015 – 2017[a]	2017 – 2019[b]
	No. of Samples	16	9	17	10	8	10	8	10	12	9	168	57	149	55	106	89
	Range	6.95 – 8.69	7.30 – 7.55	7.20 – 8.38	7.09 – 7.52	7.56 – 8.09	7.23 – 7.83	7.46 – 8.40	7.20 – 7.70	7.28 – 7.78	7.14 – 7.48	7.04 – 9.05	7.04 – 7.99	7.7 – 8.7	7.7 – 9.0	7.65 – 9.23	7.82 – 8.60
	Calculated Average	7.68	7.36	7.59	7.31	7.83	7.64	7.76	7.53	7.53	7.34	7.68	7.63	8.3	8.2	8.26	8.18

Note: The full detection limit was used in determining CI averages.

a – Dataset includes data through August 2017.

b – Dataset includes data from September 2017 through 2019.

c – Supply wells FR_GHWELL1, 2, 3, and 4 are collectively known as FR_GHHW. As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017.

5.3.1.1 Kilmarnock Creek Flow Paths

The maximum concentrations of dissolved selenium, sulphate, and nitrate-N at the Greenhouse Wells (FR_GHHW) were detected in a sample collected in June 2016. However, the concentrations were only marginally higher (i.e., 0.1% to 9% higher than the next highest concentration) than the seasonal peaks that typically occur historically in late winter or early spring, prior to freshet. The timing of the elevated concentrations in June is anomalous and may be an indication that concentrations were more elevated in late winter or early spring since there is a gap in the dataset between January and June of that year. However, the concentrations were not considerably higher compared to the rest of the dataset and would not be expected to cause particularly adverse water quality downstream. Concentrations of dissolved selenium and nitrate-N at the Greenhouse Wells are generally higher than those in the Fording River downstream of the Greenhouse Side Channel at FR_FRRD, while the concentrations of sulphate are generally similar. This suggests that water quality may be locally poorer in the groundwater discharge zone than where surface water is currently monitored.

The maximum concentrations along the flow path in samples collected at monitoring well FR_09-01A were in October 2013 (nitrate-N) and November 2017 (sulphate and dissolved selenium). At these times, flow would be expected to be directed down-valley towards the regional groundwater discharge zone and not towards the seasonal discharge area where the strongest influence is post-freshet in May or early June. Concentrations of Cl downstream of the seasonal discharge area (the Fording River at FR_FRCP1) are typically highest in winter when Fording River is influenced by surface water input from Swift and Cataract Creeks (Figures 17 to 19), and groundwater inputs along this flow path are comparatively much less than the direct inputs from Swift and Cataract Creeks during this time. Concentrations of dissolved selenium, sulphate, and nitrate-N are generally higher in groundwater at monitoring wells FR_09-01A/B than in the Fording River at FR_FRCP1 in May or June, when groundwater discharge occurs in the seasonal discharge area. This suggests that water quality in the seasonal discharge area is poorer than where monitoring occurs at FR_FRCP1.

5.3.1.2 Fording River Flow Path

Monitoring wells FR_09-02A/B are located along the upgradient portion of the inferred flow path between the Fording River recharge area and regional groundwater discharge zone. Concentrations of selenium, sulphate, and nitrate-N in these wells are generally similar to those in Fording River surface water at station FR_FR2, except seasonally in May or June when they are higher in groundwater. The seasonally elevated concentrations are inferred to due to Kilmarnock Creek-influenced water infiltrating from SKP2.

There are no monitoring wells along the inferred flow path between the Fording River recharge area and regional groundwater discharge zone downgradient of SKP2. As discussed in Section 3.6, groundwater recharged by the Fording River between the STP and the confluence with the Greenhouse Side Channel is inferred to discharge in Side Channel 2 and the main channel between FR_FRRD and GH_PC2. Water quality at FR_FRCP1 is inferred to be a proxy for this flow path and exhibits a seasonal trend with elevated concentrations of selenium, sulphate, and nitrate-N in winter and lowest concentrations post-freshet. The concentrations of dissolved selenium and sulphate at FR_FRCP1 were elevated for a prolonged period between October 2018 and March 2019, which is attributed to input from Cataract Creek at times of no flow in the Fording River. Peak concentrations of sulphate over that time period were between 1.2 and 2.4 times higher the peak concentrations in previous years, while peak concentrations of dissolved selenium were between 1.6 to 3.0 times higher. However, elevated selenium or sulphate concentrations were not observed downstream at FR_FRABCH during or after this timeframe (Golder, 2020d). This is attributed to mixing along the groundwater flow path such that there is less variability in the water quality in the discharge zone than there is in the recharging water, discussed further below in Section 5.5.3.

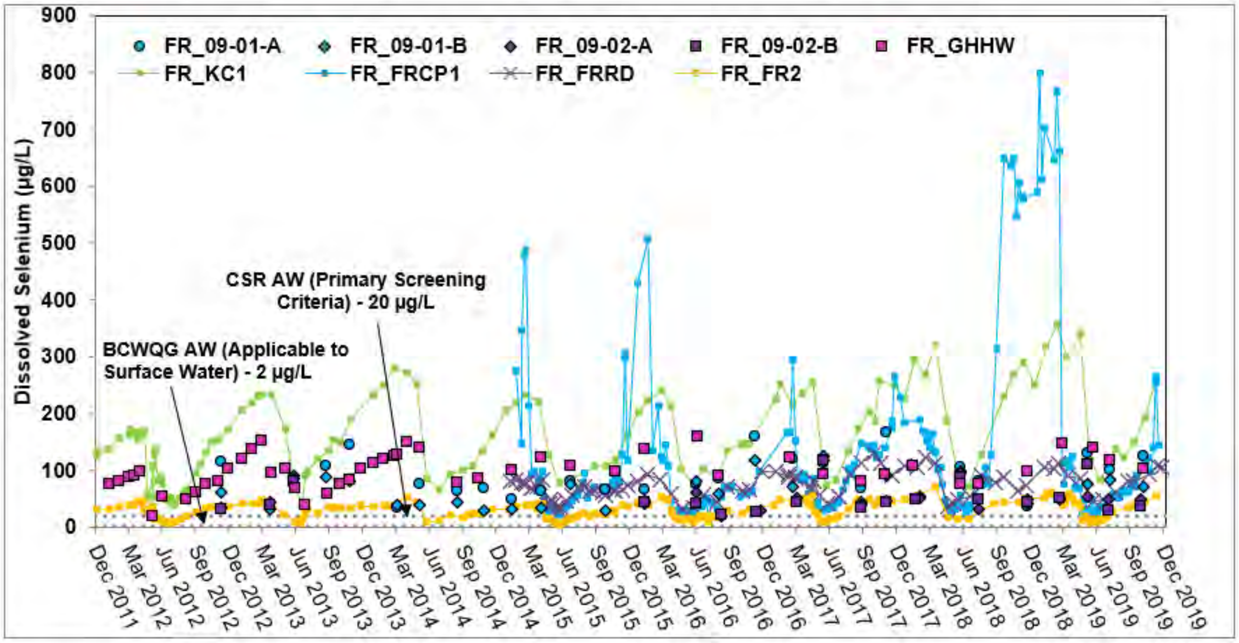

Figure 16: Dissolved Selenium Concentrations in Upgradient Groundwater and Surface Water in Kilmarnock Creek (FR_KC1) and the Fording River (FR_FR2, FR_FRCP1 and FR_FRRD). Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

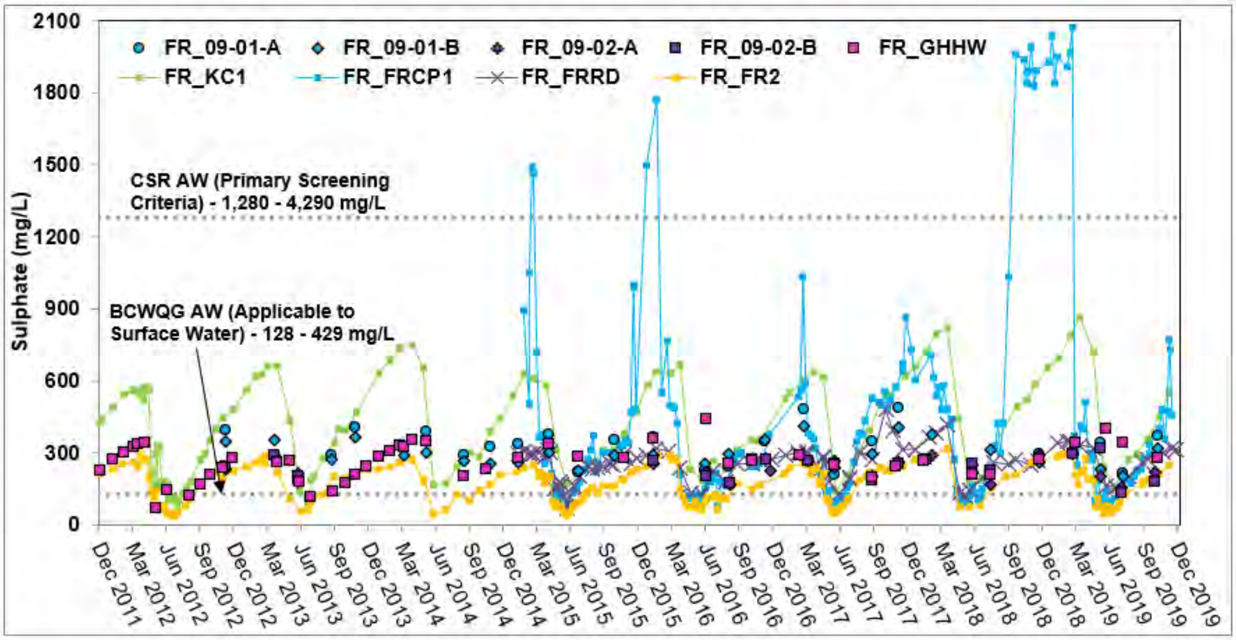

Figure 17: Sulphate Concentrations in Upgradient Groundwater and Surface Water in Kilmarnock Creek (FR_KC1) and the Fording River (FR_FR2, FR_FRCP1 and FR_FRRD). Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

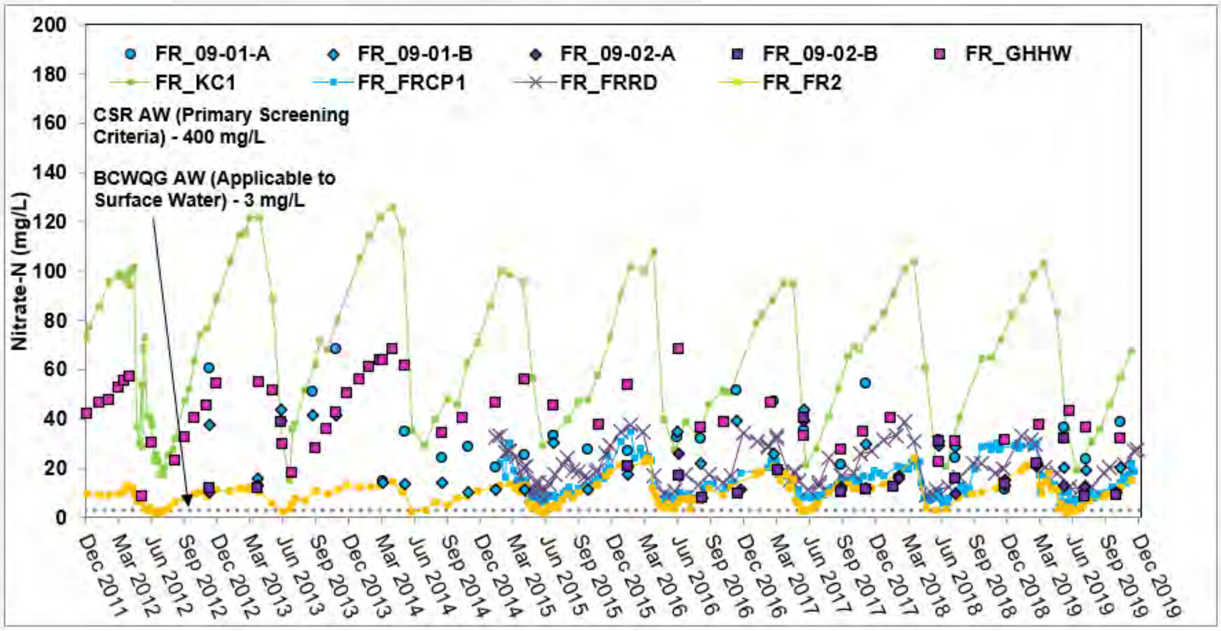

Figure 18: Nitrate-N Concentrations in Upgradient Groundwater and Surface Water in Kilmarnock Creek (FR_KC1) and the Fording River (FR_FR2, FR_FRCP1 and FR_FRRD). Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

5.3.2 Trend Analyses

The results of the Mann-Kendall trend analyses are included in Appendix A and summarized in Table F (groundwater) and Table G (surface water) below. Trends are identified where the confidence factor is greater than 95%, while probable trends are identified where the confidence factor is greater than 90%.

5.3.2.1 Kilmarnock Creek Flow Paths

Decreasing trends in the concentrations of nitrate-N in Q1 and Q4 were identified along the flow path between the Kilmarnock Creek alluvial fan and the Greenhouse Side Channel (FR_GHHW). This is associated with an apparent decreasing trend in the concentrations of nitrate-N in Kilmarnock Creek (Figure 18). Increasing or probably increasing trends in the concentrations of sulphate and dissolved selenium were identified in the third quarter Q3 and Q4, which may be due to broadly increasing trends in Kilmarnock Creek (Figures 16 and 17). Decreasing or probably decreasing trends in field measured pH were identified in the second quarter Q2 and Q3.

Along the flow path between the Kilmarnock Creek alluvial fan and the Fording River between FR_FR4 and FR_FRCP1, a probably decreasing trend was identified in the concentrations of nitrate-N in Q3, while increasing or probably increasing trends were identified in the concentrations of dissolved selenium in Q2 at FR_09-01A, and in Q1 at monitoring wells FR_09-01B and FR_09-02B. Field measured pH values were decreasing or probably decreasing in Q2 and Q4 at FR_09-01A, and in Q1, Q2, and Q3 at FR_09-01B.

Table F: Summary of Mann-Kendall Trend Analyses in Upgradient Groundwater

Parameter	Dataset	FR_09-01A	FR_09-01B	FR_09-02A	FR_09-02B	FR_GHHW
Nitrate-N	Q1	No Trend	No Trend	No Trend	No Trend	↓
	Q2	Stable	Stable	Stable	Stable	Stable
	Q3	Probably ↓	Stable	No Trend	No Trend	No Trend
	Q4	Stable	Stable	No Trend	Stable	↓
Sulphate	Q1	No Trend	No Trend	No Trend	No Trend	Stable
	Q2	No Trend	Stable	No Trend	No Trend	No Trend
	Q3	Stable	No Trend	Stable	Stable	↑
	Q4	Stable	Stable	Stable	Stable	Probably ↑
Dissolved Selenium	Q1	No Trend	Probably ↑	No Trend	↑	No Trend
	Q2	Probably ↑	No Trend	Stable	No Trend	No Trend
	Q3	No Trend	No Trend	No Trend	No Trend	Probably ↑
	Q4	Stable	No Trend	No Trend	No Trend	Probably ↑
pH	Q1	Stable	↓	Stable	Stable	No Trend
	Q2	Probably ↓	Probably ↓	Stable	Stable	↓
	Q3	Stable	↓	Stable	No Trend	Probably ↓
	Q4	Probably ↓	Stable	Stable	Stable	Stable

5.3.2.2 Fording River Flow Path

There are no monitoring wells along the inferred flow path between the Fording River and the regional groundwater discharge zone downgradient of SKP2, and FR_FRCP1 is used as a proxy for this flow path. The annual maximum and minimum concentrations of nitrate-N, sulphate, and dissolved selenium at FR_FRCP1 were identified either as stable or as not exhibiting any trends.

Trend analyses were also completed for surface water station FR_FR2 since water quality at this station is representative of groundwater recharge along the upgradient portion of this flow path, and includes contributions of mining activities upstream of the S6 Study Area. Increasing trends were identified in the annual maximum concentrations of nitrate and selenium. However, only an increasing trend in Q1 dissolved selenium concentrations at FR_09-02B was identified in monitoring wells FR_09-02A/B, which are located along this flow path.

Table G: Summary of Mann-Kendall Trend Analyses in the Fording River at FR_FRCP1

Parameter	Dataset	FR_FR2	FR_FRCP1
Nitrate	Annual Minimum Concentration	No Trend	Stable
	Annual Maximum Concentration	↑	No Trend
Sulphate	Annual Minimum Concentration	No Trend	No Trend
	Annual Maximum Concentration	No Trend	No Trend

Table G (Cont'd): Summary of Mann-Kendall Trend Analyses in the Fording River at FR_FRCP1

Parameter	Dataset	FR_FR2	FR_FRCP1
Dissolved Cadmium	Annual Minimum Concentration	Probably ↓	Stable
	Annual Maximum Concentration	Probably ↓	Stable
Dissolved Selenium	Annual Minimum Concentration	No Trend	No Trend
	Annual Maximum Concentration	↑	No Trend

5.3.3 Data Gaps and Uncertainties

The monitoring well network with sufficient water quality data is limited to one location along the inferred transport pathway between the Kilmarnock alluvial fan and the Greenhouse Side Channel and several wells located in the vicinity of the SKP2. The distribution of this network is insufficient for monitoring potential influence on surface water quality from the identified groundwater flow paths. With exception of monthly samples collected from the Greenhouse Wells between 2012 and 2014, the sampling frequency of all wells is quarterly (or less). Quarterly sampling is generally sufficient to establish seasonal trends, however, when attempting to resolve the influence of surface water on groundwater quality (and vice versa), more frequent (i.e., monthly) sampling would be ideal.

Surface water quality in the groundwater discharge areas is poorly characterized and limited to select seepage and surface water samples within and upstream of the Greenhouse Side Channel. However, there are likely localized zones where concentrations of mine-related constituents are higher than is currently captured in the surface water monitoring network due to the discharge of mine-influenced groundwater. Moreover, there is potential for WCT to have been exposed to groundwater during the decline window if they aggregated in areas of warmer groundwater discharge during unusually cold winter conditions; however, there are no data related to fish migration in these areas during the decline window. We have provided estimates of the effects of groundwater on localized surface water quality and the WCT population during the decline window in Section 5.5 below.

5.3.4 Summary of Water Quality Findings

Groundwater concentrations along the identified Kilmarnock groundwater flow paths are higher than downgradient surface water concentrations at FR_FRCP1 and FR_FRRD, indicating groundwater quality may locally affect surface water quality in the seasonal discharge area and Greenhouse Side Channel as indicated in Sections 5.3.1.1 and 5.3.1.2 above. However, there were no anomalous groundwater concentrations in the historical monitoring record that would negatively affect surface water quality and result in the WCT decline. The mine-influenced groundwater quality has remained relatively similar in the years before the decline.

Several trends identified in groundwater above may have implications for downstream surface water quality in discharge areas, including increasing or probably increasing concentrations of dissolved selenium and sulphate and decreasing or probably decreasing trends in pH. These trends have been gradual over a period of time, and there are no indications of abrupt changes in groundwater quality that would have caused corresponding changes in surface water quality that would lead to a sudden decline in WCT populations.

5.4 Other Relevant Observations and Findings

5.4.1 Groundwater Influence on Surface Water Temperature

Groundwater also has the potential to influence surface water temperature since groundwater temperatures are more consistent and surface water temperatures are subject to greater diurnal and seasonal fluctuations. The influence of groundwater on surface water temperatures in the UFR is of particular interest as areas of known groundwater discharge within the S8 Study Area and S6 Study Area are coincident with WCT spawning and overwintering habitat.

Continuous temperature data provided by Scott Cope between 2012 and 2015 at three locations in the Fording River at Kilmarnock Creek (S7), in the Fording River upstream of Chauncey Creek near FR_FRABCH (S6), and within the Greenhouse Side Channel (F2) are plotted below in Figure 19. Continuous temperature data at FR_FRABCH as well as manual measurements made at FR_FR2, FR_FRCP1, FR_FRRD, and FR_FRABCH since 2017 provided by Teck Coal are also shown on the plot. Manual measurements of groundwater samples collected at GH_PC2 since 2013, located downstream of Side Channel 2 within the inferred regional groundwater discharge zone, are also shown on Figure 19.

The 2012-2015 continuous data show that winter temperatures within the Greenhouse Side Channel at F2 are significantly warmer than upstream in the Fording River at Kilmarnock Creek (S7). The Greenhouse Side Channel temperatures are also warmer than downstream in the Fording River near FR_FRABCH (S6) in the winter of 2014-2015 (the only winter for which there are data), though temperatures at S6 were also warmer than upstream at S7. The manual measurements made at GH_PC2 are similar to the continuous data measured within the Greenhouse Side Channel, with winter (November through March) temperatures that range between 3.5 °C and 6.0°C with exception of one measurement made in March 2015 (0.6°C). This suggests a moderating effect of groundwater on temperatures downstream of the regional groundwater discharge zone.

The temperature data since 2017 show a similar influence. Winter temperatures measured upstream in the Fording at FR_FR2 and FR_FRCP1 are lower than those measured at FR_FRABCH and FR_FRRD. Winter temperatures at FR_FRRD are warmer than the temperatures FR_FRABCH, indicating the influence of warmer groundwater discharging at the Greenhouse Side Channel. There are limited temperature data at GH_PC2 within the decline window, but manual measurements made in January (4.4°C) and February (4.1°C) of 2018 were similarly (relatively) warm.

The temperature data indicate that the discharge zones are a stable source of relatively warmer water in the surface water channels during winter that moderate temperatures for some distance downstream. This zone extends beyond FR_FRABCH in the S6 Study Area, encompassing the WCT spawning and overwintering habitat. Over the decline window, average monthly water temperatures during baseflow[1] at FR_FRABCH ranged from 0.86ºC in February 2019 to 4.95ºC in October 2018, with an average of 2.63ºC. Aside from February 2019, the average water temperatures were also considerably colder than average during December 2017 (1.23ºC) and February 2018 (1.06ºC). Mean daily water temperatures fell marginally below freezing on only three occasions, on December 25 and 26, 2017 and on February 20, 2018. The above-freezing temperatures are an indication of the moderating influence of groundwater discharge upstream of FR_FRABCH. However, it is noted that there was an extended period between February 4 and

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[1] The months of October through March are considered baseflow periods.

February 11, 2019 where mean daily water temperatures did not exceed 0.2ºC, and ice was noted in the area. More discussion of ice conditions is provided in Hatfield and Whelan (2021).

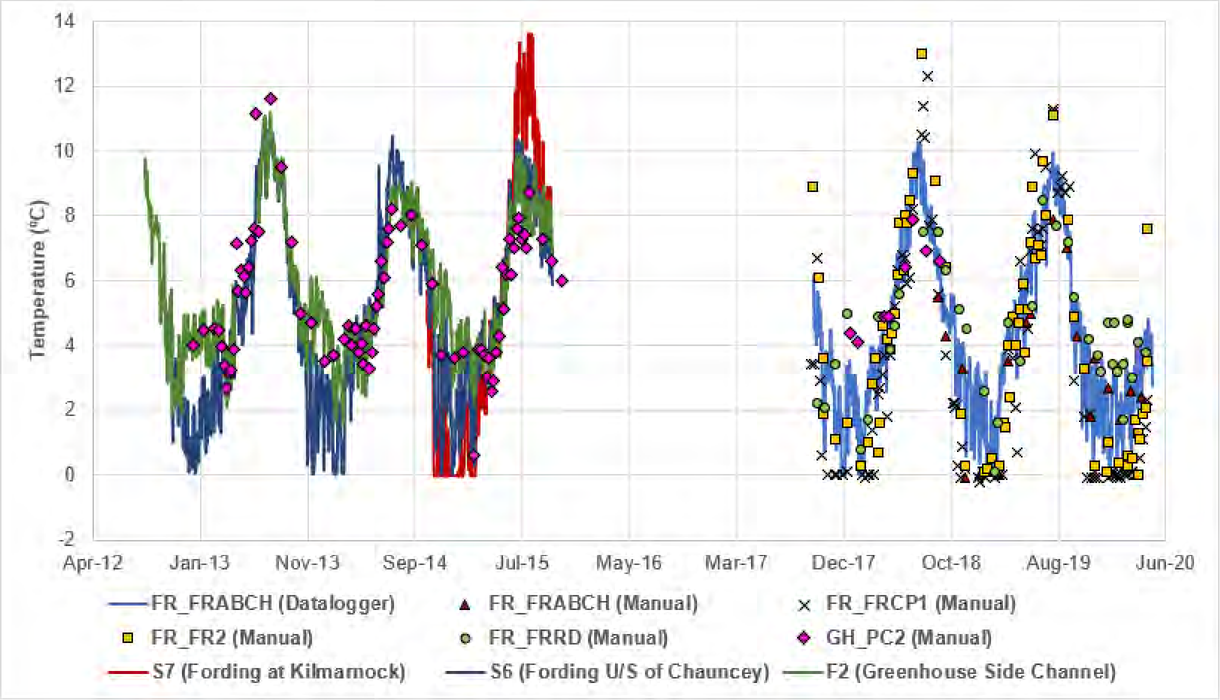

Figure 19: **Temperature Data in the Upper Fording River and Greenhouse Side Channel since 2012. (Data provided by S. Cope and Teck Coal)**

5.4.2 Speciated Selenium

The speciation of selenium data can be an indicator of geochemical transformations that may be occurring within a system. The two most dominant forms of inorganic selenium in natural waters are selenate (SeO_4^{2}) and selenite (SeO_3^{2-}). Selenate has a valence state of +6 and is dominant in oxidizing conditions, while selenite has a valence state of +4 and is dominant in reducing conditions. Generally, inorganic selenium is more stable in reducing environments and more mobile in oxic environments.

Seepage water samples collected from the Greenhouse Side Channel in February 2020 were analyzed for speciated selenium. The results are included in Table 3 along with other available speciated selenium data at FRO, including FR_09-01A/B and FR_09-02A/B south of the SKP2 in December 2018, and monitoring wells southwest (FR_MW_STPSW-A/B) and northwest (FR_MW_STPNW) off the STP, adjacent (and upslope) of the Greenhouse Side Channel (FR_MW_FRRD1), and the Chauncey Creek alluvial fan (FR_MW-CH1-A) in March 2020.

The analytical results indicate that selenate is the dominant form in all samples except for those collected from FR_09-02A and FR_ STPNW. However, selenite was not detected at either of these locations, nor were other species of selenium. Trace amounts of selenite were detected at seepage areas RG_FRSP1 and RG_FRSP3 as well as in monitoring wells FR_MW_STPSW-A/B, FR_MW_FRRD1, and FR_MW-CH1-A, suggesting the presence of localized sub-oxic zones where nitrate-N and selenate attenuation by reduction may occur.

5.5 Effects on Downgradient Surface Water Quality

Since there are no direct measurements of surface water quality in the groundwater discharge zones, the effects of groundwater quality on surface water quality in the groundwater discharge zones are estimated below based on available data.

5.5.1 Kilmarnock Creek Flow Path Discharge Areas

The conceptual model identified two groundwater flow paths and related discharge areas of mine-influenced water originating from Kilmarnock Creek: localized and seasonal discharge to the bend in the Fording River between FR_FR4 and FR_FRCP1; and, the Greenhouse Side Channel, the seepage area that feeds it, and a portion of the Fording River main stem downstream of the Greenhouse Side Channel on the eastern side of the valley. Each Kilmarnock Creek influenced discharge area is discussed separately below.

5.5.1.1 Kilmarnock Creek Seasonal Flow Path

The NO_3^--N/SO_4^{2-}-S ratios of samples collected from surface water monitoring station FR_FRCP1 suggests that Kilmarnock Creek influenced groundwater discharges within the seasonal discharge zone between late winter (February or March) and early summer (July), with peak NO_3^--N/SO_4^{2-}-S ratios in late May or June (Section 3.6.4; Figure 12). The Q2 concentrations of nitrate, sulphate, and dissolved selenium in groundwater along the inferred seasonal flow path (monitored by FR_09-01A/B) during the decline window are shown below in Table H along with concentrations in surface water upstream (FR_FR4) and downstream (FR_FRCP1) of the inferred discharge zone. There were no samples collected from FR_FR4 between April and September of 2019. The Q2 data were selected for this evaluation because the NO_3^--N/SO_4^{2-}-S ratios suggest the Kilmarnock Creek influence along this flow path is strongest in late May or early June. The surface water samples presented below were collected on the nearest date on or after the groundwater samples were collected.

The table shows that CI concentrations are higher in groundwater than in surface water, and also higher in surface water downstream of the discharge zone than upstream. This suggests there is potential for water quality in the discharge zone to be locally poorer than where it is monitored at FR_FRCP1. Alternatively, water quality at FR_FRCP1 when groundwater is seasonally discharged may be representative of water quality in the discharge zone mixed with upstream input (FR_FR4). This water is conceptualized to re-enter the groundwater system downstream of this point and re-emerge in the regional groundwater discharge zone.

Table H: CI Concentrations in Groundwater Along Inferred Seasonal Flow Path and Nearest Downstream Surface Water

Location	Nitrate-N (mg/L)	Sulphate (mg/L)	Dissolved Selenium (µg/L)
Q2 2018			
FR_FR4 (Jun. 21 2018)	5.8	101	27.6
FR_09-01A (Jun. 13 2018)	31.6	239	106
FR_FRCP1 (Jun. 13 2018)	11.0	160	55.4
Q2 2019			
FR_09-01A (May 30 2019)	36.5	343	130
FR_FRCP1 (Jun. 04 2019)	6.32	83.2	21.6

5.5.1.2 Greenhouse Side Channel

Water quality in the Kilmarnock Creek flow path discharge area on the east side of the Fording River valley has been monitored directly in shallow groundwater, seepage water, and the Greenhouse Side Channel as part of the MBI program in late 2019 and early 2020. Kilmarnock Creek discharge is also inferred to occur in the Fording River on the east side of the valley between the Greenhouse Side Channel confluence and FR_FRRD. A summary of the concentrations of nitrate, sulphate, and dissolved selenium in the Kilmarnock Creek influenced discharge zone is presented below in Table H, as well at the nearest downstream surface water station FR_FRRD at approximately the same time. The concentrations were generally comparable to those historically observed at the upgradient Greenhouse Wells (FR_GHHW), which are located along the interpreted flow path. All concentrations in the receiving environment were within the historical range observed at the Greenhouse Wells with the exception of dissolved selenium in the Greenhouse Side Channel and seepage water in February 2020. A portion of the effects of Kilmarnock Creek influenced groundwater discharge on surface water are captured by surface monitoring station FR_FRRD, which is located approximately 170 m downstream of the Greenhouse Side Channel confluence. However, FR_FRRD may not fully capture the localized effects of groundwater discharge as the nitrate-N and selenium concentrations in the discharge zone were slightly higher than those measured at FR_FRRD at similar times of the year (Table I). Therefore, concentrations in the discharge zone were likely slightly higher than those measured at station FR_FRRD.

Table I: Summary of CI Concentrations in Kilmarnock Creek Influenced Discharge Zone

Location	Nitrate-N (mg/L)	Sulphate (mg/L)	Dissolved Selenium (µg/L)
RG_FRDP13 (Dec. 04 2019)	32.2	312	122
Seepage (Dec. 03 2019)	34.0 to 38.8	310 to 320	131 to 143
FR_FRRD (Dec. 09 2019)	27.2	310	109
Seepage (Feb. 27 2020)	47.7 to 50.9	389 to 420	158 to 204
Greenhouse Side Channel (Feb. 28 2020)	37.4 to 49.7	346 to 364	125 to 166
FR_FRRD (Mar. 03 2020)	37.1	369	124

5.5.1.1 Potential Effects on Overwintering Fish

As mentioned above in Section 5.3.3, overwintering WCT may have been exposed to groundwater by preferentially migrating to warmer areas of groundwater discharge, although there are no data related to fish migration in these areas during the decline window. Overwintering fish in the upper Fording River are in the juvenile or adult life-cycle stages (Evaluation of Cause Team, 2021); therefore, potential effects of groundwater in winter were evaluated for juvenile and adult life stages using nitrate-N and selenium screening criteria from the surface water quality report (Costa and de Bruyn 2021; Table J). The screening criteria presented in Table J are considered applicable to groundwater along the flow paths without a ten-fold dilution factor since there is the potential that dilution would be lower since discharge areas are inferred to be predominantly sustained by groundwater during baseflow. It is noted that the selenium criterion is intended to be applied for selenate-dominated waters. This is appropriate since selenate is the mobile and dominant species of dissolved selenium in oxic environments, such as in the Fording River valley-bottom aquifer.

Table J: Nitrate-N and Selenium Screening Values for Juveniles and Adults

Constituent	Criteria	Rationale
Nitrate-N	50 mg/L	Costa and de Bruyn (2021) summarized juvenile and chronic effects data from Canadian Council of Ministers of the Environment (CCME 2012) and three additional studies that reported chronic effects data for juvenile fish subsequent to the CCME (2012) compilation. The lowest effect concentration for juvenile and adult fish was a maximum allowable toxicant concentration (MATC) of 50 mg/L as N for medaka growth (CCME 2012; in Costa and de Bruyn, 2021). As discussed in Costa and de Bruyn (2021), of the fish species with effects data for juveniles and adults, rainbow trout is expected to be the most relevant species to interpret potential effects to the congeneric WCT; Davidson et al. (2014) reported 87.9% survival for juvenile rainbow trout exposed to 91 mg/L as N for three months.
Selenium	466 µg/L	Teck Coal (2014) derived aqueous selenium benchmarks for juvenile fish. The level 2 benchmark is a lowest observed effect concentration (LOEC) for growth of chinook salmon larvae; dietary exposure to 18 mg/kg dw resulted in a 22% reduction in weight (Hamilton et al. 1990). As discussed in Teck Coal (2014), no survival effects were observed for chinook salmon at the dietary concentration of 18 mg/kg dw. The level 2 benchmark of 18 mg/kg dw was converted to an aqueous selenium concentration of 466 µg/L using a site-specific bioaccumulation model (Teck Coal, 2014). Because no survival effects were reported at this concentration, the level 2 aqueous benchmark (466 µg/L) was used herein to evaluate potential survival effects on fish.

The concentrations of nitrate-N and dissolved selenium in groundwater along the Kilmarnock Creek flow paths (monitoring wells FR_09-01A/B along the seasonal flow path and FR_GHHW/FR_GHWELL4 along the eastern flow path) prior to and during the decline window are summarized in Table E above. Complete results of all samples are also provided in Table 1.

The concentrations of dissolved selenium in all groundwater samples collected from monitoring wells along these flow paths were less than the screening criteria of 466 µg/L. Therefore, selenium concentrations in the groundwater discharge zones during the decline window would not be expected to result in potential effects on juvenile survival.

The concentrations of nitrate-N in groundwater samples collected during the decline window from monitoring wells along these flow paths were less than the screening criterion of 50 mg/L, except for one sample collected from FR_09-01A on 22 November 2017 that had a nitrate concentration of 54.3 mg/L as N (Figure 17; Table E; Table 1). Thus, in all but one sample, the available information indicates that nitrate concentrations would not result in chronic effects to adult or juvenile WCT. For the single sample, the screening results indicate a potential for growth effects on sensitive adult or juvenile fish that were exposed to undiluted groundwater. As discussed in Table J, chronic effects data for rainbow trout are expected to be the most relevant species to interpret potential effects to the congeneric WCT. A 12% effect on the survival of rainbow trout (which is considered more relevant to interpret potential effects to the congeneric WCT) was reported at a nitrate-N concentration of 91 mg/L for water with a hardness of 308 mg/L (Davidson et al., 2014; in Costa and de Bruyn, 2021). If rainbow trout toxicity data are indeed more relevant for interpreting effects to WCT, then nitrate effects to juvenile and adult fish would not be expected.

In aggregate, the available information indicates that nitrate concentrations in groundwater would not result in chronic effects to overwintering adult or juvenile fish. This interpretation is further supported by the observation that rainbow trout exhibited high survival at concentrations almost two times higher than the medaka MATC. Potential growth-related effects could not be ruled out for one sample collected from FR_09-01A, but the available information indicates a small magnitude of exceedance and that potential effects would be sublethal in nature.

5.5.2 Fording River Flow Path Discharge Zone

As described above in the conceptual model, groundwater recharged by the Fording River is inferred to discharge in Side Channel 2 and the Fording River main channel between FR_FRRD and GH_PC2. The majority of discharge in the regional groundwater discharge zone is considered to occur along this reach. Surface water quality has been directly measured in this discharge area during the October 2019 flow accretion study at RG_FLA_FR10, and historically at GH_PC2 (although data are limited during the decline window). However, the largest gain within the regional groundwater discharge zone occurs between RG_FLA_FR10 and RG_FLA_FR09, which accounted for approximately 73% (or 0.878 m^3/s) of the 1.201 m^3/s of flow gained between RG_FLA_FR11 and RG_FLA_FR09 during the October 2019 flow accretion study. Of this 0.878 m^3/s gain in flow, 0.541 m^3/s was sourced from Side Channel 2.

Water quality data in Side Channel 2 do not exist. Therefore, water quality of groundwater discharge between RG_FLA_FR10 and RG_FLA_FR09 (where 62% of the 0.878 m^3/s gain in flow occurred within Side Channel 2) during low flow in October 2019 was estimated using a loading approach to understand the localized surface water quality in the Fording River-influenced discharge zone (i.e., pathway iii in Section 3.6.6 above and shown in yellow on Drawing 18) during the decline window. The instantaneous load[2] of CI in groundwater discharge between RG_FLA_FR10 and RG_FLA_FR09 was calculated by subtracting the load at RG_FLA_FR10 from that calculated at RG_FLA_FR09, accounting for loading from Porter Creek at PC_GH1. Locations of the stations are shown on Drawing 12. The CI concentrations were then back-calculated from the load gained between RG_FLA_FR10 and RG_FLA_FR09 using the measured gain in flow rate between the two stations. This water quality estimate incorporates gains made in Side Channel 2, the Fording River, as well as the oxbow channel; however, gains made in the oxbow channel are thought to be minimal due to the similarity in water chemistry between GH_PC2 and downstream station FR_FRABCH, as discussed above in Section 3.6.5.

Table K: Estimated Loading and CI Concentrations in Side Channel 2 on October 25, 2019

Location	Flow (m^3/s)	Nitrate-N		Sulphate		Dissolved Selenium	
		Load (mg/s)	Concentration (mg/L)	Load (mg/s)	Concentration (mg/L)	Load (mg/s)	Concentrati on (mg/L)
RG_FLA_FR09	1.42	25,276	17.8	391,290	276	120.1	0.0846
GH_PC1[a]	0.028	95.5	3.41	12,824	458	2.4	0.0865
RG_FLA_FR10	0.514	9,663	18.8	145,976	284	45.8	0.0891
Between RG_FLA_FR10 and RG_FLA_FR09	**0.878**	**15,517**	**17.7**	**233,310**	**265.5**	**71.9**	**0.0819**

[a] Analytical results used to calculate the load at GH_PC1 were from a sampling event on October 15, 2019, while the flow was measured on October 25, 2019. Station GH_PC1 was not sampled on October 25, 2019.

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[2] Instantaneous load refers to the rate of mass solute addition and is determined by multiplying the CI concentration by the flow rate.

The predicted Cl concentrations of groundwater discharge between RG_FLA_FR10 and RG_FLA_FR09, including within Side Channel 2 and within the main stem, are very similar to those detected at RG_FLA_FR09 (Table K). The predicted NO_3^--N/SO_4^{2-}-S ratio was 0.20.

There are insufficient data to predict concentrations in the Fording River discharge zone during the decline window using the methodology above. However, analytical data downstream indicate that groundwater along this flow path is well mixed such that the seasonal variability of water quality in the recharge input (monitoring at Fording River station FR_FRCP1 is considered representative of this input) is attenuated at the point of groundwater discharge. This is discussed further above in Section 3.6.5 and below in Section 5.5.3.

5.5.2.1 Potential Effects on Overwintering Fish

As indicated above, overwintering WCT may have been exposed to groundwater by preferentially migrating to warmer areas of groundwater discharge (although there are no data related to fish migration during the decline window). Therefore, potential effects of undiluted groundwater in winter were evaluated for juvenile and adult life stages using nitrate-N and selenium screening criteria from the surface water quality report (Costa and de Bruyn 2021; Table J).

The predicted concentrations of nitrate-N and selenium in the regional groundwater discharge zone between RG_FLA_FR10 and RG_FLA_FR09, including contributions from Side Channel 2, were less than the screening criteria for juveniles and adults in Table J. These results indicate that nitrate and selenium concentrations in groundwater would not result in chronic survival effects to overwintering adult or juvenile fish.

Although these predicted concentrations are based on only one flow and load accretion study completed in October 2019, it is considered unlikely for the concentrations of nitrate-N and selenium in the regional groundwater discharge zone between RG_FLA_FR10 and RG_FLA_FR09 to have impacted the WCT population because:

- Analytical data of samples collected from surface water stations downstream of the discharge zone suggest that groundwater along the Fording River flow path is relatively well mixed and unlikely to vary as much seasonally as groundwater along the Kilmarnock flow paths; and
- The concentrations of nitrate-N and selenium in downstream surface water at GH_PC2 (since 2013) and FR_FRABCH (since 2015) have never exceeded the screening criteria for juveniles and adults.

5.5.3 Downstream of Regional Groundwater Discharge Zone

Since the majority of groundwater that discharges in the regional groundwater discharge zone is recharged by the Fording River, this pathway will have a greater influence on downstream surface water quality than Kilmarnock Creek. This is illustrated on Figure 20 below, which shows the NO_3^--N/SO_4^{2-}-S ratios in the Fording River during the flow accretion study in October 2019 along with the ratios of inputs from Kilmarnock, Swift, and Cataract Creeks, the range in ratios in the Greenhouse Side Channel in February 2020, and the estimated ratio of water in the discharge zone between RG_FLA_FR10 and RG_FLA_FR09 in October 2019. The figure also shows the averages and ranges of NO_3^--N/SO_4^{2-}-S ratios in source waters (Kilmarnock Creek at FR_KC1 and Fording River at FR_FRCP1) and downstream of the regional groundwater discharge zone during baseflow (FR_FRABCH). The figure shows that there is a drop in the NO_3^--N/SO_4^{2-}-S ratios between stations RG_FLA_FR14 and RG_FLA_FR13 after Swift Creek (which had water diverted from Cataract Creek at the time) and a rise in ratios between stations RG_FLA_FR11 and RG_FLA_FR10 after the confluence with the Greenhouse Side Channel. The ratios remain very similar following the confluence with the Greenhouse Side Channel all the way to Josephine Falls. The predicted ratio groundwater discharge between RG_FLA_FR10 and RG_FLA_FR09 is very similar to all the ratios downstream of the Greenhouse Side Channel confluence.

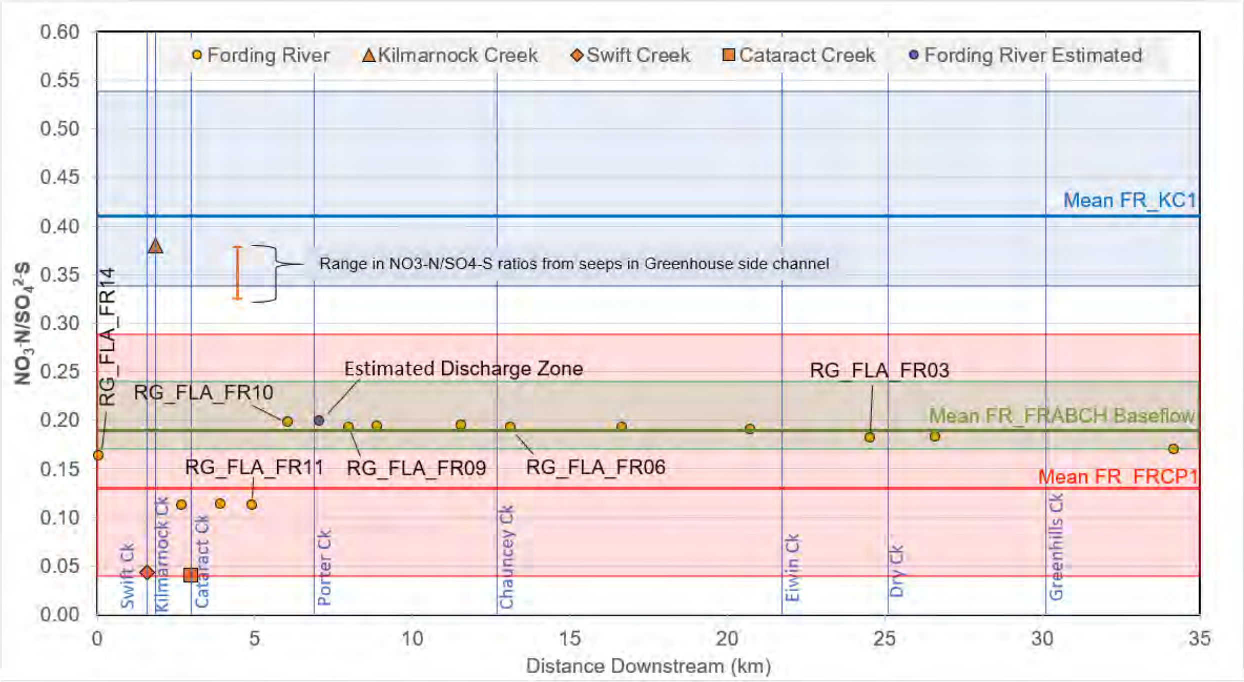

Figure 20: NO_3^--N/SO_4^{2-}-S ratios in the Fording River and Tributaries during the Flow Accretion Study in October 2019, As well as the Estimated Ratio of Groundwater Discharge between RG_FLA_FR10 and RG_FLA_FR09. Also Shown are the Ranges and Means of NO_3^--N/SO_4^{2-}-S ratios in Kilmarnock Creek at FR_KC1 (blue), the Fording River at FR_FRCP1 (red), and the Fording River at FR_FRABCH (green)

The NO_3^--N/SO_4^{2-}-S ratios within and downstream of the regional groundwater discharge zone (0.17 to 0.20) and the estimated ratio in between RG_FLA_FR10 and RG_FLA_FR09 (0.20) are very similar to the mean baseflow (October to March) ratio at FR_FRABCH (0.19), which is inferred to be sourced entirely from discharge in the regional groundwater discharge zone. This mean NO_3^--N/SO_4^{2-}-S ratio of 0.19 is considered to be representative of the mean year-round NO_3^--N/SO_4^{2-}-S inputs from Kilmarnock Creek at FR_KC1 (0.41) and the Fording River at FR_FRCP1 (0.13), weighted more heavily towards inputs from the Fording River (which is inferred to supply the majority of the gains in the regional discharge zone). However, the tighter distribution in NO_3^--N/SO_4^{2-}-S ratios in FR_FRABCH (0.14 to 0.26 overall and 0.17 to 0.24 during baseflow) compared to the overall datasets at FR_FRCP1 (0.04 to 0.29) and FR_KC1 (0.34 to 0.54) suggests that groundwater is well mixed along the flow pathways. There is some seasonality in NO_3^--N/SO_4^{2-}-S ratios at FR_FRABCH; however, the variability in NO_3^--N/SO_4^{2-}-S ratios in the Kilmarnock and Fording River groundwater discharge zones is expected to be considerably less than the surface waters in their source areas.

This is considered particularly true of groundwater recharged by the Fording River since the recharge zone spans the approximately 5 km reach between the STP and the Greenhouse Side Channel confluence.

Groundwater travelling along this pathway will therefore continuously mix with recharging water from the Fording River, incorporating inputs from all seasons over the travel period. Groundwater discharge in the Kilmarnock Creek influenced discharge zone is considered more likely to retain the seasonal inputs of the source because the recharge zone is more discrete and does not span the length of the flow path (which is evident in the seasonality observed at the Greenhouse Wells), although some mixing will occur with inputs from precipitation. It is noted that the wide range in NO_3^--N/SO_4^{2-}-S ratios in Kilmarnock Creek is more due to an overall decline in the historic dataset rather than large-scale seasonal fluctuations (Figure 10 to Figure 12 above).

Groundwater discharge in the regional discharge zone that is well-mixed along the flow paths, particularly along the flow pathway of groundwater recharged by the Fording River, is the likely cause of the integrated NO_3^--N/SO_4^{2-}-S ratio signal in FR_FRABCH baseflow. It may also explain why very elevated concentrations of selenium and sulphate at FR_FRCP1 in the winter of 2018/2019 did not appear downstream upon re-emergence and arrival at FR_FRABCH.

6 Hydrogeological Conceptual Model of the S8 Study Area

A description of site geology, physical hydrogeology, chemical hydrogeology, and groundwater-surface water interactions is provided below. The descriptions are based on work performed by Golder (2020c) with additional information provided based upon review of other information in the area.

6.1 Physical Setting

The S8 Study Area spans the Fording River between approximately Kilmarnock Creek to the south to Fish Pond Creek to the north (Cope, 2020). The area of interest for this investigation is the reach spanning the Clode Creek settling ponds to the north end of the NTP as shown on the Site Plan in Drawing 3. This reach is influenced by mining operations and in particular by the Clode Creek watershed, which is the primary focus of this conceptual model as groundwater is known to play a role in the transport of mine-influenced water and the area is a known area of groundwater discharge to surface water.

The Clode Creek watershed drains an area of approximately 10.5 km^2 (Golder, 2020b). The Clode Creek catchment is shown on Drawing 20, while current and mined-out topographies are shown on Drawings 21 and 22. Elevations in the catchment range from 1,670 m asl in the vicinity of the Clode Creek ponds to 2,500 at the peak of Mount Turnbull (Golder, 2020b).

Approximately 67% of the catchment has been mined or spoiled, with roughly 438 million bank cubic metres (BCM) of waste rock placed in the watershed since mine development began in the 1970s through the end of 2018 (SRK Consulting Inc. [SRK], 2020). The remaining 33% of the area located in the northern portion of the catchment is undeveloped (SRK, 2020), which includes the south side of Mount Turnbull. The disturbed portions of the catchment include Eagle Mountain and a number of pits, as shown on Drawing 22.

6.2 Hydrology

The Clode Creek watershed includes Clode Creek as well as the Clode Creek diversion, which was constructed in the early 1970’s. The northern and upland portions of the catchment are drained by the original Clode Creek channel, which flows subsurface beneath waste rock and receives water from a number of spoiled and undisturbed tributaries (Drawing 20). In the southern portion of the watershed, two large pits being developed into Saturated Rock Fills (SRFs), including the Eagle 4 SRF and Eagle 6 West SRF, decant through a series of backfilled pits (9 Seam Pit, Clode Pit, and R4 Pit in Figure 21) and flow via the diverted Clode Creek into the Clode Creek settling ponds (SRK, 2020).

The portion of the historic, pre-diverted Clode Creek forms the EC1 – Eagle Pond watershed along with two other tributaries, which discharge to Eagle Pond (Drawing 20). This sub-watershed is approximately 2 km^2 in area and all channels are submerged by waste rock. A small sub-watershed is present north of EC1 – Eagle Pond consisting of two relatively small tributaries that also flow beneath spoils, named the EC1 – Clode Seeps watershed. The area drains approximately 0.2 km^2 and discharges as a seepage face adjacent to the Clode Creek settling ponds.

Figure 21: **The Clode Creek Catchment showing Eagle 4 and Eagle 6 West SRFs which Decant and Flow through 9 Seam, Clode, and R4 Backfilled Pits and Diverted Clode Creek into the Clode Creek Settling Ponds. (From SRK, 2020)**

The Clode Creek settling ponds consist of two ponds as shown which discharge to the Fording River. Discharge from the ponds varied from less than 0.1 m^3/s to 1 m^3/s between 1995 and 2019 (Figure 22 below).

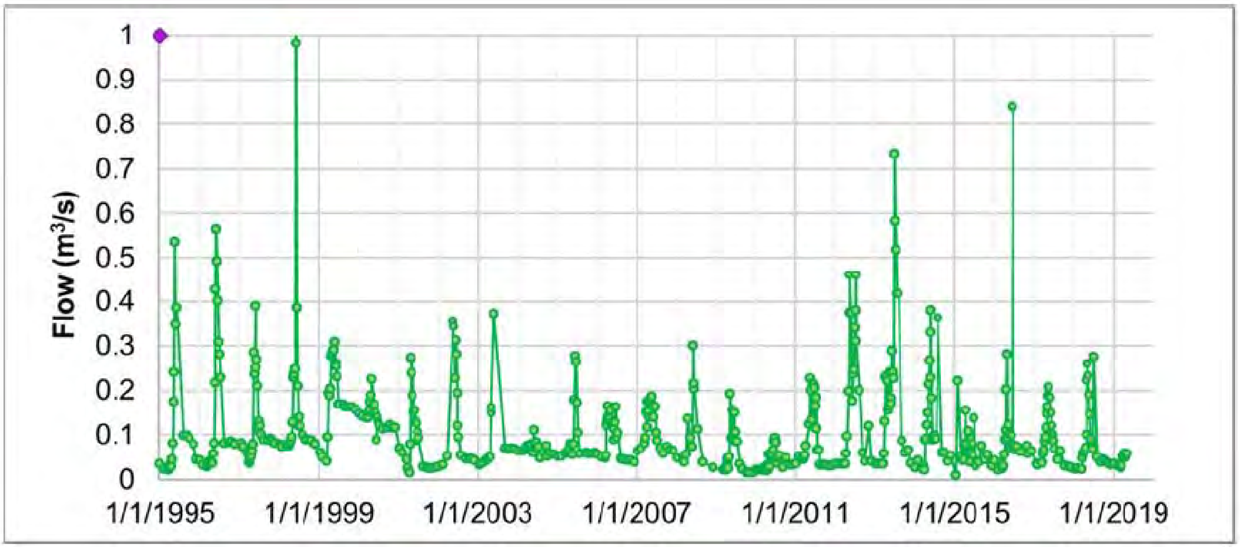

Figure 22: **Historical Flow at FR_CC1 since 1995 Representing Discharge from the Clode Creek Settling Ponds. (From SRK, 2020)**

Downstream of the Clode Creek watershed, the Fording River also receives water from Lake Mountain Creek to the west and Eagle Pond to the east.

6.3 Surficial Geology

Surficial geology of the Clode Creek area is shown on Drawing 23. Similar to elsewhere in the Elk Valley, the surficial geology in the upland areas consists of colluvial deposits or till. Also similar to elsewhere in the Elk Valley, the fluvial and alluvial sediments are considerably more permeable than the colluvial or till deposits, and are therefore of more significance hydrogeologically.

Fluvial sediments are present in the vicinity of the Clode Creek settling ponds and Fording River. An alluvial fan is identified on the map in Drawing 23 that extends from the northwest portion of the EC1 – Eagle Pond watershed in the vicinity of Eagle Pond to northeast of the Clode Creek settling ponds in the westernmost portion of the Clode Creek watershed. Another geomorphic characterization completed by Golder (2014) identified the alluvial fan as much smaller, located in the area of Eagle Pond where the historic Clode Creek channel met the Fording River valley as shown on Drawing 24. This is considered to be the more accurate interpretation of the location of the alluvial fan, since the Clode Creek diversion was constructed in the early 1970s while sediments in at the mouth of the historic Clode Creek may have been deposited over thousands of years.

Surficial geology in the area of the Clode Creek settling ponds is also shown on the geological cross-section included on Drawing 25. The figure shows that the valley-bottom sediments increase in thickness north of the primary pond and southwest of the secondary pond. There is a bedrock high to the southeast of the secondary pond. Low permeability silty or clayey soils are present north of the primary pond which form a confining layer in the vicinity at FR_CB-1A/B/C and FR_CB-3A/B and overlie more permeable fluvial sediments. Lower permeability soils were also identified east of the secondary pond at FR_CB-4A/B below 3.0 m bgs. Till was identified beneath the fluvial deposits south of the secondary pond at FR_GCMW-1A/B below 11.5 m bgs.

6.4 Hydrogeology

Monitoring wells in the area are limited to the vicinity of the Clode Creek settling ponds (13 wells) and one well (FR_MW-1B) just upstream of Eagle Pond (Drawing 3). With exception of FR_MW-1B, none of the wells have available data prior to December 2017.

The primary hydrostratigraphic units are present in the S8 Study Area are as follows:

- Till/colluvium;
- Fluvial sediments, including both the historical Clode Creek alluvial fan and Fording River valley-bottom deposits;
- Weathered bedrock; and
- Bedrock.

6.4.1 Hydraulic Conductivities

The hydraulic conductivity of the fluvial sediments (in the range of 10^{-6} to 10^{-3} m/s) are several orders of magnitude higher than the range of hydraulic conductivities of the till and colluvial deposits or weathered bedrock/bedrock (in the range of 10^{-9} to 10^{-6} m/s; Golder, 2019c). As such, the hydrogeology in the Clode Creek catchment is strongly controlled by the permeable surficial materials, as well as the bedrock topography where mined out.

Hydraulic conductivity values of monitoring wells in the Clode Creek area are shown below in Table L. Although the wells are located where fluvial sediments have been mapped, the hydraulic conductivity estimates for the majority of the wells are lower than expected for fluvial deposits. Only shallow wells FR_MW-1B, FR_GCMW-2, and FR_CB-3B and deep well FR_CB-1B have hydraulic conductivity estimates characteristic of fluvial sediments. The remaining wells are interpreted to be completed in till comprised primarily of silt and gravel. The higher hydraulic conductivity at depth at FR_CB-1B may be indicative of buried channels within the till. The higher estimate at FR_MW-1B does not match the logged clay or bedrock, and may be representative of the upper 0.3 m of the screened interval, which was logged as 'till composed of gravel and cobbles' but may actually be fluvial deposits. Alternatively, the bedrock may be highly weathered.

Table L: Summary of Hydraulic Testing Results in the Clode Creek Area

Well IDs	Hydrostratigraphic Unit	Screened Interval (m bgs)	Hydraulic Conductivity (K) (m/s)	Source
FR_MW-1B	Clay/Bedrock	5.2 – 8.2	4.0×10^{-4}	SNC-Lavalin, 2018
FR_GCMW-1A	Cobbles and Boulders with silty gravel matrix	19.5 – 21.0	3.0×10^{-6}	SNC-Lavalin, 2017c
FR_GCMW-1B		14.4 – 15.9	1.6×10^{-6}	
FR_GCMW-2	Sandy Gravel	7.6 – 9.1	3.0×10^{-4}	
FR_CB-1A	Medium to coarse Sand	22.9 – 25.9	2.0×10^{-7}	Golder, 2019a
FR_CB-1B	Medium to coarse Sand	18.3 – 21.3	3.0×10^{-5}	
FR_CB-1C	Clayey Sand	3.1 – 5.5	2.0×10^{-7}	

Table L (Cont'd): Summary of Hydraulic Testing Results in the Clode Creek Area

Well IDs	Hydrostratigraphic Unit	Screened Interval (m bgs)	Hydraulic Conductivity (K) (m/s)	Source
FR_CB-2A	Fine to coarse Sand	11.3 – 14.3	2.0×10^{-7}	
FR_CB-3A	Silty Gravel	18.3 – 24.4	4.0×10^{-7}	Golder, 2020b
FR_CB-3B	Silty Sand	6.0 – 9.0	8.0×10^{-5}	
FR_CB-4A	Silt and Gravel	9.1 – 12.2	6.0×10^{-6}	
FR_CB-4B	Silty Clay to Silt and Gravel	5.0 – 8.0	6.0×10^{-7}	
FR_CB-5A	Silty Gravel	10.3 – 13.4	5.0×10^{-9}	
FR_CB-5B	Silty Gravel	5.9 – 9.0	2.0×10^{-8}	
FR_CB-6A	Silty Gravel	7.6 – 10.7	1.0×10^{-8}	

Note: All hydraulic conductivity tests completed as slug tests.

6.4.2 Groundwater Flow Regime

A hydrograph showing groundwater levels at FR_GCMW1B and FR_GCMW2 in 2019 as well as FR_MW-1B since 2015 is shown in Figure 23. The hydrographs show that there is minimal variation in water levels at all three of these wells. Water levels varied by 0.18 m at FR_GCMW1B and by 0.08 m at FR_GCMW2 in 2019, with peak elevations in May lowest elevations in December (FR_GCMW1B) or March (FR_GCMW2). Groundwater levels at FR_MW-1B varied by 0.48 m since 2015, also with peak water levels in May or June and lowest water levels in winter.

The vertical hydraulic gradient between FR_GCMW1B and FR_GCMW2 was consistently downward in 2019, with the exception of May 31, 2019. The vertical gradient was calculated to be 0.054 m/m downward on July 26, 2019 (the only day with manual measurements at both wells). A similar downward gradient of 0.051 m/m was calculated between the wells in August 2017 (SNC-Lavalin, 2017c). Upward vertical gradients are present north of the Clode Creek settling ponds that measured approximately 0.08 m/m at FR_CB-1A/B in November 2018 and 0.06 m/m at FR_CB-3A/B in December 2019. The upward vertical gradients indicate that the low permeability soils in the area are confining.

The potentiometric elevations and inferred groundwater flow contours in the vicinity of the Clode Creek settling ponds in December 2019 are shown below in Drawing 26. Groundwater east and north of the ponds is inferred to flow down-valley towards the ponds. Flow is inferred to be radial from the secondary pond. However, analytical and flow accretion data (discussed below) suggest that groundwater does not intersect the WED from the east, and that the primary flow pathway to the Fording River from the secondary ponds is in the southern or southwestern direction (i.e., down-valley). The lateral hydraulic gradient during the December 2019 monitoring event completed by Golder (2020c) was approximately 0.011 m/m, directed towards the southeast.

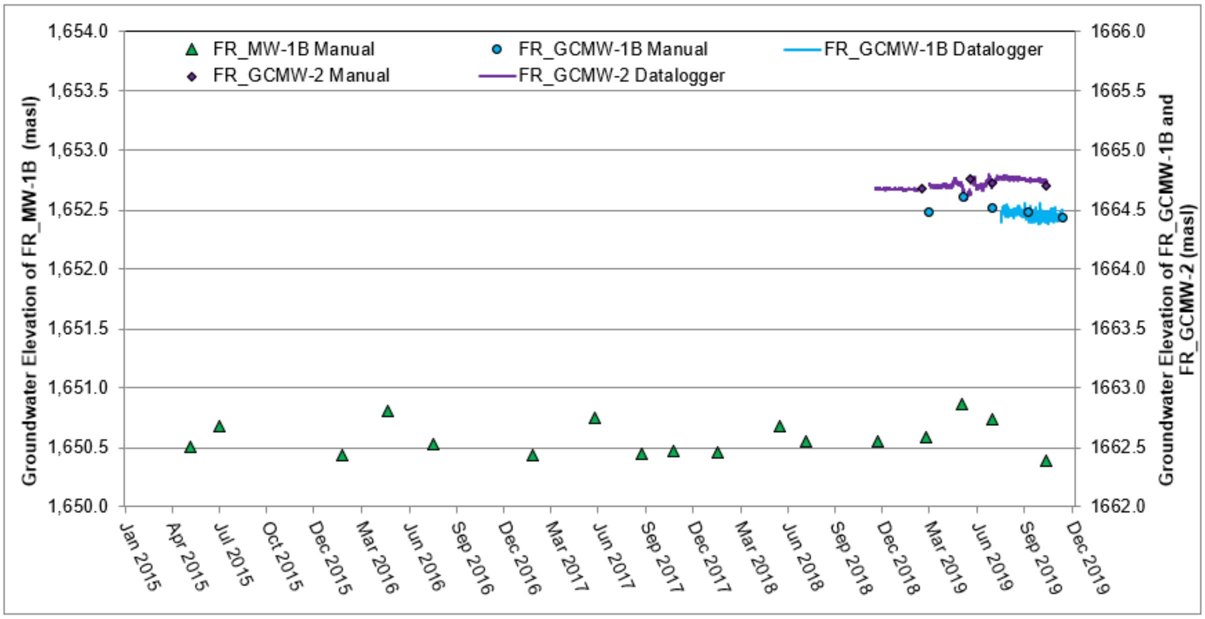

Figure 23: **Hydrograph of Monitoring Wells in the Vicinity of the Clode Creek Settling Ponds**

6.4.3 Waste Rock Seepages

There are numerous seeps that emerge from the base of the spoils in the vicinity of the Clode Creek settling ponds and along the EC1-Clode Seeps and EC1-Eagle Ponds watersheds, as shown on Drawing 3. A summary of measured flow rates at the seeps is presented in Table M below. Flows emanating from several of the seeps are substantial, and have been cumulatively measured at more than 15,000 m^3/d (or 0.174 m^3/s; Table M). The seeps are considered to be representative of groundwater flowing through the base of the spoil that has not infiltrated the unsaturated native ground surface below due to the relatively large differences in hydraulic conductivities between the waste rock (i.e., rock drain flow) and native soils in the uplands. Three seeps are captured by the Clode Creek settling ponds where they emerge upgradient of the ponds (i.e., FR_CCSEEPE1, FR_CCSEEPE2, FR_CCSEEPE3). Those that emerge cross-gradient or downgradient of the ponds (i.e., seeps FR_CCSEEPSE1 through FR_CCSEEPSE5) are considered to infiltrate to the valley bottom fluvial aquifer.

Table M: Summary of Seepage Flows in the S8 Study Area

Seep	Range of Flows (m^3/d)	Range of Flows (m^3/s)	Date of Maximum Flow
FR_CCSEEPE1	2,160 – 6,910	0.025 – 0.080	2018/10/17
FR_CCSEEPE2	0 – 260	0 – 0.003	2018/10/01
FR_CCSEEPE3	2,590 – 15,550	0.030 – 0.180	2018/10/17
FR_CCSEEPSE1	86	0.001	2018/06/04 and 2018/10/17
FR_CCSEEPSE2	2 – 43	2.31 x 10^{-5} – 0.0005	2018/06/04
FR_CCSEEPSE3	1 – 3	1.16 x 10^{-5} – 3.47 x 10^{-5}	2018/10/17
FR_CCSEEPSE4	860 – 2,590	0.010 – 0.030	2018/10/17
FR_CCSEEPSE5	670 – 2,630	0.008 – 0.030	2020/04/20

Note: All seeps monitored twice in June and October 2018 except for FR_CCSEEPSE5, which has been monitored 35 times between June 2018 and April 2020.

6.4.4 Groundwater-Surface Water Interactions

Flow accretion studies in the S8 Study Area were completed by KWL in March, April, July, and September 2019 (Golder, 2020b). Results of the flow accretion studies are shown on Drawing 27. In all four events, the Fording River and Henretta Creek were losing above the Turnbull STP, and gaining or neutral upstream of the Clode Creek settling ponds. The Fording River was neutral adjacent to and gaining downstream of the Clode Creek settling ponds between FR_FRDSCC1 and the confluence with Lake Mountain Creek in April, July, and September 2019. However, the Fording River gained adjacent to the ponds between FR_CC1 and FR_ FRDSCC1 and lost between FR_FRDSCC1 and Lake Mountain Creek in March 2019. The Fording River was gaining immediately downstream of this losing reach between in March 2019 from Lake Mountain Creek to adjacent to FR_FRNTP adjacent to the NTP south of the S8 Study Area.

The Fording River downstream of the Clode Creek settling ponds is considered a groundwater discharge zone. It appears this discharge zone is located between FR_ FRDSCC1 and Lake Mountain Creek for the majority of the year, but occurs adjacent to the Clode Creek settling ponds and downstream of Lake Mountain Creek in late winter. Water lost to ground between FR_ FRDSCC1 and Lake Mountain Creek in winter is considered to discharge back to the Fording River immediately downstream.

The gains between FR_DSCC1 and Lake Mountain Creek were approximately 5,600 m^3/d (0.065 m^3/s) in April 2019, 26,400 m^3/d (0.306 m^3/s) in July 2019, and 8,000 m^3/d (0.093 m^3/s) in September 2019. In March 2019, the loss between FR_FRDSCC1 and Lake Mountain Creek was approximately 11,000 m^3/d (0.127 m^3/s) while the gain between Lake Mountain Creek and the Liver Pool Ponds was approximately 16,900 m^3/d (0.196 m^3/s), for a net gain of approximately 5,900 m^3/d (0.068 m^3/s) in the discharge area downstream of the Clode Creek settling ponds. These results suggest that discharge south of the Clode Creek settling ponds varies considerably seasonally and are greater during high flows.

6.4.5 Water Quality

Water in the Clode Creek watershed is influenced by mining operations. Analytical results of groundwater samples collected in the S8 Study Area compared to the primary and secondary screening criteria are included in Table 1. Table N below presents a summary of nitrate-N, sulphate, and selenium concentration in discharge from the settling ponds at FR_CC1, as well as in seepage and groundwater in the vicinity of the ponds. Figure 24, Figure 25, and Figure 26 show the concentrations of nitrate-N, dissolved selenium, and sulphate, respectively, for the same locations. Historical and 2019 concentrations of total selenium in groundwater and surface water in vicinity of the ponds of work completed by Golder (2020c) are also shown on Drawing 28.

Exceedances of the primary screening criteria are limited to the concentrations of dissolved selenium in samples collected from monitoring wells FR_MW-1B, FR_GCMW-1B, FR_GCMW-2, FR_CB-1C, FR_CB-4A, and FR_CB-4B, as well as the concentrations of fluoride in two samples collected from FR_GCMW-1A. All of the groundwater samples collected in Study Area S8 met the secondary screening criteria.

Table N: Summary of CI Concentrations in Surface Water, Seepage, and Groundwater at Clode Creek Settling Ponds

Location	Screen Interval (m bgs)	Nitrate-N (mg/L)			Sulphate (mg/L)			D. Selenium (µg/L)		
		n	Range	Mean	n	Range	Mean	n	Range	Mean
FR_CC1	n/a	49	49.3 – 112	77.2	49	455 – 702	589	45	148 – 243	181
FR_CCSEEPE1	n/a	41	24 – 171	118	41	281 – 1030	835	44	62.6 – 310	234
FR_CCSEEPSE5	n/a	48	59.1 – 200	112	48	556 – 1020	746	49	183 – 304	232
FR_CB-1A	22.9 – 25.9	7	ND – 0.018	0.013	7	ND – 10.7	2.25	7	ND – 0.22	0.079
FR_CB-1B	18.3 – 21.3	7	ND	0.010	7	ND	0.47	7	ND – 0.136	0.062
FR_CB-1C	3.1 – 5.5	7	11.3 – 142	72.3	7	132 – 764	511	7	30 – 233	144
FR_CB-2A	11.3 – 14.3	7	ND – 0.396	0.067	7	ND – 8.42	2.72	7	ND – 2.85	0.56
FR_GCMW-1A	19.5 – 21.0	9	ND – 3.35	0.89	9	0.71 – 83.6	27.4	9	ND – 7.31	2.12
FR_GCMW-1B	14.4 – 15.9	13	ND – 8.5	1.94	13	5.25 – 494	77.3	13	0.10 – 47.9	8.59
FR_GCMW-2	7.6 – 9.1	5	20.3 – 83.5	42.7	5	300 – 574	408	5	73.8 - 136	102

n – Sample Size
n/a – Not Applicable
ND – Non-Detectable
Note: The full detection limit was used in calculating the mean.

Concentrations are highest in the seepage samples, which is expected as they represent undiluted contact water. There is mine influenced groundwater both upgradient (FR_CB-1C) and downgradient (FR_GCMW-1B and FR_GCMW-2) of the settling ponds. The mine influenced groundwater is stratified in the valley-bottom aquifer, with little impacts below 16 m bgs (Table N). There is some seasonality in the concentrations of nitrate-N in the settling pond discharge, with highest concentrations in late winter or early spring between February and April and declining concentrations through the summer and into fall, before concentrations begin to rise again. The same pattern is apparent in both shallow groundwater and the seepage water (Figure 24). Similar seasonality is apparent in the concentrations of sulphate in groundwater, seepage, and pond effluent; however, maximum concentrations of the pond discharge occur slightly later in the year in April and May (Figure 26). There are no obvious seasonal patterns in the concentrations of dissolved selenium in pond effluent, seepage, or shallow groundwater (Figure 25). There appears to be an overall decline in selenium concentrations in the seepage water, although the dataset is short.

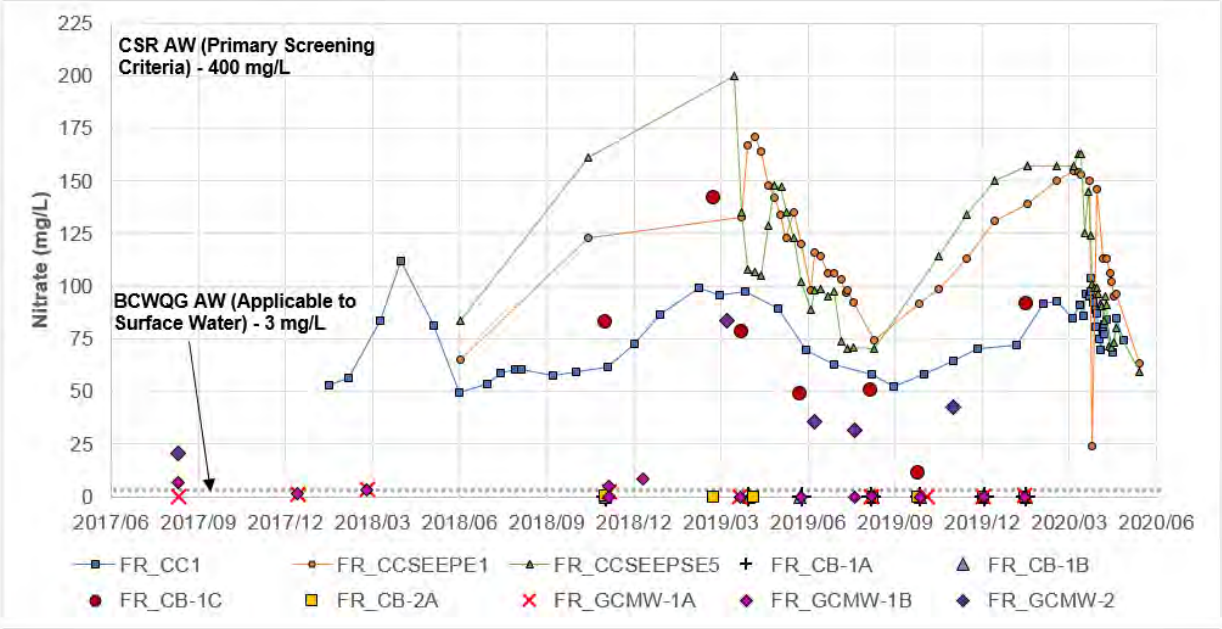

Figure 24: Nitrate-N Concentrations in Pond Effluent, Seepage, and Groundwater in the Vicinity of the Clode Creek Settling Ponds. Lines Connecting Points of Surface Water and Seepage Water Datasets are to Orient the Reader and do not Imply Continuous Data

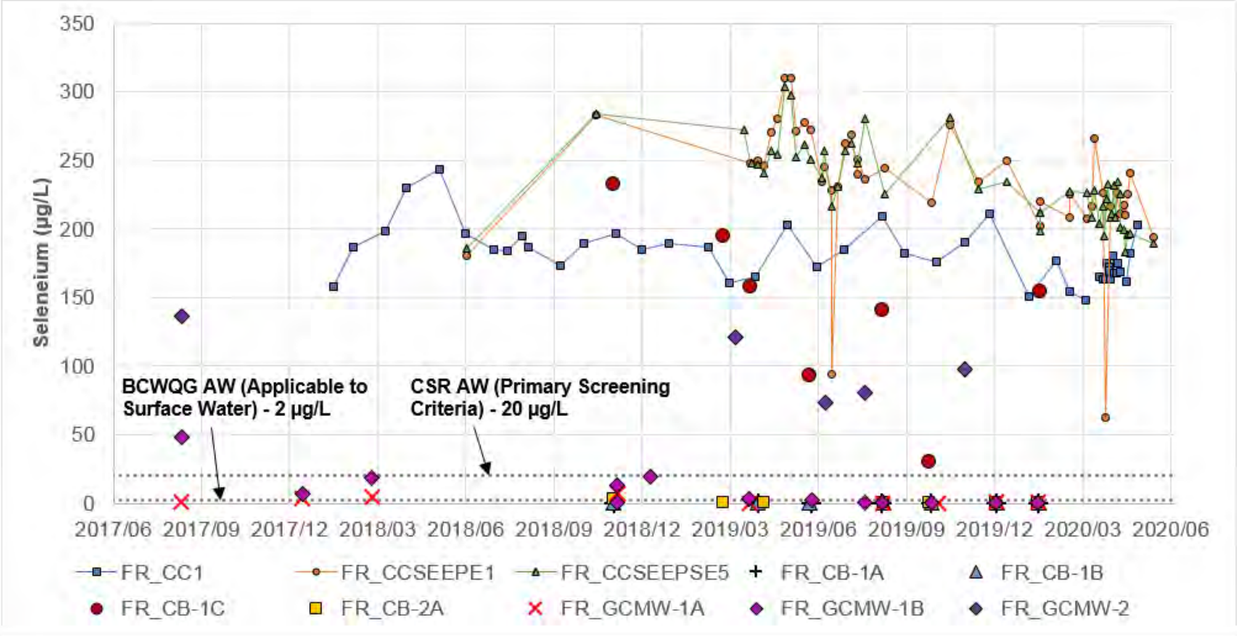

Figure 25: Selenium Concentrations in Pond Effluent, Seepage, and Groundwater in the Vicinity of the Clode Creek Settling Ponds. Lines Connecting Points of Surface Water and Seepage Water Datasets are to Orient the Reader and do not Imply Continuous Data

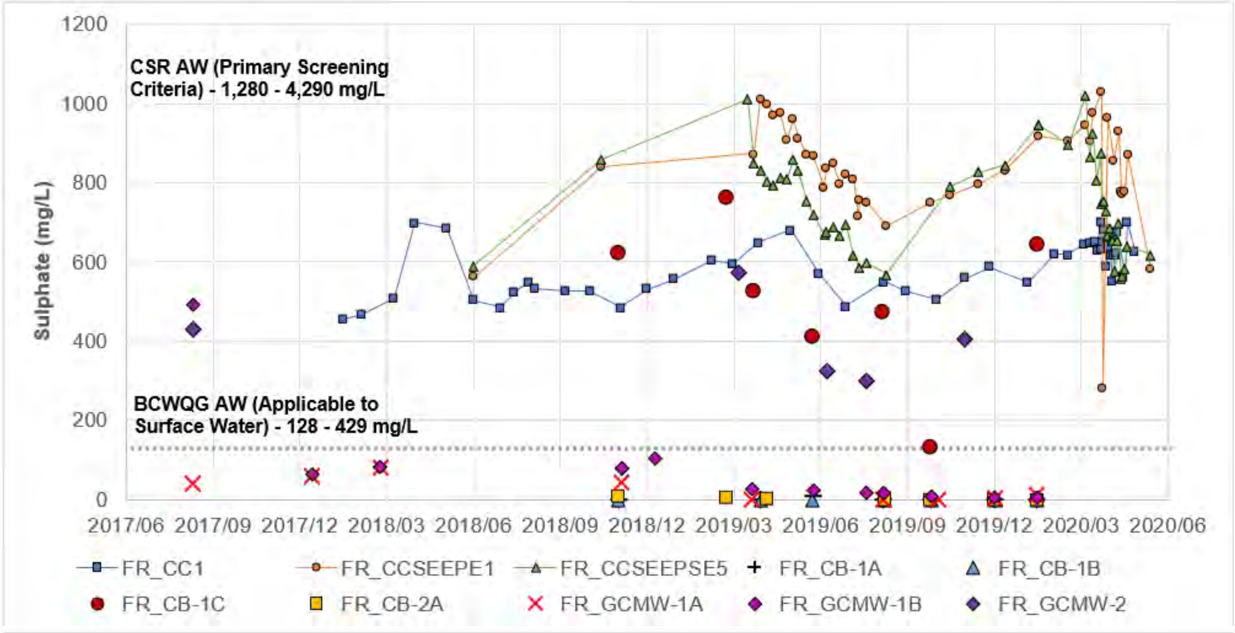

Figure 26: Sulphate Concentrations in Pond Effluent, Seepage, and Groundwater in The Vicinity of the Clode Creek Settling Ponds. Lines Connecting Points of Surface Water and Seepage Water Datasets are to Orient the Reader and do not Imply Continuous Data.

6.4.6 Transport Pathways

There are three primary pathways for mine-influenced water from the Clode Creek watershed to reach the Fording River:

i) Decanting of surface water from the Clode Creek settling ponds;
ii) Leakage of groundwater from the Clode Creek settling ponds; and
iii) Groundwater from the spoiled portion of the watershed that underflows the Clode Creek settling ponds.

The Clode Creek settling ponds receive water from a number of sub-surface channels and pits within the watershed via the Clode Creek diversion. The ponds also receive groundwater from the watershed that discharges directly to the ponds through the fluvial valley-bottom aquifer, as well as from seepage that emerges at the base of the spoil and enters the ponds via runoff. The ponds decant to Clode Creek which joins the Fording River a short distance downstream.

Leakage to the underlying fluvial valley-bottom aquifer is inferred to occur from both ponds. Leakage from the primary Clode pond is inferred to flow through the valley-bottom aquifer and discharge to the secondary pond due to the difference in hydraulic head between the two ponds. Leakage from the secondary pond flows through the valley-bottom aquifer and slows in a southern and southeastern direction, discharging to Grassy Creek to the Fording River discharge zone between FR_DSSC1 and Lake Mountain Creek. Although a gaining reach was identified adjacent to the Clode Creek settling ponds during the flow accretion study in March 2019, analytical data from the WED (discussed below) are representative of the Fording River, indicating that that WED does not intercept leakage from the Secondary pond.

Finally, groundwater underflow of the Clode Creek settling ponds is also inferred to occur, resulting in discharge to the Fording River. This includes both seepage water that infiltrates to the fluvial valley-bottom aquifer once they emerge from the base of the spoil, as well as groundwater that enters the fluvial valley-bottom aquifer from native soils beneath the spoil.

Travel times from the secondary pond to the groundwater discharge zone downstream of the settling ponds beginning at FR_FRDSCC1 were calculated using the equation presented above in Section 3.6.6. The travel times were calculated using the observed hydraulic gradient in the vicinity of the Clode Creek ponds of 0.011 m/m, a range of hydraulic conductivities representative of shallow fluvial sediments observed at FR_CB-3B (8.0 x 10^{-5} m/s) and FR_GCMW-2 (3.0 x 10^{-4} m/s), an effective porosity of 0.3 representative of sand and gravel, and a distance of 175 m from the southern edge of the Secondary to FR_FRDSCC1. The estimated range of travel times between the Clode Creek settling ponds and the groundwater discharge zone downstream is 180 days to 690 days.

Downstream of the Clode Creek watershed, mine influenced water can also reach enter the Fording River via surface water flow or groundwater discharge from the Lake Mountain Creek and/or EC1-Eagle Pond watersheds. There is limited information on the groundwater transport pathways from these areas.

6.4.7 Effects on Downstream Surface Water

Concentrations of nitrate-N, selenium, and sulphate in surface water upstream and downstream of the Clode Creek settling ponds are shown in Figures 27, 28, and 29, respectively, as well as in tributaries of the Fording River. The plots show that water quality upstream of the settling ponds at FR_FOUCL is similar to that in the WED. Although the dataset of FR_FOUCL is limited to only Q1 and Q2 of 2020, the chemistry of WED can be used as an analogue for water quality in the Fording River upstream of the settling ponds to provide an idea as to constituent loading resulting from the groundwater discharge zone south between FR_FRDSCC1. This is considered an acceptable approach as the WED is interpreted to be influenced by the Fording River.

Nitrate-N concentrations in Grassy Creek (FR_GC1) and the Clode Ponds (FR_CC1) appear to exhibit a seasonal trend of elevated concentrations in late winter and early spring and lower concentrations in the summer and fall. This results in seasonal loading of nitrate-N in late winter and early spring (February to early April) at downstream stations FR_FRDSCC1 and FR_MULTIPLATE when compared to upstream using the WED analogue. Nitrate-N concentrations in Lake Mountain Creek (FR_LMP1) were higher in late 2019 and 2020 than in 2018 and early 2019. However, this does not appear to have materially influenced the concentrations at downstream station FR_MULTIPLATE, as concentrations were similar to 2018. Also, nitrate-N concentrations at FR_MULTIPLATE are only marginally higher than those at FR_DSSC1 (located at the inferred beginning of the groundwater discharge zone), suggesting that there is minimal loading due to groundwater along this reach.

A similar pattern in selenium and sulphate loading occurs at downstream locations FR_FRDSCC1 and FR_MULTIPLATE, with lower concentrations during and after freshet and higher concentrations during winter. However, effluent from the Clode Creek settling ponds and surface water in Grassy Creek show less seasonal patterns than nitrate-N, with more stable concentrations of selenium and sulphate. Selenium and sulphate concentration patterns in Lake Mountain Creek are similar to nitrate-N, suggesting it is not the source of loading. Selenium and sulphate concentrations from the eagle Eagle Pond (FR_EC1) are considerably elevated compared to concentrations of nitrate-N but do not show the same seasonality. Therefore, neither the elevated selenium concentrations in Lake Mountain Creek nor Eagle Pond effluent appear to influence the concentrations in downstream station FR_MULTIPLATE. Similar to nitrate-N, selenium and sulphate concentrations are only marginally higher at FR_MULTIPLATE than FR_FRDSCC1.

The minimal increase in concentrations of nitrate-N, selenium, and sulphate between the Fording River at FR_FRDSCC1 (located at the beginning of the inferred groundwater discharge zone) and downstream station FR_MULTIPLATE suggests there is minimal loading from groundwater. Although a notable amount of discharge is considered to occur, it may be that the extent of the mining influence observed in groundwater at wells FR_CB-1C and FR_GCMW-2 is limited. The increase in concentrations at FR_FRDSCC1 and FR_MULTIPLATE compared to upstream FR_FOUCL and the WED is considered to be effluent from the Clode Creek settling ponds and input from Grassy Creek (transport pathways i and ii above representative of direct discharge from the ponds and leakage from the ponds that is transported to Grassy Creek). Similar seasonality is observed in each of the nitrate-N, selenium, and sulphate concentration patterns in downstream locations FR_FRDSCC1 and FR_MULTIPLATE, which is not the case of the presumed input at FR_CC1 and FR_GC1. This is considered possible if a stable input occurs throughout the winter during baseflow, leading to the elevated concentrations downstream during late winter, which are diluted during freshet.

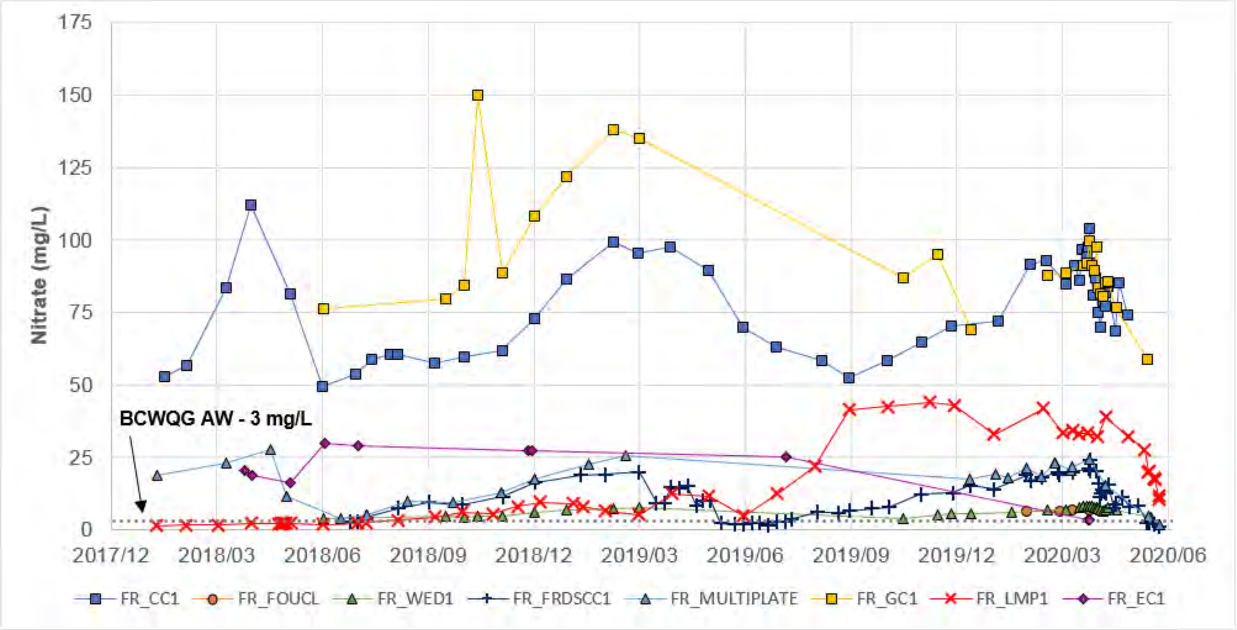

Figure 27: **Nitrate-N Concentrations in Fording River Surface Water Upstream and Downstream of the Clode Creek Settling Ponds, Tributaries, and Shallow Groundwater. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data**

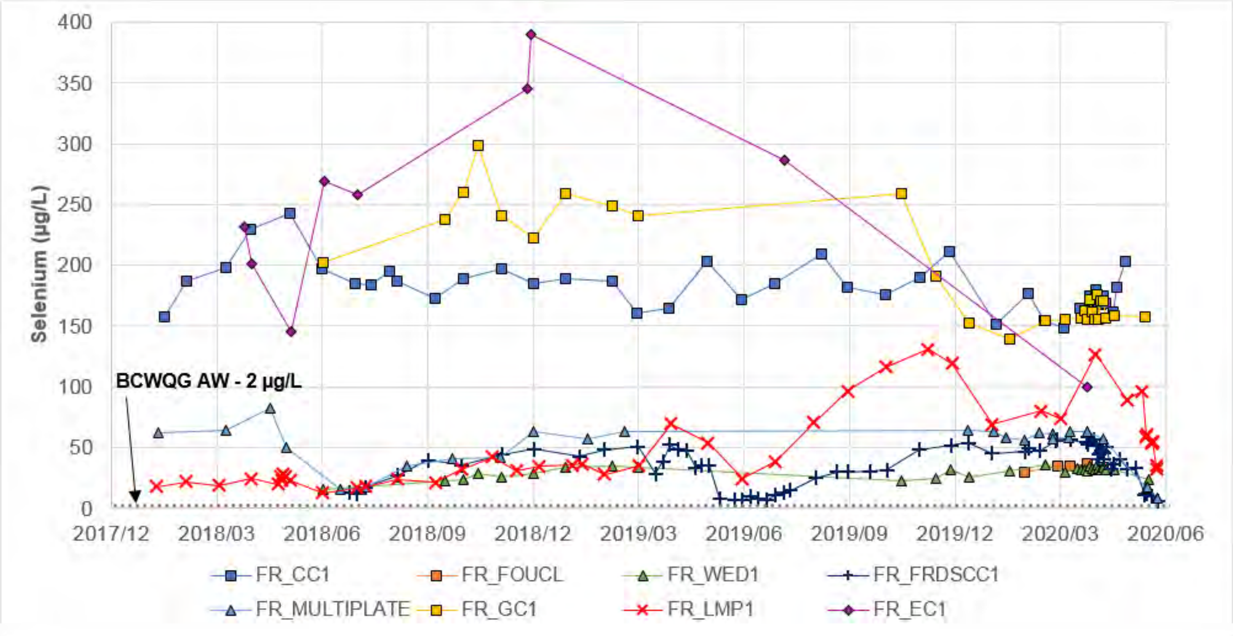

Figure 28: Selenium Concentrations in Fording River Surface Water Upstream and Downstream of the Clode Creek Settling Ponds, Tributaries, and Shallow Groundwater. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

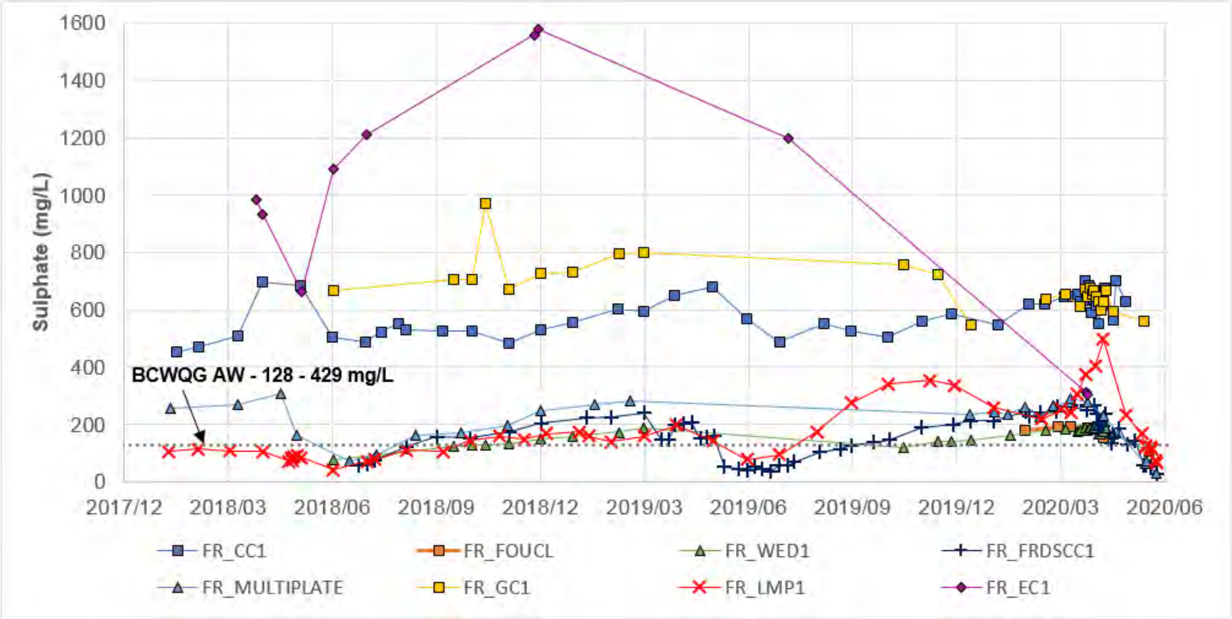

Figure 29: Sulphate Concentrations in Fording River Surface Water Upstream and Downstream of the Clode Creek Settling Ponds, Tributaries, and Shallow Groundwater. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

6.4.8 Data Gaps

Monitoring wells in the Clode Creek area are relatively new, installed between 2017 and 2019. As such, water level and water quality data only cover the decline window, and there are no historical data within which to contextualize the available data or evaluate whether they were likely to produce conditions in the receiving environment unique to the decline window. Moreover, a considerable amount of field measured temperature data are missing from the existing dataset (Table 1), which were either not collected or (more likely) not uploaded to Teck's database. There is also a general lack of monitoring wells in the S8 Study Area outside of the area of the Clode Creek settling ponds. Monitoring wells along the inferred groundwater discharge zone would be particularly useful in direct monitoring of groundwater influence.

6.5 Stressors during the Decline Window

The S8 Study Area between the Clode Creek settling ponds and NTP is a reach of the Fording River that coincides with WCT spawning and overwintering habitat, as well as influence from mining operations and an area of known groundwater discharge. Groundwater and surface water analytical data during the decline window suggest there is minimal loading of mine-influenced groundwater to the Fording River in the inferred groundwater discharge zone. However, both the groundwater and surface water datasets over that timeframe are limited, as the groundwater dataset is quarterly and there are large gaps in the surface water dataset at key monitoring stations upstream (FR_FOUCL) and downstream (FR_MULTIPLATE) of the discharge zone.

Although there are a lack of data for time period of interest, mine-influenced groundwater does not appear to have a meaningful effect on surface water quality and, as such, there is no strong evidence to suggest that groundwater quality played a role in the WCT population decline in the S8 Area.

The historical groundwater level data in the Clode Creek area only cover the decline window and not the period leading up to it. Therefore, the dataset is insufficient to evaluate whether the groundwater discharge rates or spatial distribution of discharge zones were likely to have been unique to the decline window since the historical data are unavailable for comparison.

7 Hydrogeological Conceptual Model of the S10 Study Area

Henretta Lake was identified as an area where spawning and overwintering of WTC occurs. In comparison to information available for the S6 and S8 Study Areas, the groundwater information for the S10 Study Area is relatively limited. Therefore, the basis for the hydrogeological conceptual model is limited resulting in a less detailed conceptual model than for the other study areas.

7.1 Physical Setting and Geology

A site plan of the S10 Study Area is included on Drawing 4, while a geological cross-section is included in Drawing 29. In the Henretta Lake area, the surface elevation ranges from approximately 2,300 m asl near the crest of Henretta Ridge, to topographic lows at the confluence of Henretta Creek and Fording River at 1,700 m asl. The elevation of the lake is approximately 1710 m asl. The original topography in the reclaimed area of Henretta Creek has been highly altered by historical mining and subsequent backfilling. The historical mining includes a South Pit which extends to an elevation below 1,660 m asl which has subsequently backfilled. The historical South Pit was informally subdivided into east and west portions by an anticline structure that forms a north-south bedrock ridge high that was not mined (Golder, 2013). Henretta Lake is a man-made lake situated on the west portion of the backfilled pit. Because of the historical mining, much of the surficial materials have been removed. The surficial geology in the undisturbed areas include till/morainal upland deposits and fluvial deposits in the valley-bottom. At FR_HMW3, spoils overlie an approximate 10m thick gravel which is inferred to be fluvial.

7.2 Physical Hydrogeology

Bedrock topography is a controlling factor for groundwater flow directions in upland areas (SNC-Lavalin, 2017a). Groundwater monitoring well FR_HMW2 is completed within the spoils to the north of Henretta Lake and logged lithology indicates waste rock overlying bedrock. Bedrock was identified at 47.7 m at FR_HMW2.

Depth to bedrock in the valley bottom in the area from borehole logs indicates ranges from 22.5 m bgs at FR_HMW3 to 33.5 m bgs at FR_HMW1S/D in the backfilled South Pit; however, the deepest portion of the backfilled pit is known to be approximately 60 m bgs. A down-valley groundwater flow path is inferred in the valley bottom; however, the groundwater flow pattern may be interrupted by the backfilled pits extending below the valley bottom as they can be hydraulic sinks as well as recharge zones to the regional groundwater system (Golder, 2013).

Hydraulic conductivities of the monitoring wells in the vicinity of Henretta Lake are summarized in Table O below. They are generally high and representative of the coarse material of the backfilled pits or spoils within which they are completed.

Table O: Summary of Hydraulic Testing Results in the Clode Creek Area

Well IDs	Hydrostratigraphic Unit	Screened Interval (m bgs)	Hydraulic Conductivity (K) (m/s)	Source
FR_HMW1D	Waste rock /coal/bedrock (backfilled pit)	51.2 – 54.3	1.0×10^{-4}	SNC-Lavalin, 2018
FR_HMW1S	Waste rock (backfilled pit)	29.9 – 32.5	3.0×10^{-3}	
FR_HMW2	Coal/spoils	43.3 – 46.3	3.0×10^{-3}	
FR_HMW3	Silty gravel	16.7 – 19.7	7.0×10^{-4}	

Note: Hydraulic conductivity tests at all locations listed were completed as slug tests. Constant rate tests were also completed at FR_HMW1D, FR_HMW2, and FR_HMW3.

Drawing 30 shows the potentiometric elevations and inferred contours in the vicinity of Henretta Lake in March 2019. Based on potentiometric elevations in FR_HMW2 compared to FR_HMW1D, FR_HMW1S and FR_HMW3, groundwater flows from the spoils towards the valley bottom in a west-southwesterly direction under a gradient of approximately 0.026 m/m. Groundwater flow in the valley-bottom is inferred in the down-valley direction; however, the groundwater flow pattern may be interrupted by the backfilled pits extending below the valley bottom as they can be hydraulic sinks as well as recharge zones to the regional groundwater system (Golder, 2013).

7.2.1 Groundwater Surface Water Interactions

Groundwater levels in the vicinity of Henretta Lake since 2015 are shown in Figure 30, below. The figure shows that groundwater levels at FR_HMW2 do not fluctuate highly seasonally. There is more seasonal fluctuation in monitoring wells FR_HMW1S/D and FR_HMW3, all completed within backfilled pits. The seasonal influence at these wells corresponds to freshet and suggests a hydraulic connection between the backfilled pits and Henretta Creek at this time of year. Groundwater levels are fairly stable at these wells during the remainder of the year, similar to FR_HMW2.

Vertical gradients between in the deep (i.e., 54 m bgs) backfilled pit at monitoring wells FR_HMW1S/D are consistently upward since 2015, except for manual measurements made in Q1 of 2016 and Q2 of 2018 when the gradients were downward. The transducer data also indicate a reversal of the vertical gradient to upwards in the summer and fall of 2016. The manual measurement made in Q2 of 2018 is considered to be a field error where the shallow measurement was recorded as deep and vice versa, since the datalogger data indicate an upward gradient. The same is suspected to be true of the measurement made in Q1 of 2016 as gradients are consistently upward, although there is a lack of datalogger at the time of the measurement to corroborate this suspicion.

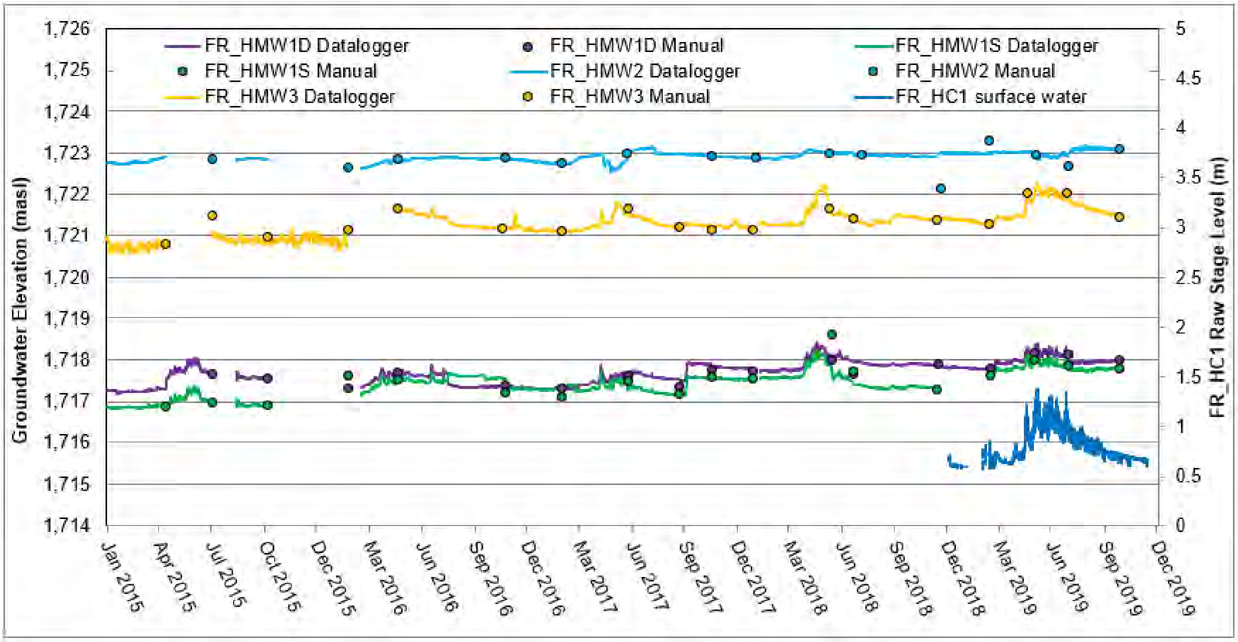

Figure 30: Groundwater and Surface Water Elevations in the Henretta Creek Watershed

7.3 Water Quality

Analytical results of groundwater samples collected in the S10 Study Area compared to the primary and secondary screening criteria are included in Table 1. The concentrations of dissolved selenium exceeded the primary screening criteria in groundwater samples collected from all wells in the S10 Study Area. The concentrations of nitrate and dissolved selenium in several samples collected from FR_HMW2 also exceeded the secondary screening criteria, as did the nitrate concentration of one sample collected from FR_HMW1S. It is noted that the secondary screening criteria for nitrate is hardness dependent and that the equation is valid up to a hardness of 500 mg/L, and that the hardness concentrations of all samples that exceeded the criteria were considerably higher than 500 mg/L.

Table P below shows a summary of nitrate-N, sulphate and dissolved selenium concentrations in monitoring wells FR_HMW1S/D, FR_HMW2, and FR_HMW3, seep FR_HENSEEP1, and surface water stations FR_HC2 and FR-HC1 which are located upstream and downstream of Henretta Lake. As indicated in the table, concentrations of these constituents are relatively high in groundwater compared to surface water.

Table P: Summary of CI Concentrations in Groundwater in S10 Study Area

Location	Screen Interval (m bgs)	Sample Size	Nitrate-N (mg/L)		Sulphate (mg/L)		D. Selenium (µg/L)	
			Range	Mean	Range	Mean	Range	Mean
FR_HMW1D	51.2 – 54.3	31	105 – 203	155	1,410 – 2,110	1,731	4.46 – 184	56.4
FR_HMW1S	29.9 – 32.5	31	110 – 227	164	1,230 – 1,940	1,628	6.00 - 262	181
FR_HMW2	43.3 – 46.3	28	48.9 – 259	139	1,100 – 1,990	1,640	184 – 891	513
FR_HMW3	16.7 – 19.7	31	1.80 – 28.4	12.7	151 – 452	263	0.97 – 73.5	47.5
FR_HC1	n/a	221	0.78 – 10.9	4.90	3.85 – 266	126	3.17 – 55.5	22.7
FR_HC2	n/a	94	0.72 – 10.1	5.00	14.1 – 203	106	2.60 – 50.9	22.9
FR_HENSEEP1	n/a	2	0.098 – 55.9	28.00	726 – 861	794	0.63 – 287	143.8

n/a – Not Applicable

There are no recent water quality samples from Henretta Lake and therefore the lake water quality can only be inferred through concentrations at the downstream station, FR_HC1. The seepage water is considered to represent groundwater; however, concentrations of dissolved selenium and nitrate-N vary by up to three orders of magnitude while sulphate does not. This variation may be the result of seasonal geochemical attenuation of nitrate-N and selenium relative to sulphate, although such seasonal attenuation is not apparent in the backfilled pits at monitoring wells FR_HMW1S/D or FR_HMW3. It is noted that the FR_HENSEEP1 has only been sampled twice and therefore there is considerable uncertainty in this interpretation.

7.3.1 Historical Groundwater Quality

Concentrations of dissolved selenium, sulphate, and nitrate-N in groundwater in the vicinity of Henretta Lake and surface water downstream of Henretta Lake are shown on Figure 31, Figure 32, and Figure 33 below, respectively. Monitoring well FR_HMW2 was specifically installed to monitor upland groundwater with elevated concentrations of mining-related constituents north of the Henretta reclaimed channel near the base of the spoil. Dissolved selenium concentrations and sulphate concentrations have displayed increasing concentrations since the well was installed (Figure 34 and Figure 35) and were the highest concentrations measured in the Henretta valley. In contrast, nitrate-N concentrations displayed decreasing concentrations since installation (Figure 36). This well was installed upgradient of the Henretta valley bottom and the spoil appears to be an ongoing source of dissolved selenium and sulphate to groundwater in the valley bottom.

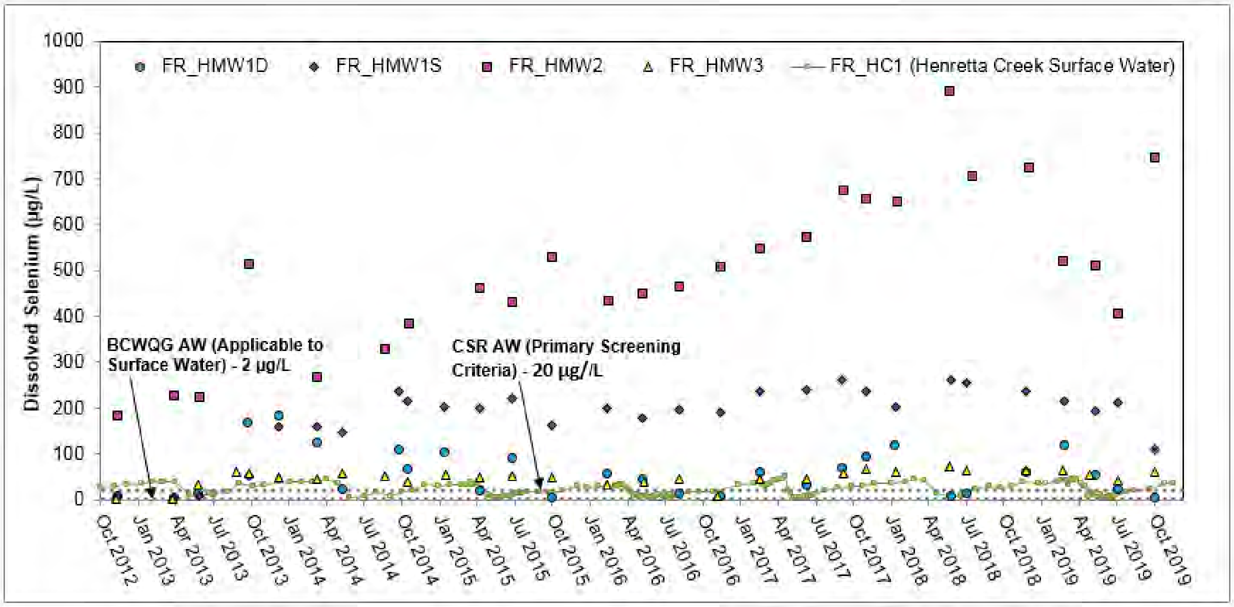

Figure 31: Dissolved Selenium Concentrations in Groundwater and Surface Water in the Henretta Creek Watershed. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

Dissolved selenium concentrations in shallow and deep monitoring wells FR_HMW1S/D, installed in backfilled pits between the Henretta reclaimed channel and the spoils to the north, show no clear seasonal historical pattern or apparent long-term trends (Figure 31). Sulphate concentrations in both wells have been increasing when compared with previous years (Figure 32); whereas, nitrate-N concentrations appear to be decreasing with time (Figure 33). A similar pattern was displayed in FR_HMW2, completed in the spoils upgradient of the backfilled pits. However, dissolved selenium concentrations differ between FR_HMW2, where they are increasing, and FR_HMW1S/D, where they have been stable between since 2015. It is noted that the maximum historical concentration of dissolved selenium in groundwater in the spoils north of Henretta Lake was detected during the decline window at FR_HMW2 (891 µg/L in June of 2018), which is screened at the base of the spoil between 43.3 and 46.3 m bgs. It is suspected that the cause of the decreasing nitrate-N concentrations is related to decreasing effects of residual nitrate-N from blasting residue, whereas the increasing selenium and sulphate concentrations are from leaching of waste rock. However, they do not appear to be adversely affecting surface water or downgradient groundwater, as discussed below.

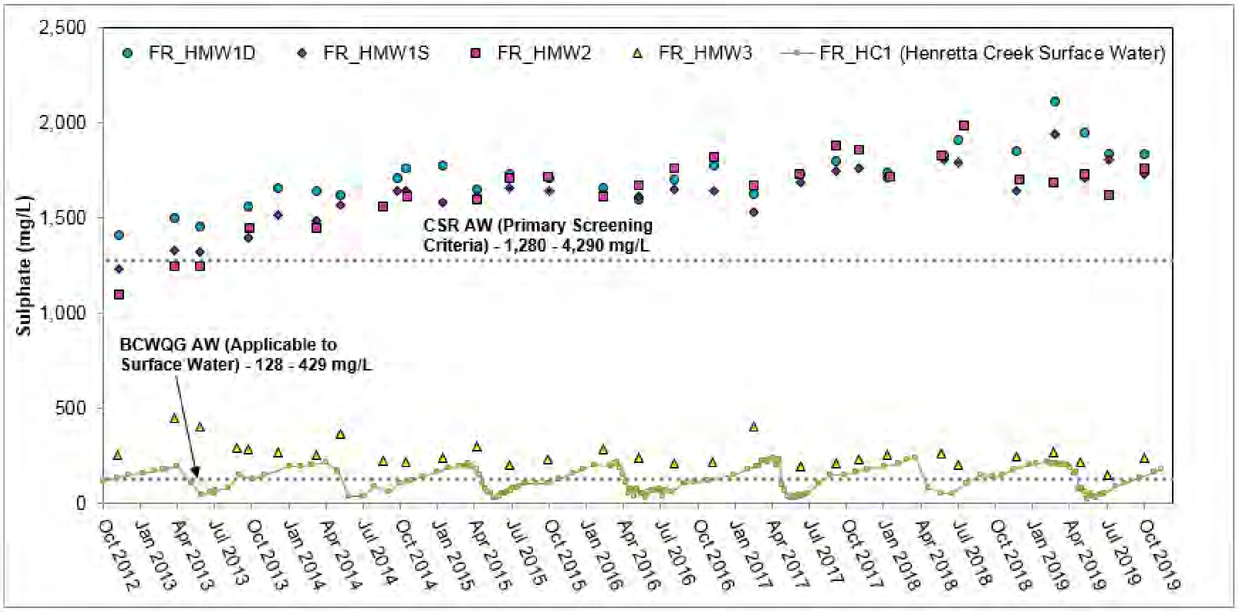

Figure 32: Sulphate Concentrations in Groundwater and Surface Water in the Henretta Creek Watershed. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

Monitoring well FR_HMW3 monitors groundwater in backfilled pits in the eastern portion of the former South Henretta Pit. Concentrations of dissolved selenium, sulphate, and nitrate-N at this well are considerably lower than at FR_HMW1S/D or FR_HMW2, and similar to (but slightly higher than the concentrations Henretta Creek downstream of Henretta Lake at FR_HC1 (Figure 31 to Figure 33).

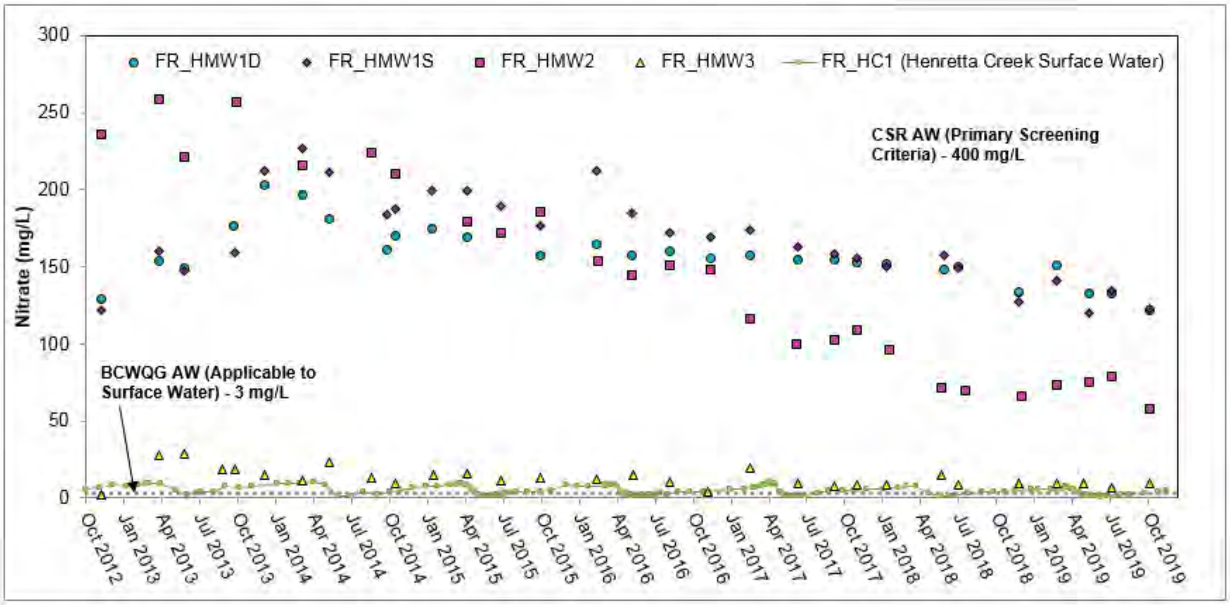

Figure 33: **Nitrate-N Concentrations in Groundwater and Surface Water in the Henretta Creek Watershed. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data**

7.3.2 Fate and Transport Pathways

Drawing 30 indicates groundwater with elevated concentrations of mining-related constituents flows from the upland spoils towards Henretta Lake, suggesting discharge of mine-influenced groundwater into the lake. However, water quality at the surface water stations upstream (FR_HC2) and downstream (FR_HC1) of Henretta Lake, as well as at the Henretta Lake outlet (FR_HL1, assumed to be collected near surface), do not demonstrate that. The concentrations of dissolved selenium, sulphate, and nitrate-N are shown in Figure 34, Figure 35, and Figure 36 below, respectively. The plots show that the concentrations of all three parameters are generally similar at each station (particularly between downstream station FR_HC1 and the Henretta Lake outlet at FR_HL1), and show seasonal variations of higher concentrations in winter and lowest concentrations during freshet (Figure 34 to Figure 36). Marginal differences in concentrations between stations FR_HC1 and FR_HC2 are generally only apparent during winter. Minimal loading of sulphate and nitrate-N is apparent between stations FR_HC1 and FR_HC2 during the winters of 2013/2014 and 2014/2015 (Figure 35 and Figure 36). However, attenuation between stations FR_HC1 and FR_HC2 is apparent in the concentrations of dissolved selenium during the winters of 2010/2011 through 2013/2014 and of nitrate-N in the winters of 2011/2012 and 2012/2013 (Figure 34 and Figure 36).

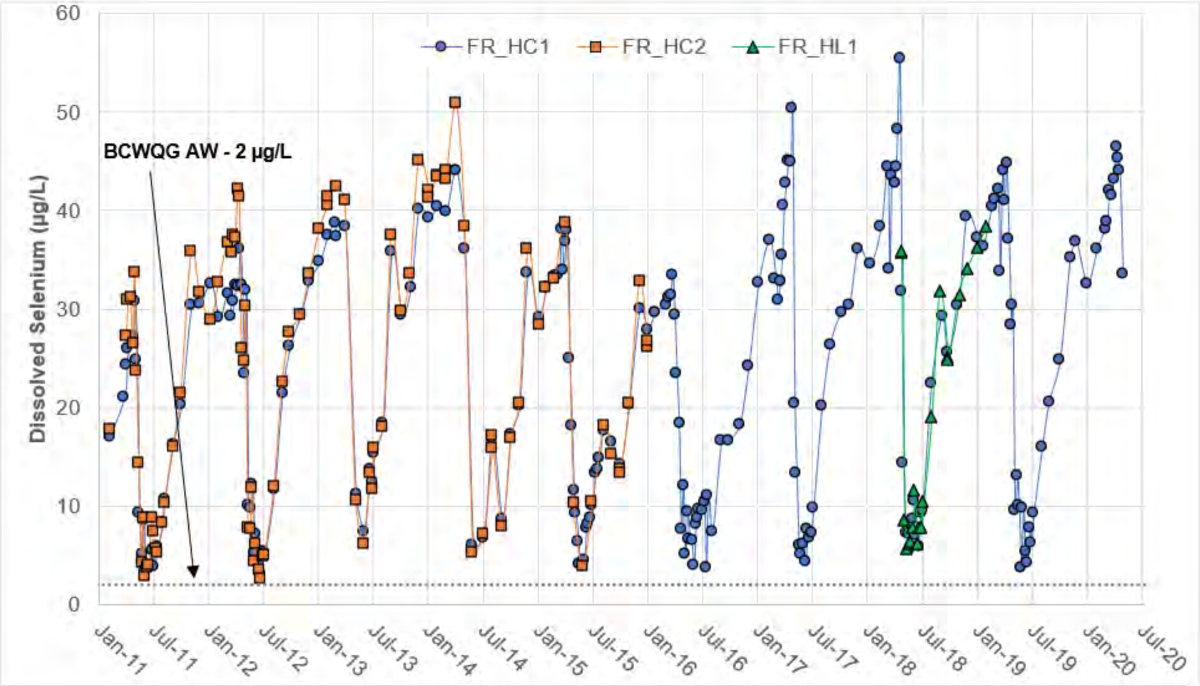

Figure 34: **Dissolved Selenium Concentrations in Henretta Creek Upstream (FR_HC2) and Downstream (FR_HC1) of Henretta Lake, as well as at the Henretta Lake Outlet (FR_HL1). Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data**

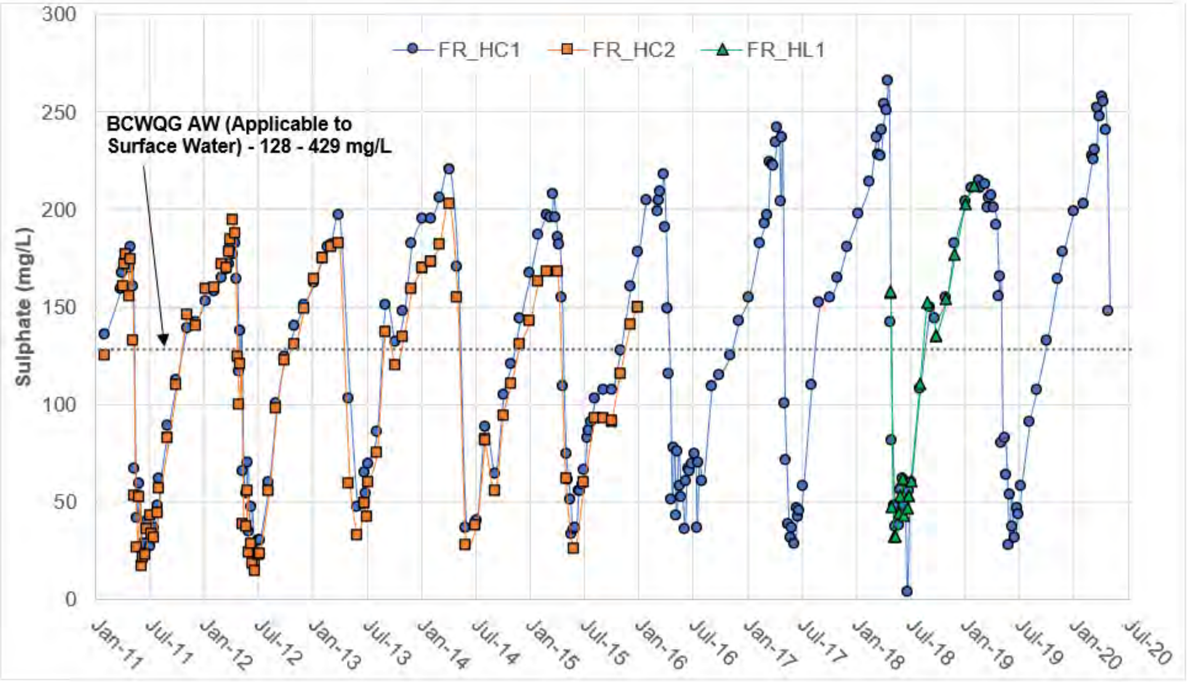

Figure 35: Sulphate Concentrations in Henretta Creek Upstream (Fr_Hc2) and Downstream (Fr_Hc1) of Henretta Lake, as well as at the Henretta Lake Outlet (Fr_Hl1). Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

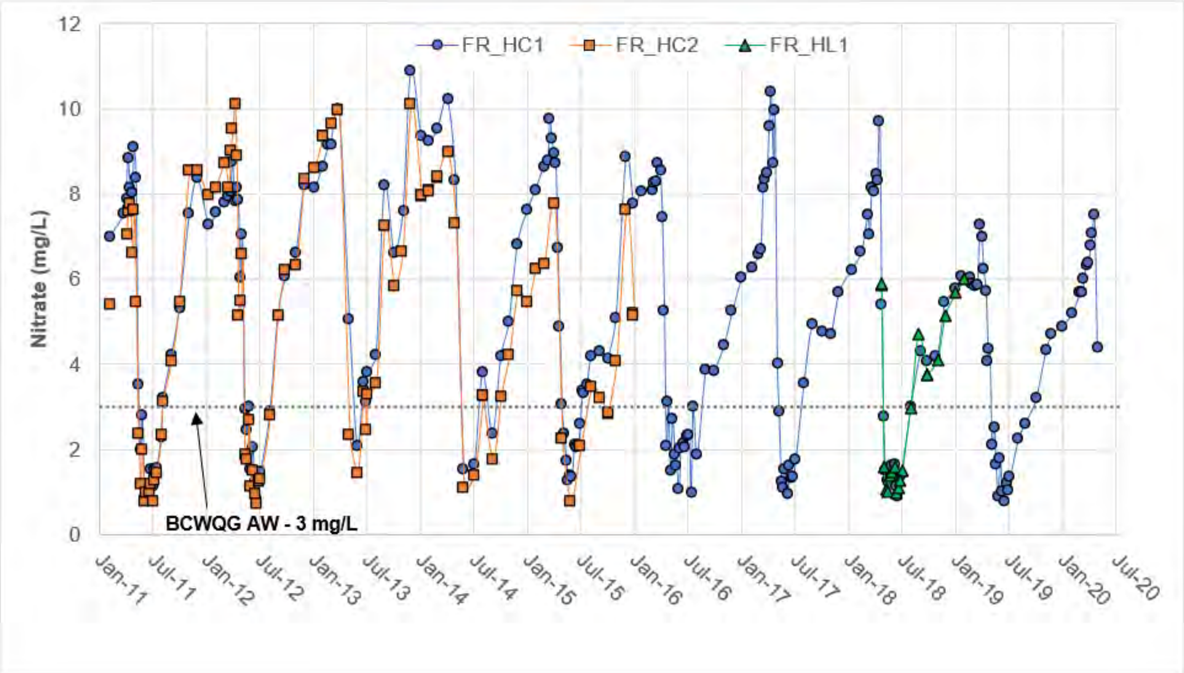

Figure 36: Nitrate-N Concentrations in Henretta Creek Upstream (FR_HC2) and Downstream (FR_HC1) of Henretta Lake, as well as at the Henretta Lake Outlet (FR_HL1). Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

Overall, the similar water quality between the stations shown on these plots suggests that there is minimal loading from groundwater to Henretta Lake in the area of the backfilled pits. Although concentrations of mining-related constituents in the spoiled backfilled pits are consistently high, there are no apparent downgradient effects in the Fording River valley bottom or Henretta Lake resulting from groundwater transport from these sources. It may be that elevated concentrations of mining-related constituents are attenuated by reduction of nitrate and selenate along the flow path, mitigating loading from groundwater to Henretta Lake. An alternative explanation could be underflow of groundwater beneath Henretta Lake, rather than discharge to it.

7.3.2.1 Potential Effects on Overwintering Fish

As discussed in Section 5.5.1.1 and Section 5.5.2.1, it cannot be ruled out that WCT could have been exposed to undiluted groundwater by preferentially migrating to warmer areas of groundwater discharge. Therefore, concentrations nitrate-N and dissolved selenium from upgradient well FR_HMW2 were compared to acute and chronic screening values developed by Costa and de Bruyn (2021). Chronic values are summarized in Table J; acute values were 4.2 mg/L selenium and 381 mg/L nitrate as N.

Concentrations of nitrate and selenium in upgradient well FR_HMW2 were below acute screening values, indicating that acute effects to fish would not be expected. Concentrations of nitrate and selenium were above their respective chronic screening values; these results indicate that, if fish lived in undiluted groundwater chronically, then there is a potential for chronic adverse effects. The FR_HMW2 well is completed in the source materials of the Henretta spoils on top of bedrock, and is not located in the valley bottom. There are no groundwater data for the valley bottom downgradient of the spoils nor are there water quality data at the base of Henretta Lake, which is recognized as a data gap (discussed below in 7.4). However, dilution would be expected in the valley bottom groundwater downgradient of the spoils; for concentrations to be below the chronic screening criteria, an approximate two-times dilution would be required. As discussed in the surface water quality report (Costa and de Bruyn 2021), surface water quality concentrations at the outlet of Henretta Lake were below chronic screening values, indicating that chronic effects to fish are unlikely.

In aggregate, the above information indicates that acute effects of nitrate and selenium would not be expected and that the interpretation for potential chronic effects is uncertain. It is recognized that the localized water quality in the lake and upgradient groundwater valley bottom is an uncertainty in the assessment.

7.4 Data Gaps

There are limited water quality data available for Henretta Lake -which is the presumed discharge zone of groundwater in the spoils and backfilled pits upgradient. - both historically and during the decline window. The limited water quality data available for Henretta Lake was collected at the outlet, which appears to correlate well with FR_HC1. Therefore, historical water quality in the lake has been inferred from downstream water quality in Henretta Creek at FR_HC1. However, there could be stratification of CI in Henretta Lake that has not been captured through surface water sampling at FR_HL1 or FR_HC1, with potentially higher concentrations at depth if mining influenced groundwater in the backfilled pits and spoils discharges to the lake bed. As discussed above, the potential chronic effects to fish are uncertain due to the lack of water quality data in Henretta Lake at depth and of groundwater quality data in the valley-bottom downgradient of the spoils.

7.5 Stressors during the Decline Window

Historical groundwater level data were reviewed since there were sufficient data during the decline window. The hydrographs show that seasonal water level fluctuations have remained consistent throughout the monitoring period at all wells. There is nothing unique to the decline window about the groundwater levels that would abnormally affect discharge to Henretta Lake. Similarly, there are no historical anomalies in the record that would result in an expected change in groundwater flow directions.

The hydrogeological conceptual model and review of the available data indicate that water quality downstream of Henretta Lake is better than the quality of upgradient groundwater that is inferred to discharge to the lake, indicating minimal constituent loading to the lake from groundwater discharge. This may be due to attenuation of mining-related constituents along the flow path, or due to underflow of Henretta Lake by groundwater. Since there is no indication of constituent loading to Henretta Lake, there is no strong evidence to suggest that groundwater quality played a role in the WCT population decline in the S10 Study Area. However, the lack of water quality data at depth within Henretta Lake during the decline window is a key data gap given that dissolved selenium concentrations within the spoils north of Henretta Lake increased throughout the decline window and that groundwater flow is directed towards the lake, which could potentially cause stratification of CI. The potential chronic effects to fish are also uncertain due to the lack of water quality data at depth in Henretta Lake and in valley-bottom groundwater downgradient of the spoils.

8 Operational Influences on Groundwater Resources

The stressor evaluations for each study area focused on available monitoring data (i.e., groundwater, surface water, seep, drive point). This was considered appropriate as they are direct measurements and the best indicators of changes with respect to identified potential stressors of water quantity and quality. However, there are operational activities that may influence groundwater and therefore have the potential to influence baseflow (i.e., water quantity) in the Fording River, including groundwater extraction, consumptive use of water stored in ponds or pits, and pit development.

Groundwater extraction from supply wells has the potential to affect base flow in the river if there is a direct hydraulic connection between the wells and the river, or by altering the flow field and affecting groundwater discharge to the river. Consumptive use of stored water in pits and ponds may influence the amount of groundwater recharge, which can in turn affect the amount of groundwater discharge in gaining reaches. Pit development can influence whether groundwater is directed towards or away from the river depending on the water level maintained within the pit if the base of the pit is below that of the river. The following sections summarize the state of knowledge, key data gaps and/or uncertainties regarding the influence of water use at Points of Diversion (POD's) where water is extracted, as well as the influence of the development of several pits. Trends in water use across FRO during the decline window were also evaluated by Ecofish (Wright et al., 2021).

8.1 Groundwater Extraction

8.1.1 FRO Potable Wells

The potable wells (FR_POTWELLS) at FRO consist of six production wells completed in fluvial sediments in the Fording River valley-bottom adjacent to Turnbull Pit (Drawing 31), with the nearest well (FR_PW91) located approximately 65 m southeast of the river. Well construction details are provided in the as-built drawings included in Appendix II. Despite the name, groundwater withdrawn from the FR_POTWELLS is used for operational purposes and is not used as a potable water source.

A section of the Fording River upgradient and adjacent to the FR_POTWELLS dries seasonally in the winter months (Hocking et. al, 2021) and shown on Drawing 31. Daily pumping data from the FR_POTWELLS are available since 2015; however, pumping tests on individual wells to understand the well yields and aquifer transmissivity have not been completed. Analyses of the pumping data during operation of the wells has also not been completed since the wells are not instrumented with pressure transducers. Capture zone analyses to understand zone of influence have also not been completed due to a lack of aquifer transmissivity and hydraulic gradient data. Additionally, the pumping data are the combined rates from all six production wells; pumping rates of individual wells (also needed for capture zone analyses) are not available. Groundwater elevation data are not available in the vicinity of the FR_POTWELLS and the wells are unable to be instrumented with dataloggers due to safety concerns (confined space) and the infrastructure of the wells (the pumps would need to be removed and drop tubes would need to be installed). The similarity in concentrations of Cl between the FR_POTWELLS and nearest surface water monitoring station in the Fording River (FR_FR1) suggests that there is a hydraulic connection between the extraction wells and the river (Figure 37 to Figure 39).

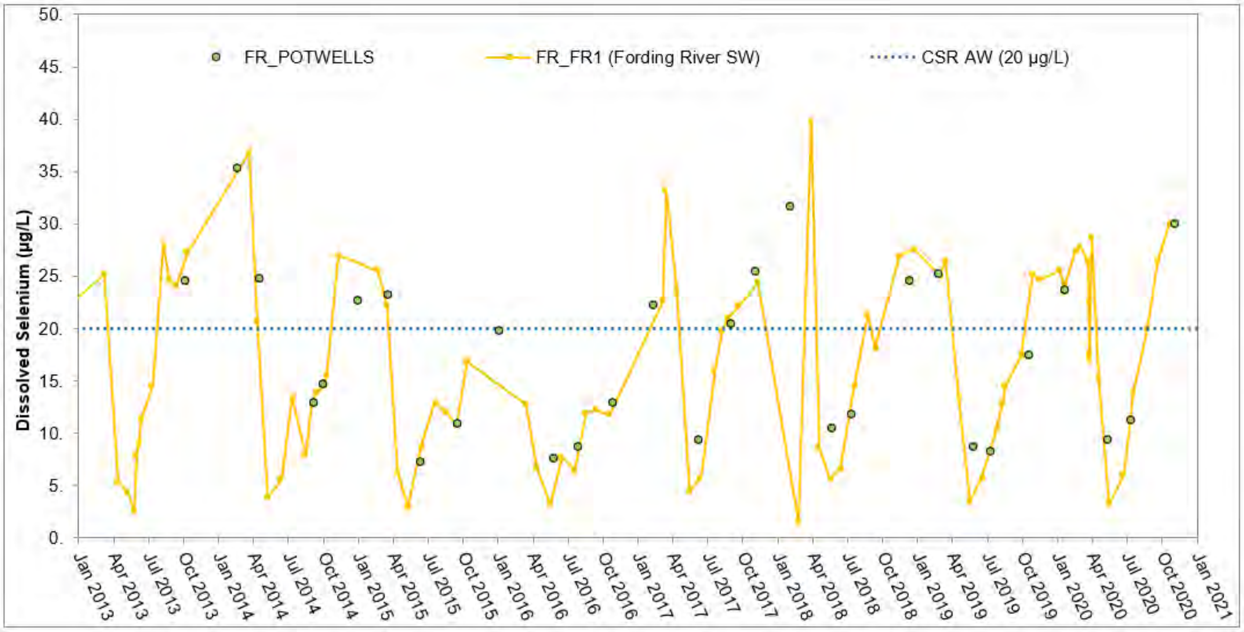

Figure 37: Dissolved Selenium Concentrations in Groundwater at FR_POTWELLS and Surface Water at FR_FR1. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

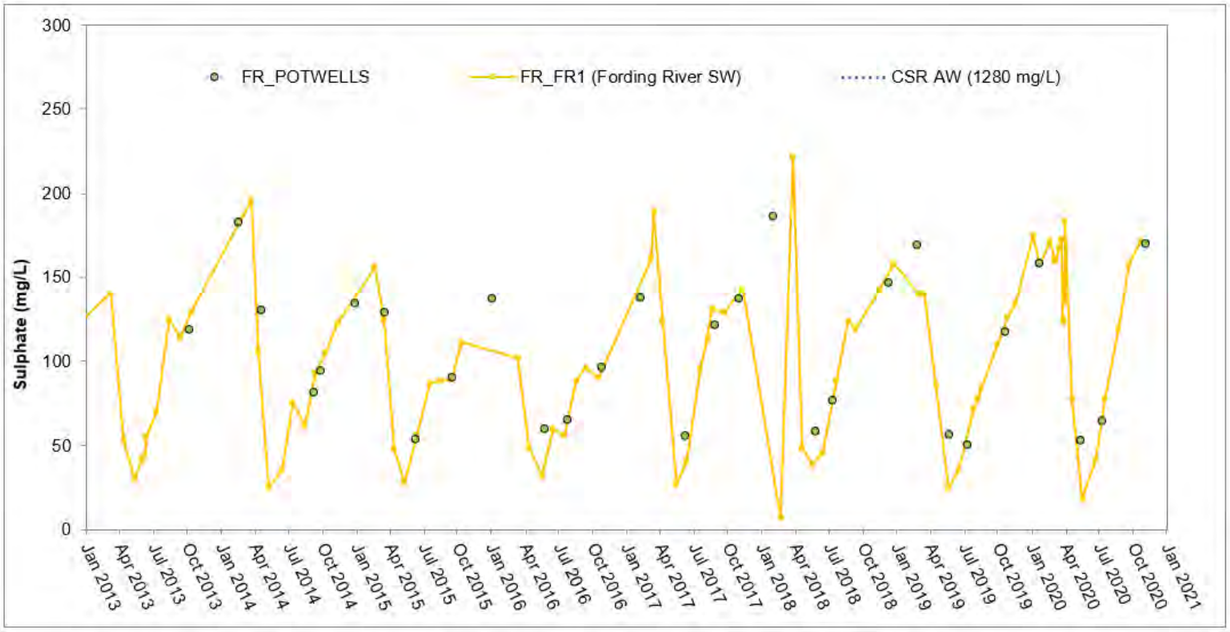

Figure 38: Sulphate Concentrations in Groundwater at FR_POTWELLS and Surface Water at FR_FR1. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data

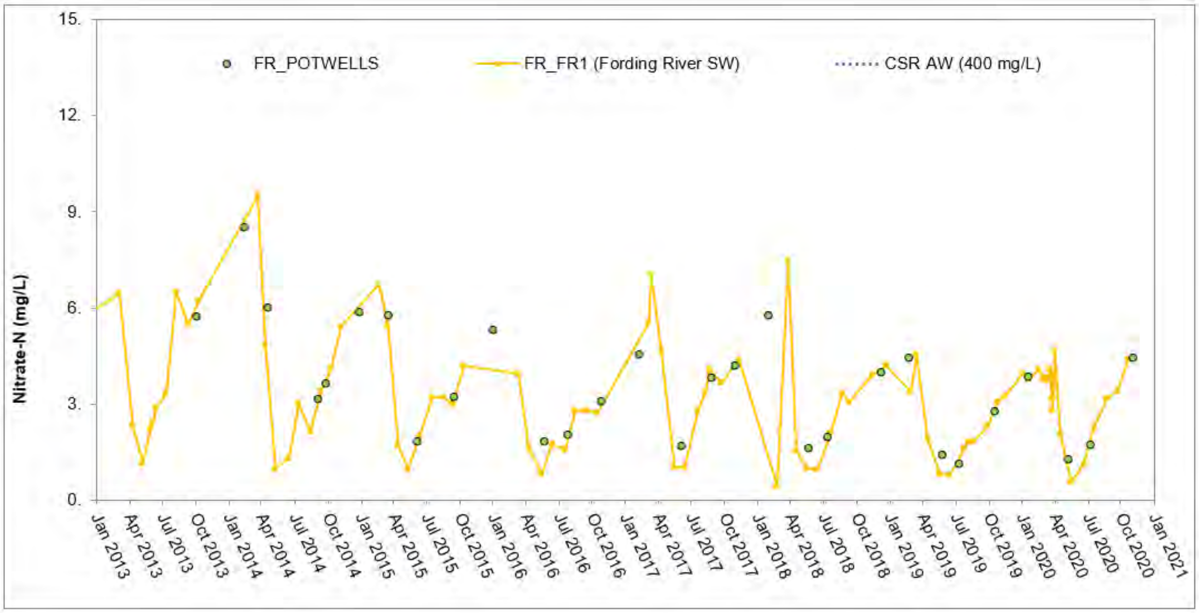

Figure 39: **Nitrate-N Concentrations in Concentrations in Groundwater at FR_POTWELLS and Surface Water at FR_FR1. Lines Connecting Data Points of Surface Water Stations are to Orient the Reader and do not Imply Continuous Data**

Groundwater extraction at the FR_POTWELLS between 2015 and 2019 is summarized along with discharge at station FR_FRNTP (approximately 3.5 km downstream) in Table Q below. For context, the table also expresses the water withdrawn the FR_POTWELLS as a percentage of flow in the Fording River as measured at FR_FRNTP. This represents the upper bound of potential flow reduction in the Fording River caused by groundwater extraction at the FR_POTWELLS in the absence of knowing the true influence. Figure 40 also shows the average daily groundwater extraction at the FR_POTWELLS, Fording River discharge at FR_FRNTP, and potential withdrawal as a temporal plot.

The data show that the percentages of Fording River discharge are greatest during the winter months when flow in the river is lowest, and the highest percentages of Fording River discharge occurred prior to the decline window during the winter of 2015-2016 (Figure 40). There is no apparent change in groundwater extraction volumes during the decline window compared to earlier data (Figure 40). It is noted that a change in pumping rate is not necessarily required to influence flows in the river if the flows were lower during the decline window than historical flows. However, the influence of groundwater extraction cannot be evaluated independently or separated from other stressors, and therefore the flows were evaluated directly in Wright et al. (2021). The available data indicate that average annual streamflow in the Fording River was among the highest during the decline window compared to previous years, although flows were particularly low in December 2018 and February 2019 (Wright et. al, 2021).

Table Q: Summary of daily groundwater extraction at FR_POTWELLS and Fording River Discharge at FR_FRNTP

Value	Statistic	2015 - 2019	Prior to Decline (2015 to Sep. 2017)	Decline Window (Sep. 2017 to Sep. 2019)
FR_POTWELLS Average Daily Pumping Rate (m^3/s)	Minimum	0.013	0.014	0.013
	Maximum	0.055	0.054	0.055
	Average	0.040	0.039	0.042
FR_FRNTP Average Daily Discharge (m^3/s)	Minimum	0.207	0.207	0.288
	Maximum	14.1	11.2	14.1
	Average	1.94	2.01	1.97
Percentage of Fording Discharge (%)	Minimum	0.179	0.179	0.358
	Maximum	19.8	19.8	16.0
	Average	4.98	4.70	5.17

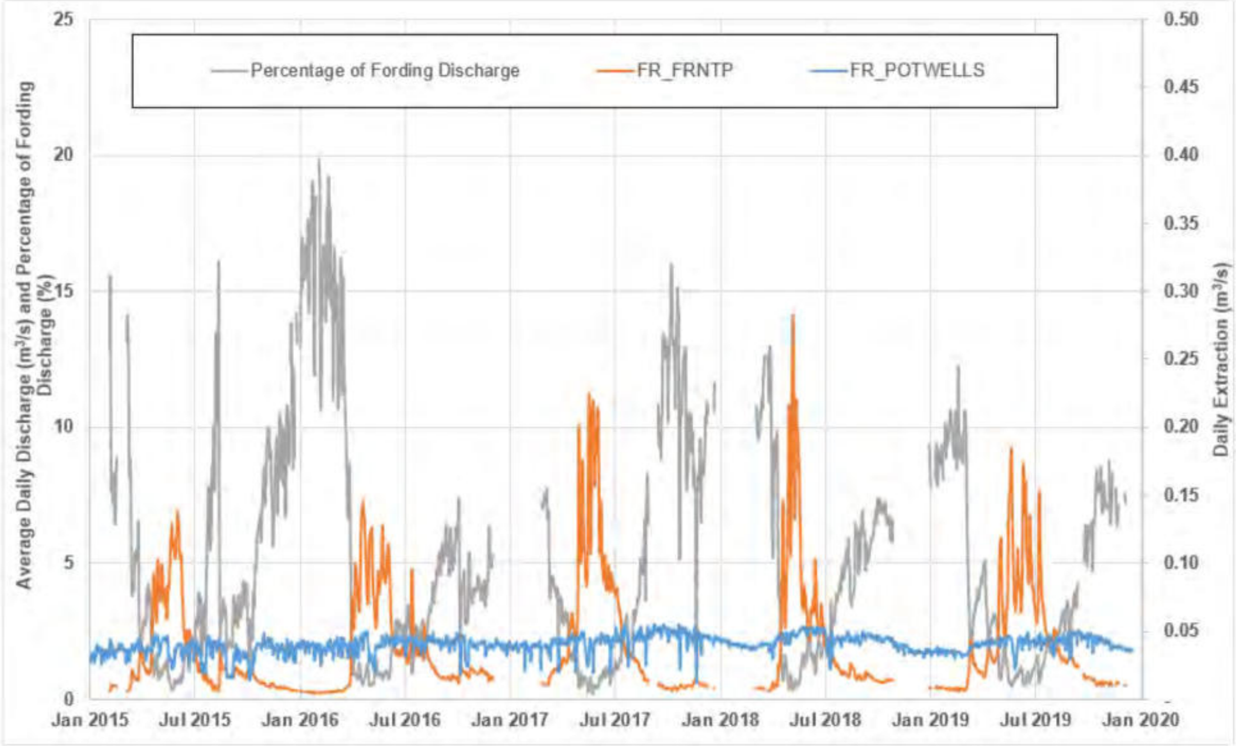

Figure 40: Average Daily Groundwater Extraction at the FR_POTWELLS, Discharge in the Fording River at FR_FRNTP, and Extracted Groundwater at the FR_POTWELLS Expressed as a Percentage of Discharge in the Fording River at FR_FRNTP

While a hydraulic connection between the FR_POTWELLS and the Fording River is evident from the chemistry data, the extraction and flow data discussed above suggest the influence of FR_POTWELLS pumping on flows in the Fording is unlikely to have been pronounced during the decline window. However, there are some gaps in the available discharge data in winter on Figure 40 above, and there are also no direct groundwater monitoring measurements to fully understand the influence of pumping on the river. It is acknowledged that there is a likely effect of groundwater withdrawal from the FR_POTWELLS on flow in the Fording River, which is considered a data gap.

8.1.2 Greenhouse Wells

The Greenhouse Wells are located approximately 350 m east of the Fording River and surface water monitoring station FR_FRCP1 (Drawing 2). The Greenhouse Wells are pumped intermittently at low volumes between January to October. Well FR_GHWELL4 pumps approximately 3.6 m^3/d during these months, while the remaining wells pump approximately 0.9 m^3/d three days per week during the same months (SNC-Lavalin, 2019a). The combined extraction between January and October is therefore approximately 3.6 to 6.3 m^3/d, or 2.5 to 4.5 L/min.

For comparison, continuous flow data provided by Teck for surface water monitoring station FR_FRABCH (Figure 15) ranged from 0.67 m^3/s (57,816 m^3/d) to 21.2 m^3/s (more than 1.8 million m^3/d) over the decline window, with average winter baseflows of 0.96 m^3/s (82,944 m^3/d) over the winter of 2017/2018 and 0.84 m^3/s (72,576 m^3/d) over the winter of 2018/2019 (Section 4.4.1).

As discussed above in Section 3.5.1.2, the Fording River seasonally dries in the winter along a reach extending from the confluence between the main-stem and the Greenhouse Side Channel north to approximately FR_FRCP1 (cross-gradient and downgradient of the Greenhouse Wells), with isolated areas that also dry north of FR_FRCP1. An evaluation was conducted using available data to understand the potential influence of these wells on the drying reach and also the downgradient discharge area.

Given that the direction of groundwater flow is down-valley, the vast majority of groundwater drawn from the Greenhouse Wells would come from upgradient to the north. The lateral extent of the capture zone of a single Greenhouse Well pumping at the maximum extraction rate of all wells combined cited above (6.3 m^3/d, or 4.5 L/min) was estimated using Step 2 of the ENV Water Protection Toolkit according to:

$$Y = \frac{Q}{2000Ti}$$

and

$$T = Kb$$

where *Y* is the half width of the capture zone in m, *Q* is the pumping rate in L/s, *T* is the transmissivity of the aquifer in m^2/s, *i* is the hydraulic gradient, *K* is the hydraulic conductivity, and *b* is the aquifer thickness. This analytical solution is applicable to unconsolidated aquifers that have a uniform ambient (i.e., non-pumping) water table slope (ENV, 2004).

Using the equations above and a pumping rate equal to 0.075 L/s (6.3 m^3/d, or 4.5 L/min), hydraulic gradient of 0.008 m/m observed in the S6 Study Area, a range of hydraulic conductivities equal to the range of the lower and upper 95th percentiles presented above in Section 3.4.1 (1.3×10^{-4} to 4.0×10^{-3} m/s), and aquifer thickness of 30 m based on the log of FR_GH_WELL4 (Piteau, 2012b), the half-width of the capture zone was estimated to range between 0.04 m and 1.2 m. These widths are very small compared to the distance to the Fording River (approximately 350 m east), and indicate that almost all water will be drawn from upgradient and not laterally from the Fording River. Although the zone of influence extends beyond the capture zone, it is not expected to extend to the Fording River considering relatively long distance.

Finally, the analytical chemistry data of groundwater samples collected from the Greenhouse Wells and surface water samples collected from the Fording River also indicate that there is no influence of the Fording River on groundwater chemistry at the Greenhouse Wells. The NO_3^--N/SO_4^{2-}-S ratios of groundwater extracted from the Greenhouse Wells indicate that the source is groundwater recharged by Kilmarnock Creek (Figure 11). The NO_3^--N/SO_4^{2-}-S ratios of samples collected from the Fording River at FR_FR4 (Figure 12) and FR_FRCP1 (Figure 11 and Figure 12) are considerably different to groundwater samples collected from the Greenhouse Wells, especially at FR_FRCP1 during baseflow when there is a strong input from Swift and Cataract creeks.

Based on the evidence above, it is concluded that groundwater extraction from the Greenhouse Wells does not affect the Fording River or contribute to the drying reach between FR_FRCP1 and the confluence of the Greenhouse Side Channel with the main stem.

8.2 Pit Development

The conceptual models and stressor evaluations of each Study Area presented in earlier sections of this report focused on groundwater flow through valley-bottom alluvial aquifer since it is the primary conduit for to reach the Fording River. However, pit development can also influence conditions in the Fording River which is a transport pathway that occurs primarily through bedrock.

Groundwater flow in bedrock is topographically driven and predominantly limited to fracture flow within bedding, joints, or along faults. The primary porosity in bedrock (i.e., matrix porosity, or rock pore space), is considered to be relatively minimal compared to the secondary porosity (i.e., fracture flow). A high spatial variability in bedrock hydraulic conductivity is common, and in combination with topographic relief, has a strong effect on determining direction of groundwater flow (BC MWLAP, 1994). From a regional perspective, the bedrock flow system has previously been divided into shallow, intermediate and deep flow systems (SNC-Lavalin, 2020b and references therein).

The shallow bedrock flow system consists of groundwater in weathered or fractured bedrock that is at or near the surface, or near the overburden contact. Groundwater in the shallow bedrock is hydraulically connected to the unconsolidated flow system and thus flow directions and hydraulic gradients reflect the unconsolidated system. Localized flow in shallow bedrock is expected to follow topography both within the existing mining footprint and on the flanks of the mountains (SNC-Lavalin, 2020b).

The intermediate bedrock flow system has longer flow paths and residence times than the shallow system, with discharge to the valley flanks and not the valley bottoms of the main stems. The intermediate flow system is controlled by variations in bedrock permeability where more permeable units (i.e., units that exhibit greater fracturing due to brittle deformation) outcrop on the valley flank, which may locally increase permeability. Where it outcrops, weathering may also increase the localized permeability. Flow in these units is expected to follow bedding planes and structural features. Discharge from these exposures can occur along flanks of upland areas and results in surface or shallow groundwater flow in the tributary drainage; as such, the intermediate flow system is still relatively localized and does not play an important role in regional groundwater flow.

A deeper, regional flow system exists that ultimately discharges to the valley-bottom sediments in either the main stem rivers or significant tributaries. The deep system represents a relatively small portion of total regional groundwater flow because it is a rock mass broadly demonstrated to have low permeability (Section 5.3.3). Residence times for the bedrock mass in the deep flow system have been modelled to be on the order of decades to millennia at LCO (Teck, 2011), FRO (Golder, 2014b) and EVO (Golder, 2015b). As such, from a regional water balance perspective, volumetric flow through the deeper bedrock mass is minor compared to flow through surface water and unconsolidated aquifers. Isolated localized exceptions may occur where karst and faults result in elevated hydraulic conductivity.

Hydraulic conductivity within bedrock is highly variable, ranging between 10^{-11} and 10^{-6} m/s within the Mist Mountain Formation at FRO (Golder, 2014; SNC-Lavalin, 2015). Bedrock hydraulic conductivity is generally greatest near the bedrock surface due to weathering and decreases with depth due to increasing lithostatic pressure that reduces fracture apertures. Regionally, the geometric mean of bedrock in the upper 100 m is 1.0×10^{-7} m/s, which is reduced by an order of magnitude to 1.0×10^{-8} m/s at depths of 300 m to 400 m (Golder, 2015).

Considering the generally lower permeability and longer travel times, the discussion below on the potential influence of pit development on flows in the Fording River is limited to pits in close proximity to the Fording River valley bottom. The discussion below is further limited to consideration of changes in flow to the Fording River only, due to a lack of data to evaluate impacts to flow in tributaries. However, it is acknowledged that there may have been reductions in flow to Fording River tributaries from the pre-mining condition due to a number of factors such as upstream diversions, direct losses to pits, and changes in hydraulic gradients, and that these losses also affect flows in the Fording River.

8.2.1 Swift Project

8.2.1.1 Shandley Pit

Shandley Pit is part of the Swift Project and is located west of the NTP as shown on Drawing 32. Water currently stored in Shandley Pit is used as make-up water for the Process Plant (Teck Coal, 2017). In the future, Shandley Pit will be dewatered as part of the development of Swift Pit. The base of Shandley Pit is below the elevation of the Fording River, with the hydraulic gradient under current conditions towards the Fording River. The hydraulic gradient under the future de-watered scenario is expected to be reversed.

O'Neill Hydro-Geotechnical Engineering (OHGE) recently completed an evaluation of the hydraulic connectivity between Shandley Pit and the Fording River to assess the potential reduction in flow due to the gradient reversal during future dewatering. OHGE estimated that seepage to Shandley Pit under the future dewatering scenario to be 0.002 m^3/s or 0.7% of Fording River baseflow, with a predicted travel time from the river to the pit would be on the order of nine years (OHGE, 2020a). Using a gradient (0.1 m/m) based on the average water level of the pit lake (1645 m asl) and Fording River adjacent to the pit (1625 m asl), and same hydraulic conductivity (8×10^{-8} m/s), cross-sectional area (112,200 m^2), distance (200 m), and effective porosity (0.025) reported by OHGE, SNC-Lavalin estimates that the current discharge to the Fording River from the Shandley Pit Lake to be on the order of 0.001 m^3/s with a travel time of approximately 20 years.

Monthly and annual use of water stored in Shandley Pit between 2015 and 2019 is summarized in Table R below. Generally, water use was highest between June to October and comparatively lower during the winter months. Shandley Pit water usage was also higher during the decline window than prior to it; however, Ecofish noted that Teck's POD data records improved following the issue of current water licenses in 2017 (Wright et. al, 2021) so the higher usage may be a result of better record keeping. For the Fording River to lose water to Shandley Pit via leakage, consumptive water use would have to draw the water level in the pit below the elevation of the Fording River, and there would need to be a hydraulic connection between the pit and the river. However, the hydrograph included in OHGE indicated that the water level in the pit was continually above the elevation of the river prior to and during the decline window (UHGE, 2020). Since the water level in the pit is greater than the elevation of the Fording River, the water removed from Shandley Pit represents a potential reduction in recharge to the Fording River if there were to be a hydraulic connection between the pit and the river. However, the water used from Shandley Pit represents a small proportion of flow in the Fording River (Figure 41), and considering the long travel times along the relatively low-permeability bedrock pathway and low estimated discharge rate to the Fording River emanating from the pit, it is considered unlikely that water use from Shandley Pit would have deleteriously reduced baseflows in the Fording River during the decline window.

Table R: Summary of monthly and annual use of water stored in Shandley Pit from 2015 to 2019

Volume Used (m^3)	2015	2016	2017	2018	2019
January	-	43,585	7,595	**22,855**	**26,896**
February	-	47,618	2,154	**8,822**	**22,317**
March	149,902	4,106	507	-	**16,625**
April	136,275	58,268	2,024	**52,847**	**208,670**
May	54,510	12,152	21,445	**346,124**	**266,579**
June	40,882	75,270	61,296	**362,621**	**243,292**
July	-	212,043	134,126	**259,369**	**34,645**
August	-	360,871	404,618	**322,236**	**83,067**
September	-	65,238	**449,296**	**223,607**	**28,029**
October	161,849	1,426	**274,122**	**214,446**	8,919
November	59,790	48,780	**226,173**	**32,221**	178
December	6,567	80,817	**128,474**	**31,677**	-
Annual	609,775	1,010,174	1,711,830	1,876,825	939,217

Bold – Water used during the WCT population decline window (September 2017 to September 2019).

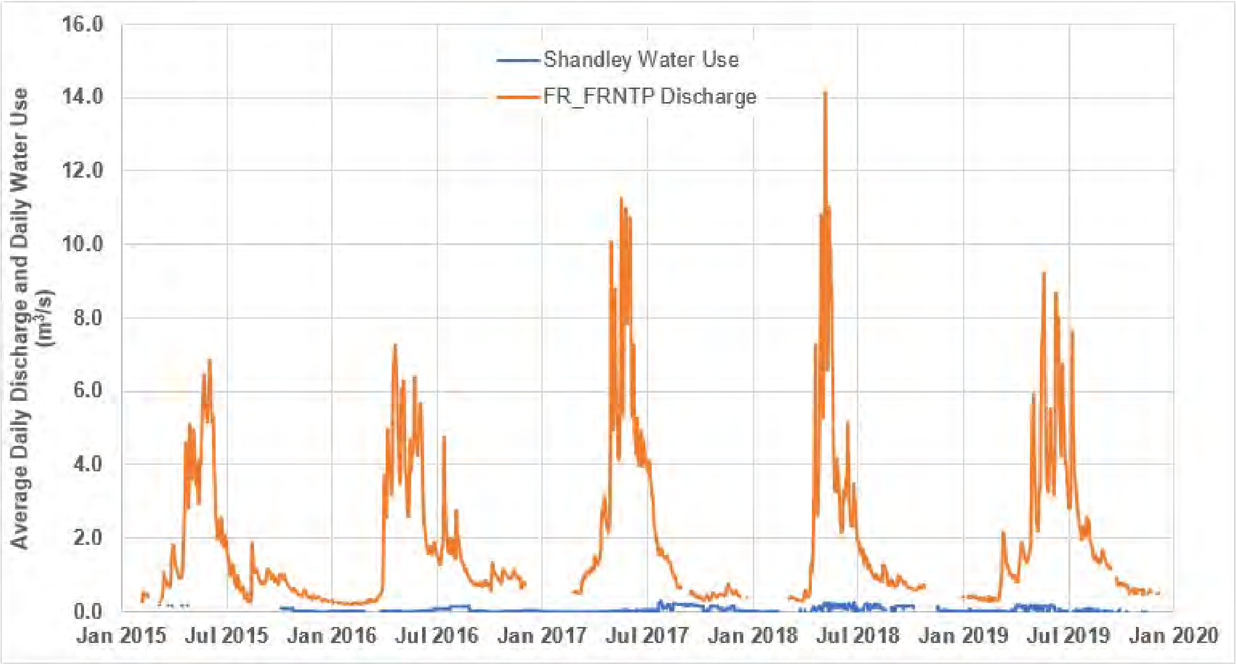

Figure 41: **Average Daily Discharge in the Fording River at FR_FRNTP and Daily Water Use from Shandley Pit between 2015 And 2019**

It is acknowledged that the above assessment conceptualizes groundwater movement as occurring though porous media rather than through discrete structural discontinuities, which may form preferential pathways for groundwater flow. Groundwater flow velocities through a high permeability discontinuity could be considerably higher than the estimates cited above. However, the available data indicate that the hydraulic conductivity of the Erickson Fault is relatively low and similar to competent bedrock (OHGE, 2020), and there is no evidence that such preferential flow through structural discontinuities exists.

8.2.1.2 Swift 1 Pit

A review of multiple lines of evidence by OHGE (2021) indicated that that there is likely no hydraulic connection between the Fording River and the larger Swift 1 Pit, of which Shandley Pit is a part of. OHGE (2021) summarized the rationale for why it is unlikely that the Fording River will lose water through percolation towards Swift 1 Pit, using the following lines of evidence:

- There is a topographic high comprising undisturbed ground and the NTP between the Fording River and Swift 1 Pit that is approximately 40 m higher than the river, which is expected to act as a groundwater divide. Vibrating wire piezometers installed in bedrock, soils, and the NTP facility between the Swift 1 Pit and the river show that the water level within the NTP facility is above both the river and the level of the NTP foundation soils;
- Flow accretion studies completed in 2019 (Golder, 2020b) indicate that the Fording River is stable or gaining between the Liverpool Ponds and surface water station FR_FRNTP;
- The bedrock formation (Spray River Group) through which water from the Fording River would need to travel to Swift 1 Pit is composed of low-permeability mudstone, siltstone, and shale. The estimated

hydraulic conductivity is low (4.0 x 10^{-9} m/s) and the average yield of six wells completed within the Spray River Group in the Elk Valley is also low (19 m^3/d). The Erickson Fault which lies adjacent to the east side of the Swift 1 Pit is also estimated to have a low hydraulic conductivity (9.0 x 10^{-9} m/s); and

- Considering the hydraulic properties of the Spray River Group, if any water from the Fording River did migrate to Swift 1 Pit, the volume would be very low and the travel time would be very long.

8.2.2 Turnbull Pits

The Turnbull South Pit is located east of the Fording River between Henretta and Clode Creeks as shown on Drawing 32. Turnbull South Pit has been used as a tailings storage facility (the Turnbull South Tailings Storage Facility) since mining was completed in the pit in 2016. An impact assessment was completed by Golder in 2012 prior to completion of the Turnbull Tailings Storage Facility (Golder 2012), including a field investigation to characterize the hydraulic properties of the bedrock and modeling to predict the amount of discharge to the Fording River originating from the storage facility.

The bedrock hydraulic conductivity among nine tests completed within six boreholes located along the western side of the South Pit varied between 1 x 10^{-8} m/s to 4 x 10^{-5} m/s, with a geometric mean of 2 x 10^{-7} m/s. Hydraulic conductivities of tests completed on boreholes that intersected a major thrust fault and a minor thrust fault (a splay of the major) were estimated to be 2 x 10^{-8} m/s and 7 x 10^{-8} m/s, respectively, suggesting the faults do not act as preferential flow paths. This was confirmed through visual inspection of seepage along the pit wall, which indicated minimal seepage. Two relatively high hydraulic conductivity values (4 x 10^{-5} m/s and 7 x 10^{-6} m/s) measured in the same borehole corresponded to a thin (less than 6 m) sub-horizontal bedding interval associated with a coal bed seam. These relatively high values were deemed to be representative of a small volume of bedrock in the vicinity of the borehole and not the bulk hydraulic conductivity of the bedrock, based on the results of five long-term pump tests completed in a similar structural regime with similar bedrock types in support of the development of Swift Pit which indicated low bulk hydraulic conductivity of the bedrock (3 x 10^{-8} m/s to 3 x 10^{-5} m/s: Golder, 2012). The numerical modeling performed for the impact assessment indicated that up to 220 m^3/d of groundwater originating from the tailings storage facility would discharge to the adjacent Fording River, which is less than 3% of baseflow (Golder, 2012).

Consumptive water use data provided by Teck indicated that no water from the Turnbull South Tailings Storage Facility was used between 2015 and 2019. It is therefore concluded that there was no influence of the Turnbull South Tailings Storage Facility on flows in the Fording River during the decline window.

An application was submitted in June 2018 to expand the mining operations at Turnbull. Called the Turnbull West Project, it is an eastward pushback of the upper highwall of the existing Turnbull South Pit. A groundwater impact assessment for the project concluded that a groundwater sink would be created by the open pit during mining, but that the reduction in groundwater discharge to Henretta Creek and the Fording River would be negligible due to the moderate to low hydraulic conductivity of the bedrock and the relatively small size of the Turnbull West Pit (Teck Coal, 2018). Considering the recency of the application, any development of the Turnbull West Pit that may have occurred during the decline window is not considered to have been a contributor to the WCT population decline due to the relatively low hydraulic conductivity of the bedrock and limited size of the pit.

8.2.3 Lake Mountain Pit

Lake Mountain Pit is located west of the Fording River, as shown on Drawing 32. Mining of Lake Mountain Pit began in 2017 and is expected to continue until 2022, and as such this timeframe spanned the WCT population decline. The pit encompasses portions of both the Lake Mountain Creek and Fording River catchments. Groundwater modeling was completed by OHGE in 2017 and refined in 2019 to evaluate the impact of the pit on groundwater-surface water interactions and flows in the Fording River.

The modeling consisted of developing a Base Case model to simulate the average groundwater flow regime prior to mining activities that began in 2017, based on average groundwater elevations and flow rates in and out of surface water bodies within and around the planned final footprint of the pit. A Post Mining Case was then simulated to estimate groundwater inflows to the pit and quantify changes in groundwater-surface water interactions from the Base Case. Additional scenarios were also simulated to investigate uncertainty associated with potential variability of input parameters and the presence of structural discontinuities. These simulations included a High Flux Case where the three most sensitive model input parameters were increased by 50% from the Post Mining Case simulation, and a Structural Uncertainty Case where structural discontinuities that have not been identified were hypothesized to cross-cut the Erickson Fault and provide a hydraulic connection between the Fording River and the pit (OHGE, 2020b).

However, it is SNC-Lavalin's understanding that mining of Lake Mountain Pit did not progress below the elevation of the Fording River until December of 2020. Therefore, considerations of flow reduction in the Fording River induced by a reversal in gradient from the river towards the pit are not relevant to the decline window. The primary concern of relevance to the decline window would be a reduction in groundwater discharge to the Fording River caused a reduction in recharge associated with dewatering the pit during development.

The pre-mining piezometric surface indicated the presence of a groundwater mound, with flow directed towards Lake Mountain Creek to the west and south, as well as flow towards the Fording River to the east. The calibrated Base Case model indicated a groundwater flux of 2.76 x 10^{-3} m^3/s that discharges that discharges to the Fording River along a 740 m long reach adjacent to the east wall of the final pit shell (OHGE, 2020b). For comparison, the average annual flow at surface water monitoring station FR_FR1 between 1995 and 2016 was 1.26 m^3/s, while the average annual baseflow (October and April) was 0.19 m^3/s (OHGE, 2020b). Therefore, the simulated groundwater contribution to baseflow in the Fording River adjacent to the pit is approximately 1.5% of baseflow as measured at FR_FR1. Considering the small contribution to baseflow from the pit area adjacent to the Fording River, the relatively small footprint of the pit, and relatively long travel time to reach the river through bedrock once the overburden has been stripped, it is likely that the reduction in flow in the Fording River caused by reduced recharge within the footprint of the developing pit would have been negligible during the decline window (i.e., a likely small percentage of the model-simulated 1.5% contribution of discharge to Fording River baseflow adjacent to the pit).

8.3 Other PODs

There are 22 POD's associated with FRO located above Chauncey Creek, which are shown on Drawing 32. Four of the POD's do not have minimum instream flow requirements (IFR's) in the water license because they are in pits or ponds that either have small local drainages, are not hydraulically connected to the Fording River, or have long inferred flow pathways (Wright et al., 2021). Water use data provided by Teck indicates that water from eight of the PODs (at nine locations) was used between 2015 and 2019. This consumption is discussed briefly below. Trends in water use at six of the PODs (at seven locations) are also discussed in the report prepared by Ecofish (Wright et al., 2021); water use from Eagle 4 Pit and the Eagle Settling Ponds were not discussed in the Ecofish report as there are no IFR's for those POD's.

Total water use by POD between 2015 and 2019 and during the decline window is summarized below in Table S. The most water used from any POD between 2015 and 2019 and during the decline window was removed from Shandley Pit. The effects on water use from Shandley Pit are discussed above in Section 8.2.

The next highest amounts of water used between 2015 and 2019 was withdrawn from the Kilmarnock Control Pond and the Kilmarnock Phase 1 Secondary Settling Pond. All of the water withdrawn from the Kilmarnock Phase 1 Secondary Settling Pond between 2015 and 2019 was withdrawn during the decline window. Water stored in the Kilmarnock Control Pond and the Kilmarnock Phase 1 Secondary Settling Pond infiltrates to groundwater, flows down-valley, and is ultimately inferred to emerge in the downstream in the regional groundwater discharge zone. Therefore, the water withdrawals from these ponds may result in a reduction in base flows in the Fording River. The volume of water withdrawn from Kilmarnock Control Pond and the Kilmarnock Phase 1 Secondary Settling Pond during the decline window was approximately 3,950 m^3/d, or approximately 0.046 m^3/s (Table S), which corresponds to approximately 7% of the minimum baseflow (0.67 m^3/s) detected at downstream surface water monitoring station FR_FRABCH during the decline window.

The local and cumulative effects of water use from these locations on groundwater resources and flows in the Fording River are currently unknown. On an average monthly basis, total water use during the decline window (332,204 m^3/month) was higher than prior to the decline (244,506 m^3/month) by approximately 26%. This apparent increase is likely partially attributable to the improvement in record keeping beginning in 2017 noted by Ecofish (Wright et al., 2017), where earlier water use may have been underestimated. While an increase in water use during the decline window could potentially influence flows in the Fording River, the available data indicate that average annual streamflow was relatively high during the decline window (Wright et al., 2021). However, there were gaps in the flow data and flow was particularly low during the decline window in December 2018 and February 2019 (Wright et al., 2021). Travel times along the groundwater transport pathways between the points of consumption and the Fording River are also not known, but would need to be relatively short for there to have been any direct influence on flows during the decline window considering the relatively short timeframe (i.e., September 2017 to September 2019). These travel times between the POD's and river also constitute a data gap.

Table S: Summary of Water Use at POD's between 2015 and 2019, prior to, and during the Decline Window

POD	Water Source	Total Water Use – 2015 to 2019 (m^3)	Total Water Use – 2015 to August 2017 (m^3)	Total Water Use – Sep. 2017 to Sep. 2019 (m^3)
PD23455	Kalmakoff Pod	143,845	143,845	-
PD189629	Shandley Pit	6,147,821	2,253,714	3,885,009
	I Pit	1,051,088	1,051,088	-
PD64428	Lake Mountain Pit	31,046	-	31,046
PD189638	Eagle 4 Pit	645,520	242,698	402,822
PD189633	Eagle Settling Ponds	1,040,954	562,169	420,259

Table S (Cont'd): Summary of Water Use at POD's between 2015 and 2019, prior to, and during the Decline Window

POD	Water Source	Total Water Use – 2015 to 2019 (m³)	Total Water Use – 2015 to August 2017 (m³)	Total Water Use – Sep. 2017 to Sep. 2019 (m³)
PD189635	Lee's Lake	833,960	833,960	-
PD61147	Kilmarnock Control Pond	3,086,134	2,736,706	349,428
PD189652	Kilmarnock Phase 1 Secondary Settling Pond	2,884,321	-	2,884,321
Total	All Water Sources	15,864,689	7,972,886	7,824,180

8.4 Summary of Operational Influences

A review of available information pertaining to operational influences that may have potentially influenced flows in the Fording River during the decline window was completed. The following available information suggests that there is no strong evidence that any of these operational influences played a role in the WCT population decline when considered on an individual basis:

- There were no changes in groundwater extraction of the FRO potable wells during the decline window from prior to the decline window, and flows in the Fording River were not anomalously low during the decline window (Wright et al., 2021);
- The estimated width of the capture zone of the Greenhouse Wells (up to 2.4 m) was very small compared to the distance to the Fording River (approximately 250 m), the extraction rates are low, and the wells are pumped only intermittently for part of the year. The available groundwater and surface water analytical chemistry data also indicate there is no hydraulic influence of the river on groundwater extracted from the production wells;
- The estimated contribution of water stored in Shandley Pit to baseflow in the Fording River is very small (less than 0.5%) with relatively long travel times (on the order of 20 years);
- The presence of a groundwater divide between the Fording River and Swift 1 Pit and the properties of the bedrock formation make a hydraulic connection through bedrock extremely unlikely;
- There was no consumptive water use from the Turnbull South Tailings Storage Facility during the decline window, and the application for the development of another pit was recent (June 2018), with a localized project footprint and long transport pathway to the river; and
- Mined out topography of Lake Mountain Pit did not extend below the elevation of the Fording River until 2021; reduction in flow in the Fording River caused by reduced recharge from pit dewatering is likely negligible considering the small simulated pre-mining contribution to base flow of the area adjacent to the Fording River, the relatively small project footprint, and longer pathway through low-permeability bedrock once overburden has been stripped.

However, water usage data provided by Teck indicates total average monthly consumption amongst all POD's was greater during the decline window than prior to the decline window, although this may be partially attributable to an improvement in record keeping in 2017(Wright et al., 2021). Although an increase in consumptive water use could potentially have influenced flows in the Fording River during the decline window, the travel times between the POD's and the river would need to be short, and the available flow data indicate that flows were not anomalously low during the decline window (Wright et al., 2021).

Several data gaps were identified, including:

- The effects of groundwater withdrawals from the FRO potable wells and Greenhouse Wells on flows in the Fording River are not known;
- It is unknown whether structural discontinuities that may form preferential flow pathways within bedrock between pits and the Fording River are present, although such discontinuities would be expected to be localized and discrete;
- Flow losses to Fording River tributaries in areas of pit development have not been estimated; and
- The impact of cumulative effects of water use from POD's and pit dewatering on groundwater resources and consequent flows in the Fording River, including travel times between POD's and the river and the reduction of groundwater recharge from pit dewatering and consumptive use, are not known.

A recommendation has been made (Recommendation 1) in the Evaluation of Cause report to consider developing an integrated watershed-scale model of groundwater and surface water to better understand the cumulative effects of these operational influences, including water use, water diversion, and water storage (Evaluation of Cause Team, 2021).

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Tables

1: Summary of Analytical Results for Groundwater
2: Summary of Analytical Results for Seep, Shallow Groundwater and Surface Water in the Upper Fording River
3: Summary of Analytical Results for Groundwater - Speciated Selenium

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab) pH	Hardness mg/L	Turbidity NTU	Total Anions meq/L	Total Cations meq/L	Conductivity µS/cm	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Dissolved Organic Carbon mg/L	Oxidation Reduction Potential mV	Cation Anion Balance %	Field Temperature C	Field Conductivity µS/cm	Field Turbidity NTU	Dissolved Oxygen mg/L	pH (field) pH	Field ORP mV	Total Alkalinity mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Nitrate+Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Nitrogen mg/L	Total Nitrogen-N mg/L	Chloride mg/L	Fluoride µg/L	Sulfate mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Bromide mg/L	Total Acidity mg/L	Acidity (pH 8.3) mg/L	Ortho-Phosphate mg/L	Total Organic Carbon mg/L	Total Phosphorous as P mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S6 Study Area																																									
FR_09-01-A	FR_09-01-A-121114	2012 11 14	8.01	859	122	18	17.4	1,420	1,240	309	< 0.5	470	-	-	-	-	-	-	-	266	< 0.005	60.6	< 0.01	-	< 0.05	-	-	3.2	< 200	395	266	< 1	< 1	-	-	< 0.5	8.8	-	0.0039	2.11	-
	FRO12_0104201307	2013 05 30	8.2	545	1.89	11.1	10.9	930	724	< 3.0	1.13	356	-	5	800.8	-	10.75	7.78	73.8	231	< 0.0050	38.9	< 0.010	-	< 0.050	-	-	1	360	178	231	< 1.0	< 1.0	-	-	< 0.50	-	2.5	0.0017	0.89	0.0054
	FR_09-01-A_Q_01062013_N	2013 08 29	8.12	704	21.3	14.8	14.2	1,230	965	52.1	0.83	438	-	11.5	1,114	-	9.01	7.95	24.3	253	< 0.0050	50.8	< 0.010	-	< 0.050	-	-	2.1	370	290	253	< 1.0	< 1.0	-	-	< 0.50	-	4.5	0.0016	0.86	0.153
	FR_09-01-A_Q_01092013_N	2013 10 31	8.08	909	33.4	18.2	18.4	1,490	1,290	39.4	0.58	456	-	6.2	1,393	-	13.16	7.46	57.8	243	< 0.0050	68.6	< 0.010	-	< 0.050	-	-	2.4	< 200	403	243	< 2.0	< 2.0	-	-	< 0.50	-	3.8	0.0021	0.88	0.0663
	FR_09-01-A_Q_01012014_N	2014 03 13	8.15	631	0.11	12.8	12.8	1,050	782	< 1.0	0.57	412	-	3.2	956	-	9.98	7.83	31.3	245	< 0.0050	14.6	< 0.010	-	< 0.050	-	-	4.2	260	320	245	< 1.0	< 1.0	-	-	< 0.50	-	2.5	0.0016	0.80	< 0.0020
	FR_09-01-A_Q_01042014_N	2014 05 14	8.06	788	0.3	16.1	16	1,320	1,070	1.1	< 0.50	234	-	4.6	1,128	-	8.76	7.63	-40.9	272	< 0.0050	34.7	< 0.010	-	< 0.050	-	-	4.7	< 200	389	272	< 1.0	< 1.0	-	-	< 0.50	-	4.9	0.0020	< 0.50	0.0037
	FR_09-01-A_QSW_02072014_N	2014 08 25	8.14	659	< 0.10	13.7	13.4	1,100	833	< 1.0	< 0.50	375	-	10.5	1,018	-	7.39	6.95	3.9	297	< 0.0050	24.0	< 0.010	-	< 0.050	-	-	2.9	320	287	297	< 1.0	< 1.0	-	-	< 0.50	-	3.8	0.0027	< 0.50	0.0049
	FR_09-01-A_QSW_02102014_N	2014 11 06	8.01	702	0.22	14.1	14.2	1,190	895	1.4	< 0.50	403	-	7.5	1,100	-	8.56	7.83	-39.7	257	< 0.0050	28.6	< 0.010	-	< 0.050	-	-	3.3	< 200	327	257	< 1.0	< 1.0	-	-	< 0.50	-	6.0	0.0025	0.52	0.021
	FR_09-01-A_QSW_02012015_N	2015 01 22	7.98	644	-	-	-	1,130	876	< 1.0	0.86	-	-	6	951	-	-	7.49	-	260	< 0.0050	20.1	< 0.0050	-	< 0.050	-	-	3.6	130	336	-	-	-	-	-	< 0.25	-	-	0.0025	0.69	0.0030
	FR_09-01-A_DUP																																								
	QA/QC RPD%		0	2	-	-	-	0	3	*	*	-	-	-	-	-	-	-	-	1	*	0	*	-	*	-	-	0	7	0	-	-	-	-	-	*	-	-	*	*	*
	FR_09-01-A_QSW_02042015_N	2015 04 14	8.34	735	-	-	-	1,260	962	< 1.0	0.71	-	-	-	-	-	-	-	-	273	< 0.0050	25.1	< 0.0050	-	< 0.050	-	-	4.5	140	374	-	-	-	-	-	< 0.25	-	-	0.0023	0.56	0.0029
	FR_09-01-A_QSW_02072015_N	2015 07 02	7.99	601	-	-	-	1,020	903	3	0.52	-	-	12.3	-	-	-	7.62	-	247	< 0.0050	33.1	< 0.0050	-	< 0.050	-	-	1.3	220	219	-	-	-	-	-	< 0.25	-	-	0.0029	< 0.50	0.0036
	FR_09-01-A_QSW_02102015_N	2015 10 08	8.27	724	-	-	-	1,250	967	1.2	0.52	-	-	9.8	1,217	-	-	7.42	-	306	< 0.0050	27.8	< 0.0050	-	< 0.050	-	-	3.7	120	351	-	-	-	-	-	< 0.25	-	-	0.0027	< 0.50	0.0022
	FR_09-01-A_QSW_04012016_N	2016 01 25	7.77	763	-	14.8	15.5	1,250	927	< 1.0	0.64	-	-	-	1,097	-	8.27	8.69	150.6	257	< 0.0050	27.1	< 0.0050	-	< 0.050	-	-	3.9	140	366	257	< 1.0	< 1.0	-	-	< 0.25	-	10.7	0.0024	0.80	0.0032
	FD_QSW_04012016_001																																								
	QA/QC RPD%		0	1	-	*	*	1	2	*	*	-	-	-	-	-	-	-	-	2	*	2	*	-	*	-	-	0	0	2	2	*	*	-	-	*	-	1	*	*	*
	FR_09-01-A-WG-201606141205	2016 06 14	8.08	583	-	12.1	11.8	1,030	743	< 1.0	0.59	-	-	-	88.7	-	9.36	7.61	167.8	253	< 0.0050	32.4	< 0.0050	-	< 0.050	-	-	0.93	260	226	253	< 1.0	< 1.0	-	-	< 0.25	-	5.3	0.0031	0.72	0.0027
	FR_DC1-WG-201606141205	Duplicate	8.1	583	-	12	11.8	1,020	783	1.1	0.64	-	-	-	-	-	-	-	-	251	< 0.0050	32.1	< 0.0050	-	< 0.050	-	-	0.9	270	224	251	< 1.0	< 1.0	-	-	< 0.25	-	6.0	0.0036	0.67	0.0041
	QA/QC RPD%		0	0	-	*	*	1	5	*	*	-	-	-	-	-	-	-	-	1	*	1	*	-	*	-	-	*	4	1	1	*	*	-	-	*	-	12	*	*	*
	FR_09-01-A_QSW_04072016_N	2016 08 17	8.19	696	-	13.3	14.1	1,210	848	< 1.0	0.61	-	-	-	973	-	7.61	7.8	168.5	296	< 0.0050	32.2	< 0.0050	-	< 0.050	-	-	1.13	180	242	296	< 1.0	< 1.0	-	-	< 0.25	-	2.9	0.0026	0.52	0.0033
	FR_09-01-A_QSW_03102016_N	2016 11 24	7.83	796	-	16.9	16.1	1,450	1,160	< 1.0	< 0.50	-	-	-	1,379	-	9.46	7.41	-15.1	295	< 0.0050	51.7	< 0.0050	-	0.051	-	-	1.16	140	347	295	< 1.0	< 1.0	-	-	< 0.25	-	12.3	0.0031	< 0.50	0.0027
	FR_09-01-A_QSW_02012017_N	2017 03 08	7.51	986	0.15	19.6	20	1,540	1,240	< 1.0	< 0.50	353	-	2.8	1,447	-	8.43	7.73	63.4	305	< 0.0050	47.2	< 0.0050	-	0.165	-	-	3.2	120	481	305	< 1.0	< 1.0	-	-	< 0.25	-	22.5	0.0034	< 0.50	0.0083
	FR_09-01-A_QSW_03042017_N	2017 06 01	8.04	557	0.86	11.5	11.3	1,030	789	< 1.0	0.53	467	-0.7	5.5	990	-	10.76	7.65	181.7	231	< 0.0050	35.1	< 0.0050	-	0.486	-	-	< 2.5	200	208	231	< 1.0	< 1.0	-	-	< 0.25	-	4.4	0.0021	0.76	0.0029
	FR_09-01-A_QTR_2017-09-11_N	2017 09 12	8.08	738	0.13	14.8	15	1,170	927	< 1.0	0.74	299	0.8	8.6	1,185	-	5.41	7.34	226.2	298	< 0.0050	21.2	< 0.0050	-	< 0.050	-	-	3	< 100	347	298	< 1.0	< 1.0	-	-	< 0.25	-	5.4	0.0016	0.63	0.0233
	FR_09-01-A_QTR_2017-10-02_N	2017 11 22	7.79	1,050	0.29	20.6	21.2	1,590	1,350	< 1.0	< 0.50	323	1.5	6.9	1,542	-	7.71	7.3	252.5	328	< 0.0050	54.3	0.0127	-	0.449	-	-	< 2.5	< 100	486	328	< 1.0	< 1.0	-	-	< 0.25	-	8.5	0.0030	0.58	0.0039
	FR_09-01-A_QTR_2018-04-02_N	2018 06 13	8.27	633	0.2	12.6	12.9	1,050	808	1.6	0.82	258	0.9	6.8	1,002	-	9.54	7.31	219	268	0.0145	31.6	0.0077	-	< 0.10	-	-	< 2.5	240	239	268	< 1.0	< 1.0	-	-	< 0.25	-	< 1.0	0.0020	0.72	0.0026
	FR_09-01-A_QTR_2018-07-02_N	2018 07 31	8.18	565	0.12	12.9	11.5	1,040	808	< 1.0	2.34	351	-5.9	7.6	901	-	7.32	7.55	175.5	324	< 0.0050	24.0	0.0038	-	< 0.050	-	-	0.87	144	226	324	< 1.0	< 1.0	-	-	< 0.050	-	2.4	0.0040	0.53	0.0027
	FR_09-01-A_QTR_2018-10-01_N	2018 12 13	7.89	560	0.11	11.8	11.4	956	729	< 1.0	0.7	367	-1.8	5.6	904	-	7.49	7.36	216.1	235	0.0620	11.5	< 0.0010	-	0.413	-	-	3.09	164	297	235	< 1.0	< 1.0	-	-	< 0.050	-	3.3	0.0128	0.71	0.253
	FR_09-01-A_QTR_2019-01-07_N	2019 03 14	7.89	589	0.11	12	11.9	1,000	808	< 1.0	0.64	491	-0.1	0.9	882.1	-	13.77	7.51	284	205	0.0388	21.3	< 0.0010	-	< 0.050	-	-	1.78	106	302	205	< 1.0	< 1.0	-	-	< 0.050	-	6.1	0.0019	0.68	0.0023
	FR_09-01-A_QTR_2019-04-01_N	2019 05 30	8.29	813	< 0.10	14.8	16.5	1,300	956	< 1.0	0.62	252	5.5	5.5	1,132	-	11.3	7.51	229.8	250	< 0.0050	36.5	< 0.0050	-	< 0.050	-	-	< 2.5	220	343	250	< 1.0	< 1.0	-	-	< 0.25	-	3.0	< 0.0010	< 0.50	0.0029
	FR_09-01-A_QTR_2019-07-01_N	2019 07 29	8.27	622	0.16	12.6	12.6	1,150	832	< 1.0	0.71	224	0.1	7.6	952	-	10.51	7.51	132.9	322	< 0.0050	23.5	< 0.0050	-	< 0.050	-	-	< 2.5	240	215	322	< 1.0	< 1.0	-	-	< 0.25	-	2.9	0.0036	0.75	0.0027
	FR_09-01-A_QTR_2019-10-07_N	2019 11 01	8.28	861	< 0.10	17.6	17.4	1,210	1,090	1.1	< 0.50	464	-0.4	4.2	1,474	-	9.8	7.31	116.1	354	0.0235	38.7	< 0.0050	-	< 0.050	-	-	< 2.5	140	371	354	< 1.0	< 1.0	-	-	< 0.25	-	< 1.0	0.0028	< 0.50	0.0027
	FR_09-01-A_QTR_2020-01-06_N	2020 02 13	7.75	906	< 0.10	18.7	18.4	1,400	1,150	< 1.0	< 0.50	460	-0.9	4.7	1,467	-	8.81	8.45	256.7	339	< 0.0050	37.0	< 0.0050	-	< 0.050	-	-	3	120	442	339	< 1.0	< 1.0	-	-	< 0.25	-	2.5	0.0022	< 0.50	< 0.0020
FR_09-01-B	FR_09-01-B-121114	2012 11 14	7.97	777	1.82	16	15.7	1,270	1,030	< 3	< 0.5	489	-	-	-	-	-	-	-	297	< 0.005	37.6	< 0.01	-	< 0.05	-	-	4.8	< 200	350	297	< 1	< 1	-	-	< 0.5	9.8	-	0.0032	0.63	-
	FRO12_0101201308	2013 03 26	7.97	673	0.74	14.3	13.7	1,170	859	< 3.0	1.27	415	-	5.1	1,047	-	6.5	7.63	159.5	280	< 0.0050	16.0	< 0.010	-	0.052	-	-	5.2	340	354	280	< 1.0	< 1.0	-	-	< 0.50	-	5.8	0.0016	1.08	0.0080
	FRO12_0104201308																																								
	FR_09-01-B_Q_01062013_N	2013 08 29	8.01	671	0.29	13.9	13.6	1,160	908	< 3.0	0.53	460	-	8.4	1,052	-	7.56	7.63	25.9	259	< 0.0050	41.3	< 0.010	-	< 0.050	-	-	2.7	370	271	259	< 1.0	< 1.0	-	-	< 0.50	-	6.4	0.0020	0.58	0.0024

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Dissolved Metals																													
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																
FR_09-01-A	FR_09-01-A-121114	2012 11 14	5	200	< 30	87.5	0.724	3.4	2.4	0.29	< 0.1	184	< 0.1	22	0.078	< 0.1	0.11	< 0.5	< 0.05	49.6	< 0.01	0.731	0.57	***116***	< 0.01	214	< 0.01	< 0.1	11	4.08	< 1	< 3
	FRO12_0104201307	2013 05 30	< 3.0	126	< 30	56.1	0.102	2.6	< 2.0	0.29	< 0.10	91.4	< 0.10	16	0.021	0.14	< 0.10	< 0.50	< 0.050	30.6	< 0.010	1.45	< 0.50	***85.5***	< 0.010	111	< 0.010	< 0.10	< 10	4.01	< 1.0	< 3.0
	FR_09-01-A_Q_01062013_N	2013 08 29	1.4	163	< 10	72.0	0.399	3.21	1.80	0.372	< 0.10	120	< 0.050	20.9	0.033	0.12	< 0.050	< 0.20	< 0.030	41.0	< 0.010	1.89	< 0.50	***107***	< 0.010	146	< 0.010	< 0.050	< 1.0	5.03	< 0.50	< 1.0
	FR_09-01-A_Q_01092013_N	2013 10 31	< 3.0	209	< 30	93.8	0.275	3.41	2.44	0.28	< 0.10	149	< 0.10	20	0.032	< 0.10	< 0.10	< 0.50	< 0.050	46.7	< 0.010	0.762	< 0.50	***146***	< 0.010	199	< 0.010	< 0.10	10	4.52	< 1.0	< 3.0
	FR_09-01-A_Q_01012014_N	2014 03 13	< 3.0	145	< 10	65.0	< 0.050	2.47	3.90	0.19	< 0.10	98.3	< 0.10	15	0.058	< 0.10	0.25	< 0.50	< 0.050	53.1	< 0.010	0.461	1.01	***35.6***	< 0.010	145	< 0.010	< 0.10	16	3.02	< 1.0	< 3.0
	FR_09-01-A_Q_01042014_N	2014 05 14	< 3.0	180	< 10	82.2	< 0.050	3.02	4.74	0.18	< 0.10	130	< 0.10	17	0.056	0.11	0.24	< 0.50	< 0.050	71.3	< 0.010	0.478	0.93	***75***	< 0.010	193	< 0.010	< 0.10	15	3.63	< 1.0	5.3
	FR_09-01-A_QSW_02072014_N	2014 08 25	< 3.0	145	< 10	72.2	< 0.050	2.99	2.65	0.32	< 0.10	105	< 0.10	20	0.044	0.11	0.23	< 0.50	< 0.050	50.4	< 0.010	1.69	0.71	***62.7***	< 0.010	145	< 0.010	< 0.10	< 10	5.06	< 1.0	< 3.0
	FR_09-01-A_QSW_02102014_N	2014 11 06	< 3.0	160	< 10	73.4	< 0.050	3.08	3.43	0.30	< 0.10	114	< 0.10	25	0.045	< 0.10	0.26	< 0.50	< 0.050	64.8	< 0.010	0.866	0.91	***68***	< 0.010	155	< 0.010	< 0.10	17	4.42	< 1.0	< 3.0
	FR_09-01-A_QSW_02012015_N	2015 01 22	< 3.0	146	< 10	67.7	< 0.050	3.07	4.12	0.23	< 0.10	109	< 0.10	21	0.056	0.14	0.31	< 0.50	< 0.050	59.3	< 0.010	0.619	1.17	***49.3***	< 0.010	152	< 0.010	< 0.10	17	3.51	< 1.0	< 3.0
	FR_09-01-A_DUP	Duplicate	< 3.0	150	< 10	68.5	< 0.050	3.08	4.19	0.23	< 0.10	108	< 0.10	21	0.054	0.13	0.31	< 0.50	< 0.050	61.7	< 0.010	0.624	1.18	***49***	< 0.010	155	< 0.010	< 0.10	16	3.61	< 1.0	< 3.0
	QA/QC RPD%																															
	FR_09-01-A_QSW_02042015_N	2015 04 14	< 3.0	165	< 10	78.2	< 0.10	3.09	4.66	0.19	< 0.10	120	< 0.10	17	0.0517	< 0.10	0.37	< 0.50	< 0.050	63.9	< 0.0050	0.537	1.31	***64.5***	< 0.010	178	< 0.010	< 0.10	14	4.6	< 0.50	< 3.0
	FR_09-01-A_QSW_02072015_N	2015 07 02	< 3.0	143	< 10	59.3	< 0.10	3.03	1.71	0.3	< 0.10	89.3	< 0.10	20	0.0217	< 0.10	< 0.10	< 0.50	< 0.050	38.9	< 0.0050	1.96	< 0.50	***82.2***	< 0.010	127	< 0.010	< 0.10	< 10	5.37	< 0.50	< 3.0
	FR_09-01-A_QSW_02102015_N	2015 10 08	< 3.0	171	< 10	72.5	< 0.10	3.36	3.92	0.26	< 0.10	121	< 0.10	28	0.0447	0.17	0.32	< 0.50	< 0.050	68.8	< 0.0050	0.589	1.18	***66.6***	< 0.010	167	< 0.010	< 0.10	< 10	3.56	< 0.50	< 3.0
	FR_09-01-A_QSW_04012016_N	2016 01 25	< 3.0	176	< 10	79.0	< 0.10	3.38	4.11	0.23	< 0.10	119	< 0.10	21	0.0418	< 0.10	0.33	< 0.50	< 0.050	76.1	< 0.0050	0.624	1.32	***66.1***	< 0.010	167	< 0.010	< 0.10	14	4.36	< 0.50	< 3.0
	FD_QSW_04012016_001	Duplicate	< 3.0	180	< 10	78.9	< 0.10	3.33	4.08	0.24	< 0.10	118	< 0.10	20	0.0468	< 0.10	0.33	< 0.50	< 0.050	71.7	< 0.0050	0.610	1.29	***66.3***	< 0.010	165	< 0.010	< 0.10	14	4.33	< 0.50	< 3.0
	QA/QC RPD%																															
	FR_09-01-A-WG-201606141205	2016 06 14	< 3.0	134	< 10	60.2	< 0.10	2.77	1.97	0.28	< 0.10	82.7	< 0.020	15	0.0203	< 0.10	< 0.10	< 0.50	< 0.050	37.4	< 0.0050	1.73	< 0.50	***76.1***	< 0.010	117	< 0.010	< 0.10	< 10	5.19	< 0.50	< 3.0
	FR_DC1-WG-201606141205	Duplicate	< 3.0	134	< 10	60.0	< 0.10	2.68	1.77	0.27	< 0.10	85.4	< 0.020	15	0.0250	< 0.10	< 0.10	< 0.50	< 0.050	37.3	< 0.0050	1.75	< 0.50	***77.5***	< 0.010	118	< 0.010	< 0.10	< 10	5.14	< 0.50	< 3.0
	QA/QC RPD%																															
	FR_09-01-A_QSW_04072016_N	2016 08 17	< 3.0	155	< 10	74.9	< 0.10	3.52	2.74	0.32	< 0.10	105	< 0.020	22	0.0348	< 0.10	< 0.10	< 0.50	< 0.050	53.3	< 0.0050	1.35	< 0.50	***85.7***	< 0.010	143	< 0.010	< 0.10	< 10	4.84	< 0.50	< 3.0
	FR_09-01-A_QSW_03102016_N	2016 11 24	< 3.0	177	< 10	86.3	< 0.10	3.05	2.87	0.22	< 0.10	112	< 0.020	17	0.0257	< 0.10	< 0.10	< 0.50	< 0.050	56.3	< 0.0050	0.803	< 0.50	***159***	< 0.010	174	< 0.010	< 0.10	< 10	5.71	< 0.50	< 3.0
	FR_09-01-A_QSW_02012017_N	2017 03 08	< 1.0	214	< 10	110	< 0.10	3.32	4.10	0.19	< 0.10	139	< 0.020	18	0.0571	< 0.10	0.31	< 0.20	< 0.050	76.8	< 0.0050	0.658	1.40	***120***	< 0.010	214	< 0.010	< 0.10	< 10	6.34	< 0.50	< 1.0
	FR_09-01-A_QSW_03042017_N	2017 06 01	< 1.0	123	< 10	60.8	0.15	2.57	2.52	0.27	< 0.10	70.0	< 0.020	13	0.0269	< 0.10	< 0.10	< 0.20	< 0.050	51.4	< 0.0050	1.81	< 0.50	***112***	< 0.010	115	< 0.010	< 0.10	< 10	4.77	< 0.50	2.5
	FR_09-01-A_QTR_2017-09-11_N	2017 09 12	< 3.0	170	< 10	76.4	< 0.10	3.43	4.27	0.34	< 0.10	99.9	< 0.020	27	0.0478	< 0.10	0.33	< 0.50	< 0.050	65.5	< 0.0050	0.804	1.37	***68.1***	< 0.010	163	< 0.010	< 0.10	< 10	4.26	< 0.50	< 3.0
	FR_09-01-A_QTR_2017-10-02_N	2017 11 22	< 3.0	234	< 10	112	0.71	3.64	4.10	0.24	< 0.10	144	< 0.020	23	0.0471	< 0.10	0.17	< 0.50	< 0.050	68.0	< 0.0050	0.603	0.74	***166***	< 0.010	222	< 0.010	< 0.10	< 10	5.36	< 0.50	< 3.0
	FR_09-01-A_QTR_2018-04-02_N	2018 06 13	< 3.0	143	< 10	67.1	< 0.10	3.45	2.61	0.33	< 0.10	79.3	< 0.020	16	0.0286	< 0.10	< 0.10	16.4	< 0.050	47.9	< 0.0050	1.86	2.51	***106***	< 0.010	140	< 0.010	< 0.10	< 10	5.90	< 0.50	3.8
	FR_09-01-A_QTR_2018-07-02_N	2018 07 31	3.7	125	< 10	61.2	< 0.10	2.81	2.64	0.28	< 0.10	66.1	< 0.020	18	0.0251	0.27	< 0.10	4.90	< 0.050	47.1	< 0.0050	1.17	< 0.50	***81.2***	< 0.010	129	< 0.010	< 0.10	< 10	4.44	< 0.50	< 1.0
	FR_09-01-A_QTR_2018-10-01_N	2018 12 13	< 3.0	131	< 10	56.3	< 0.10	2.82	2.67	0.20	< 0.10	67.5	< 0.020	14	0.0525	0.14	0.44	< 0.50	< 0.050	41.5	< 0.0050	0.664	1.21	***38.1***	< 0.010	150	< 0.010	< 0.10	< 10	3.27	< 0.50	< 1.0
	FR_09-01-A_QTR_2019-01-07_N	2019 03 14	< 3.0	133	< 10	62.1	< 0.10	2.08	2.66	0.15	< 0.10	59.0	< 0.020	< 10	0.0553	< 0.10	0.12	< 0.50	< 0.050	41.1	< 0.0050	0.637	0.69	***50.5***	< 0.010	178	< 0.010	< 0.10	< 10	3.49	< 0.50	< 1.0
	FR_09-01-A_QTR_2019-04-01_N	2019 05 30	< 3.0	182	< 10	87.0	< 0.10	2.94	3.29	0.22	< 0.10	87.0	< 0.020	12	0.0310	< 0.10	0.16	< 0.50	< 0.050	60.7	< 0.0050	1.03	< 0.50	***130***	< 0.010	239	< 0.010	< 0.10	< 10	5.90	< 0.50	< 1.0
	FR_09-01-A_QTR_2019-07-01_N	2019 07 29	< 3.0	139	< 10	66.6	< 0.10	3.01	2.53	0.40	< 0.10	68.0	< 0.020	20	0.0284	< 0.10	0.11	< 0.50	< 0.050	52.0	< 0.0050	2.20	< 0.50	***102***	< 0.010	160	< 0.010	< 0.10	< 10	6.36	< 0.50	< 1.0
	FR_09-01-A_QTR_2019-10-07_N	2019 11 01	< 3.0	197	< 10	89.8	< 0.10	3.29	3.42	0.28	< 0.10	91.1	< 0.020	20	0.0377	< 0.10	0.23	< 0.20	< 0.050	64.6	< 0.0050	0.781	0.59	***126***	< 0.010	240	< 0.010	< 0.10	< 10	5.28	< 0.50	< 1.0
	FR_09-01-A_QTR_2020-01-06_N	2020 02 13	< 3.0	208	< 10	93.6	< 0.10	3.42	4.26	0.22	< 0.10	93.5	< 0.020	22	0.0612	0.15	0.36	0.23	< 0.050	75.2	< 0.0050	0.664	1.42	***119***	< 0.010	239	< 0.010	< 0.10	< 10	5.88	< 0.50	4.7
FR_09-01-B	FR_09-01-B-121114	2012 11 14	< 3	179	< 30	80.1	0.074	3.2	3.3	0.16	< 0.1	231	< 0.1	23	0.041	0.15	0.2	< 0.5	< 0.05	45.3	< 0.01	0.92	0.75	***61.5***	< 0.01	191	< 0.01	< 0.1	11	4.18	< 1	< 3
	FRO12_0101201308	2013 03 26	< 3.0	159	< 30	67.1	< 0.050	2.9	4.6	0.13	< 0.10	159	< 0.10	20	0.050	0.12	0.43	< 0.50	< 0.050	46.0	< 0.010	0.681	1.36	***31.1***	< 0.010	172	< 0.010	< 0.10	< 10	3.29	< 1.0	< 3.0
	FRO12_0104201308	2013 05 30	< 3.0	141	< 30	60.8	0.061	2.8	2.8	0.13	< 0.10	155	< 0.10	20	0.022	0.17	< 0.10	< 0.50	< 0.050	44.1	< 0.010	0.597	< 0.50	***90.2***	< 0.010	151	< 0.010	< 0.10	10	2.39	< 1.0	< 3.0
	FR_09-01-B_Q_01062013_N	2013 08 29	< 1.0	155	< 10	68.7	< 0.050	2.99	2.36	0.154	< 0.10	171	< 0.050	19.2	0.025	0.18	0.107	< 0.20	< 0.030	38.5	< 0.010	1.02	< 0.50	***89***	< 0.010	172	< 0.010	< 0.050	< 1.0	4.12	< 0.50	2.3

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																			
FR_09-01-A	FR_09-01-A-121114	2012 11 14	2,640	0.41	1.83	238	0.17	< 0.5	22	0.572	223,000	6.05	1.48	4.88	4,290	2	41.6	89,700	210	< 0.01	1.19	6.93	179	4,200	113	7,720	0.069	2,300	207	0.08	0.18	85	3.82	11.8	26.3
	FRO12_0104201307	2013 05 30	20.2	0.30	< 0.10	96.3	< 0.10	< 0.50	14	0.024	129,000	0.12	< 0.10	< 0.50	< 30	< 0.050	32.8	58,100	1.24	< 0.010	1.52	< 0.50	-	2,700	88.0	1,620	< 0.010	< 2,000	117	< 0.010	< 0.10	10	4.27	< 1.0	< 3.0
	FR_09-01-A_Q_01062013_N	2013 08 29	106	0.408	0.22	124	< 0.050	-	24.3	0.073	170,000	0.50	0.283	0.67	238	0.221	46.0	74,400	25.8	< 0.010	1.84	0.83	-	3,420	110	1,940	< 0.010	1,840	164	< 0.010	< 0.050	2.3	5.29	0.74	3.3
	FR_09-01-A_QSW_02072014_N	2014 08 25	< 3.0	0.35	0.14	110	< 0.10	< 0.50	21	0.046	150,000	0.14	0.23	< 0.50	< 10	< 0.050	51.8	74,600	< 0.050	< 0.010	1.81	0.74	-	3,190	66.2	1,790	< 0.010	2,870	152	< 0.010	< 0.10	< 10	5.42	< 1.0	< 3.0
	FR_09-01-A_QSW_02102014_N	2014 11 06	3.9	0.30	< 0.10	113	< 0.10	< 0.50	25	0.055	162,000	0.12	0.28	< 0.50	< 10	< 0.050	65.3	75,200	0.288	< 0.010	0.845	0.84	-	3,020	69.5	2,160	< 0.010	3,490	159	< 0.010	< 0.10	18	4.48	< 1.0	< 3.0
	FR_09-01-A_QSW_02012015_N	2015 01 22	-	-	-	-	-	< 0.50	-	0.057	-	0.13	-	-	-	-	-	-	-	-	-	-	-	3,060	49.6	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_DUP	Duplicate	-	-	-	-	-	< 0.50	-	0.061	-	0.13	-	-	-	-	-	-	-	-	-	-	-	3,060	49.6	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	*	-	7	-	*	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QSW_02042015_N	2015 04 14	-	-	-	-	-	< 0.050	-	0.0522	-	0.12	-	-	-	-	-	-	-	-	-	-	-	3,160	63	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QSW_02072015_N	2015 07 02	-	-	-	-	-	< 0.050	-	0.0258	-	< 0.10	-	-	-	-	-	-	-	-	-	-	-	3,010	93.3	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QSW_02102015_N	2015 10 08	-	-	-	-	-	< 0.050	-	0.0455	-	0.21	-	-	-	-	-	-	-	-	-	-	-	3,200	69.4	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QSW_04012016_N	2016 01 25	< 3.0	0.24	< 0.10	119	< 0.10	< 0.050	21	0.0488	162,000	0.10	0.34	< 0.50	< 10	< 0.050	71.7	76,300	< 0.10	< 0.0050	0.596	1.44	-	3,330	59.5	2,250	< 0.010	4,150	167	< 0.010	< 0.10	13	4.36	< 0.50	< 3.0
	FD_QSW_04012016_001	Duplicate	< 3.0	0.23	< 0.10	117	< 0.10	< 0.050	20	0.0532	161,000	0.11	0.33	< 0.50	< 10	< 0.050	68.1	76,900	< 0.10	< 0.0050	0.586	1.40	-	3,260	58.3	2,250	< 0.010	4,100	164	< 0.010	< 0.10	14	4.33	< 0.50	< 3.0
	QA/QC RPD%		*	*	*	2	*	*	*	9	1	*	3	*	*	*	5	1	*	*	2	*	-	2	2	0	*	1	2	*	*	7	1	*	*
	FR_09-01-A-WG-201606141205	2016 06 14	< 3.0	0.32	< 0.10	82.1	< 0.020	< 0.050	16	0.0234	135,000	0.10	< 0.10	< 0.50	< 10	< 0.050	39.4	61,500	< 0.10	< 0.0050	1.75	< 0.50	-	2,900	77.1	1,670	< 0.010	2,080	118	< 0.010	< 0.10	< 10	5.23	< 0.50	< 3.0
	QA/QC RPD%		*	*	*	6	*	*	*	*	0	*	*	*	*	*	1	1	*	*	1	*	-	3	1	0	*	9	1	*	*	*	1	*	*
	FR_09-01-A_QSW_04072016_N	2016 08 17	< 3.0	0.34	< 0.10	96.5	< 0.020	< 0.050	23	0.0326	145,000	0.21	< 0.10	< 0.50	< 10	< 0.050	50.1	69,500	< 0.10	< 0.0050	1.37	< 0.50	-	3,200	83.7	2,110	< 0.010	2,550	136	< 0.010	< 0.10	< 10	4.72	< 0.50	< 3.0
	FR_09-01-A_QSW_03102016_N	2016 11 24	< 3.0	0.28	0.10	111	< 0.020	< 0.050	21	0.0283	178,000	< 0.10	< 0.10	< 0.50	< 10	< 0.050	58.0	89,100	< 0.10	< 0.0050	0.787	< 0.50	-	3,100	137	1,920	< 0.010	2,890	173	< 0.010	< 0.10	< 10	5.74	< 0.50	< 3.0
	FR_09-01-A_QSW_02012017_N	2017 03 08	< 3.0	0.25	< 0.10	153	< 0.020	< 0.050	21	0.0561	240,000	< 0.10	0.36	< 0.50	< 10	< 0.050	82.9	117,000	0.13	< 0.0050	0.737	1.70	-	3,680	137	2,390	< 0.010	4,740	240	< 0.010	< 0.10	< 10	7.27	< 0.50	< 3.0
	FR_09-01-A_QSW_03042017_N	2017 06 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2017-09-11_N	2017 09 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2017-10-02_N	2017 11 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2018-04-02_N	2018 06 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2018-07-02_N	2018 07 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2018-10-01_N	2018 12 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2019-01-07_N	2019 03 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2019-04-01_N	2019 05 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2019-07-01_N	2019 07 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2019-10-07_N	2019 11 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-A_QTR_2020-01-06_N	2020 02 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_09-01-B	FR_09-01-B-121114	2012 11 14	71.8	0.17	0.14	242	< 0.1	< 0.5	21	0.158	182,000	0.32	0.26	0.92	89	0.101	45	78,900	3.39	< 0.01	0.923	1.01	5.5	3,300	66.2	2,370	< 0.01	3,400	196	< 0.01	< 0.1	13	4.05	< 1	< 3
	FRO12_0101201308	2013 03 26	55.0	0.14	0.11	184	< 0.10	< 0.50	20	0.061	159,000	0.25	0.46	0.91	81	0.092	46.6	69,600	2.99	< 0.010	0.679	1.46	-	3,000	31.6	2,270	< 0.010	4,700	176	< 0.010	< 0.10	< 10	3.36	< 1.0	< 3.0
	FRO12_0104201308	2013 05 30	17.7	0.13	< 0.10	156	< 0.10	< 0.50	19	0.037	144,000	0.13	< 0.10	< 0.50	< 30	< 0.050	47.7	63,000	0.857	< 0.010	0.604	< 0.50	-	3,000	95.3	2,220	< 0.010	2,900	152	< 0.010	< 0.10	11	2.43	< 1.0	< 3.0

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.
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< Denotes concentration less than indicated detection limit or RPD less than indicated value.
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* RPDs are not calculated where one or more concentrations are less than five times RDL.
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BOLD Concentration greater than CSR Aquatic Life (AW) standard
BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with chloride.
[d] Standard varies with hardness.
[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.
[g] Sample collected in 2018 but Teck sample ID reads 2019.
[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15
[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.
[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab) pH	Hardness mg/L	Turbidity NTU	Total Anions meq/L	Total Cations meq/L	Conductivity µS/cm	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Dissolved Organic Carbon mg/L	Oxidation Reduction Potential mV	Cation Anion Balance %	Field Temperature C	Field Conductivity µS/cm	Field Turbidity NTU	Dissolved Oxygen mg/L	pH (field) pH	Field ORP mV	Total Alkalinity mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Nitrate+Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Nitrogen mg/L	Total Nitrogen-N mg/L	Chloride mg/L	Fluoride µg/L	Sulfate mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Bromide mg/L	Total Acidity mg/L	Acidity (pH 8.3) mg/L	Ortho-Phosphate mg/L	Total Organic Carbon mg/L	Total Phosphorous as P mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S6 Study Area																																									
FR_09-01-B	FR_09-01-B_Q_01092013_N	2013 10 31	8.11	821	3.97	16.3	16.7	1,340	1,100	5.3	0.61	457	-	7.2	1,235	-	9.12	7.28	47.9	282	< 0.0050	41.8	< 0.010	-	< 0.050	-	-	4.4	< 200	364	282	< 2.0	< 2.0	-	-	< 0.50	-	3.7	0.0021	0.61	0.0085
	FD_Q_01092013_010																																								
	QA/QC RPD%		0	0	38	*	*	2	1	*	*	*	-	-	-	-	-	-	-	3	*	2	*	-	*	-	-	5	*	1	3	*	*	-	-	*	-	*	*	*	13
	FR_09-01-B_Q_01012014_N	2014 03 13	8.13	571	0.12	11.6	11.6	960	721	< 1.0	0.68	421	-	4.9	862	-	9.92	7.64	9.7	224	< 0.0050	14.3	< 0.010	-	0.089	-	-	2.9	270	288	224	< 1.0	< 1.0	-	-	< 0.50	-	2.2	0.0019	0.54	0.0030
	FR_09-01-B_Q_01042014_N	2014 05 14	8.15	604	1.67	12	12.3	1,010	755	6.2	< 0.50	237	-	4.9	878	-	8.98	7.64	-39	233	< 0.0050	13.5	< 0.010	-	< 0.050	-	-	4	< 200	302	233	< 1.0	< 1.0	-	-	< 0.50	-	2.5	0.0014	< 0.50	0.0048
	FR_09-01-B_QSW_02072014_N	2014 08 25	8.08	601	0.22	12.3	12.2	1,000	744	< 1.0	< 0.50	382	-	9.2	9.36	-	7.6	7.58	28.7	283	< 0.0050	14.0	< 0.010	-	< 0.050	-	-	3.3	290	267	283	< 1.0	< 1.0	-	-	< 0.50	-	4.6	0.0019	< 0.50	0.0043
	FR_09-01-B_QSW_02102014_N	2014 11 06	8.04	552	0.14	11.2	11.3	944	689	< 1.0	0.53	401	-	7.9	874	-	7.92	8.38	-32.1	255	< 0.0050	10.2	< 0.010	-	< 0.050	-	-	3.5	< 200	256	255	< 1.0	< 1.0	-	-	< 0.50	-	4.6	0.0020	< 0.50	0.023
	FR_09-01-B_QSW_02012015_N	2015 01 22	8.01	523	-	-	-	902	691	< 1.0	0.74	-	-	6.6	751.5	-	-	7.60	-	225	< 0.0050	11.4	< 0.0050	-	< 0.050	-	-	3	190	261	-	-	-	-	-	< 0.25	-	-	0.0022	0.78	0.0026
	FR_09-01-B_QSW_02042015_N	2015 04 14	8.39	596	-	-	-	1,020	756	1.1	0.65	-	-	-	-	-	-	-	-	246	< 0.0050	11.3	< 0.0050	-	< 0.050	-	-	4	180	300	-	-	-	-	-	< 0.25	-	-	0.0022	0.53	< 0.0020
	FR_09-01-B_QSW_02072015_N	2015 07 02	7.86	588	-	-	-	991	838	< 1.0	< 0.50	-	-	9.3	-	-	-	7.48	-	229	< 0.0050	30.5	< 0.0020	-	< 0.050	-	-	1.6	166	224	-	-	-	-	-	< 0.10	-	-	0.0018	< 0.50	0.0023
	FD_QSW_02072015_010																																								
	QA/QC RPD%		0	0	-	-	-	1	1	*	*	-	-	-	-	-	-	-	-	1	*	1	*	-	*	-	-	*	1	1	-	-	-	-	-	*	-	-	*	*	*
	FR_09-01-B_QSW_02102015_N	2015 10 08	8.28	588	-	-	-	1,030	754	< 1.0	< 0.50	-	-	9.4	986	-	-	7.46	-	274	< 0.0050	11.1	< 0.0050	-	0.067	-	-	4.2	190	288	-	-	-	-	-	< 0.25	-	-	0.0023	< 0.50	0.0021
	FR_09-01-B_QSW_04012016_N	2016 01 25	7.74	641	-	12.2	13.1	1,060	762	< 1.0	< 0.50	-	-	-	935	-	6.99	7.59	270	240	< 0.0050	17.6	< 0.0050	-	0.059	-	-	3.2	170	291	240	< 1.0	< 1.0	-	-	< 0.25	-	10.1	0.0025	0.54	0.0024
	FR_09-01-B-WG-201606141245	2016 06 14	7.94	595	-	12.6	12	1,060	772	< 1.0	0.54	-	-	-	920	-	11.12	7.54	174.3	241	< 0.0050	34.8	< 0.0050	-	< 0.050	-	-	1.12	200	252	241	< 1.0	< 1.0	-	-	< 0.25	-	9.1	0.0022	0.58	0.0043
	FR_09-01-B_QSW_04072016_N	2016 08 17	7.73	723	-	13.8	14.7	1,220	857	< 1.0	0.54	-	-	-	990	-	7.73	7.66	156.7	299	< 0.0050	22.0	< 0.0050	-	< 0.050	-	-	3.2	190	297	299	< 1.0	< 1.0	-	-	< 0.25	-	15.8	0.0023	0.59	0.0031
	FR_09-01-B_QSW_03102016_N	2016 11 24	7.71	787	-	16.6	16	1,410	1,130	< 1.0	< 0.50	-	-	-	1,342	-	6.79	7.2	-6.4	320	< 0.0050	39.4	< 0.0050	-	0.137	-	-	2.42	170	351	320	< 1.0	< 1.0	-	-	< 0.25	-	17.7	0.0030	< 0.50	0.0032
	FR_09-01-B_QSW_02012017_N	2017 03 08	7.45	882	11.2	16.6	17.9	1,320	1,040	36.4	< 0.50	363	-	4.7	1,231	-	5.76	7.45	77.9	307	< 0.0050	25.9	< 0.0050	-	0.613	-	-	4.1	120	409	307	< 1.0	< 1.0	-	-	< 0.25	-	23.6	0.0027	< 0.50	0.0154
	FR_09-01-B_QSW_03042017_N	2017 06 01	8.18	636	0.27	13.4	12.9	1,160	907	< 1.0	< 0.50	472	-1.8	6.1	1,102	-	10.34	7.32	181.4	236	0.0050	43.9	< 0.0050	-	0.457	-	-	< 2.5	170	267	236	< 1.0	< 1.0	-	-	< 0.25	-	5.7	0.0014	0.54	0.0044
	FR_09-01-B_QTR_2017-09-11_N	2017 09 12	8.19	613	0.35	12.3	12.5	987	738	< 1.0	0.88	293	0.7	7.9	1,012	-	4.28	7.23	230.5	258	< 0.0050	12.7	< 0.0050	-	< 0.050	-	-	3	140	296	258	< 1.0	< 1.0	-	-	< 0.25	-	6.6	0.0010	0.78	0.0028
	FR_09-01-B_QTR_2017-10-02_N	2017 11 22	7.85	890	1.26	17.4	18.1	1,330	1,050	2.3	< 0.50	323	1.9	7.6	1,298	-	8.29	7.29	250.1	336	< 0.0050	29.6	< 0.0050	-	0.294	-	-	3.1	140	407	336	< 1.0	< 1.0	-	-	< 0.25	-	9.7	0.0032	0.70	0.0055
	FR_09-01-B_QTR_2018-01-01_N	2018 02 22	7.81	716	1.05	17.4	14.6	1,330	984	1	0.7	334	-8.7	6.8	1,216	-	7.09	7.2	181.2	410	0.0085	17.0	< 0.0010	-	0.333	-	-	4.08	133	378	410	< 1.0	< 1.0	-	-	< 0.050	-	9.2	0.0013	0.64	0.0044
	WG_2018-01-01_003																																								
	QA/QC RPD%		1	3	8	*	*	3	3	*	*	*	*	-	-	-	-	-	-	2	*	0	*	-	1	-	-	0	5	0	2	*	*	-	-	*	-	26	*	*	*
	FR_09-01-B_QTR_2018-04-02_N	2018 06 13	8.25	550	0.19	11.1	11.2	952	715	< 1.0	0.81	244	0.6	5.6	928	-	10.03	7.09	223.8	217	0.0061	29.3	0.0056	-	0.13	-	-	< 2.5	210	222	217	< 1.0	< 1.0	-	-	< 0.25	-	< 1.0	0.0012	0.70	0.0017
	FR_09-01-B_QTR_2018-07-02_N	2018 07 31	8.06	586	0.6	13.1	11.9	1,010	859	< 1.0	0.79	359	-4.8	6.3	936	-	7.46	7.29	156.1	226	< 0.0050	28.4	0.0090	-	< 0.050	-	-	2.7	210	311	226	< 1.0	< 1.0	-	-	< 0.25	-	< 1.0	0.0031	1.15	0.0013
	FR_09-01-B_QTR_2018-10-01_N	2018 12 13	7.94	471	0.49	10.3	9.57	845	648	< 1.0	0.7	312	-3.4	6.6	777	-	9.18	7.39	301.1	192	0.0205	12.8	< 0.0010	-	0.275	-	-	1.85	216	262	192	< 1.0	< 1.0	-	-	< 0.050	-	4.1	0.0097	0.69	< 0.0020
	FR_09-01-B_QTR_2019-01-07_N	2019 03 14	7.85	586	0.52	11.7	11.9	983	777	1.1	< 0.50	427	0.6	1.6	868	-	10.18	7.52	283.6	197	0.0287	21.1	< 0.0010	-	< 0.050	-	-	1.73	104	300	197	< 1.0	< 1.0	-	-	< 0.050	-	3.7	0.0028	< 0.50	0.0028
	FR_09-01-B_QTR_2019-04-01_N	2019 05 30	8.09	640	2.12	10.2	12.9	959	688	4.3	< 0.50	330	12	2	992	-	9.21	7.51	231.8	195	< 0.0050	20.5	< 0.0010	-	< 0.050	-	-	0.87	234	230	195	< 1.0	< 1.0	-	-	< 0.050	-	3.2	0.0012	< 0.50	0.0062
	FR_09-01-B_QTR_2019-07-01_N	2019 07 29	8.2	565	0.23	11	11.5	1,010	747	< 1.0	0.76	287	2.2	6.1	855	-	10.38	7.15	132.6	270	0.0169	19.3	< 0.0050	-	< 0.050	-	-	< 2.5	210	201	270	< 1.0	< 1.0	-	-	< 0.25	-	< 1.0	0.0029	0.76	0.0028
	FR_09-01-B_QTR_2019-10-07_N	2019 11 01	7.92	711	0.84	14.2	14.5	1,190	889	2.1	< 0.50	488	0.9	6.3	1,213	-	7.67	7.42	97	303	< 0.0050	20.4	0.0011	-	< 0.050	-	-	3.12	214	317	303	< 1.0	< 1.0	-	-	< 0.050	-	8.3	0.0069	2.50	0.0040
	FR_09-01-B_QTR_2020-01-06_N	2020 02 13	7.77	660	0.29	13.5	13.4	1,070	810	< 1.0	< 0.50	437	-0.1	5.9	1,102	-	8.62	8.07	252.3	305	< 0.0050	14.8	< 0.0010	-	< 0.050	-	-	2.6	128	299	305	< 1.0	< 1.0	-	-	< 0.050	-	2.1	0.0018	< 0.50	0.0022
FR_09-02-A	09-02-A_L1237947	2012 11 14	8.14	452	86.5	9.3	9.18	768	612	138	0.54	464	-	-	-	-	-	-	-	187	< 0.0050	10.1	< 0.010	-	< 0.050	-	-	2.6	< 200	229	187	< 1.0	< 1.0	-	-	< 0.50	-	4.2	0.0039	2.38	0.159
	FRO12_0101201309	2013 03 26	8.13	518	457	11.2	10.5	936	683	612	0.55	410	-	2.7	792	-	9.09	7.93	172.2	204	0.0063	13.1	< 0.010	-	0.147	-	-	3.2	< 200	291	204	< 1.0	< 1.0	-	-	< 0.50	-	3.5	0.0023	10.1	0.718
	FRO12_0104201309	2013 05 30	8.17	553	75.6	11.2	11	939	728	81.4	1.14	369	-	5	825	-	11.3	8.03	-	229	0.0087	39.3	< 0.010	-	< 0.050	-	-	2.3	420	179	229	< 1.0	< 1.0	-	-	< 0.50	-	2.5	0.0024	2.50	0.0917
	FR_09-02-A_QSW_04012016_N	2016 01 25	7.9	562	18.7	10.7	11.4	953	663	17.6	0.58	404	-	2.7	839.6	-	10.4	7.87	251.7	193	< 0.0050	20.7	< 0.0050	-	0.058	-	-	2.1	170	255	193	< 1.0	< 1.0	-	-	< 0.25	-	5.5	0.0029	0.96	0.0399
	FR_09-02-A-WG-201606151125	2016 06 15	8.02	564	82.9	11.5	11.4	988	726	93.9	< 0.50	335	-	7.3	882	-	10.03	7.72	75.4	255	< 0.0050	26.1	< 0.0050	-	< 0.050	-	-	1.28	220	218	255	< 1.0	< 1.0	-	-	< 0.25	-	8.0	0.0047	1.21	0.0419
	FR_09-02-A_QSW_04072016_N	2016 08 22	8.13	404	0.12	8.31	8.22	759	490	< 1.0	0.67	416	-	8.2	676.4	-	7.16	8.09	118.8	213	< 0.0050	7.74	< 0.0050	-	0.076	-	-	2.07	200	165	213	< 1.0	< 1.0	-	-	< 0.25	-	3.6	0.0030	0.69	0.0037
	FR_09-02-A_QSW_03102016_N	2016 12 08	7.86	483	0.27	9.95	9.83	842	573	< 1.0	0.53	337	-	7	709.6	-	7.37	7.66	2.1	219	0.0081	11.1	< 0.0010	-	1.52	-	-	2.49	182	226	219	< 1.0	< 1.0	-	-	< 0.050	-	9.0	0.0044	0.99	0.0038
	FR_09-02-A_QSW_02012017_N	2017 03 20	7.94	488	22.6	10.9	9.89	907	688	12.2	0.5	345	-	3.4	582	-	10.72	7.75	77.5	197	< 0.0050	19.8	< 0.0010	-	1.05	-	-	1.44	161	264	197	< 1.0	< 1.0	-	-	< 0.050	-	4.5	0.0029	0.85	0.0214
	FR_09-02-A_QSW_03042017_N	2017 06 01	8.11	583	0.91	12.3	11.8	1,070	850	< 1.0	0.55	472	-1.9	5.4	1,016	-	10.23	7.56	179.3	226	< 0.0050	39.4	< 0.0050	-	0.502	-	-	< 2.5	170	236	226	< 1.0	< 1.0	-	-	< 0.25	-	3.4	0.0025	0.76	0.0044

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																													
			Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																
FR_09-01-B	FR_09-01-B_Q_01092013_N	2013 10 31	< 3.0	192	< 30	83.2	0.091	3.46	3.98	0.16	< 0.10	169	< 0.10	20	0.039	0.13	0.23	< 0.50	< 0.050	47.9	< 0.010	0.860	0.74	***79.9***	< 0.010	201	< 0.010	< 0.10	10	4.27	< 1.0	< 3.0
	FD_Q_01092013_010	Duplicate	< 3.0	191	< 30	82.6	0.162	3.57	3.97	0.15	< 0.10	164	< 0.10	21	0.035	0.12	0.22	< 0.50	< 0.050	53.9	< 0.010	0.855	0.80	***78.2***	< 0.010	198	< 0.010	< 0.10	< 10	4.34	< 1.0	< 3.0
	QA/QC RPD%																															
	FR_09-01-B_Q_01012014_N	2014 03 13	< 3.0	132	< 10	58.8	< 0.050	2.34	3.58	0.12	< 0.10	118	< 0.10	15	0.038	< 0.10	0.18	< 0.50	< 0.050	47.3	< 0.010	0.658	0.65	***38.7***	< 0.010	135	< 0.010	< 0.10	15	2.56	< 1.0	< 3.0
	FR_09-01-B_Q_01042014_N	2014 05 14	< 3.0	137	< 10	63.2	0.088	2.52	3.48	0.11	< 0.10	126	< 0.10	17	0.044	0.11	0.19	< 0.50	< 0.050	51.5	< 0.010	0.643	0.76	***39.5***	< 0.010	151	< 0.010	< 0.10	14	2.89	< 1.0	< 3.0
	FR_09-01-B_QSW_02072014_N	2014 08 25	< 3.0	133	< 10	65.6	< 0.050	2.82	2.74	0.15	< 0.10	138	< 0.10	18	0.034	0.12	0.24	< 0.50	< 0.050	47.7	< 0.010	0.979	0.74	***44***	< 0.010	158	< 0.010	< 0.10	< 10	4.06	< 1.0	< 3.0
	FR_09-01-B_QSW_02102014_N	2014 11 06	< 3.0	128	< 10	56.3	< 0.050	2.81	3.40	0.15	< 0.10	133	< 0.10	23	0.029	0.13	0.30	< 0.50	< 0.050	61.9	< 0.010	0.838	0.85	***29.7***	< 0.010	144	< 0.010	< 0.10	15	3.40	< 1.0	< 3.0
	FR_09-01-B_QSW_02012015_N	2015 01 22	< 3.0	121	< 10	53.4	0.057	2.71	3.49	0.14	< 0.10	123	< 0.10	20	0.034	0.15	0.25	< 0.50	< 0.050	50.7	< 0.010	0.798	0.78	***31.1***	< 0.010	138	< 0.010	< 0.10	14	2.68	< 1.0	< 3.0
	FR_09-01-B_QSW_02042015_N	2015 04 14	< 3.0	135	< 10	63	< 0.10	2.62	4.1	0.11	< 0.10	134	< 0.10	16	0.039	0.11	0.33	< 0.50	< 0.050	52.1	< 0.0050	0.65	0.94	***34.2***	< 0.010	157	< 0.010	< 0.10	12	3.23	< 0.50	< 3.0
	FR_09-01-B_QSW_02072015_N	2015 07 02	< 3.0	138	< 10	59.1	< 0.10	2.80	2.19	0.13	< 0.10	128	< 0.10	18	0.0173	< 0.10	< 0.10	< 0.50	< 0.050	45.1	< 0.0050	0.788	< 0.50	***76.8***	< 0.010	150	< 0.010	< 0.10	< 10	3.45	< 0.50	< 3.0
	FD_QSW_02072015_010	Duplicate	< 3.0	139	< 10	58.5	< 0.10	2.79	2.2	0.14	< 0.10	127	< 0.10	18	0.0199	< 0.10	< 0.10	< 0.50	< 0.050	44.9	< 0.0050	0.789	< 0.50	***71.8***	< 0.010	150	< 0.010	< 0.10	< 10	3.48	< 0.50	< 3.0
	QA/QC RPD%																															
	FR_09-01-B_QSW_02102015_N	2015 10 08	< 3.0	139	< 10	58.7	< 0.10	2.96	3.86	0.14	< 0.10	144	< 0.10	23	0.0314	0.15	0.37	< 0.50	< 0.050	62.3	< 0.0050	0.916	1.22	***30.2***	< 0.010	162	< 0.010	< 0.10	< 10	3.7	< 0.50	< 3.0
	FR_09-01-B_QSW_04012016_N	2016 01 25	< 3.0	151	< 10	64.0	< 0.10	3.66	4.52	0.14	< 0.10	169	< 0.10	20	0.0325	0.11	0.32	< 0.50	< 0.050	72.8	< 0.0050	0.689	1.13	***42.6***	< 0.010	157	< 0.010	< 0.10	14	3.09	< 0.50	< 3.0
	FR_09-01-B-WG-201606141245	2016 06 14	< 3.0	136	< 10	61.9	< 0.10	2.67	2.14	0.11	< 0.10	134	< 0.020	15	0.0194	< 0.10	< 0.10	< 0.50	< 0.050	43.8	< 0.0050	0.717	< 0.50	***79.9***	< 0.010	149	< 0.010	< 0.10	< 10	3.59	< 0.50	< 3.0
	FR_09-01-B_QSW_04072016_N	2016 08 17	< 3.0	161	< 10	78.2	< 0.10	3.48	3.82	0.13	< 0.10	155	< 0.020	16	0.0316	< 0.10	0.25	< 0.50	< 0.050	58.7	< 0.0050	0.938	0.99	***58.9***	< 0.010	177	< 0.010	< 0.10	< 10	5.09	< 0.50	< 3.0
	FR_09-01-B_QSW_03102016_N	2016 11 24	< 3.0	177	< 10	84.0	< 0.10	3.48	3.83	0.13	< 0.10	175	< 0.020	19	0.0328	< 0.10	0.17	< 0.50	< 0.050	62.1	< 0.0050	0.748	0.62	***117***	< 0.010	199	< 0.010	< 0.10	< 10	4.72	< 0.50	< 3.0
	FR_09-01-B_QSW_02012017_N	2017 03 08	< 1.0	184	< 10	103	< 0.10	3.79	4.89	0.13	< 0.10	153	< 0.020	21	0.0536	0.13	0.52	< 0.20	< 0.050	69.1	< 0.0050	0.640	2.00	***71.8***	< 0.010	212	< 0.010	< 0.10	< 10	4.54	< 0.50	1.2
	FR_09-01-B_QSW_03042017_N	2017 06 01	< 1.0	137	< 10	71.2	< 0.10	3.14	3.63	0.11	< 0.10	126	< 0.020	17	0.0209	< 0.10	< 0.10	< 0.20	< 0.050	54.7	< 0.0050	0.565	< 0.50	***126***	< 0.010	155	< 0.010	< 0.10	< 10	3.21	< 0.50	< 1.0
	FR_09-01-B_QTR_2017-09-11_N	2017 09 12	< 3.0	140	< 10	63.8	< 0.10	3.08	3.79	0.14	< 0.10	117	< 0.020	16	0.0350	0.11	0.32	< 0.50	< 0.050	54.3	< 0.0050	0.966	1.25	***44.2***	< 0.010	148	< 0.010	< 0.10	< 10	4.79	< 0.50	< 3.0
	FR_09-01-B_QTR_2017-10-02_N	2017 11 22	< 3.0	202	< 10	93.8	0.42	3.50	4.84	0.15	< 0.10	156	< 0.020	23	0.0402	< 0.10	0.42	< 0.50	< 0.050	67.7	< 0.0050	0.835	1.32	***91.5***	< 0.010	208	< 0.010	< 0.10	< 10	5.30	< 0.50	< 3.0
	FR_09-01-B_QTR_2018-01-01_N	2018 02 22	< 3.0	159	< 10	77.4	< 0.10	3.59	5.02	0.12	< 0.10	134	< 0.020	23	0.0414	0.16	0.47	< 0.50	< 0.050	65.0	< 0.0050	0.645	1.69	***53.5***	< 0.010	189	< 0.010	< 0.10	< 10	4.79	< 0.50	< 3.0
	WG_2018-01-01_003	Duplicate	< 3.0	152	< 10	77.2	< 0.10	3.64	5.11	0.12	< 0.10	137	< 0.020	21	0.0404	0.11	0.48	< 0.50	< 0.050	60.8	< 0.0050	0.675	1.71	***54.1***	< 0.010	194	< 0.010	< 0.10	< 10	4.89	< 0.50	< 3.0
	QA/QC RPD%																															
	FR_09-01-B_QTR_2018-04-02_N	2018 06 13	< 3.0	125	< 10	57.9	< 0.10	3.09	2.77	0.12	< 0.10	103	< 0.020	14	0.0177	< 0.10	< 0.10	< 0.50	< 0.050	44.6	< 0.0050	0.650	< 0.50	***97.1***	< 0.010	139	< 0.010	< 0.10	< 10	3.30	< 0.50	< 1.0
	FR_09-01-B_QTR_2018-07-02_N	2018 07 31	< 3.0	130	< 10	63.2	< 0.10	3.16	2.94	0.12	< 0.10	108	< 0.020	16	0.0278	0.13	0.12	< 0.50	< 0.050	50.9	< 0.0050	0.779	< 0.50	***79.4***	< 0.010	152	< 0.010	< 0.10	< 10	4.72	< 0.50	< 1.0
	FR_09-01-B_QTR_2018-10-01_N	2018 12 13	< 3.0	110	< 10	48.0	< 0.10	2.77	2.00	0.12	< 0.10	84.9	< 0.020	14	0.0289	0.11	0.18	< 0.50	< 0.050	37.6	< 0.0050	0.833	0.50	***41.8***	< 0.010	124	< 0.010	< 0.10	< 10	2.66	< 0.50	< 1.0
	FR_09-01-B_QTR_2019-01-07_N	2019 03 14	< 3.0	134	< 10	61.2	< 0.10	2.34	2.46	< 0.10	< 0.10	88.2	< 0.020	< 10	0.0351	0.10	0.13	< 0.50	< 0.050	34.4	< 0.0050	0.728	0.52	***52.2***	< 0.010	152	< 0.010	< 0.10	< 10	3.21	< 0.50	< 1.0
	FR_09-01-B_QTR_2019-04-01_N	2019 05 30	< 3.0	147	< 10	66.1	< 0.10	2.04	2.51	0.21	< 0.10	135	< 0.020	11	0.0280	< 0.10	< 0.10	< 0.50	< 0.050	45.8	< 0.0050	1.91	< 0.50	***76***	< 0.010	209	< 0.010	< 0.10	< 10	4.09	< 0.50	< 1.0
	FR_09-01-B_QTR_2019-07-01_N	2019 07 29	< 3.0	130	< 10	58.7	< 0.10	2.74	2.40	0.14	< 0.10	103	< 0.020	13	0.0153	< 0.10	0.17	< 0.50	< 0.050	50.6	< 0.0050	1.20	< 0.50	***83.2***	< 0.010	165	< 0.010	< 0.10	< 10	5.08	< 0.50	< 1.0
	FR_09-01-B_QTR_2019-10-07_N	2019 11 01	< 3.0	164	< 10	73.0	< 0.10	3.19	3.94	0.16	< 0.10	119	< 0.020	16	0.0327	< 0.10	0.49	< 0.20	< 0.050	54.1	< 0.0050	1.37	0.80	***70.7***	< 0.010	218	< 0.010	< 0.10	< 10	5.64	< 0.50	1.6
	FR_09-01-B_QTR_2020-01-06_N	2020 02 13	< 3.0	157	< 10	64.9	< 0.10	2.92	3.73	0.14	< 0.10	102	< 0.020	18	0.0350	< 0.10	0.34	0.21	< 0.050	62.4	< 0.0050	0.828	1.12	***48.6***	< 0.010	185	< 0.010	< 0.10	< 10	4.03	< 0.50	< 1.0
FR_09-02-A	09-02-A_L1237947	2012 11 14	6.2	107	< 30	44.6	0.463	2.2	2.1	0.21	< 0.10	140	< 0.10	15	0.049	0.16	0.12	< 0.50	< 0.050	25.2	< 0.010	0.994	< 0.50	***35.2***	< 0.010	127	< 0.010	< 0.10	< 10	2.09	< 1.0	< 3.0
	FRO12_0101201309	2013 03 26	26.9	120	< 30	52.8	1.68	< 2.0	3.0	0.13	< 0.10	139	< 0.10	10	0.068	0.15	0.16	0.62	< 0.050	27.3	< 0.010	0.995	0.56	***44.5***	< 0.010	169	< 0.010	< 0.10	< 10	2.64	< 1.0	< 3.0
	FRO12_0104201309	2013 05 30	23.6	129	< 30	55.8	1.05	< 2.0	< 2.0	0.19	< 0.10	148	< 0.10	13	0.027	0.17	< 0.10	< 0.50	< 0.050	31.0	< 0.010	1.26	< 0.50	***85.9***	< 0.010	164	< 0.010	< 0.10	11	2.97	< 1.0	< 3.0
	FR_09-02-A_QSW_04012016_N	2016 01 25	160	138	50	52.9	1.34	1.93	2.69	0.15	< 0.10	137	< 0.10	< 10	0.0400	0.30	0.10	< 0.50	< 0.050	41.6	< 0.0050	1.04	0.53	***47.1***	< 0.010	167	< 0.010	< 0.10	21	2.66	0.56	< 3.0
	FR_09-02-A-WG-201606151125	2016 06 15	< 3.0	133	< 10	56.4	< 0.10	2.06	2.13	0.18	< 0.10	139	< 0.020	12	0.0253	< 0.10	< 0.10	< 0.50	< 0.050	40.4	< 0.0050	1.46	0.51	***61.5***	< 0.010	169	< 0.010	< 0.10	< 10	4.06	< 0.50	< 3.0
	FR_09-02-A_QSW_04072016_N	2016 08 22	< 3.0	93.8	< 10	41.1	< 0.10	2.16	2.38	0.20	< 0.10	115	< 0.020	15	0.0272	0.11	0.16	< 0.50	< 0.050	40.6	< 0.0050	1.15	0.61	20	< 0.010	121	< 0.010	< 0.10	< 10	2.38	< 0.50	< 3.0
	FR_09-02-A_QSW_03102016_N	2016 12 08	< 1.0	120	< 10	44.4	< 0.10	2.32	2.62	0.20	< 0.10	146	< 0.020	15	0.0424	0.12	0.24	0.48	< 0.050	46.7	< 0.0050	1.18	1.00	***30.5***	< 0.010	168	< 0.010	< 0.10	< 10	2.82	< 0.50	1.6
	FR_09-02-A_QSW_02012017_N	2017 03 20	< 1.0	116	< 10	47.9	< 0.10	1.74	2.33	0.14	< 0.10	136	< 0.020	< 10	0.0431	0.19	< 0.10	0.33	< 0.050	37.3	< 0.0050	0.959	< 0.50	***50.8***	< 0.010	177	< 0.010	< 0.10	< 10	2.60	< 0.50	5.8
	FR_09-02-A_QSW_03042017_N	2017 06 01	< 1.0	132	< 10	61.2	0.13	2.00	2.70	0.17	< 0.10	151	< 0.020	< 10	0.0268	< 0.10	< 0.10	0.31	< 0.050	50.0	< 0.0050	1.23	< 0.50	***117***	< 0.010	193	< 0.010	< 0.10	< 10	3.39	< 0.50	< 1.0

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

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[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Total Metals																																
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																			
FR_09-01-B																																			
	FD_Q_01092013_010	Duplicate	75.3	0.19	0.13	201	< 0.10	< 0.50	25	0.052	187,000	0.29	0.25	< 0.50	62	< 0.050	58.5	85,200	2.99	< 0.010	0.865	0.77	-	3,490	81.6	2,570	< 0.010	4,010	197	< 0.010	< 0.10	13	4.55	< 1.0	< 3.0
	QA/QC RPD%		8	*	*	19	*	*	*	10	2	*	15	*	61	*	20	1	14	*	1	*	-	0	2	2	*	1	6	*	*	7	3	*	*
	FR_09-01-B_QSW_02072014_N	2014 08 25	< 3.0	0.15	< 0.10	143	< 0.10	< 0.50	18	0.040	136,000	0.15	0.26	< 0.50	< 10	< 0.050	50.2	66,700	< 0.050	< 0.010	0.972	0.70	-	2,920	45.5	2,130	< 0.010	2,870	166	< 0.010	< 0.10	< 10	4.16	< 1.0	< 3.0
	FR_09-01-B_QSW_02102014_N	2014 11 06	< 3.0	0.18	< 0.10	135	< 0.10	< 0.50	24	0.040	128,000	0.15	0.30	< 0.50	< 10	< 0.050	63.1	57,100	0.098	< 0.010	0.864	0.81	-	2,860	30	2,310	< 0.010	3,490	149	< 0.010	< 0.10	15	3.53	< 1.0	< 3.0
	FR_09-01-B_QSW_02012015_N	2015 01 22	-	-	-	-	-	< 0.50	-	0.04	-	0.13	-	-	-	-	-	-	-	-	-	-	-	2,640	30.6	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QSW_02042015_N	2015 04 14	-	-	-	-	-	< 0.050	-	0.0427	-	0.13	-	-	-	-	-	-	-	-	-	-	-	2,710	33	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QSW_02072015_N	2015 07 02	-	-	-	-	-	< 0.050	-	0.022	-	0.12	-	-	-	-	-	-	-	-	-	-	-	2,840	78.3	-	-	-	-	-	-	-	-	-	-
	FD_QSW_02072015_010	Duplicate	-	-	-	-	-	< 0.050	-	0.0217	-	0.11	-	-	-	-	-	-	-	-	-	-	-	2,830	78.5	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	*	-	*	-	*	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QSW_02102015_N	2015 10 08	-	-	-	-	-	< 0.050	-	0.034	-	0.27	-	-	-	-	-	-	-	-	-	-	-	3,010	31	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QSW_04012016_N	2016 01 25	< 3.0	0.16	< 0.10	145	< 0.10	< 0.050	21	0.113	140,000	0.13	0.29	< 0.50	< 10	< 0.050	71.8	62,500	< 0.10	< 0.0050	0.707	1.09	-	3,130	37.8	2,370	< 0.010	3,940	160	< 0.010	< 0.10	13	3.16	< 0.50	< 3.0
	FR_09-01-B-WG-201606141245	2016 06 14	< 3.0	0.17	< 0.10	135	< 0.020	< 0.050	16	0.0216	136,000	< 0.10	< 0.10	< 0.50	< 10	< 0.050	45.0	62,200	< 0.10	< 0.0050	0.711	< 0.50	-	2,840	80.5	2,100	< 0.010	2,290	151	< 0.010	< 0.10	< 10	3.58	< 0.50	< 3.0
	FR_09-01-B_QSW_04072016_N	2016 08 17	< 3.0	0.15	< 0.10	143	< 0.020	< 0.050	18	0.0339	153,000	0.12	0.27	< 0.50	< 10	< 0.050	57.5	71,100	< 0.10	< 0.0050	0.965	0.93	-	3,050	60.2	2,220	< 0.010	3,470	169	< 0.010	< 0.10	< 10	4.97	< 0.50	< 3.0
	FR_09-01-B_QSW_03102016_N	2016 11 24	< 3.0	0.16	0.12	160	< 0.020	< 0.050	23	0.0279	180,000	0.11	0.17	< 0.50	< 10	< 0.050	64.6	83,400	0.11	< 0.0050	0.743	0.76	-	3,400	106	2,440	< 0.010	3,760	200	< 0.010	< 0.10	< 10	4.82	< 0.50	5.6
	FR_09-01-B_QSW_02012017_N	2017 03 08	< 3.0	0.18	< 0.10	147	< 0.020	< 0.050	24	0.0518	210,000	0.13	0.54	< 0.50	< 10	< 0.050	74.9	101,000	0.14	< 0.0050	0.757	2.20	-	3,870	78.3	2,810	< 0.010	5,240	241	< 0.010	< 0.10	< 10	5.33	< 0.50	< 3.0
	FR_09-01-B_QSW_03042017_N	2017 06 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2017-09-11_N	2017 09 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2017-10-02_N	2017 11 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2018-01-01_N	2018 02 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WG_2018-01-01_003	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2018-04-02_N	2018 06 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2018-07-02_N	2018 07 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2018-10-01_N	2018 12 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2019-01-07_N	2019 03 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2019-04-01_N	2019 05 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2019-07-01_N	2019 07 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2019-10-07_N	2019 11 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-01-B_QTR_2020-01-06_N	2020 02 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_09-02-A	09-02-A_L1237947	2012 11 14	1,800	0.34	1.18	170	0.11	< 0.50	17	0.279	124,000	3.72	1.13	3.38	2,660	1.30	25.8	48,100	104	< 0.010	1.23	4.12	-	3,000	34.8	5,790	0.070	2,200	139	0.060	0.16	60	2.21	7.8	17.7
	FRO12_0101201309	2013 03 26	10,600	0.83	10.1	358	1.13	< 0.50	24	2.16	290,000	26.8	9.74	36.7	24,800	12.5	37.8	88,500	982	0.054	3.47	35.5	-	8,100	44.2	38,900	0.546	3,600	314	0.478	0.28	486	4.61	53.4	156
	FRO12_0104201309	2013 05 30	1,650	0.32	1.00	168	0.11	< 0.50	14	0.218	144,000	3.36	0.93	2.92	2,550	1.24	31.8	58,200	91.0	< 0.010	1.49	3.67	-	2,600	86.7	4,420	0.051	< 2,000	177	0.063	< 0.10	41	3.17	7.1	15.9
	FR_09-02-A_QSW_04012016_N	2016 01 25	407	0.19	0.29	143	< 0.10	< 0.050	< 10	0.0869	132,000	0.98	0.27	0.75	541	0.272	40.6	53,200	18.0	< 0.0050	1.13	1.26	-	2,050	44	2,780	0.015	2,740	176	0.013	< 0.10	27	2.82	1.81	4.0
	FR_09-02-A-WG-201606151125	2016 06 15	536	0.22	0.31	142	0.028	< 0.050	13	0.0569	132,000	1.07	0.27	0.84	528	0.283	40.3	56,300	18.0	< 0.0050	1.60	1.11	-	2,190	64.2	3,240	0.014	2,130	171	0.014	< 0.10	25	4.04	1.86	5.1
	FR_09-02-A_QSW_04072016_N	2016 08 22	< 3.0	0.24	< 0.10	113	< 0.020	< 0.050	15	0.0311	90,200	0.11	0.17	< 0.50	< 10	< 0.050	38.6	39,500	< 0.10	< 0.0050	1.14	0.64	-	2,070	20.3	2,000	< 0.010	2,300	120	< 0.010	< 0.10	< 10	2.43	< 0.50	< 3.0
	FR_09-02-A_QSW_03102016_N	2016 12 08	< 3.0	0.19	0.13	144	< 0.020	< 0.050	14	0.0433	114,000	0.14	0.23	< 0.50	< 10	< 0.050	44.8	44,200	< 0.10	< 0.0050	1.11	1.04	-	2,360	26.5	2,250	< 0.010	2,650	160	< 0.010	< 0.10	< 10	2.58	< 0.50	< 3.0
	FR_09-02-A_QSW_02012017_N	2017 03 20	112	0.17	0.20	138	< 0.020	< 0.050	< 10	0.0681	121,000	0.41	0.22	1.65	281	0.235	37.9	49,500	11.5	< 0.0050	1.08	0.95	-	1,830	50.6	2,000	< 0.010	2,410	185	< 0.010	0.26	< 10	2.68	0.78	4.4
	FR_09-02-A_QSW_03042017_N	2017 06 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date	pH (lab)	Hardness	Turbidity	Total Anions	Total Cations	Conductivity	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Oxidation Reduction Potential	Cation Anion Balance	Field Temperature	Field Conductivity	Field Turbidity	Dissolved Oxygen	pH (field)	Field ORP	Total Alkalinity	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Nitrate+Nitrite (as N)	Kjeldahl Nitrogen-N	Nitrogen	Total Nitrogen-N	Chloride	Fluoride	Sulfate	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Bromide	Total Acidity	Acidity (pH 8.3)	Ortho-Phosphate	Total Organic Carbon	Total Phosphorous as P
		(yyyy mm dd)	pH	mg/L	NTU	meq/L	meq/L	µS/cm	mg/L	mg/L	mg/L	mV	%	C	µS/cm	NTU	mg/L	pH	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S6 Study Area																																									
FR_09-02-A	FR_09-02-A_QTR_2017-09-11_N	2017 09 13	8.12	420	5.18	8.53	8.53	750	509	11.2	0.57	338	0	10.5	715	-	6.56	7.53	204.7	176	< 0.0050	11.3	< 0.0010	-	0.353	-	-	1.09	185	200	176	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0019	0.85	0.0192
	FR_09-02-A_QTR_2017-10-02_N	2017 11 22	7.97	532	5.94	10.2	10.8	867	639	3.3	0.57	312	2.8	10	829	-	7.59	7.55	254	195	< 0.0050	12.1	0.0011	-	0.213	-	-	1.64	162	259	195	< 1.0	< 1.0	-	-	< 0.050	-	3.2	0.0034	0.83	0.0138
	FR_09-02-A_QTR_2018-01-01_N	2018 02 22	7.87	506	29.1	12.7	10.3	989	733	13.6	0.77	334	-11	4.1	921	-	11.29	7.56	181.2	276	< 0.0050	15.7	< 0.0010	-	0.356	-	-	1.77	140	287	276	< 1.0	< 1.0	-	-	< 0.050	-	4.2	0.0016	1.07	0.0328
	FR_09-02-A_QTR_2018-04-02_N	2018 06 13	8.12	633	0.42	11.9	12.8	1,030	812	1.2	0.82	195	3.6	5.9	1,012	-	9.24	7.23	212.6	228	< 0.0050	31.0	0.0082	-	< 0.10	-	-	< 2.5	210	247	228	< 1.0	< 1.0	-	-	< 0.25	-	2.7	0.0025	0.74	0.0037
	WG_2018-04-02_008	Duplicate	8.1	634	0.38	12	12.8	1,020	778	< 1.0	0.95	193	3.4	-	-	-	-	-	-	226	< 0.0050	30.7	0.0061	-	< 0.10	-	-	2.6	230	250	226	< 1.0	< 1.0	-	-	< 0.25	-	2.2	0.0029	0.90	0.0039
	QA/QC RPD%		0	0	*	*	*	1	4	*	*	*	*	-	-	-	-	-	-	1	*	1	29	-	*	-	-	*	9	1	1	*	*	-	-	*	-	*	*	*	*
	FR_09-02-A_QTR_2018-07-02_N	2018 07 31	8.26	361	1.37	8.09	7.35	679	502	1.7	0.97	344	-4.8	8.4	591.6	-	6.91	7.61	174.1	192	0.0055	9.87	0.0032	-	< 0.050	-	-	1.14	189	169	192	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0041	1.06	0.0043
	FR_09-02-A_QTR_2018-10-01_N	2018 12 13	8.12	528	14.6	11.1	10.7	909	714	32.4	0.83	339	-1.9	1.4	855.4	-	11.31	7.75	307.6	197	0.0272	15.5	< 0.0010	-	0.588	-	-	1.77	214	288	197	< 1.0	< 1.0	-	-	< 0.050	-	2.8	0.0091	0.90	0.0510
	FR_09-02-A_QTR_2019-01-07_N	2019 03 14	8.06	608	4.21	11.9	12.3	1,010	821	5.3	0.58	341	1.5	0.5	875.3	-	11.22	7.83	279.2	207	0.0467	21.9	< 0.0010	-	< 0.050	-	-	1.72	133	296	207	< 1.0	< 1.0	-	-	< 0.050	-	4.1	0.0031	0.53	0.0184
	FR_09-02-A_QTR_2019-04-01_N	2019 05 30	8.18	433	1.18	8.61	8.8	821	556	1.8	< 0.50	258	1.1	5	867	-	8.53	7.81	227.2	173	< 0.0050	13.3	< 0.0010	-	< 0.050	-	-	0.85	215	200	173	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	< 0.0010	< 0.50	0.0050
	FR_09-02-A_QTR_2019-07-01_N	2019 07 26	8.25	435	2.19	9.18	8.83	810	578	3.8	0.78	441	-2	7.3	694.3	-	10.7	7.79	104.9	248	< 0.0050	12.7	< 0.0010	-	< 0.050	-	-	0.77	250	158	248	< 1.0	< 1.0	-	-	< 0.050	-	4.7	0.0038	0.93	0.0083
	FR_DC1_QTR_2019-07-01_N	Duplicate	8.28	437	2.15	9.09	8.87	811	584	4	0.69	457	-1.2	-	-	-	-	-	-	243	0.0096	12.7	0.0010	-	< 0.050	-	-	0.86	247	158	243	< 1.0	< 1.0	-	-	< 0.050	-	4.8	0.0038	0.71	0.0094
	QA/QC RPD%		0	0	2	*	*	0	1	*	*	*	*	-	-	-	-	-	-	2	*	0	*	-	*	-	-	*	1	0	2	*	*	-	-	*	-	*	*	*	12
	FR_09-02-A_QTR_2019-10-07_N	2019 10 24	8.01	458	2.58	9.06	9.31	780	594	4.7	< 0.50	471	1.4	8.2	820	-	10.4	7.69	139	186	0.0092	10.4	< 0.0010	-	< 2.5	-	-	1.15	146	219	186	< 1.0	< 1.0	-	-	< 0.050	-	4.0	0.0032	1.05	0.0069
	FR_DC3_QTR_2019-10-07_N	Duplicate	8.08	463	17.8	9.05	9.39	762	607	20.9	0.82	344	1.8	-	-	-	-	-	-	186	< 0.0050	10.3	< 0.0010	-	< 0.050	-	-	1.59	153	218	186	< 1.0	< 1.0	-	-	< 0.050	-	2.1	0.0034	1.87	0.0412
	QA/QC RPD%		1	1	149	*	*	2	2	*	*	*	*	-	-	-	-	-	-	0	*	1	*	-	*	-	-	*	5	0	0	*	*	-	-	*	-	*	*	*	143
	FR_09-02-A_QTR_2020-01-06_N	2020 02 13	7.98	680	13.8	13	13.7	1,070	911	28.2	< 0.50	426	2.8	1.6	1,135	-	10.78	8.11	241.3	215	< 0.0050	17.7	< 0.0010	-	< 0.050	-	-	1.85	107	354	215	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0026	< 0.50	0.0391
	FR_09-02-B_QSW_03042017_N	2017 06 01	8.08	601	3.39	13	12.2	1,090	853	4.7	0.51	476	-3.2	4	1,067	-	10.52	7.52	192.7	241	< 0.0050	40.5	< 0.0050	-	< 0.050	-	-	< 2.5	150	253	241	< 1.0	< 1.0	-	-	< 0.25	-	5.0	0.0010	0.70	0.0044
FR_09-02-B	FRO12_0101201310	2013 03 26	8.06	545	3.74	11.2	11	943	681	9.1	0.65	415	-	2.7	790.5	-	9.71	8.04	168.4	212	< 0.0050	11.8	< 0.010	-	0.06	-	-	3.4	300	288	212	< 1.0	< 1.0	-	-	< 0.50	-	4.0	0.0017	0.84	0.0090
	FRO12_0104201310	2013 05 30	8.13	578	7.57	11.7	11.7	974	784	18.9	1.13	372	-	3.2	863	-	10.98	8.4	20.1	230	0.0094	38.9	< 0.010	-	< 0.050	-	-	1.7	330	204	230	< 1.0	< 1.0	-	-	< 0.50	-	3.0	0.0017	0.97	0.0297
	FR_09-02-B_QSW_04012016_N	2016 01 25	7.86	538	1.91	10.8	10.9	919	646	3.1	< 0.50	423	-	5.4	813	-	9.69	7.94	226.3	185	< 0.0050	20.8	< 0.0050	-	< 0.050	-	-	2.3	180	265	185	< 1.0	< 1.0	-	-	< 0.25	-	6.4	0.0020	0.77	0.0062
	FR_09-02-B-WG-201606151207	2016 06 15	8.03	491	8.93	9.99	9.95	883	617	28.6	0.51	336	-	4.8	774.4	-	9.43	7.56	108	226	< 0.0050	17.0	< 0.0050	-	< 0.050	-	-	1.76	170	202	226	< 1.0	< 1.0	-	-	< 0.25	-	4.6	0.0028	0.64	0.0118
	FR_09-02-B_QSW_04072016_N	2016 08 22	8.07	393	0.2	8.56	8	754	483	< 1.0	0.66	396	-	6.6	549.9	-	6.57	7.6	149	218	< 0.0050	8.15	< 0.0050	-	0.08	-	-	2.05	190	171	218	< 1.0	< 1.0	-	-	< 0.25	-	4.3	0.0023	0.52	0.0034
	FR_09-02-B_QSW_03102016_N	2016 11 28	8.12	529	0.56	11.5	10.8	986	713	< 1.0	0.54	430	-	7.4	860	-	4.89	7.46	-24.4	251	< 0.0050	9.87	< 0.0050	-	0.122	-	-	3.96	170	271	251	< 1.0	< 1.0	-	-	< 0.25	-	4.3	0.0025	0.86	0.0075
	FR_09-02-B_QSW_02012017_N	2017 03 20	7.79	498	2.9	11.2	10.1	940	681	3.2	< 0.50	348	-	4.3	844	-	8.6	7.58	82.6	210	< 0.0050	18.9	0.0012	-	1.29	-	-	1.8	148	267	210	< 1.0	< 1.0	-	-	< 0.050	-	7.1	0.0029	< 0.50	0.0251
	FD_QSW_02012017_028																																								
	QA/QC RPD%		0	1	34	*	*	1	2	*	*	*	-	-	-	-	-	-	-	0	*	0	*	-	50	-	-	*	8	0	0	*	*	-	-	*	-	16	*	*	98
	FR_09-02-B_QTR_2017-09-11_N	2017 09 13	8.03	424	0.39	8.64	8.64	759	492	< 1.0	< 0.50	342	0	7.3	714.6	-	5.85	7.53	176.4	201	0.0092	9.90	< 0.0010	-	0.337	-	-	1.22	160	186	201	< 1.0	< 1.0	-	-	< 0.050	-	2.1	0.0019	0.79	0.0043
	FR_DC1_QTR_2017-09-11_N	Duplicate	8.24	420	0.36	8.69	8.56	757	526	2.6	< 0.5	252	-0.7	-	-	-	-	-	-	204	< 0.005	10	< 0.001	-	0.3	-	-	1.24	159	186	204	< 1	< 1	-	-	< 0.05	-	1.5	0.0015	0.62	0.0034
	QA/QC RPD%		3	1	*	*	*	0	7	*	*	*	*	-	-	-	-	-	-	1	*	1	*	-	12	-	-	*	1	0	1	*	*	-	-	*	-	*	*	*	*
	FR_09-02-B_QTR_2017-10-02_N	2017 11 22	7.93	546	0.11	10.4	11.1	884	666	< 1.0	< 0.50	311	3.1	9.3	846	-	6.49	7.44	249.6	214	< 0.0050	11.5	< 0.0010	-	0.232	-	-	1.94	154	254	214	< 1.0	< 1.0	-	-	< 0.050	-	1.6	0.0030	0.65	0.0059
	FR_09-02-B_QTR_2018-01-01_N	2018 02 08	8.06	556	0.46	10.7	11.3	981	729	< 1.0	0.74	401	2.7	6	892	-	9.35	7.42	151.6	205	0.0121	12.7	< 0.0010	-	0.364	-	-	2.13	130	270	205	< 1.0	< 1.0	-	-	< 0.050	-	4.4	0.0030	0.72	0.0029
	FR_09-02-B_QTR_2018-04-02_N	2018 06 13	8.29	616	0.25	11.9	12.5	995	748	1	0.96	245	2.2	4.8	967	-	9.66	7.2	206.5	224	< 0.0050	31.0	0.0060	-	< 0.10	-	-	< 2.5	200	252	224	< 1.0	< 1.0	-	-	< 0.25	-	< 1.0	0.0012	0.90	0.0025
	FR_09-02-B_QTR_2018-07-02_N	2018 07 31	8.1	456	0.74	9.76	9.28	823	663	1.1	1.15	340	-2.5	5.9	741.8	-	6.87	7.52	177.4	196	0.0059	15.9	0.0018	-	< 0.050	-	-	1.82	171	223	196	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0032	1.11	0.0019
	FR_09-02-B_QTR_2018-10-01_N	2018 12 13	8.08	508	1.29	10.5	10.3	876	668	1.2	0.93	328	-1	4.4	812.5	-	10.88	7.61	300.2	188	0.0258	13.8	< 0.0010	-	0.179	-	-	1.61	196	274	188	< 1.0	< 1.0	-	-	< 0.050	-	2.6	0.0109	0.92	< 0.0020
	FR_09-02-B_QTR_2019-01-07_N	2019 03 14	8.05	600	1.75	11.8	12.2	1,010	764	2.4	0.63	412	1.5	1.1	864.7	-	11.58	7.61	283.4	201	0.0306	21.8	< 0.0010	-	< 0.050	-	-	1.67	173	296	201	< 1.0	< 1.0	-	-	< 0.050	-	5.8	0.0021	0.66	0.0038
	FR_09-02-B_QTR_2019-04-01_N	2019 05 30	8.13	620	0.6	13	12.6	1,150	840	1.6	< 0.50	226	-1.8	3.7	720.1	-	10.39	7.7	225.4	205	< 0.0050	31.9	< 0.0050	-	< 0.050	-	-	< 2.5	200	319	205	< 1.0	< 1.0	-	-	< 0.25	-	2.8	< 0.0010	< 0.50	0.0033
	FR_09-02-B_QTR_2019-07-01_N	2019 07 26	8.32	362	0.16	7.7	7.35	685	474	< 1.0	< 0.50	430	-2.3	6.7	318.2	-	9.02	7.7	111.5	217	0.0242	8.56	< 0.0010	-	< 0.050	-	-	0.81	257	130	213	4.2	< 1.0	-	-	< 0.050	-	4.7	0.0024	< 0.50	0.0025
	FR_09-02-B_QTR_2019-10-07_N	2019 10 24	7.93	424	0.16	8.63	8.62	714	512	2	0.84	468	-0.1	8.3	755	-	8.06	7.61	151.6	210	< 0.0050	9.24	< 0.0010	-	< 0.050	-	-	1.35	181	180	210	< 1.0	< 1.0	-	-	< 0.050	-	3.7	0.0027	0.87	0.0026
	FR_09-02-B_QTR_2020-01-06_N	2020 02 13	7.91	532	6.34	11	10.8	901	716	11.3	< 0.50	413	-1.1	3.6	1,330	-	10.97	8.01	239.9	219	< 0.0050	16.3	< 0.0010	-	< 0.050	-	-	1.31	145	261	219	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0020	< 0.50	0.0118

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																													
			Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																
FR_09-02-A	FR_09-02-A_QTR_2017-09-11_N	2017 09 13	< 3.0	107	< 10	37.1	0.48	2.29	1.77	0.25	< 0.10	113	< 0.020	17	0.0337	< 0.10	< 0.10	1.80	0.071	38.6	< 0.0050	1.18	< 0.50	***38.2***	< 0.010	126	< 0.010	< 0.10	< 10	2.29	< 0.50	3.0
	FR_09-02-A_QTR_2017-10-02_N	2017 11 22	< 3.0	128	< 10	51.5	< 0.10	2.26	2.44	0.20	< 0.10	153	< 0.020	14	0.0434	< 0.10	< 0.10	< 0.50	< 0.050	39.5	< 0.0050	1.17	< 0.50	***47.9***	< 0.010	169	< 0.010	< 0.10	< 10	2.50	< 0.50	< 3.0
	FR_09-02-A_QTR_2018-01-01_N	2018 02 22	< 3.0	117	< 10	51.9	< 0.10	1.81	2.63	0.13	< 0.10	145	< 0.020	< 10	0.0528	0.16	0.12	< 0.50	< 0.050	30.1	< 0.0050	0.990	0.52	***52.8***	< 0.010	188	< 0.010	< 0.10	< 10	2.87	< 0.50	< 3.0
	FR_09-02-A_QTR_2018-04-02_N	2018 06 13	< 3.0	149	< 10	63.3	< 0.10	2.47	2.63	0.22	< 0.10	167	< 0.020	12	0.0304	< 0.10	< 0.10	< 0.50	< 0.050	47.8	< 0.0050	1.71	< 0.50	***96.3***	< 0.010	204	< 0.010	< 0.10	< 10	4.57	< 0.50	< 1.0
	WG_2018-04-02_008	Duplicate	< 3.0	149	< 10	63.5	< 0.10	2.46	2.59	0.22	< 0.10	165	< 0.020	12	0.0279	< 0.10	< 0.10	< 0.50	< 0.050	47.3	< 0.0050	1.68	< 0.50	***96.3***	< 0.010	205	< 0.010	< 0.10	< 10	4.60	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_09-02-A_QTR_2018-07-02_N	2018 07 31	< 3.0	83.7	< 10	37.0	< 0.10	2.07	1.73	0.19	< 0.10	104	< 0.020	13	0.0257	0.12	< 0.10	< 0.50	< 0.050	28.8	< 0.0050	1.19	< 0.50	***33***	< 0.010	115	< 0.010	< 0.10	< 10	2.46	< 0.50	< 1.0
	FR_09-02-A_QTR_2018-10-01_N	2018 12 13	< 3.0	120	< 10	55.5	< 0.10	1.60	2.20	0.14	< 0.10	109	< 0.020	< 10	0.0394	0.12	0.10	< 0.50	< 0.050	37.8	< 0.0050	1.56	< 0.50	***49.2***	< 0.010	165	< 0.010	< 0.10	< 10	3.42	< 0.50	< 1.0
	FR_09-02-A_QTR_2019-01-07_N	2019 03 14	< 3.0	138	< 10	63.7	< 0.10	1.53	2.62	0.15	< 0.10	113	< 0.020	< 10	0.0414	< 0.10	0.11	< 0.50	< 0.050	53.9	< 0.0050	1.65	0.51	***50.4***	< 0.010	197	< 0.010	< 0.10	< 10	3.82	< 0.50	< 1.0
	FR_09-02-A_QTR_2019-04-01_N	2019 05 30	< 3.0	97.6	< 10	46.0	0.14	1.69	2.38	0.13	< 0.10	130	< 0.020	< 10	0.0134	0.11	< 0.10	0.74	0.087	38.0	< 0.0050	1.28	< 0.50	***52.9***	< 0.010	158	< 0.010	< 0.10	< 10	2.98	< 0.50	3.1
	FR_09-02-A_QTR_2019-07-01_N	2019 07 26	< 3.0	96.7	< 10	46.9	< 0.10	2.18	2.02	0.27	< 0.10	110	< 0.020	16	0.0201	0.14	0.13	< 0.50	< 0.050	37.9	< 0.0050	1.97	< 0.50	***49***	< 0.010	138	< 0.010	< 0.10	< 10	3.77	< 0.50	< 1.0
	FR_DC1_QTR_2019-07-01_N	Duplicate	< 3.0	99.0	< 10	46.1	< 0.10	2.12	1.99	0.27	< 0.10	109	< 0.020	17	0.0225	< 0.10	0.13	< 0.50	< 0.050	37.2	< 0.0050	1.95	< 0.50	***49.5***	< 0.010	139	< 0.010	< 0.10	< 10	3.74	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_09-02-A_QTR_2019-10-07_N	2019 10 24	< 3.0	105	13	47.8	0.25	2.25	2.26	0.24	0.15	119	< 0.020	16	0.0326	0.12	< 0.10	1.75	0.065	28.8	< 0.0050	1.70	< 0.50	***49.3***	< 0.010	147	< 0.010	< 0.10	< 10	2.79	< 0.50	4.2
	FR_DC3_QTR_2019-10-07_N	Duplicate	< 3.0	106	< 10	48.3	< 0.10	2.26	1.80	0.23	< 0.10	119	< 0.020	13	0.0272	0.13	< 0.10	< 0.20	< 0.050	28.9	< 0.0050	1.64	< 0.50	***52.4***	< 0.010	151	< 0.010	< 0.10	< 10	2.72	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_09-02-A_QTR_2020-01-06_N	2020 02 13	< 3.0	159	< 10	68.8	0.15	1.87	2.33	0.15	< 0.10	134	< 0.020	< 10	0.0363	< 0.10	< 0.10	0.29	< 0.050	42.5	< 0.0050	1.34	< 0.50	***87.7***	< 0.010	209	< 0.010	< 0.10	< 10	3.77	< 0.50	< 1.0
	FR_09-02-B_QSW_03042017_N	2017 06 01	< 1.0	137	< 10	63.1	0.11	2.06	2.99	< 0.10	< 0.10	183	< 0.020	< 10	0.0205	< 0.10	< 0.10	0.33	< 0.050	47.2	< 0.0050	0.625	< 0.50	***117***	< 0.010	200	< 0.010	< 0.10	< 10	2.67	< 0.50	2.0
FR_09-02-B	FRO12_0101201310	2013 03 26	< 3.0	128	< 30	54.5	< 0.050	< 2.0	3.1	< 0.10	< 0.10	164	< 0.10	13	0.045	< 0.10	0.19	< 0.50	< 0.050	27.7	< 0.010	0.729	0.64	***40.4***	< 0.010	177	< 0.010	< 0.10	< 10	2.31	< 1.0	< 3.0
	FRO12_0104201310	2013 05 30	126	137	81	57.5	4.02	< 2.0	2.7	< 0.10	< 0.10	164	< 0.10	13	0.035	0.34	0.11	< 0.50	0.066	35.3	< 0.010	0.708	< 0.50	***80.2***	< 0.010	173	< 0.010	< 0.10	15	2.34	< 1.0	< 3.0
	FR_09-02-B_QSW_04012016_N	2016 01 25	17.1	130	< 10	51.5	< 0.10	1.93	2.44	0.12	< 0.10	161	< 0.10	12	0.0242	0.12	0.12	< 0.50	< 0.050	39.2	< 0.0050	0.777	< 0.50	***44.1***	< 0.010	175	< 0.010	< 0.10	15	1.86	< 0.50	< 3.0
	FR_09-02-B-WG-201606151207	2016 06 15	< 3.0	117	< 10	48.2	< 0.10	1.77	2.19	< 0.10	< 0.10	137	< 0.020	< 10	0.0170	< 0.10	0.13	< 0.50	< 0.050	37.9	< 0.0050	0.795	0.52	***42.4***	< 0.010	158	< 0.010	< 0.10	< 10	2.64	< 0.50	< 3.0
	FR_09-02-B_QSW_04072016_N	2016 08 22	< 3.0	93.1	< 10	38.9	< 0.10	1.80	2.38	0.11	< 0.10	125	< 0.020	12	0.0211	< 0.10	0.16	< 0.50	< 0.050	39.0	< 0.0050	0.840	0.56	***21***	< 0.010	139	< 0.010	< 0.10	< 10	2.24	< 0.50	< 3.0
	FR_09-02-B_QSW_03102016_N	2016 11 28	< 3.0	130	< 10	50.0	< 0.10	2.34	3.30	0.12	< 0.10	196	< 0.020	14	0.0355	0.11	0.36	< 0.50	< 0.050	49.7	< 0.0050	0.850	1.46	***26.4***	< 0.010	199	< 0.010	< 0.10	< 10	2.96	< 0.50	< 3.0
	FR_09-02-B_QSW_02012017_N	2017 03 20	< 1.0	119	< 10	48.9	< 0.10	1.98	2.46	< 0.10	< 0.10	172	< 0.020	11	0.0335	< 0.10	0.13	< 0.20	< 0.050	41.7	< 0.0050	0.670	0.58	***43.8***	< 0.010	182	< 0.010	< 0.10	< 10	2.46	< 0.50	4.3
	FD_QSW_02012017_028	Duplicate	< 1.0	119	< 10	50.0	< 0.10	2.06	2.50	0.13	< 0.10	174	< 0.020	11	0.0313	< 0.10	0.15	< 0.20	< 0.050	42.0	< 0.0050	0.658	0.55	***43.5***	< 0.010	183	< 0.010	< 0.10	< 10	2.45	< 0.50	4.1
	QA/QC RPD%																															
	FR_09-02-B_QTR_2017-09-11_N	2017 09 13	< 3.0	102	< 10	41.1	< 0.10	1.96	2.60	0.10	< 0.10	138	< 0.020	12	0.0230	0.10	0.13	< 0.50	< 0.050	42.9	< 0.0050	0.801	< 0.50	***34.4***	< 0.010	144	< 0.010	< 0.10	< 10	2.24	< 0.50	< 3.0
	FR_DC1_QTR_2017-09-11_N	Duplicate	< 3	101	< 10	40.8	< 0.1	1.95	2.61	0.1	< 0.1	137	< 0.02	12	0.0259	< 0.1	0.12	< 0.5	< 0.05	42.4	< 0.005	0.746	< 0.5	***33.1***	< 0.01	143	< 0.01	< 0.1	< 10	2.25	< 0.5	< 3
	QA/QC RPD%																															
	FR_09-02-B_QTR_2017-10-02_N	2017 11 22	< 3.0	128	< 10	55.2	< 0.10	2.25	2.99	0.12	< 0.10	172	< 0.020	15	0.0326	< 0.10	0.17	< 0.50	< 0.050	45.7	< 0.0050	0.795	0.61	***43.1***	< 0.010	177	< 0.010	< 0.10	< 10	2.54	< 0.50	< 3.0
	FR_09-02-B_QTR_2018-01-01_N	2018 02 08	< 3.0	131	< 10	55.9	< 0.10	2.26	2.91	< 0.10	< 0.10	184	< 0.020	11	0.0387	0.45	0.16	0.97	< 0.050	41.6	< 0.0050	0.742	0.85	***49.9***	< 0.010	181	< 0.010	< 0.10	< 10	2.48	< 0.50	< 3.0
	FR_09-02-B_QTR_2018-04-02_N	2018 06 13	< 3.0	145	< 10	61.4	< 0.10	2.46	2.81	0.13	< 0.10	181	< 0.020	10	0.0243	< 0.10	< 0.10	< 0.50	< 0.050	45.9	< 0.0050	0.888	< 0.50	***87.8***	< 0.010	212	< 0.010	< 0.10	< 10	3.43	< 0.50	< 1.0
	FR_09-02-B_QTR_2018-07-02_N	2018 07 31	< 3.0	107	< 10	46.0	< 0.10	2.02	2.48	< 0.10	< 0.10	139	< 0.020	< 10	0.0225	< 0.10	0.13	< 0.50	< 0.050	36.2	< 0.0050	0.815	< 0.50	***49***	< 0.010	159	< 0.010	< 0.10	< 10	2.98	< 0.50	< 1.0
	FR_09-02-B_QTR_2018-10-01_N	2018 12 13	< 3.0	119	< 10	50.8	< 0.10	2.05	2.13	< 0.10	< 0.10	138	< 0.020	< 10	0.0228	0.11	< 0.10	< 0.50	< 0.050	33.4	< 0.0050	0.916	< 0.50	***45***	< 0.010	179	< 0.010	< 0.10	< 10	2.65	< 0.50	< 1.0
	FR_09-02-B_QTR_2019-01-07_N	2019 03 14	< 3.0	138	< 10	62.1	< 0.10	1.74	2.67	< 0.10	< 0.10	159	< 0.020	< 10	0.0334	< 0.10	0.12	< 0.50	< 0.050	43.6	< 0.0050	0.896	0.60	***51.8***	< 0.010	206	< 0.010	< 0.10	< 10	3.35	< 0.50	1.2
	FR_09-02-B_QTR_2019-04-01_N	2019 05 30	< 3.0	142	< 10	64.6	< 0.10	2.48	2.70	0.11	< 0.10	102	< 0.020	< 10	0.0200	< 0.10	0.14	< 0.50	< 0.050	40.6	< 0.0050	0.781	< 0.50	***111***	< 0.010	177	< 0.010	< 0.10	< 10	3.79	< 0.50	< 1.0
	FR_09-02-B_QTR_2019-07-01_N	2019 07 26	< 3.0	81.4	< 10	38.4	< 0.10	1.92	1.84	0.13	< 0.10	98.3	< 0.020	10	0.0137	0.13	0.14	< 0.50	< 0.050	33.3	< 0.0050	1.40	< 0.50	***30.6***	< 0.010	121	< 0.010	< 0.10	< 10	2.84	< 0.50	< 1.0
	FR_09-02-B_QTR_2019-10-07_N	2019 10 24	< 3.0	96.7	< 10	44.2	< 0.10	1.94	2.48	0.14	< 0.10	120	< 0.020	14	0.0207	0.12	0.12	< 0.20	< 0.050	37.3	< 0.0050	1.48	< 0.50	***36.3***	< 0.010	152	< 0.010	< 0.10	< 10	2.71	< 0.50	2.2
	FR_09-02-B_QTR_2020-01-06_N	2020 02 13	< 3.0	127	< 10	52.4	< 0.10	1.81	2.21	< 0.10	< 0.10	138	< 0.020	< 10	0.0197	< 0.10	< 0.10	< 0.20	< 0.050	31.8	< 0.0050	1.01	< 0.50	***50.6***	< 0.010	179	< 0.010	< 0.10	< 10	2.80	< 0.50	< 1.0

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[j]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																			
FR_09-02-A	FR_09-02-A_QTR_2017-09-11_N	2017 09 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2017-10-02_N	2017 11 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2018-01-01_N	2018 02 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2018-04-02_N	2018 06 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WG_2018-04-02_008	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2018-07-02_N	2018 07 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2018-10-01_N	2018 12 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2019-01-07_N	2019 03 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2019-04-01_N	2019 05 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2019-07-01_N	2019 07 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC1_QTR_2019-07-01_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2019-10-07_N	2019 10 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC3_QTR_2019-10-07_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-A_QTR_2020-01-06_N	2020 02 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QSW_03042017_N	2017 06 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_09-02-B	FRO12_0101201310	2013 03 26	95.7	< 0.10	< 0.10	168	< 0.10	< 0.50	12	0.061	125,000	0.29	0.25	< 0.50	95	0.073	29.2	55,700	3.57	< 0.010	0.739	0.77	-	< 2,000	41.6	1,960	< 0.010	3,000	186	< 0.010	< 0.10	< 10	2.37	< 1.0	< 3.0
	FRO12_0104201310	2013 05 30	135	0.11	0.16	171	< 0.10	< 0.50	12	0.036	141,000	0.31	0.15	< 0.50	196	0.128	34.4	60,200	7.03	< 0.010	0.745	< 0.50	-	< 2,000	81.7	2,290	< 0.010	2,800	181	< 0.010	< 0.10	14	2.47	< 1.0	< 3.0
	FR_09-02-B_QSW_04012016_N	2016 01 25	31.7	0.13	< 0.10	159	< 0.10	< 0.050	12	0.0358	119,000	0.16	0.13	< 0.50	35	< 0.050	46.1	50,600	1.34	< 0.0050	0.778	0.59	-	2,050	39	2,100	< 0.010	2,600	176	< 0.010	< 0.10	14	2.22	< 0.50	< 3.0
	FR_09-02-B-WG-201606151207	2016 06 15	119	0.10	0.14	138	< 0.020	< 0.050	10	0.0297	118,000	0.32	0.20	< 0.50	144	0.104	39.1	49,700	4.86	< 0.0050	0.895	0.71	-	1,880	43.2	2,340	< 0.010	2,270	166	< 0.010	< 0.10	11	2.74	0.63	< 3.0
	FR_09-02-B_QSW_04072016_N	2016 08 22	4.8	0.15	< 0.10	125	< 0.020	< 0.050	12	0.0199	92,900	0.14	0.16	< 0.50	< 10	< 0.050	38.0	40,400	0.22	< 0.0050	0.850	0.59	-	1,840	21	2,040	< 0.010	2,460	137	< 0.010	< 0.10	< 10	2.24	< 0.50	< 3.0
	FR_09-02-B_QSW_03102016_N	2016 11 28	28.5	0.14	< 0.10	203	< 0.020	< 0.050	15	0.0394	136,000	0.20	0.42	0.88	50	0.120	50.5	52,200	2.47	< 0.0050	0.903	1.59	-	2,500	25.9	2,520	< 0.010	3,450	210	< 0.010	0.11	< 10	3.10	< 0.50	< 3.0
	FR_09-02-B_QSW_02012017_N	2017 03 20	18.1	< 0.10	< 0.10	156	< 0.020	< 0.050	10	0.0365	113,000	0.15	0.16	< 0.50	34	< 0.050	38.9	46,500	1.56	< 0.0050	0.655	0.70	-	1,910	40.2	2,040	< 0.010	2,560	176	< 0.010	< 0.10	< 10	2.30	< 0.50	< 3.0
	FD_QSW_02012017_028	Duplicate	7.4	0.11	< 0.10	173	< 0.020	< 0.050	12	0.0384	121,000	0.18	0.15	< 0.50	13	< 0.050	43.5	51,900	0.78	< 0.0050	0.734	0.65	-	2,090	43.2	2,200	< 0.010	2,620	193	< 0.010	< 0.10	< 10	2.52	< 0.50	< 3.0
	QA/QC RPD%		84	*	*	10	*	*	*	5	7	*	*	*	*	*	11	11	67	*	11	*	-	9	7	8	*	2	9	*	*	*	9	*	*
	FR_09-02-B_QTR_2017-09-11_N	2017 09 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC1_QTR_2017-09-11_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2017-10-02_N	2017 11 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2018-01-01_N	2018 02 08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2018-04-02_N	2018 06 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2018-07-02_N	2018 07 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2018-10-01_N	2018 12 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2019-01-07_N	2019 03 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2019-04-01_N	2019 05 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2019-07-01_N	2019 07 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2019-10-07_N	2019 10 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_09-02-B_QTR_2020-01-06_N	2020 02 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

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QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Physical Parameters											Field Parameters						Dissolved Inorganics																					
			pH (lab) pH	Hardness mg/L	Turbidity NTU	Total Anions meq/L	Total Cations meq/L	Conductivity µS/cm	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Dissolved Organic Carbon mg/L	Oxidation Reduction Potential mV	Cation Anion Balance %	Field Temperature C	Field Conductivity µS/cm	Field Turbidity NTU	Dissolved Oxygen mg/L	pH (field) pH	Field ORP mV	Total Alkalinity mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Nitrate+Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Nitrogen mg/L	Total Nitrogen-N mg/L	Chloride mg/L	Fluoride µg/L	Sulfate mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Bromide mg/L	Total Acidity mg/L	Acidity (pH 8.3) mg/L	Ortho-Phosphate mg/L	Total Organic Carbon mg/L	Total Phosphorous as P mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S6 Study Area																																									
FR_GHHW	FR_GHHW_810619	2011 12 06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42.3	< 0.010	-	-	-	-	< 5.0	< 200	224	-	-	-	-	-	< 0.50	-	-	-	-	< 0.30
	FR_GHHW_810809	2012 01 09	8.18	687	0.27	14	13.8	1,180	950	< 3.0	0.52	366	-	-	-	-	-	-	-	246	< 0.0050	46.6	0.019	-	-	-	-	2.3	250	273	246	< 1.0	< 1.0	-	-	< 0.50	-	5.1	0.0013	8.16	< 0.30
	FR_GHHW_810788	2012 02 07	8.03	742	0.73	14.9	14.9	1,240	983	< 3.0	< 0.50	527	-	-	-	-	-	-	-	256	< 0.0050	47.8	< 0.010	-	0.383	-	-	2.5	< 200	302	256	< 1.0	< 1.0	-	-	< 0.50	-	6.1	0.0011	0.63	< 0.30
	FR_GHHW_810776	2012 03 05	8.16	768	0.31	15.7	15.4	1,320	1,050	< 3.0	0.5	477	-	-	-	-	-	-	-	256	< 0.0050	52.8	< 0.010	-	< 0.050	-	-	2.8	< 200	322	256	< 1.0	< 1.0	-	-	< 0.50	-	3.7	0.0010	0.84	< 0.30
	FR_GHHW_810753	2012 03 19	8.14	796	1.65	16.3	16	1,350	1,020	3.3	< 0.50	295	-	-	-	-	-	-	-	261	0.0089	55.6	< 0.010	-	< 0.050	-	-	2.7	< 200	336	261	< 1.0	< 1.0	-	-	< 0.50	-	7.5	0.0012	0.67	< 0.30
	FR_GHHW_811045	2012 04 02	8.19	818	0.75	16.6	16.4	1,390	1,180	< 3.0	0.5	359	-	-	-	-	-	-	-	265	< 0.0050	57.1	0.017	-	0.143	-	-	2.7	< 200	344	265	< 1.0	< 1.0	-	-	< 0.50	-	1.7	0.0015	0.80	< 0.30
	FR_GHHW_810962	2012 05 08	8.2	314	0.17	6.07	6.28	546	344	< 3.0	2.27	380	-	-	-	-	-	-	-	192	< 0.0050	8.53	< 0.0010	-	< 0.050	-	-	7.7	218	66.7	192	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0020	2.85	< 0.30
	FR_GHHW_810887	2012 06 04	8.24	455	0.37	9.28	9.31	820	586	< 3.0	1.71	397	-	-	-	-	-	-	-	198	< 0.0050	30.3	< 0.0050	-	< 0.050	-	-	2.7	170	147	198	< 1.0	< 1.0	-	-	< 0.25	-	7.6	0.0024	1.91	< 0.30
	FR_GHHW_811529	2012 08 07	8.15	436	0.14	8.7	8.76	749	570	< 3.0	0.56	365	-	-	-	-	-	-	-	221	< 0.0050	23.2	< 0.0050	-	< 0.050	-	-	1.3	190	124	221	< 1.0	< 1.0	-	-	< 0.25	-	3.6	0.0122	0.75	< 0.30
	FR_GHHW040912M	2012 09 04	8.1	522	1.86	10.5	10.5	869	765	7.3	0.58	343	-	-	-	-	-	-	-	230	< 0.0050	32.7	< 0.010	-	< 0.050	-	-	1.2	< 200	170	230	< 1.0	< 1.0	-	-	< 0.50	-	3.9	0.0037	0.74	< 0.30
	GH-HARD_L1220068	2012 10 01	8.2	569	0.29	11.9	11.4	970	828	< 3.0	1.04	512	-	-	-	-	-	-	-	233	< 0.0050	40.2	< 0.010	-	< 0.050	-	-	1.4	< 200	207	233	< 1.0	< 1.0	-	-	< 0.50	-	5.9	0.0030	0.86	0.0031
	GHHARD_L1235448	2012 11 05	8.14	653	0.6	12.9	13.1	1,070	849	< 3.0	< 0.50	493	-	-	-	-	-	-	-	232	< 0.0050	45.7	< 0.010	-	< 0.050	-	-	1.6	< 200	235	232	< 1.0	< 1.0	-	-	< 0.50	-	5.4	0.0013	0.55	0.0027
	GH-HARD_L1245128	2012 12 03	8.03	663	0.6	14.5	13.3	1,200	1,000	< 3.0	0.7	522	-	-	-	-	-	-	-	237	< 0.0050	54.4	< 0.010	-	< 0.050	-	-	1.7	< 200	278	237	< 1.0	< 1.0	-	-	< 0.50	-	5.3	0.0013	0.89	0.0032
	FRO03_0101201301	2013 01 08	7.98	802	0.54	16.4	16.1	1,360	1,200	< 3.0	0.58	476	-	-	-	-	-	-	-	239	< 0.0050	64.5	< 0.010	-	< 0.050	-	-	2.1	250	333	239	< 1.0	< 1.0	-	-	< 0.50	-	7.2	0.0010	0.71	0.0026
	FRO03_010220131	2013 02 04	7.96	878	1.97	17.9	17.6	1,470	1,420	< 3.0	< 0.50	479	-	-	-	-	-	-	-	246	< 0.0050	72.2	< 0.020	-	< 0.050	-	-	2.3	< 400	373	246	< 1.0	< 1.0	-	-	< 1.0	-	7.6	< 0.0010	0.56	0.0031
	FRO03_010320131	2013 03 05	8.1	911	0.41	18.9	18.4	1,600	1,280	3.1	< 0.50	428	-	-	-	-	-	-	-	236	0.0109	75.6	0.013	-	< 0.050	-	-	2.6	280	419	236	< 1.0	< 1.0	-	-	< 0.50	-	3.0	0.0012	0.72	0.0021
	FRO03_010420131	2013 04 01	8.03	674	1.31	13.8	13.6	1,200	898	< 3.0	< 0.50	459	-	-	-	-	-	-	-	219	0.0597	55.2	0.043	-	< 0.050	-	-	2.4	220	262	219	< 1.0	< 1.0	-	-	< 0.50	-	3.4	0.0256	0.67	0.0358
	FRO03_010520131	2013 05 07	8	682	1.11	13.6	13.7	1,210	881	< 3.0	0.59	418	-	-	-	-	-	-	-	219	0.0064	51.7	0.019	-	< 0.050	-	-	1.8	< 200	265	219	< 1.0	< 1.0	-	-	< 0.50	-	6.1	< 0.0010	0.76	0.0022
	FRO03_010620131	2013 06 03	8.05	532	1.04	10.2	10.7	903	693	< 3.0	1.23	384	-	-	-	-	-	-	-	209	0.0063	29.8	0.012	-	< 0.050	-	-	2.4	270	181	209	< 1.0	< 1.0	-	-	< 0.50	-	3.9	0.0377	1.38	0.0448
	FR_GHHW_M_01072013_NP	2013 07 02	8.12	382	0.37	7.49	7.64	672	448	< 3.0	1.34	472	-	-	-	-	-	-	-	186	0.0075	17.8	0.0138	-	< 0.050	-	-	2	180	116	186	< 1.0	< 1.0	-	-	< 0.25	-	2.7	0.0019	1.37	0.0037
	FR_GHHW_M_01092013_NP	2013 09 03	8.09	439	0.37	8.92	8.77	802	634	< 3.0	1.2	456	-	17.9	804	-	5.09	7.57	66.4	197	< 0.0050	28.1	< 0.010	-	< 0.050	-	-	2.9	< 200	139	197	< 1.0	< 1.0	-	-	< 0.50	-	9.8	0.0024	1.11	0.0050
	FR_GHHW_M_01102013_NP	2013 10 07	8.25	533	0.68	10.3	10.8	927	739	< 1.0	0.76	451	-	-	-	-	-	-	-	204	< 0.0050	35.9	< 0.010	-	< 0.050	-	-	2.9	< 200	174	204	< 1.0	< 1.0	-	-	< 0.50	-	< 1.0	0.0024	0.98	0.0028
	FR_GHHW_Q_01092013_N	2013 10 31	8.27	584	0.4	11.6	11.8	1,030	778	4.8	0.8	377	-	11.4	601.6	-	7.44	7.28	121.8	205	< 0.0050	42.8	< 0.010	-	< 0.050	-	-	2.5	< 200	209	205	< 2.0	< 2.0	-	-	< 0.50	-	< 1.0	0.0011	0.74	0.0025
	FR_GHHW_M_01122013_NP	2013 12 02	8.11	635	4.84	12.9	12.8	1,130	779	10	0.74	479	-	-	-	-	-	-	-	208	< 0.0050	50.4	< 0.010	-	< 0.050	-	-	2.3	< 200	245	208	< 1.0	< 1.0	-	-	< 0.50	-	3.5	0.0021	0.79	0.0143
	FR_GHHW_M_01012014_NP	2014 01 06	7.99	706	2.16	14.3	14.2	1,220	921	< 1.0	< 0.50	441	-	-	-	-	-	-	-	215	< 0.0050	56.2	0.023	-	< 0.050	-	-	2.3	210	282	215	< 1.0	< 1.0	-	-	< 0.50	-	4.5	< 0.0010	0.78	0.0026
	FR_GHHW_M_01022014_NP	2014 02 03	8.16	710	0.41	14.9	14.3	1,290	957	1.1	0.52	482	-	-	-	-	-	-	-	202	0.0064	61.2	< 0.010	-	< 0.050	-	-	2.8	< 200	308	202	< 1.0	< 1.0	-	-	< 0.50	-	2.6	< 0.0010	< 0.50	< 0.0020
	FR_GHHW_M_01032014_NP	2014 03 04	8.01	766	0.28	16.1	15.4	1,370	1,070	< 1.0	< 0.50	495	-	-	-	-	-	-	-	228	< 0.0050	64.0	< 0.010	-	< 0.050	-	-	2.7	210	328	228	< 1.0	< 1.0	-	-	< 0.50	-	3.7	0.0231	< 0.50	0.0249
	FR_GHHW_Q_01012014_N	2014 03 13	8.07	767	0.76	15.8	15.5	1,320	1,020	< 1.0	0.71	411	-	9.3	1,220	-	8.73	7.28	-	223	0.0090	63.6	0.010	-	< 0.050	-	-	2.1	230	322	223	< 1.0	< 1.0	-	-	< 0.50	-	3.9	0.0025	0.89	0.0021
	FR_GHHW-WG-0704140830	2014 04 07	8.05	802	0.63	17	16.2	1,400	1,160	< 1.0	0.55	401	-	-	-	-	-	-	-	232	0.0097	68.3	0.021	-	< 0.050	-	-	2.5	< 200	356	232	< 1.0	< 1.0	-	-	< 0.50	-	4.5	< 0.0010	0.58	0.0032
	FR_GHHW_Q_01042014_N	2014 05 14	8.12	841	0.27	16.6	16.9	1,430	1,230	< 1.0	< 0.50	253	-	11	1,215	-	6.87	7.69	-43.9	240	0.0066	61.4	< 0.010	-	< 0.050	-	-	4.1	< 200	349	240	< 1.0	< 1.0	-	-	< 0.50	-	3.8	< 0.0010	< 0.50	< 0.0020
	FR_GHHW_QSW_02072014_N	2014 08 25	8.12	542	0.27	11.2	10.9	950	689	< 1.0	0.65	362	-	19.3	849	-	4.13	7.41	-0.2	224	0.0075	34.4	< 0.010	-	< 0.050	-	-	2.1	220	204	224	< 1.0	< 1.0	-	-	< 0.50	-	3.6	0.0044	0.53	0.0156
	FD_QSW_02072014_004	Duplicate	8.02	539	0.36	11.2	10.9	944	684	< 1.0	0.61	379	-	-	-	-	-	-	-	222	0.0055	34.1	< 0.010	-	< 0.050	-	-	2	220	202	222	< 1.0	< 1.0	-	-	< 0.50	-	4.6	0.0124	0.70	0.0089
	QA/QC RPD%		1	1	*	*	*	1	1	*	*	*	-	-	-	-	-	-	-	1	*	1	*	-	*	-	-	*	0	1	1	*	*	-	-	*	-	*	*	*	55
	FR_GHHW_QSW_02102014_N	2014 10 23	8.18	606	0.75	12.3	12.2	1,070	836	< 1.0	1.19	364	-	16.8	96.36	-	5.72	7.69	34.6	223	< 0.0050	40.3	< 0.010	-	< 0.050	-	-	1.6	< 200	234	223	< 1.0	< 1.0	-	-	< 0.50	-	6.1	< 0.0010	0.96	< 0.0020
	FR_GHHW_QSW_02012015_N	2015 01 21	7.98	672	-	-	-	1,210	920	< 1.0	0.68	-	-	-	-	-	-	-	-	238	< 0.0050	46.7	< 0.0050	-	< 0.050	-	-	2.4	110	276	-	-	-	-	-	< 0.25	-	-	-	0.78	< 0.0020
	FR_GHHW_QSW_02042015_N	2015 04 14	8.44	748	-	-	-	1,330	1,020	< 1.0	0.72	-	-	-	-	-	-	-	-	239	< 0.0050	56.2	< 0.010	-	< 0.050	-	-	3	< 200	336	-	-	-	-	-	< 0.50	-	-	-	0.80	0.0062
	3_FR_DC1_020415																																								
	QA/QC RPD%		1	0	-	-	-	1	2	*	*	-	-	-	-	-	-	-	-	8	*	2	*	-	*	-	-	10	*	1	-	-	-	-	-	*	-	-	-	*	*
	FR_GHHW_QSW_02072015_N	2015 07 02	7.88	705	-	-	-	1,180	1,070	1.1	0.63	-	-	21.5	-	-	-	7.78	-	229	< 0.0050	45.5	< 0.0050	-	< 0.050	-	-	3.5	< 100	286	-	-	-	-	-	< 0.25	-	-	-	< 0.50	0.0048
	FR_GHHW_NPQ_01102015_NP	2015 11 05	-	682	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.279	37.8	0.0692	-	-	-	-	1.6	150	280	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescipt upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Dissolved Metals																													
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																
FR_GHHW	FR_GHHW_810619	2011 12 06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GHHW_810809	2012 01 09	< 3.0	166	< 30	66.5	0.842	3.0	< 2.0	< 0.10	< 0.10	219	< 0.10	20	0.040	0.16	< 0.10	4.85	0.091	28.9	< 0.010	0.646	< 0.50	***77.2***	< 0.010	174	< 0.010	< 0.10	11	3.33	< 1.0	143
	FR_GHHW_810788	2012 02 07	< 3.0	174	< 30	74.8	1.24	3.1	< 2.0	< 0.10	< 0.10	194	< 0.10	19	0.039	< 0.10	< 0.10	7.17	0.067	26.4	< 0.010	0.715	< 0.50	***81.0***	< 0.010	185	< 0.010	< 0.10	10	4.02	< 1.0	108
	FR_GHHW_810776	2012 03 05	< 3.0	181	< 30	76.5	1.57	3.1	< 2.0	< 0.10	< 0.10	177	< 0.10	19	0.048	0.14	< 0.10	4.41	< 0.050	26.2	< 0.010	0.718	0.57	***89.4***	< 0.010	207	< 0.010	< 0.10	< 10	4.37	< 1.0	148
	FR_GHHW_810753	2012 03 19	< 3.0	190	< 30	77.8	6.76	3.2	< 2.0	< 0.10	< 0.10	127	< 0.10	20	0.068	0.10	0.12	3.30	< 0.050	29.2	< 0.010	0.730	0.89	***91.4***	< 0.010	202	< 0.010	< 0.10	< 10	4.18	< 1.0	197
	FR_GHHW_811045	2012 04 02	< 3.0	195	< 30	80.5	2.73	3.0	< 2.0	< 0.10	< 0.10	147	< 0.10	19	0.149	0.18	0.10	3.49	0.092	27.6	< 0.010	0.718	0.84	***98.9***	< 0.010	199	< 0.010	< 0.10	15	4.44	< 1.0	477
	FR_GHHW_810962	2012 05 08	< 3.0	74.4	< 30	31.2	0.553	< 2.0	< 2.0	< 0.10	< 0.10	104	< 0.10	14	0.057	0.12	< 0.10	2.37	0.191	14.8	< 0.010	0.818	< 0.50	18.7	< 0.010	75.6	< 0.010	< 0.10	< 10	1.84	< 1.0	171
	FR_GHHW_810887	2012 06 04	< 3.0	111	< 30	42.8	0.895	2.3	3.6	< 0.10	< 0.10	133	< 0.10	16	0.092	< 0.10	< 0.10	2.10	0.099	17.1	< 0.010	0.747	< 0.50	***55.0***	< 0.010	116	< 0.010	< 0.10	16	2.63	< 1.0	239
	FR_GHHW_811529	2012 08 07	< 3.0	104	< 30	42.5	0.379	2.3	< 2.0	< 0.10	< 0.10	138	< 0.10	17	0.033	0.12	< 0.10	2.77	< 0.050	19.8	< 0.010	0.755	< 0.50	***50***	< 0.010	115	< 0.010	< 0.10	< 10	2.37	< 1.0	62.4
	FR_GHHW040912M	2012 09 04	< 3.0	127	< 30	49.9	0.826	2.5	< 2.0	< 0.10	< 0.10	160	< 0.10	19	0.052	0.18	< 0.10	4.45	0.098	24.2	< 0.010	0.826	< 0.50	***62***	< 0.010	143	< 0.010	< 0.10	15	2.98	< 1.0	91
	GH-HARD_L1220068	2012 10 01	< 3.0	132	< 30	58.1	0.968	2.6	< 2.0	< 0.10	< 0.10	187	< 0.10	24	0.090	0.25	< 0.10	10.1	0.121	29.3	< 0.010	0.973	< 0.50	***75.5***	< 0.010	169	< 0.010	< 0.10	20	3.77	< 1.0	207
	GHHARD_L1235448	2012 11 05	< 3.0	156	< 30	64.1	2.03	3.0	< 2.0	< 0.10	< 0.10	199	< 0.10	20	0.130	< 0.10	< 0.10	5.55	< 0.050	27.7	< 0.010	0.847	< 0.50	***81.3***	< 0.010	168	< 0.010	< 0.10	15	3.43	< 1.0	351
	GH-HARD_L1245128	2012 12 03	< 3.0	155	< 30	67.0	1.39	3.0	< 2.0	< 0.10	< 0.10	194	< 0.10	16	0.118	< 0.10	< 0.10	4.64	< 0.050	28.3	< 0.010	0.780	< 0.50	***103***	< 0.010	173	< 0.010	< 0.10	15	3.97	< 1.0	271
	FRO03_0101201301	2013 01 08	< 3.0	190	< 30	79.6	1.44	3.1	< 2.0	< 0.10	< 0.10	189	< 0.10	19	0.055	< 0.10	< 0.10	2.76	< 0.050	34.2	< 0.010	0.687	< 0.50	***121***	< 0.010	211	< 0.010	< 0.10	17	4.02	< 1.0	54.5
	FRO03_010220131	2013 02 04	< 3.0	206	< 30	88.4	1.18	3.2	< 2.0	< 0.10	< 0.10	145	< 0.10	17	0.044	< 0.10	< 0.10	1.81	< 0.050	34.6	< 0.010	0.652	< 0.50	***138***	< 0.010	227	< 0.010	< 0.10	< 10	4.82	< 1.0	28.9
	FRO03_010320131	2013 03 05	< 3.0	212	< 30	92.6	1.14	3.3	2.0	< 0.10	< 0.10	122	< 0.10	17	0.047	< 0.10	< 0.10	5.79	< 0.050	31.5	< 0.010	0.686	< 0.50	***152***	< 0.010	230	< 0.010	< 0.10	< 10	4.70	< 1.0	137
	FRO03_010420131	2013 04 01	< 3.0	174	< 30	58.2	4.41	< 2.0	2.1	< 0.10	< 0.10	228	< 0.10	12	0.041	< 0.10	< 0.10	2.15	< 0.050	14.0	< 0.010	< 0.35	< 0.50	***94.9***	< 0.010	265	< 0.010	< 0.10	< 10	1.85	< 1.0	131
	FRO03_010520131	2013 05 07	< 3.0	172	< 30	61.4	2.14	< 2.0	2.1	< 0.10	< 0.10	200	< 0.10	13	0.045	< 0.10	< 0.10	2.44	< 0.050	15.6	< 0.010	0.315	< 0.50	***103***	< 0.010	288	< 0.010	< 0.10	< 10	2.06	< 1.0	89.4
	FRO03_010620131	2013 06 03	< 3.0	137	38	46.3	2.71	< 2.0	2.1	< 0.10	< 0.10	170	< 0.10	11	0.034	< 0.10	< 0.10	3.97	0.163	14.7	< 0.010	0.463	0.50	***67.9***	< 0.010	203	< 0.010	< 0.10	< 10	1.65	< 1.0	79.4
	FR_GHHW_M_01072013_NP	2013 07 02	< 3.0	97.9	< 30	33.5	1.63	< 2.0	< 2.0	< 0.10	< 0.10	133	< 0.10	13	0.034	0.14	< 0.10	2.82	< 0.050	11.4	< 0.010	0.337	< 0.50	***39.8***	< 0.010	140	< 0.010	< 0.10	< 10	1.39	< 1.0	90.7
	FR_GHHW_M_01092013_NP	2013 09 03	< 3.0	111	< 30	39.1	0.936	< 2.0	< 2.0	< 0.10	< 0.10	160	< 0.10	15	0.035	0.17	< 0.10	9.56	< 0.050	13.1	< 0.010	0.335	< 0.50	***58.1***	< 0.010	167	< 0.010	< 0.10	< 10	1.50	< 1.0	185
	FR_GHHW_M_01102013_NP	2013 10 07	< 3.0	133	< 30	48.8	1.22	0.923	1.82	< 0.10	< 0.10	174	< 0.10	11	0.048	< 0.10	< 0.10	9.48	0.055	11.9	< 0.010	0.342	0.54	***75.5***	< 0.010	213	< 0.010	< 0.10	25	1.67	< 1.0	380
	FR_GHHW_Q_01092013_N	2013 10 31	< 3.0	151	< 30	50.3	1.10	0.956	1.94	< 0.10	< 0.10	196	< 0.10	10	0.045	< 0.10	< 0.10	8.59	0.064	11.3	< 0.010	0.312	0.53	***84.5***	< 0.010	223	< 0.010	< 0.10	< 10	1.72	< 1.0	236
	FR_GHHW_M_01122013_NP	2013 12 02	< 3.0	163	< 30	55.6	1.55	1.11	2.19	< 0.10	< 0.10	196	< 0.10	11	0.065	< 0.10	< 0.10	10.9	< 0.050	16.3	< 0.010	0.322	1.52	***103***	< 0.010	252	< 0.010	< 0.10	10	1.96	< 1.0	253
	FR_GHHW_M_01012014_NP	2014 01 06	< 3.0	179	< 30	62.9	2.98	1.12	2.18	< 0.10	< 0.10	139	< 0.10	13	0.054	< 0.10	< 0.10	4.61	< 0.050	14.1	< 0.010	0.318	< 0.50	***113***	< 0.010	277	< 0.010	< 0.10	< 10	2.06	< 1.0	324
	FR_GHHW_M_01022014_NP	2014 02 03	< 3.0	180	< 10	63.5	1.77	1.16	2.31	< 0.10	< 0.10	133	< 0.10	13	0.052	< 0.10	< 0.10	3.37	< 0.050	18.0	< 0.010	0.330	< 0.50	***121***	< 0.010	288	< 0.010	< 0.10	11	2.28	< 1.0	282
	FR_GHHW_M_01032014_NP	2014 03 04	< 3.0	195	< 10	67.7	0.598	1.14	2.17	< 0.10	< 0.10	146	< 0.10	13	0.065	< 0.10	< 0.10	39.2	0.203	16.3	< 0.010	0.301	0.59	***126***	< 0.010	280	< 0.010	< 0.10	16	2.24	< 1.0	142
	FR_GHHW_Q_01012014_N	2014 03 13	< 3.0	195	< 10	68.2	1.77	1.09	2.35	< 0.10	< 0.10	129	< 0.10	12	0.053	< 0.10	< 0.10	4.05	< 0.050	16.7	< 0.010	0.287	< 0.50	***127***	< 0.010	268	< 0.010	< 0.10	17	2.20	< 1.0	133
	FR_GHHW-WG-0704140830	2014 04 07	< 3.0	201	< 10	73.1	1.83	1.14	2.33	< 0.10	< 0.10	122	< 0.10	15	0.054	< 0.10	< 0.10	1.28	< 0.050	17.6	< 0.010	0.340	< 0.50	***150***	< 0.010	311	< 0.010	< 0.10	14	2.62	< 1.0	75.2
	FR_GHHW_Q_01042014_N	2014 05 14	< 3.0	210	< 10	76.7	1.03	1.26	2.05	< 0.10	< 0.10	116	< 0.10	13	0.059	< 0.10	< 0.10	2.64	< 0.050	19.1	< 0.010	0.297	< 0.50	***140***	< 0.010	287	< 0.010	< 0.10	16	2.71	< 1.0	65.4
	FR_GHHW_QSW_02072014_N	2014 08 25	< 3.0	130	< 10	52.5	0.740	1.09	1.93	< 0.10	< 0.10	80.9	< 0.10	13	0.040	0.10	< 0.10	9.23	< 0.050	17.0	< 0.010	0.335	< 0.50	***78.2***	< 0.010	189	< 0.010	< 0.10	< 10	1.96	< 1.0	76.2
	FD_QSW_02072014_004	Duplicate	< 3.0	130	15	51.8	0.790	1.08	1.91	< 0.10	< 0.10	81.6	< 0.10	13	0.039	< 0.10	< 0.10	7.74	0.088	16.7	< 0.010	0.334	< 0.50	***78.3***	< 0.010	187	< 0.010	< 0.10	< 10	1.94	< 1.0	71.2
	QA/QC RPD%		*	0	*	1	7	1	1	*	*	1	*	*	3	*	*	18	*	2	*	0	*	0	*	1	*	*	*	1	*	7
	FR_GHHW_QSW_02102014_N	2014 10 23	< 3.0	152	< 10	55.3	1.64	1.10	2.05	< 0.10	< 0.10	92.3	< 0.10	12	0.045	< 0.10	< 0.10	4.03	< 0.050	17.2	< 0.010	0.311	< 0.50	***87***	< 0.010	200	< 0.010	< 0.10	16	2.24	< 1.0	172
	FR_GHHW_QSW_02012015_N	2015 01 21	< 3.0	168	< 10	61.2	0.486	1.15	2.22	< 0.10	< 0.10	108	< 0.10	13	0.047	0.12	< 0.10	6.81	< 0.050	19.3	< 0.010	0.352	< 0.50	***102***	< 0.010	226	< 0.010	< 0.10	18	2.52	< 1.0	50.2
	FR_GHHW_QSW_02042015_N	2015 04 14	< 3.0	187	< 10	68.1	1.37	1.28	2.42	< 0.10	< 0.10	110	< 0.10	13	0.0439	< 0.10	< 0.10	4.66	< 0.050	20.3	< 0.0050	0.306	< 0.50	***123***	< 0.010	265	< 0.010	< 0.10	14	2.99	< 0.50	116
	3_FR_DC1_020415	Duplicate	< 3.0	187	< 10	67.6	1.13	1.30	2.45	< 0.10	< 0.10	108	< 0.10	13	0.0441	< 0.10	< 0.10	5.53	< 0.050	21.4	< 0.0050	0.355	< 0.50	***127***	< 0.010	270	< 0.010	< 0.10	14	3.08	< 0.50	131
	QA/QC RPD%		*	0	*	1	19	2	1	*	*	2	*	*	0	*	*	17	*	5	*	15	*	3	*	2	*	*	0	3	*	12
	FR_GHHW_QSW_02072015_N	2015 07 02	< 3.0	178	< 10	63.3	0.53	1.49	2.65	< 0.10	< 0.10	127	< 0.10	13	0.0486	< 0.10	< 0.10	12.1	0.111	21.6	< 0.0050	0.322	< 0.50	***108***	< 0.010	225	< 0.010	< 0.10	< 10	2.63	< 0.50	86.3
	FR_GHHW_NPQ_01102015_NP	2015 11 05	< 3.0	158	< 10	69.9	2.2	-	2.3	< 0.10	< 0.10	81.8	< 0.10	22	0.0421	-	< 0.10	5.02	< 0.050	39.8	< 0.0050	0.728	0.71	***97.5***	< 0.010	144	< 0.010	< 0.10	13	4.23	< 0.50	105

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																			
FR_GHHW	FR_GHHW_810619	2011 12 06	< 3.0	< 0.10	< 0.10	199	< 0.10	< 0.50	17	0.047	140,000	0.13	0.17	20.1	< 30	0.698	26.7	59,700	1.13	< 0.010	0.679	0.61	-	2,800	65.3	2,060	< 0.010	< 2,000	171	< 0.010	< 0.10	11	3.15	< 1.0	211
	FR_GHHW_810809	2012 01 09	3.4	< 0.10	< 0.10	218	< 0.10	< 0.50	20	0.042	168,000	0.24	0.12	6.05	< 30	0.282	27.4	69,100	1.03	< 0.010	0.626	< 0.50	-	3,200	72.5	2,170	< 0.010	< 2,000	166	< 0.010	< 0.10	12	3.18	< 1.0	143
	FR_GHHW_810788	2012 02 07	< 3.0	< 0.10	< 0.10	194	< 0.10	< 0.50	20	0.044	170,000	0.16	< 0.10	6.95	73	0.606	27.5	73,700	1.50	< 0.010	0.726	< 0.50	-	3,000	80.0	2,150	< 0.010	< 2,000	187	< 0.010	< 0.10	< 10	4.04	< 1.0	107
	FR_GHHW_810776	2012 03 05	< 3.0	< 0.10	< 0.10	179	< 0.10	< 0.50	21	0.050	185,000	0.18	0.10	4.62	51	0.391	29.0	78,600	1.68	< 0.010	0.758	0.53	-	3,200	89.5	2,100	< 0.010	< 2,000	215	< 0.010	< 0.10	< 10	4.48	< 1.0	148
	FR_GHHW_810753	2012 03 19	51.0	< 0.10	< 0.10	140	< 0.10	< 0.50	20	0.053	195,000	0.23	0.12	5.09	292	0.778	29.4	82,100	6.04	< 0.010	0.705	0.95	-	3,400	94.1	2,080	< 0.010	2,000	200	< 0.010	< 0.10	< 10	4.20	< 1.0	169
	FR_GHHW_811045	2012 04 02	< 3.0	< 0.10	< 0.10	157	< 0.10	< 0.50	17	0.158	189,000	0.12	< 0.10	4.17	115	1.78	27.6	79,200	3.85	< 0.010	0.735	0.83	-	3,100	94.6	2,020	< 0.010	< 2,000	199	< 0.010	< 0.10	15	4.45	< 1.0	476
	FR_GHHW_810962	2012 05 08	< 3.0	< 0.10	< 0.10	103	< 0.10	< 0.50	15	0.055	74,200	0.16	< 0.10	2.60	< 30	0.401	15.5	31,300	0.601	< 0.010	0.847	< 0.50	-	< 2,000	19.0	1,810	< 0.010	< 2,000	75.5	< 0.010	< 0.10	< 10	1.86	< 1.0	170
	FR_GHHW_810887	2012 06 04	< 3.0	< 0.10	< 0.10	135	< 0.10	< 0.50	17	0.093	112,000	0.17	< 0.10	2.44	< 30	< 0.40	17.4	43,400	1.22	< 0.010	0.770	< 0.50	-	2,400	56.0	1,990	< 0.010	3,600	116	< 0.010	< 0.10	16	2.69	< 1.0	238
	FR_GHHW_811529	2012 08 07	< 3.0	< 0.10	0.1	141	< 0.10	< 0.50	18	0.037	108,000	0.15	< 0.10	3.44	< 30	0.203	20.3	44,600	0.444	< 0.010	0.802	< 0.50	-	2,400	52.2	2,130	< 0.010	< 2,000	121	< 0.010	< 0.10	< 10	2.44	< 1.0	67.5
	FR_GHHW040912M	2012 09 04	< 3.0	< 0.10	< 0.10	198	< 0.10	< 0.50	21	0.058	129,000	0.21	< 0.10	6	216	1.27	26.9	51,200	2.24	< 0.010	0.846	0.51	-	2,600	65	2,180	< 0.010	< 2,000	140	< 0.010	< 0.10	15	2.97	< 1.0	112
	GH-HARD_L1220068	2012 10 01	< 3.0	< 0.10	< 0.10	200	< 0.10	< 0.50	21	0.086	132,000	0.26	< 0.10	11.1	32	0.572	25.1	58,000	0.948	< 0.010	0.899	< 0.50	-	2,600	74.9	2,090	< 0.010	< 2,000	168	< 0.010	< 0.10	20	3.47	< 1.0	217
	GHHARD_L1235448	2012 11 05	< 3.0	< 0.10	< 0.10	204	< 0.10	< 0.50	22	0.134	157,000	0.28	< 0.10	7.02	71	0.829	32.5	65,100	2.27	< 0.010	0.896	< 0.50	-	3,000	84.9	2,100	< 0.010	< 2,000	174	< 0.010	< 0.10	15	3.62	< 1.0	356
	GH-HARD_L1245128	2012 12 03	< 3.0	< 0.10	< 0.10	202	< 0.10	< 0.50	16	0.125	160,000	< 0.10	< 0.10	7.59	99	0.647	29.2	69,100	2.31	< 0.010	0.796	< 0.50	-	3,100	105	2,020	< 0.010	< 2,000	176	< 0.010	< 0.10	15	4.00	< 1.0	286
	FRO03_0101201301	2013 01 08	< 3.0	< 0.10	< 0.10	170	< 0.10	< 0.50	17	0.061	191,000	0.20	< 0.10	4.46	102	0.338	30.6	79,800	2.98	< 0.010	0.608	< 0.50	-	3,200	121	2,030	< 0.010	< 2,000	194	< 0.010	< 0.10	17	4.08	< 1.0	78.5
	FRO03_010220131	2013 02 04	< 3.0	< 0.10	< 0.10	158	< 0.10	< 0.50	19	0.044	215,000	0.12	< 0.10	2.43	83	0.239	34.5	94,200	1.44	< 0.010	0.687	< 0.50	-	3,500	145	2,170	< 0.010	2,000	233	< 0.010	< 0.10	< 10	4.84	< 1.0	31.3
	FRO03_010320131	2013 03 05	< 3.0	< 0.10	0.11	121	< 0.10	< 0.50	17	0.051	213,000	0.10	< 0.10	6.48	44	0.410	31.5	93,900	1.25	< 0.010	0.680	0.97	-	3,300	151	2,070	< 0.010	2,100	225	< 0.010	< 0.10	< 10	4.72	< 1.0	145
	FRO03_010420131	2013 04 01	4.1	< 0.10	0.10	235	< 0.10	< 0.50	11	0.046	175,000	0.12	< 0.10	3.03	171	0.378	14.8	58,800	4.88	< 0.010	0.311	< 0.50	-	< 2,000	98.9	2,560	< 0.010	2,200	284	< 0.010	< 0.10	< 10	1.92	< 1.0	137
	FRO03_010520131	2013 05 07	3.4	< 0.10	< 0.10	221	< 0.10	< 0.50	14	0.051	176,000	0.16	< 0.10	2.91	118	0.293	16.5	63,500	2.45	< 0.010	0.341	< 0.50	-	< 2,000	106	2,630	< 0.010	2,200	299	< 0.010	< 0.10	< 10	2.23	< 1.0	91.9
	FRO03_010620131	2013 06 03	< 3.0	< 0.10	< 0.10	170	< 0.10	< 0.50	13	0.041	124,000	0.11	< 0.10	7.34	99	0.497	14.5	44,800	3.10	< 0.010	0.353	0.61	-	< 2,000	60.3	2,500	< 0.010	< 2,000	197	< 0.010	< 0.10	< 10	1.77	< 1.0	135
	FR_GHHW_M_01072013_NP	2013 07 02	< 3.0	0.13	< 0.10	131	< 0.10	< 0.50	12	0.035	98,900	0.11	< 0.10	3.45	47	0.244	12.6	33,900	1.73	< 0.010	0.364	< 0.50	-	< 2,000	41.6	2,460	< 0.010	< 2,000	154	< 0.010	< 0.10	< 10	1.48	< 1.0	98.1
	FR_GHHW_M_01092013_NP	2013 09 03	< 3.0	< 0.10	< 0.10	161	< 0.10	< 0.50	11	0.035	114,000	0.12	< 0.10	10.6	34	0.253	12.9	39,700	1.07	< 0.010	0.322	< 0.50	-	< 2,000	59.7	2,470	< 0.010	< 2,000	169	< 0.010	< 0.10	< 10	1.46	< 1.0	187
	FR_GHHW_M_01102013_NP	2013 10 07	< 3.0	< 0.10	0.11	169	< 0.10	< 0.50	14	0.051	133,000	0.20	< 0.10	11.2	70	0.823	13.0	48,500	1.17	< 0.010	0.374	0.52	-	914	75	2,430	< 0.010	1,880	221	< 0.010	< 0.10	24	1.69	< 1.0	377
	FR_GHHW_Q_01092013_N	2013 10 31	< 3.0	< 0.10	< 0.10	193	< 0.10	< 0.50	11	0.038	150,000	< 0.10	< 0.10	11.5	33	0.398	11.8	52,200	1.46	< 0.010	0.335	< 0.50	-	996	87	2,610	< 0.010	2,080	235	< 0.010	< 0.10	< 10	1.78	< 1.0	233
	FR_GHHW_M_01122013_NP	2013 12 02	4.9	< 0.10	< 0.10	199	< 0.10	< 0.50	14	0.073	168,000	0.12	< 0.10	13.0	78	0.517	16.8	59,800	1.85	< 0.010	0.364	1.65	-	1,160	103	2,600	< 0.010	2,220	267	< 0.010	< 0.10	14	2.05	< 1.0	270
	FR_GHHW_M_01012014_NP	2014 01 06	14.5	< 0.10	< 0.10	138	< 0.10	< 0.50	13	0.054	179,000	0.17	< 0.10	7.84	172	0.429	13.7	65,100	4.15	< 0.010	0.324	0.57	-	1,140	118	2,640	< 0.010	2,240	279	< 0.010	< 0.10	< 10	2.11	< 1.0	383
	FR_GHHW_M_01022014_NP	2014 02 03	< 3.0	< 0.10	< 0.10	133	< 0.10	< 0.50	15	0.055	183,000	0.14	< 0.10	4.60	45	0.188	18.2	65,600	1.89	< 0.010	0.370	< 0.50	-	1,160	122	2,600	< 0.010	2,370	293	< 0.010	< 0.10	12	2.34	< 1.0	282
	FR_GHHW_M_01032014_NP	2014 03 04	< 3.0	< 0.10	< 0.10	142	< 0.10	< 0.50	14	0.073	200,000	0.12	< 0.10	24.8	27	0.402	18.1	73,000	0.678	< 0.010	0.317	< 0.50	-	1,220	134	2,660	< 0.010	2,290	297	< 0.010	< 0.10	16	2.48	< 1.0	144
	FR_GHHW_Q_01012014_N	2014 03 13	< 3.0	< 0.10	< 0.10	133	< 0.10	< 0.50	15	0.060	200,000	0.11	< 0.10	5.29	68	0.141	17.8	70,200	2.19	< 0.010	0.309	< 0.50	-	1,120	127	2,660	< 0.010	2,420	286	< 0.010	< 0.10	18	2.21	< 1.0	137
FR_GHHW	FR_GHHW-WG-0704140830	2014 04 07	< 3.0	< 0.10	< 0.10	121	< 0.10	< 0.50	13	0.056	203,000	< 0.10	< 0.10	2.53	575	0.390	17.3	73,300	2.45	< 0.010	0.349	< 0.50	-	1,130	153	2,650	0.014	2,360	308	< 0.010	< 0.10	14	2.71	< 1.0	88.4
	FR_GHHW_Q_01042014_N	2014 05 14	< 3.0	< 0.10	< 0.10	113	< 0.10	< 0.50	14	0.060	209,000	0.11	< 0.10	3.27	35	0.103	19.6	76,300	1.37	< 0.010	0.331	< 0.50	-	1,260	136	2,710	< 0.010	2,090	301	< 0.010	< 0.10	16	2.80	< 1.0	65.5
	FR_GHHW_QSW_02072014_N	2014 08 25	< 3.0	< 0.10	0.10	81.7	< 0.10	< 0.50	13	0.042	130,000	0.13	< 0.10	8.70	25	0.141	16.8	51,900	0.867	< 0.010	0.348	< 0.50	-	1,080	79.9	2,430	< 0.010	1,920	189	< 0.010	< 0.10	< 10	1.97	< 1.0	73.1
	FD_QSW_02072014_004	Duplicate	< 3.0	< 0.10	< 0.10	83.9	< 0.10	< 0.50	13	0.043	133,000	0.14	< 0.10	8.15	24	0.147	16.7	52,700	0.762	< 0.010	0.325	< 0.50	-	1,080	81.2	2,520	< 0.010	1,940	195	< 0.010	0.11	< 10	2.03	< 1.0	62.8
	QA/QC RPD%		*	*	*	3	*	*	*	2	2	*	*	7	*	*	1	2	13	*	7	*	-	0	2	4	*	1	3	*	*	*	3	*	15
	FR_GHHW_QSW_02102014_N	2014 10 23	< 3.0	< 0.10	< 0.10	95.3	< 0.10	< 0.50	12	0.056	154,000	15.0	< 0.10	6.83	153	0.303	18.1	56,500	1.59	< 0.010	0.428	0.57	-	1,120	88.4	2,560	< 0.010	2,150	210	< 0.010	< 0.10	17	2.32	< 1.0	152
	FR_GHHW_QSW_02012015_N	2015 01 21	-	-	-	-	-	< 0.50	-	0.045	-	0.13	-	-	-	-	-	-	-	-	-	-	-	1,140	98.6	-	-	-	-	-	-	-	-	-	-
	FR_GHHW_QSW_02042015_N	2015 04 14	-	-	-	-	-	< 0.050	-	0.0511	-	< 0.10	-	-	-	-	-	-	-	-	-	-	-	1,360	122	-	-	-	-	-	-	-	-	-	-
	3_FR_DC1_020415	Duplicate	-	-	-	-	-	< 0.050	-	0.051	-	< 0.10	-	-	-	-	-	-	-	-	-	-	-	1,340	125	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	*	-	0	-	*	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-
	FR_GHHW_QSW_02072015_N	2015 07 02	-	-	-	-	-	< 0.050	-	0.0469	-	0.15	-	-	-	-	-	-	-	-	-	-	-	1,310	108	-	-	-	-	-	-	-	-	-	-
	FR_GHHW_NPQ_01102015_NP	2015 11 05	-	-	-	-	-	-	-	0.0597	-	-	-	-	-	-	-	-	-	-	-	-	-	-	87.1	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab) pH	Hardness mg/L	Turbidity NTU	Total Anions meq/L	Total Cations meq/L	Conductivity µS/cm	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Dissolved Organic Carbon mg/L	Oxidation Reduction Potential mV	Cation Anion Balance %	Field Temperature C	Field Conductivity µS/cm	Field Turbidity NTU	Dissolved Oxygen mg/L	pH (field) pH	Field ORP mV	Total Alkalinity mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Nitrate+Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Nitrogen mg/L	Total Nitrogen-N mg/L	Chloride mg/L	Fluoride µg/L	Sulfate mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Bromide mg/L	Total Acidity mg/L	Acidity (pH 8.3) mg/L	Ortho-Phosphate mg/L	Total Organic Carbon mg/L	Total Phosphorous as P mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S6 Study Area																																									
FR_GHHW	FR_GHHW_QSW_04012016_N	2016 01 25	7.84	862	-	16.8	17.4	1,450	1,080	< 1.0	< 0.50	-	-	-	612.2	-	8.97	7.52	160.4	272	< 0.0050	53.9	< 0.0050	-	0.063	-	-	2.2	150	360	272	< 1.0	< 1.0	-	-	< 0.25	-	11.0	0.0012	0.57	0.0028
	FR_GHHW_QSW_04042016_N	2016 05 18	8.17	940	-	19.5	19	1,620	1,360	< 1.0	< 0.50	-	-	-	1,507	-	7.79	7.51	147.7	272	< 0.0050	68.4	< 0.010	-	< 0.050	-	-	2.3	< 200	438	272	< 1.0	< 1.0	-	-	< 0.50	-	3.8	0.0018	0.81	0.0054
	FR_GHHW_QSW_04072016_N	2016 08 17	7.85	655	-	13.4	13.3	1,220	833	1.4	0.54	-	-	-	983	-	8.18	7.71	148.8	278	< 0.0050	36.3	< 0.0050	-	0.12	-	-	0.93	160	252	278	< 1.0	< 1.0	-	-	< 0.25	-	12.6	0.0023	0.60	0.0045
	FR_GHHW_QSW_02012017_N	2017 02 27	7.58	689	0.3	14.6	13.9	1,230	957	< 1.0	0.78	331	-	7.9	1,082	-	5.84	7.57	50.1	263	< 0.0050	46.6	0.0019	-	< 0.050	-	-	1.52	96	287	263	< 1.0	< 1.0	-	-	< 0.050	-	19.0	0.0101	0.87	0.0155
	FR_GHHW_QSW_03042017_N	2017 06 01	8.09	597	0.88	13.1	12.1	1,090	844	< 1.0	0.6	477	-3.9	12.2	1,024	-	6.4	7.34	86.5	271	0.0075	33.4	< 0.0050	-	< 0.050	-	-	2.9	< 100	248	271	< 1.0	< 1.0	-	-	< 0.25	-	4.0	< 0.0010	0.76	< 0.0020
	FR_GHHW_QTR_2017-09-11_N	2017 09 13	8.26	527	1.32	10.9	10.6	942	637	< 1.0	1.57	268	-1.3	17.7	898	-	3.32	7.33	111.4	242	0.0092	27.3	***0.398***		99	-	-	1.67	94	195	242	< 1.0	< 1.0	-	-	< 0.050	-	3.7	< 0.0010	2.08	0.0014
FR_GH_WELL4	FR_GH_WELL4_QTR_2017-10-02_N	2017 11 15	8.35	590	0.38	12.5	11.9	1,050	772	< 1.0	0.77	322	-2.4	8.7	976	-	5.39	7.48	95.9	248	< 0.0050	34.9	0.0191	-	0.24	-	-	< 2.5	< 100	243	238	10.2	< 1.0	-	-	< 0.25	-	6.3	< 0.0010	0.93	< 0.0020
	FR_GH_WELL4_QTR_2018-01-01_N	2018 01 31	8.32	661	0.38	13.7	13.4	1,230	846	< 1.0	1.33	380	-1.3	6.3	1,105	-	5.29	7.34	117.3	262	0.0104	40.4	0.0080	-	0.224	-	-	< 2.5	< 100	269	254	8.2	< 1.0	-	-	< 0.25	-	6.1	0.0015	0.96	< 0.0010
	FR_GH_WELL4_QTR_2018-04-02_N	2018 06 14	8.41	567	0.23	11	11.5	968	724	< 1.0	1.5	292	1.9	8.4	935	-	4.81	7.14	120.3	254	0.0312	22.4	0.0431	-	0.47	-	-	1.31	138	207	248	6.6	< 1.0	-	-	< 0.050	-	< 1.0	< 0.0010	1.25	< 0.0010
	FR_GH_WELL4_QTR_2018-07-02_N	2018 07 31	8.34	491	0.21	10.9	9.95	925	727	< 1.0	1.22	400	-4.6	10.7	803	-	5.64	7.38	108.6	217	0.0133	30.9	0.0320	-	< 0.050	-	-	2.19	96	207	213	3.2	< 1.0	-	-	< 0.050	-	< 1.0	0.0015	0.80	< 0.0010
	FR_GH_WELL4_QTR_2018-10-01_N	2018 12 13	7.98	669	8.44	13.3	13.5	1,090	838	4.8	0.8	410	1	9.9	1,038	-	4.5	7.34	260.9	266	0.0281	31.6	0.0082	-	0.075	-	-	2.02	114	271	266	< 1.0	< 1.0	-	-	< 0.050	-	2.0	0.0117	0.78	< 0.0020
	FR_GH_WELL4_QTR_2019-01-07_N	2019 03 21	7.98	767	4.92	15.4	15.5	1,340	1,030	< 1.0	< 0.50	452	0.2	-	-	-	-	-	-	280	0.115	37.7	***0.579***	-	< 0.050	-	-	< 2.5	< 100	342	280	< 1.0	< 1.0	-	-	< 0.25	-	12.1	< 0.0010	< 0.50	< 0.0020
	FR_GH_WELL4_QTR_2019-04-01_N	2019 06 13	8.23	818	0.6	17.3	16.5	1,400	1,090	< 1.0	< 0.50	450	-2.3	6.9	1,262	-	6.78	7.32	87.3	288	0.0223	43.1	0.0070	-	< 0.25	-	-	5.2	120	400	288	< 1.0	< 1.0	-	-	< 0.25	-	8.1	0.0011	0.51	< 0.0020
	FR_GH_WELL4_QTR_2019-07-01_N	2019 07 30	8.27	720	0.26	15.5	14.5	1,280	984	< 1.0	0.53	431	-3.2	7.4	1,109	-	7.31	7.33	76.1	284	< 0.0050	36.6	< 0.0050	-	< 0.25	-	-	3.4	140	342	284	< 1.0	< 1.0	-	-	< 0.25	-	8.5	0.0012	0.58	< 0.0020
	FR_DC3_QTR_2019-07-01_N	Duplicate	8.28	738	0.24	15.1	14.9	1,280	1,040	< 1.0	1.19	458	-0.7	-	-	-	-	-	-	269	< 0.0050	36.7	< 0.0050	-	< 0.25	-	-	3.1	130	339	269	< 1.0	< 1.0	-	-	< 0.25	-	8.1	0.0011	1.26	< 0.0020
	QA/QC RPD%		0	2	*	*	*	0	6	*	*	*	*	-	-	-	-	-	-	5	*	0	*	-	*	-	-	9	7	1	5	*	*	-	-	*	-	5	*	*	*
	FR_GH_WELL4_QTR_2019-10-07_N	2019 11 01	8.25	697	0.17	12.2	14.1	907	837	< 1.0	< 0.50	372	7.1	8.9	1,166	-	5.65	7.4	115	207	0.0262	31.9	< 0.0050	-	< 0.050	-	-	< 2.5	130	278	207	< 1.0	< 1.0	-	-	< 0.25	-	< 1.0	< 0.0010	< 0.50	< 0.0020
	FR_GH_WELL4_QTR_2020-01-06_N	2020 02 07	7.86	814	0.53	15.2	16.5	1,280	1,010	< 1.0	< 0.50	325	4	6.6	1,274	-	5.76	7.47	65	287	0.0479	40.8	< 0.0050	-	< 0.050	-	-	< 2.5	100	314	287	< 1.0	< 1.0	-	-	< 0.25	-	16.4	< 0.0010	< 0.50	< 0.0020
FR_KB-1	FR_KB-1_2019-02-28	2019 02 28	7.85	1,630	0.43	31.3	33	2,490	2,120	3.3	1.52	394	2.6	2.35	2,479.30	1.7	9.35	7.1	81.9	394	< 0.0050	97.5	< 0.0050	-	< 0.050	-	-	< 2.5	160	790	394	< 1.0	< 1.0	-	-	< 0.25	-	15.8	0.0023	1.31	0.0050
	FR_KB-1_2019-04-10	2019 04 10	7.68	1,540	0.39	32.2	31.1	2,410	2,040	1.2	0.98	415	-1.7	3.89	2,631.50	0.44	8.21	7.3	67.8	410	0.0158	98.3	< 0.0050	-	< 0.050	-	-	< 2.5	160	813	410	< 1.0	< 1.0	-	-	< 0.25	-	17.7	0.0023	0.80	0.0024
	FR_KB-1-2019-06-11_NP																																								
	FR_KB_1_2019-07-31																																								
	FR_KB-1_2019-10-09	2019 10 09	8.05	983	0.36	20	19.9	1,470	1,260	1.6	0.57	466	-0.3	-	-	-	-	-	-	435	0.0058	47.3	< 0.0050	-	< 0.050	-	-	< 2.5	200	381	435	< 1.0	< 1.0	-	-	< 0.25	-	10.6	0.0022	0.57	0.0022
	FR_KB-1-2019-11-27	2019 11 27	7.39	1,190	0.2	25.7	24.1	1,940	1,770	< 1.0	0.56	429	-3.2	-	-	-	-	-	-	436	< 0.0050	65.1	< 0.0050	-	< 0.050	-	-	< 2.5	130	592	436	< 1.0	< 1.0	-	-	< 0.25	-	25.4	0.0027	1.10	0.0030
FR_KB-2	FR_KB-2_2019-02-28	2019 02 28	7.64	1,550	983	30.7	31.3	2,420	2,100	960	0.83	421	1	2.8	2,412.30	679	9.06	7.07	73.2	418	0.0149	95.2	< 0.0050	-	1.97	-	-	< 2.5	150	745	418	< 1.0	< 1.0	-	-	< 0.25	-	29.1	0.0020	2.37	1.47
	FR_KB-2_2019-04-10	2019 04 10	7.66	1,570	2.15	32.7	31.6	2,470	2,110	6	0.77	453	-1.7	3.88	2,660.40	3.53	7.67	7.25	62.6	416	< 0.0050	102	< 0.0050	-	< 0.050	-	-	< 2.5	160	819	416	< 1.0	< 1.0	-	-	< 0.25	-	27.3	0.0016	0.98	0.0042
	FR_KB-2_2019-06-10_NP	2019 06 10	8.14	828	0.81	16.2	16.8	1,380	1,110	1.8	0.63	430	1.8	7.43	1,443.90	2.34	7.74	7.36	63.9	296	0.0069	42.9	< 0.0050	-	< 0.050	-	-	< 2.5	180	346	296	< 1.0	< 1.0	-	-	< 0.25	-	10.4	< 0.0010	0.60	0.0027
	FR_KB_2_2019-07-31	2019 07 31	8.1	702	7.85	13.8	14.2	1,160	912	3.7	< 0.50	517	1.6	12.4	1,207	22.9	5.86	7	199.1	331	< 0.0050	28.4	0.0158	-	< 0.25	-	-	< 2.5	210	246	331	< 1.0	< 1.0	-	-	< 0.25	-	16.3	0.0014	< 0.50	0.015
	FR_DC1-2019-07-31																																								
	QA/QC RPD%		0	1	35	*	*	3	2	*	*	*	*	-	-	-	-	-	-	6	*	2	*	-	*	-	-	*	5	2	6	*	*	-	-	*	-	2	*	*	73
	FR_KB-2_2019-10-21																																								
	FR_DC4_2019-10-21																																								
	QA/QC RPD%		0	0	*	*	*	0	2	*	*	*	*	-	-	-	-	-	-	12	*	1	*	-	*	-	-	*	0	1	12	*	*	-	-	*	-	12	*	*	*
	FR_KB-2-2019-12-10	2019 12 10	7.76	1,140	67	22.9	23	1,830	1,450	31.9	1.39	455	0.3	3.2	1,953	15.1	8.94	7.18	70.2	387	0.0062	66.0	< 0.0050	-	0.196	-	-	< 2.5	< 100	503	387	< 1.0	< 1.0	-	-	< 0.25	-	23.1	0.0028	1.34	0.0727
FR_KB-3A	FR_KB-3A_2019-02-26	2019 02 26	7.55	1,120	1.22	22.6	22.7	1,770	1,600	< 1.0	< 0.50	449	0.2	4.09	1,951.30	1.7	4.09	7.26	75.2	369	0.0109	63.1	0.0246	-	-	-	-	< 2.5	< 100	512	369	< 1.0	< 1.0	-	-	< 0.25	-	16.5	0.0025	0.62	0.0050
	FR_DC1_2019-02-26																																								
	QA/QC RPD%		0	2	36	*	*	1	3	*	*	*	*	-	-	-	-	-	-	1	*	1	17	-	-	-	-	*	*	1	1	*	*	-	-	*	-	15	*	*	*
	FR_KB-3A_2019-03-25	2019 03 25	7.6	1,130	6.09	23.7	22.8	1,900	1,600	10.5	1.19	424	-1.8	4.04	1,934.40	15.4	4.33	7	68.9	383	0.0228	64.7	< 0.0050	-	< 0.050	-	-	< 2.5	< 100	547	383	< 1.0	< 1.0	-	-	< 0.25	-	16.3	0.0021	0.63	0.0150
	FR_DC1_2019-03-25																																								
	QA/QC RPD%		1	1	24	*	*	1	3	33	*	*	*	-	-	-	-	-	-	10	*	1	*	-	*	-	-	*	*	1	10	*	*	-	-	*	-	22	*	*	9

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																													
			Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																
FR_GHHW	FR_GHHW_QSW_04012016_N	2016 01 25	4.3	201	20	87.7	1.30	3.18	2.42	< 0.10	< 0.10	96.5	< 0.10	16	0.0336	< 0.10	< 0.10	2.85	0.067	55.5	< 0.0050	0.691	< 0.50	***137***	< 0.010	177	< 0.010	< 0.10	15	5.18	< 0.50	76.4
	FR_GHHW_QSW_04042016_N	2016 05 18	< 3.0	216	< 10	97.4	0.40	3.03	2.55	< 0.10	< 0.10	102	< 0.020	14	0.0353	< 0.10	< 0.10	2.89	< 0.050	42.3	< 0.0050	0.615	0.53	***160***	< 0.010	186	< 0.010	< 0.10	< 10	5.16	< 0.50	32.1
	FR_GHHW_QSW_04072016_N	2016 08 17	< 3.0	149	< 10	68.4	0.65	2.88	2.30	< 0.10	< 0.10	80.5	< 0.020	17	0.0305	< 0.10	< 0.10	5.46	< 0.050	45.1	< 0.0050	0.701	< 0.50	***91***	< 0.010	135	< 0.010	< 0.10	< 10	4.16	< 0.50	55.8
	FR_GHHW_QSW_02012017_N	2017 02 27	< 1.0	169	91	64.7	1.93	1.46	2.61	< 0.10	< 0.10	110	< 0.020	11	0.0515	< 0.10	< 0.10	1.98	0.080	24.8	< 0.0050	0.328	< 0.50	***123***	< 0.010	238	< 0.010	< 0.10	< 10	2.88	< 0.50	67.4
	FR_GHHW_QSW_03042017_N	2017 06 01	< 1.0	143	47	58.2	5.93	1.27	2.41	< 0.10	< 0.10	90.6	< 0.020	11	0.0408	< 0.10	< 0.10	1.96	0.070	23.7	< 0.0050	0.343	< 0.50	***93.5***	< 0.010	194	< 0.010	< 0.10	< 10	2.64	< 0.50	48.8
	FR_GHHW_QTR_2017-09-11_N	2017 09 13	< 3.0	132	13	48.0	1.03	1.18	2.15	< 0.10	< 0.10	82.3	< 0.020	< 10	0.0403	< 0.10	< 0.10	1.87	0.090	21.9	< 0.0050	0.290	< 0.50	***82.2***	< 0.010	169	< 0.010	< 0.10	< 10	2.35	< 0.50	90.3
FR_GH_WELL4	FR_GH_WELL4_QTR_2017-10-02_N	2017 11 15	< 3.0	143	12	56.6	1.08	1.19	2.26	< 0.10	< 0.10	83.1	< 0.020	< 10	0.0297	< 0.10	< 0.10	1.36	0.060	24.9	< 0.0050	0.322	< 0.50	***92.8***	< 0.010	185	< 0.010	< 0.10	< 10	2.50	< 0.50	20.5
	FR_GH_WELL4_QTR_2018-01-01_N	2018 01 31	< 3.0	157	14	65.4	1.42	1.30	2.78	< 0.10	< 0.10	99.7	< 0.020	10	0.0468	< 0.10	< 0.10	1.59	0.079	23.4	< 0.0050	0.320	< 0.50	***109***	< 0.010	214	< 0.010	< 0.10	< 10	2.94	< 0.50	21.2
	FR_GH_WELL4_QTR_2018-04-02_N	2018 06 14	< 3.0	134	24	56.4	2.77	1.43	2.53	< 0.10	< 0.10	84.0	< 0.020	11	0.0382	< 0.10	< 0.10	2.04	0.058	26.0	< 0.0050	0.361	< 0.50	***77***	< 0.010	177	< 0.010	< 0.10	< 10	2.78	< 0.50	18.2
	FR_GH_WELL4_QTR_2018-07-02_N	2018 07 31	< 3.0	117	11	48.2	0.70	1.35	2.31	< 0.10	< 0.10	73.9	< 0.020	11	0.0342	< 0.10	< 0.10	2.22	0.430	22.7	< 0.0050	0.333	< 0.50	***76.9***	< 0.010	159	< 0.010	< 0.10	< 10	2.43	< 0.50	28.3
	FR_GH_WELL4_QTR_2018-10-01_N	2018 12 13	< 3.0	163	28	63.3	2.25	1.47	2.68	< 0.10	< 0.10	90.0	< 0.020	12	0.0388	< 0.10	0.10	2.20	0.100	28.9	< 0.0050	0.323	< 0.50	***99.2***	< 0.010	210	< 0.010	< 0.10	< 10	3.11	< 0.50	85.9
	FR_GH_WELL4_QTR_2019-01-07_N	2019 03 21	< 3.0	181	71	76.5	11.1	1.44	2.98	< 0.10	< 0.10	106	< 0.020	12	0.0500	< 0.10	0.58	1.09	0.076	29.2	< 0.0050	0.329	< 0.50	***147***	< 0.010	242	< 0.010	< 0.10	< 10	3.39	< 0.50	31.9
	FR_GH_WELL4_QTR_2019-04-01_N	2019 06 13	< 3.0	194	15	81.0	0.35	1.74	2.99	< 0.10	< 0.10	109	< 0.020	11	0.0529	0.11	0.76	0.64	< 0.050	28.0	< 0.0050	0.314	< 0.50	***140***	< 0.010	250	< 0.010	< 0.10	< 10	4.18	< 0.50	13.9
	FR_GH_WELL4_QTR_2019-07-01_N	2019 07 30	< 3.0	175	14	68.8	0.90	1.49	2.69	< 0.10	< 0.10	92.5	< 0.020	10	0.0562	0.14	0.42	0.76	< 0.050	31.7	< 0.0050	0.365	< 0.50	***118***	< 0.010	237	< 0.010	< 0.10	< 10	3.77	< 0.50	29.4
	FR_DC3_QTR_2019-07-01_N	Duplicate	< 3.0	183	14	68.3	0.80	1.54	2.83	< 0.10	< 0.10	92.2	< 0.020	11	0.0519	0.11	0.44	0.78	< 0.050	33.1	< 0.0050	0.348	< 0.50	***117***	< 0.010	241	< 0.010	< 0.10	< 10	3.99	< 0.50	29.7
	QA/QC RPD%																															
	FR_GH_WELL4_QTR_2019-10-07_N	2019 11 01	< 3.0	170	15	66.4	0.92	1.49	3.00	< 0.10	< 0.10	81.1	< 0.020	11	0.0463	< 0.10	0.22	1.70	< 0.050	30.0	< 0.0050	0.336	< 0.50	***103***	< 0.010	226	< 0.010	< 0.10	< 10	3.62	< 0.50	64.0
	FR_GH_WELL4_QTR_2020-01-06_N	2020 02 07	< 3.0	200	15	76.7	5.13	1.75	3.35	< 0.10	< 0.10	101	< 0.020	12	0.0514	0.11	0.14	1.59	< 0.050	34.4	< 0.0050	0.342	< 0.50	***122***	< 0.010	247	< 0.010	< 0.10	< 10	4.26	< 0.50	33.4
FR_KB-1	FR_KB-1_2019-02-28	2019 02 28	< 1.0	364	< 10	176	< 0.10	4.97	4.59	0.41	0.14	50.8	< 0.020	25	0.547	< 0.10	3.53	< 0.20	< 0.050	103	< 0.0050	1.41	20.0	***378***	< 0.010	308	0.016	< 0.10	< 10	12.9	< 0.50	10.0
	FR_KB-1_2019-04-10	2019 04 10	< 5.0	350	< 50	162	< 0.50	4.88	4.33	< 0.50	< 0.50	47.9	< 0.10	< 50	0.611	< 0.50	1.95	< 1.0	< 0.25	100	< 0.0050	1.11	24.2	***287***	< 0.050	293	< 0.050	< 0.50	< 10	13.2	< 2.5	12.3
	FR_KB-1-2019-06-11_NP	2019 06 11	< 1.0	158	< 10	85.1	< 0.10	4.12	3.15	0.44	0.10	34.2	< 0.020	28	0.476	< 0.10	2.08	0.22	< 0.050	61.8	< 0.0050	1.86	14.8	***206***	< 0.010	165	0.015	< 0.10	< 10	5.99	< 0.50	9.7
	FR_KB_1_2019-07-31	2019 07 31	< 3.0	158	< 10	75.4	< 0.10	3.51	2.49	0.57	< 0.10	29.1	< 0.020	27	0.392	< 0.10	0.23	< 0.50	< 0.050	55.7	< 0.0050	1.89	12.1	***116***	< 0.010	156	0.013	< 0.10	< 10	6.04	< 0.50	8.6
	FR_KB-1_2019-10-09	2019 10 09	< 3.0	218	< 10	106	< 0.10	4.32	3.13	0.54	< 0.10	39.5	< 0.020	29	0.514	< 0.10	0.12	0.43	< 0.050	74.4	< 0.0050	1.87	16.8	***175***	< 0.010	214	0.016	< 0.10	< 10	8.49	< 0.50	9.7
	FR_KB-1-2019-11-27	2019 11 27	< 3.0	277	< 10	121	< 0.10	4.63	3.88	0.40	< 0.10	54.0	< 0.020	29	0.476	< 0.10	0.84	0.20	< 0.050	83.2	< 0.0050	1.20	12.0	***215***	< 0.010	253	0.019	< 0.10	< 10	9.83	< 0.50	9.4
FR_KB-2	FR_KB-2_2019-02-28	2019 02 28	19.0	349	< 50	165	< 0.50	4.99	4.30	< 0.50	< 0.50	48.6	< 0.10	64	0.521	< 0.50	3.51	< 1.0	< 0.25	93.8	< 0.0050	1.38	20.1	***273***	< 0.050	296	< 0.050	< 0.50	< 10	13.4	< 2.5	12.9
	FR_KB-2_2019-04-10	2019 04 10	< 5.0	367	< 50	158	0.85	4.42	4.26	< 0.50	< 0.50	78.0	< 0.10	< 50	0.145	< 0.50	< 0.50	< 1.0	< 0.25	98.2	< 0.0050	1.10	5.2	***300***	< 0.050	310	< 0.050	< 0.50	< 10	12.2	< 2.5	< 5.0
	FR_KB-2_2019-06-10_NP	2019 06 10	< 3.0	182	< 10	90.7	1.40	3.55	3.12	0.29	< 0.10	43.2	< 0.020	22	0.0934	0.14	0.31	< 0.50	< 0.050	66.0	< 0.0050	0.875	3.30	***174***	< 0.010	153	< 0.010	< 0.10	< 10	5.73	< 0.50	3.3
	FR_KB_2_2019-07-31	2019 07 31	< 3.0	157	< 10	75.4	0.86	3.35	2.67	0.35	< 0.10	38.9	< 0.020	25	0.0700	< 0.10	< 0.10	< 0.50	< 0.050	56.4	< 0.0050	1.21	2.60	***122***	< 0.010	145	< 0.010	< 0.10	< 10	5.99	< 0.50	2.1
	FR_DC1-2019-07-31	Duplicate	< 3.0	156	< 10	73.8	0.83	3.30	2.65	0.35	< 0.10	39.2	< 0.020	24	0.0708	< 0.10	< 0.10	< 0.50	< 0.050	56.2	< 0.0050	1.24	2.57	***121***	< 0.010	147	< 0.010	< 0.10	< 10	5.81	< 0.50	2.4
	QA/QC RPD%																															
	FR_KB-2_2019-10-21	2019 10 21	11.4	262	19	110	1.99	3.97	3.03	0.43	< 0.10	55.0	< 0.020	26	0.123	< 0.10	< 0.10	0.36	< 0.050	70.1	< 0.0050	1.25	4.15	***170***	< 0.010	222	< 0.010	< 0.10	< 10	8.82	< 0.50	3.0
	FR_DC4_2019-10-21	Duplicate	9.2	263	19	110	2.02	3.96	3.03	0.43	0.10	54.7	< 0.020	27	0.131	< 0.10	< 0.10	0.48	< 0.050	69.8	< 0.0050	1.29	4.10	***167***	< 0.010	221	< 0.010	< 0.10	< 10	8.80	< 0.50	3.5
	QA/QC RPD%		21	0	*	0	1	0	0	*	*	1	*	*	6	*	*	*	*	0	*	3	1	2	*	0	*	*	*	0	*	*
	FR_KB-2-2019-12-10	2019 12 10	5.7	252	< 50	124	0.58	3.92	3.40	< 0.50	< 0.50	66.0	< 0.10	< 50	0.121	< 0.50	< 0.50	< 1.0	< 0.25	72.9	< 0.0050	1.36	< 2.5	***192***	< 0.050	252	< 0.050	< 0.50	< 10	9.26	< 2.5	< 5.0
FR_KB-3A	FR_KB-3A_2019-02-26	2019 02 26	< 1.0	272	< 10	107	2.34	2.18	4.13	< 0.10	< 0.10	62.4	< 0.020	17	0.0273	0.17	2.57	< 0.20	< 0.050	34.5	< 0.0050	0.307	< 0.50	***237***	< 0.010	311	< 0.010	< 0.10	< 10	5.02	< 0.50	1.7
	FR_DC1_2019-02-26	Duplicate	< 1.0	267	< 10	105	2.32	2.24	4.01	0.11	0.11	61.5	< 0.020	16	0.0296	0.14	2.55	< 0.20	< 0.050	31.8	< 0.0050	0.319	< 0.50	***233***	< 0.010	296	0.015	< 0.10	< 10	4.99	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_KB-3A_2019-03-25	2019 03 25	< 3.0	267	< 10	112	5.37	2.08	4.02	< 0.10	< 0.10	62.8	< 0.020	15	0.0275	0.17	2.75	< 0.50	< 0.050	35.8	< 0.0050	0.263	< 0.50	***244***	< 0.010	294	< 0.010	< 0.10	< 10	5.75	< 0.50	5.2
	FR_DC1_2019-03-25	Duplicate	< 3.0	268	< 10	109	5.50	2.06	3.95	< 0.10	< 0.10	63.8	< 0.020	16	0.0316	0.12	2.76	< 0.50	< 0.050	34.9	< 0.0050	0.267	< 0.50	***241***	< 0.010	303	< 0.010	< 0.10	< 10	5.71	< 0.50	5.0
	QA/QC RPD%		*	0	*	3	2	1	2	*	*	2	*	*	14	*	0	*	*	3	*	2	*	1	*	3	*	*	*	1	*	4

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																			
FR_GH_WELL4	FR_GHHW_QSW_04012016_N	2016 01 25	9.6	< 0.10	< 0.10	97.1	< 0.10	< 0.050	17	0.0445	192,000	0.61	< 0.10	5.96	87	0.241	54.8	87,100	2.01	< 0.0050	0.707	0.60	-	3,240	123	2,170	< 0.010	2,510	179	< 0.010	< 0.10	15	5.23	< 0.50	115
	FR_GHHW_QSW_04042016_N	2016 05 18	9.8	< 0.10	< 0.10	101	< 0.020	< 0.050	15	0.0329	213,000	0.13	< 0.10	4.49	46	0.326	43.9	96,500	0.78	< 0.0050	0.640	< 0.50	-	3,000	152	2,100	< 0.010	2,570	186	< 0.010	< 0.10	< 10	5.25	< 0.50	34.4
	FR_GHHW_QSW_04072016_N	2016 08 17	9.8	< 0.10	< 0.10	79.9	< 0.020	< 0.050	18	0.0388	155,000	0.13	< 0.10	7.25	38	0.271	45.5	68,800	0.71	< 0.0050	0.727	< 0.50	-	2,910	95.4	2,210	< 0.010	2,320	142	< 0.010	< 0.10	< 10	4.37	< 0.50	65.3
	FR_GHHW_QSW_02012017_N	2017 02 27	< 3.0	0.11	< 0.10	115	< 0.020	< 0.050	11	0.0612	169,000	0.10	< 0.10	2.48	94	0.114	25.4	63,400	1.64	< 0.0050	0.352	< 0.50	-	1,520	108	2,870	< 0.010	2,910	248	< 0.010	< 0.10	< 10	2.98	< 0.50	57.7
	FR_GHHW_QSW_03042017_N	2017 06 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GHHW_QTR_2017-09-11_N	2017 09 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2017-10-02_N	2017 11 15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2018-01-01_N	2018 01 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2018-04-02_N	2018 06 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2018-07-02_N	2018 07 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2018-10-01_N	2018 12 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2019-01-07_N	2019 03 21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2019-04-01_N	2019 06 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2019-07-01_N	2019 07 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC3_QTR_2019-07-01_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2019-10-07_N	2019 11 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GH_WELL4_QTR_2020-01-06_N	2020 02 07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_KB-1	FR_KB-1_2019-02-28	2019 02 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0051	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-1_2019-04-10	2019 04 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-1-2019-06-11_NP	2019 06 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB_1_2019-07-31	2019 07 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-1_2019-10-09	2019 10 09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-1-2019-11-27	2019 11 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_KB-2	FR_KB-2_2019-02-28	2019 02 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0062	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-2_2019-04-10	2019 04 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-2_2019-06-10_NP	2019 06 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB_2_2019-07-31	2019 07 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC1-2019-07-31	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-2_2019-10-21	2019 10 21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC4_2019-10-21	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-2-2019-12-10	2019 12 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_KB-3A	FR_KB-3A_2019-02-26	2019 02 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0051	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC1_2019-02-26	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-3A_2019-03-25	2019 03 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC1_2019-03-25	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

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*	RPDs are not calculated where one or more concentrations are less than five times RDL.
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BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date	pH (lab)	Hardness	Turbidity	Total Anions	Total Cations	Conductivity	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Oxidation Reduction Potential	Cation Anion Balance	Field Temperature	Field Conductivity	Field Turbidity	Dissolved Oxygen	pH (field)	Field ORP	Total Alkalinity	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Nitrate+Nitrite (as N)	Kjeldahl Nitrogen-N	Nitrogen	Total Nitrogen-N	Chloride	Fluoride	Sulfate	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Bromide	Total Acidity	Acidity (pH 8.3)	Ortho-Phosphate	Total Organic Carbon	Total Phosphorous as P
		(yyyy mm dd)	pH	mg/L	NTU	meq/L	meq/L	µS/cm	mg/L	mg/L	mg/L	mV	%	C	µS/cm	NTU	mg/L	pH	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S6 Study Area																																									
FR_KB-3A	FR_KB-3A_2019-06-10_NP																																								
	FR_DC-4_2019-06-10_NP																																								
	QA/QC RPD%		0	2	17	*	*	2	4	24	*	*	*	-	-	-	-	-	-	1	*	1	*	-	*	-	-	*	*	1	1	*	*	-	-	*	-	1	*	*	6
	FR_KB_3A_2019-07-30	2019 07 30	8.09	1,140	1.14	23.8	23.1	1,950	1,680	5.6	< 0.50	355	-1.6	16.3	1,992.80	3.97	5.48	7.18	77.8	331	< 0.0050	71.4	< 0.0050	-	< 0.050	-	-	< 2.5	100	583	331	< 1.0	< 1.0	-	-	< 0.25	-	20.0	0.0015	0.67	0.0095
	FR_KB-3A_2019-10-18	2019 10 18	7.74	1,300	10.5	23.1	26.3	1,660	1,490	30.1	< 0.50	472	6.4	-	-	-	-	-	-	338	0.0074	63.3	0.0293	-	< 0.25	-	-	< 2.5	< 100	569	338	< 1.0	< 1.0	-	-	< 0.25	-	14.6	0.0012	1.04	0.0198
	FR_KB-3A-2019-12-11	2019 12 11	7.83	1,090	0.62	21.1	22	1,730	1,390	2.5	2.11	324	2.1	2.7	1,833	4.57	5.47	7.14	83.9	335	0.0107	58.6	0.0145	-	< 0.050	-	-	< 2.5	< 100	493	335	< 1.0	< 1.0	-	-	< 0.25	-	17.9	< 0.0010	0.77	0.0026
FR_KB-3B	FR_KB-3B_2019-02-25	2019 02 25	7.63	1,260	639	25.6	25.4	1,890	1,780	474	2.14	424	-0.3	3.89	1,910.80	777	6.65	7.19	60.3	433	0.0647	72.9	0.206	-	-	-	-	< 2.5	120	561	433	< 1.0	< 1.0	-	-	< 0.25	-	28.4	< 0.0010	2.78	0.743
	FR_KB-3B_2019-03-25	2019 03 25	7.65	1,280	26.1	26	25.7	2,090	1,760	11.4	0.51	416	-0.6	4.34	2,138.10	38	7.56	7.29	60.8	377	0.0266	76.7	0.0079	-	< 0.050	-	-	< 2.5	< 100	625	377	< 1.0	< 1.0	-	-	< 0.25	-	16.1	0.0021	0.77	0.0294
	FR_KB-3B_2019-06-10_NP	2019 06 10	8.14	1,230	8.93	23.4	24.9	1,950	1,830	8	0.61	452	3	7.83	2,071.60	17.6	7.05	7.26	80.1	297	< 0.0050	74.4	0.0147	-	< 0.25	-	-	< 2.5	130	584	297	< 1.0	< 1.0	-	-	< 0.25	-	28.3	0.0011	0.52	0.0216
	FR_KB_3B_2019-07-30																																								
	FR_KB-3B_2019-10-18																																								
	FR_KB-3B-2019-12-11	2019 12 11	7.78	1,030	1.82	19.1	20.8	1,600	1,280	2.8	1.23	331	4.3	2.3	1,714	4.66	7.63	7.18	82.9	316	0.0075	54.5	< 0.0050	-	< 0.050	-	-	< 2.5	< 100	426	316	< 1.0	< 1.0	-	-	< 0.25	-	16.6	< 0.0010	0.94	0.0028
	FR_DC4-2019-12-11																																								
	QA/QC RPD%		0	3	15	*	*	1	2	*	*	*	*	-	-	-	-	-	-	0	*	1	*	-	*	-	-	*	*	1	0	*	*	-	-	*	-	1	*	*	*
FR_MW-SK1A	FR_MW_SK1-A_WG_Q1_2019_NP	2019 03 28	7.79	1,180	0.58	22.9	24	1,970	1,630	< 1.0	0.56	437	2.3	-	-	-	-	-	-	350	< 0.0050	66.0	< 0.0050	66.0	< 0.050	66	-	< 2.5	< 100	537	350	< 1.0	< 1.0	-	-	< 0.25	-	11.4	0.0027	1.04	0.0047
	FR_MW-SK1A_WG_2019-06-13_N_17	2019 06 13	8.24	601	0.13	12.8	12.2	1,050	820	< 1.0	< 0.50	458	-2.6	5.4	970	-	11.34	7.62	162.4	266	0.0134	31.2	< 0.0050	-	< 0.050	-	-	< 2.5	210	254	266	< 1.0	< 1.0	-	-	< 0.25	-	2.4	0.0021	< 0.50	< 0.0020
	FR_MW-SK1A_QTR_2019-07-01_N	2019 07 29	8.28	666	0.23	13.4	13.5	1,200	878	< 1.0	0.52	436	0.2	7.6	1,009	-	9.51	7.56	94.7	320	< 0.0050	26.8	< 0.0050	-	0.166	-	-	< 2.5	200	246	320	< 1.0	< 1.0	-	-	< 0.25	-	1.1	0.0042	0.69	0.0030
	FR_DC2_QTR_2019-07-01_N	Duplicate	8.32	690	0.11	14.4	14	1,210	917	< 1.0	0.75	430	-1.4	-	-	-	-	-	-	338	< 0.0050	28.7	< 0.0050	-	< 0.050	-	-	< 2.5	240	268	332	6.2	< 1.0	-	-	< 0.25	-	< 1.0	0.0040	0.78	0.0034
	QA/QC RPD%		0	4	*	*	*	1	4	*	*	*	*	-	-	-	-	-	-	5	*	7	*	-	*	-	-	*	18	9	4	*	*	-	-	*	-	*	*	*	*
	FR_MW-SK1A_QTR_2019-10-07_N	2019 10 24	7.68	875	0.12	17.1	17.7	1,320	1,100	2.4	< 0.50	530	1.7	5.3	1,445	-	8.2	7.21	199.9	366	< 0.0050	41.3	< 0.0050	-	< 0.050	-	-	< 2.5	110	330	366	< 1.0	< 1.0	-	-	< 0.25	-	11.2	0.0036	0.90	0.0032
FR_MW-SK1B	FR_MW_SK1-B_WG_Q1_2019_NP	2019 03 28	8.01	432	3.68	9.32	9.14	664	536	2.3	< 0.50	389	-1	-	-	-	-	-	-	282	0.0146	0.805	0.0127	0.818	0.236	1.05	-	4.32	146	168	282	< 1.0	< 1.0	-	-	< 0.050	-	5.1	< 0.0010	< 0.50	0.0020
	FR_MW-SK1B_WG_2019-06-13_N_16	2019 06 13	8.21	447	1.76	9.3	9.18	766	548	2.3	0.94	330	-0.6	6	720.7	-	0.25	7.51	-13.5	244	0.0231	1.52	0.0115	-	0.274	-	-	5.04	167	200	244	< 1.0	< 1.0	-	-	< 0.050	-	4.7	< 0.0010	< 0.50	0.0115
	FR_MW-SK1B_QTR_2019-07-01_N	2019 07 29	8.27	448	1.04	9.36	9.19	852	588	< 1.0	0.95	222	-0.9	6.8	703.7	-	0.14	7.46	-34.3	248	0.0151	2.11	0.0099	-	0.064	-	-	4.63	145	198	248	< 1.0	< 1.0	-	-	< 0.050	-	1.2	< 0.0010	1.13	< 0.0020
	FR_MW-SK1B_20191024	2019 10 24	7.82	520	2.7	10.3	10.6	824	604	7.1	0.64	380	1.6	-	-	-	-	-	-	265	0.0088	3.23	< 0.0050	-	0.073	-	-	5	140	222	265	< 1.0	< 1.0	-	-	< 0.25	-	6.1	0.0013	0.80	0.0047
	FR_MW-SK1B_QTR_2019-10-07_N	2019 11 07	-	-	-	-	-	-	-	-	-	-	-	5.3	888	-	0.41	7.39	26.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S8 Study Area																																		-	-						
FR_MW-1B	FR_MW-1B_Q_01062013_N	2013 08 29	8.14	323	2,050	6.56	6.53	580	376	1,170	1.02	395	-	-	509.9	-	6.34	-	37	176	< 0.0050	7.30	< 0.0010	-	1.76	-	-	1.6	183	118	176	< 1.0	< 1.0	-	-	< 0.050	-	2.4	0.0024	9.72	1.93
	FR_MW-1B_Q_01092013_N	2013 10 31	8.25	347	< 0.10	6.97	7.02	622	431	3,500	0.85	389	-	6.4	549.6	-	11.14	7.71	-	172	0.0115	8.64	< 0.0010	-	3.47	-	-	3.8	172	135	172	< 2.0	< 2.0	-	-	< 0.050	-	< 1.0	0.0026	40.6	4.87
	FR_MW-1B_Q_01012014_N	2014 03 14	8.11	399	12.2	8.28	8.08	718	454	8.3	0.76	491	-	-	-	-	-	-	-	186	< 0.0050	11.9	< 0.0050	-	< 0.050	-	-	1.5	280	175	186	< 1.0	< 1.0	-	-	< 0.25	-	1.1	0.0025	0.88	0.0203
	FR_MW-1B_Q_01042014_N	2014 05 14	8.17	368	1.84	7.27	7.44	652	447	2.5	0.79	251	-	3.3	560.5	-	9.09	8.18	-45.5	177	< 0.0050	10.1	< 0.0010	-	< 0.050	-	-	1.7	159	142	177	< 1.0	< 1.0	-	-	< 0.050	-	1.1	0.0016	1.10	0.0046
	FR_MW-1B_QSW_02072014_N	2014 08 25	8.15	288	4.62	5.97	5.83	529	315	4.1	< 0.50	384	-	8.2	474.5	-	6.14	8.1	77.9	170	< 0.0050	6.33	< 0.0010	-	< 0.050	-	-	< 1.0	188	102	170	< 1.0	< 1.0	-	-	< 0.050	-	1.9	0.0018	< 0.50	0.0082
	FR_MW-1B_QSW_02102014_N	2014 11 06	8.17	316	18.9	6.42	6.4	566	381	18.9	0.6	392	-	6.7	519.3	-	11.47	8.79	12.1	167	< 0.0050	7.76	< 0.0010	-	< 0.050	-	-	1.6	180	119	165	1.7	< 1.0	-	-	< 0.050	-	1.4	0.0019	0.93	0.0200
	FR_MW-1B_QSW_02012015_N	2015 01 21	8.15	381	-	-	-	703	480	1.6	0.59	-	-	2.3	692.2	-	-	7.89	-	174	< 0.0050	12.5	< 0.0020	-	< 0.050	-	-	1.6	146	162	-	-	-	-	-	< 0.10	-	-	-	0.83	0.0045
	FR_MW-1B_QSW_02042015_N	2015 04 14	8.45	383	-	-	-	685	475	2.2	0.87	-	-	4.7	679.3	-	-	7.49	-	184	< 0.0050	12.7	< 0.0020	-	< 0.050	-	-	1.4	163	159	-	-	-	-	-	< 0.10	-	-	-	0.82	0.0047
	FR_MW-1B_QSW_02072015_N	2015 07 03	8.08	250	-	-	-	441	307	2.5	0.65	-	-	9.6	445.1	-	-	7.78	-	152	< 0.0050	4.89	< 0.0010	-	0.106	-	-	1.2	184	71.8	-	-	-	-	-	< 0.050	-	-	-	0.55	0.0076
	FR_MW-1B_QSW_02102015_N	2015 10 08	8.27	329	-	-	-	610	408	1.5	< 0.50	-	-	9	651.6	-	-	7.64	-	169	< 0.0050	11.1	< 0.0010	-	< 0.050	-	-	1.1	180	120	-	-	-	-	-	< 0.050	-	-	-	< 0.50	0.0044
	FR_MW-1B_QSW_04012016_N	2016 02 23	7.99	458	5.87	9.22	9.25	851	600	2.8	< 0.50	312	-	2.6	756	-	9.53	8.07	214.2	168	< 0.0050	24.2	< 0.0050	-	0.067	-	-	< 1.0	150	199	168	< 1.0	< 1.0	-	-	< 0.25	-	3.9	0.0025	0.58	0.0084
	FR_MW-1B_QSW_04042016_N	2016 05 19	8.32	258	4.55	5.02	5.22	478	325	5.8	0.71	330	-	3.5	418.7	-	7.39	7.76	150.9	146	< 0.0050	6.61	< 0.0010	-	0.105	-	-	0.33	176	77.4	146	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0021	0.86	0.0092
	FR_MW-1B_QSW_04072016_N	2016 08 16	8.19	270	15.2	5.78	5.48	554	340	9.3	0.74	309	-	7.2	477.7	-	6.78	8.05	158.7	164	< 0.0050	8.08	< 0.0010	-	0.102	-	-	0.34	193	91.4	164	< 1.0	< 1.0	-	-	< 0.050	-	1.6	0.0025	1.03	0.0151

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Dissolved Metals																													
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																
FR_KB-3A	FR_KB-3A_2019-06-10_NP	2019 06 10	< 3.0	289	< 20	122	2.34	2.17	4.22	< 0.20	< 0.20	65.9	< 0.040	< 20	< 0.010	< 0.20	3.06	< 0.50	< 0.10	40.0	< 0.0050	0.39	5.0	***216***	< 0.020	319	< 0.020	< 0.20	< 10	5.58	< 1.0	10.3
	FR_DC-4_2019-06-10_NP	Duplicate	< 3.0	285	< 20	119	2.51	2.17	4.33	< 0.20	< 0.20	63.9	< 0.040	< 20	0.012	< 0.20	2.99	< 0.50	< 0.10	38.7	< 0.0050	0.41	4.9	***208***	< 0.020	316	< 0.020	< 0.20	< 10	5.68	< 1.0	3.9
	QA/QC RPD%																															
	FR_KB_3A_2019-07-30	2019 07 30	< 3.0	282	< 10	107	2.48	1.87	3.75	0.20	< 0.10	63.5	< 0.020	17	0.0199	0.14	2.81	< 0.50	< 0.050	39.1	< 0.0050	1.26	0.84	***266***	< 0.010	318	< 0.010	< 0.10	< 10	5.63	< 0.50	5.1
	FR_KB-3A_2019-10-18	2019 10 18	< 3.0	314	< 10	127	9.13	2.15	3.99	0.28	< 0.10	61.7	< 0.020	18	0.0317	0.18	2.73	0.87	< 0.050	39.4	< 0.0050	0.949	2.47	***226***	< 0.010	338	< 0.010	0.11	< 10	5.50	< 0.50	7.4
	FR_KB-3A-2019-12-11	2019 12 11	< 3.0	276	< 10	97.8	1.20	1.97	3.62	0.15	< 0.10	55.2	< 0.020	18	0.0210	0.13	2.08	0.67	< 0.050	39.6	< 0.0050	0.367	0.77	***194***	< 0.010	306	< 0.010	0.35	< 10	5.34	< 0.50	4.8
FR_KB-3B	FR_KB-3B_2019-02-25	2019 02 25	1.7	289	< 10	130	15.5	3.72	4.90	0.15	0.12	76.3	< 0.020	20	0.0275	0.13	1.20	< 0.20	< 0.050	58.3	< 0.0050	0.700	0.55	***281***	< 0.010	281	0.014	< 0.10	< 10	7.25	< 0.50	< 1.0
	FR_KB-3B_2019-03-25	2019 03 25	< 3.0	294	< 10	131	3.29	3.17	3.67	0.12	< 0.10	80.3	< 0.020	18	0.0343	0.13	0.89	< 0.50	< 0.050	61.6	< 0.0050	0.443	< 0.50	***297***	< 0.010	277	< 0.010	< 0.10	< 10	8.86	< 0.50	2.3
	FR_KB-3B_2019-06-10_NP	2019 06 10	< 3.0	278	< 10	130	6.28	3.24	4.40	0.12	< 0.10	73.1	< 0.020	18	0.0296	0.12	0.56	< 0.50	< 0.050	59.9	< 0.0050	0.505	0.57	***271***	< 0.010	263	< 0.010	< 0.10	< 10	7.25	< 0.50	1.6
	FR_KB_3B_2019-07-30	2019 07 30	< 3.0	207	< 10	90.0	1.20	2.49	3.43	0.12	< 0.10	63.1	< 0.020	19	0.0217	0.10	0.39	< 0.50	< 0.050	52.1	< 0.0050	0.526	< 0.50	***200***	< 0.010	210	< 0.010	< 0.10	< 10	5.86	< 0.50	1.4
	FR_KB-3B_2019-10-18	2019 10 18	3.1	239	< 10	108	1.03	2.77	2.93	0.11	< 0.10	61.3	< 0.020	20	0.0209	0.11	0.31	0.46	< 0.050	52.5	< 0.0050	0.517	< 0.50	***188***	< 0.010	222	< 0.010	< 0.10	< 10	6.18	< 0.50	< 1.0
	FR_KB-3B-2019-12-11	2019 12 11	< 3.0	253	< 10	96.8	0.73	2.73	3.09	0.12	< 0.10	60.3	< 0.020	21	0.0231	0.13	0.22	0.45	< 0.050	59.0	< 0.0050	0.522	< 0.50	***191***	< 0.010	239	< 0.010	< 0.10	< 10	6.73	< 0.50	2.6
	FR_DC4-2019-12-11	Duplicate	< 3.0	242	< 10	96.6	0.71	2.73	3.09	0.13	< 0.10	60.4	< 0.020	21	0.0265	0.12	0.23	0.40	< 0.050	56.3	< 0.0050	0.527	< 0.50	***184***	< 0.010	238	< 0.010	< 0.10	< 10	6.72	< 0.50	2.4
	QA/QC RPD%																															
FR_MW-SK1A	FR_MW_SK1-A_WG_Q1_2019_NP	2019 03 28	< 1.0	281	< 10	115	0.40	2.85	4.24	< 0.10	< 0.10	94.8	< 0.020	16	0.0392	0.44	0.42	< 0.20	< 0.050	50.0	< 0.0050	0.447	< 0.50	***266***	< 0.010	294	< 0.010	< 0.10	< 0.30	6.44	< 0.50	< 1.0
	FR_MW-SK1A_WG_2019-06-13_N_17	2019 06 13	< 3.0	135	< 10	63.9	< 0.10	2.73	2.74	0.26	< 0.10	48.4	< 0.020	13	0.0168	< 0.10	< 0.10	0.54	< 0.050	43.4	< 0.0050	1.69	< 0.50	***114***	< 0.010	127	< 0.010	< 0.10	< 10	5.53	< 0.50	< 1.0
	FR_MW-SK1A_QTR_2019-07-01_N	2019 07 29	< 3.0	153	< 10	69.2	< 0.10	3.03	2.75	0.35	< 0.10	60.7	< 0.020	20	0.0254	< 0.10	0.13	1.36	0.060	50.8	< 0.0050	1.67	< 0.50	***112***	< 0.010	149	< 0.010	< 0.10	< 10	5.66	< 0.50	1.5
	FR_DC2_QTR_2019-07-01_N	Duplicate	< 3.0	159	< 10	71.0	< 0.10	3.10	2.85	0.33	< 0.10	62.4	< 0.020	19	0.0254	< 0.10	0.12	< 0.50	< 0.050	51.7	< 0.0050	1.63	< 0.50	***112***	< 0.010	154	< 0.010	< 0.10	< 10	5.79	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_MW-SK1A_QTR_2019-10-07_N	2019 10 24	< 3.0	201	< 10	90.8	< 0.10	2.60	4.08	0.15	< 0.10	72.4	< 0.020	18	0.0336	0.12	0.15	< 0.20	< 0.050	46.8	< 0.0050	0.525	< 0.50	***171***	< 0.010	201	< 0.010	< 0.10	< 10	5.10	< 0.50	< 1.0
FR_MW-SK1B	FR_MW_SK1-B_WG_Q1_2019_NP	2019 03 28	1.1	116	231	34.6	282	0.99	5.02	< 0.10	0.37	81.0	< 0.020	15	0.0094	< 0.10	0.24	< 0.20	< 0.050	10.9	< 0.0050	0.621	0.67	1.98	< 0.010	248	< 0.010	< 0.10	< 0.30	1.41	< 0.50	< 1.0
	FR_MW-SK1B_QTR_2019-07-01_N	2019 07 29	< 3.0	116	97	38.3	287	1.03	4.44	0.15	0.21	54.4	< 0.020	15	0.0135	< 0.10	0.31	< 0.50	< 0.050	10.3	< 0.0050	0.539	1.19	3.23	< 0.010	239	0.014	< 0.10	< 10	2.30	< 0.50	1.4
	FR_MW-SK1B_20191024	2019 10 24	< 3.0	135	25	44.3	354	1.08	4.75	0.24	0.16	46.0	< 0.020	14	0.0210	< 0.10	0.46	< 0.20	< 0.050	10.5	< 0.0050	0.460	1.62	4.48	< 0.010	244	0.014	< 0.10	< 10	3.14	< 0.50	< 1.0
S8 Study Area																																
FR_MW-1B	FR_MW-1B_Q_01062013_N	2013 08 29	9.9	86.3	< 10	26.0	0.430	1.12	1.23	0.195	< 0.10	105	< 0.050	13.6	0.015	0.13	< 0.050	< 0.20	< 0.030	14.8	< 0.010	0.844	< 0.50	***27.5***	< 0.010	152	< 0.010	< 0.050	< 1.0	1.12	< 0.50	1.3
	FR_MW-1B_Q_01092013_N	2013 10 31	16.2	90.8	< 30	29.2	< 0.10	1.02	1.22	< 0.20	< 0.20	111	< 0.20	< 20	< 0.020	< 0.20	< 0.20	< 0.50	< 0.10	13.7	< 0.010	0.88	< 1.0	***31***	< 0.020	148	< 0.020	< 0.20	< 10	1.26	< 2.0	< 3.0
	FR_MW-1B_Q_01012014_N	2014 03 14	7.8	103	< 10	34.3	0.461	0.967	2.02	0.218	< 0.10	120	< 0.050	8.7	0.015	0.12	0.120	< 0.20	< 0.030	24.5	< 0.010	1.51	< 0.50	***38.6***	< 0.010	170	< 0.010	< 0.050	< 1.0	1.66	< 0.50	< 1.0
	FR_MW-1B_Q_01042014_N	2014 05 14	< 3.0	94.4	< 10	32.1	< 0.050	0.969	1.58	0.20	< 0.10	111	< 0.10	< 10	< 0.010	< 0.10	< 0.10	< 0.50	< 0.050	21.0	< 0.010	1.21	< 0.50	***36.8***	< 0.010	145	< 0.010	< 0.10	12	1.33	< 1.0	< 3.0
	FR_MW-1B_QSW_02072014_N	2014 08 25	< 3.0	75.9	< 10	23.9	0.140	1.16	1.15	0.21	< 0.10	98.7	< 0.10	12	< 0.010	0.13	< 0.10	< 0.50	< 0.050	17.2	< 0.010	1.11	< 0.50	***21.4***	< 0.010	134	< 0.010	< 0.10	< 10	1.03	< 1.0	< 3.0
	FR_MW-1B_QSW_02102014_N	2014 11 06	9.1	83.5	< 10	26.2	0.252	1.02	1.19	0.16	< 0.10	98.1	< 0.10	< 10	0.011	< 0.10	< 0.10	< 0.50	< 0.050	16.8	< 0.010	0.996	< 0.50	***24.5***	< 0.010	134	< 0.010	< 0.10	12	1.14	< 1.0	< 3.0
	FR_MW-1B_QSW_02012015_N	2015 01 21	< 3.0	98	< 10	33.1	0.075	0.963	1.62	0.16	< 0.10	108	< 0.10	< 10	0.012	0.12	< 0.10	< 0.50	< 0.050	22	< 0.010	1.15	< 0.50	***34.3***	< 0.010	156	< 0.010	< 0.10	13	1.51	< 1.0	< 3.0
	FR_MW-1B_QSW_02042015_N	2015 04 14	< 3.0	98.7	< 10	33.1	< 0.10	1.06	1.94	0.17	< 0.10	111	< 0.10	< 10	0.0099	0.11	< 0.10	< 0.50	< 0.050	24.5	< 0.0050	1.07	< 0.50	***36.8***	< 0.010	159	< 0.010	< 0.10	10	1.57	< 0.50	< 3.0
	FR_MW-1B_QSW_02072015_N	2015 07 03	6.6	67.1	< 10	20	0.23	0.993	1.09	0.2	< 0.10	76.4	< 0.10	11	0.0111	0.14	< 0.10	< 0.50	< 0.050	18.5	< 0.0050	1.1	< 0.50	14.1	< 0.010	102	< 0.010	< 0.10	< 10	0.869	< 0.50	< 3.0
	FR_MW-1B_QSW_02102015_N	2015 10 08	< 3.0	86.8	< 10	27.3	< 0.10	1.15	1.49	0.2	< 0.10	108	< 0.10	10	0.0112	0.14	< 0.10	< 0.50	< 0.050	24.4	< 0.0050	1.06	< 0.50	***23.5***	< 0.010	150	< 0.010	< 0.10	< 10	1.23	< 0.50	< 3.0
	FR_MW-1B_QSW_04012016_N	2016 02 23	< 3.0	118	< 10	39.4	< 0.10	1.09	1.63	0.13	< 0.10	121	< 0.10	< 10	0.0123	0.12	< 0.10	< 0.50	< 0.050	26.3	< 0.0050	0.950	< 0.50	***45***	< 0.010	181	< 0.010	< 0.10	11	2.06	< 0.50	< 3.0
	FR_MW-1B_QSW_04042016_N	2016 05 19	13.0	67.6	< 10	21.7	0.35	0.904	1.03	0.16	< 0.10	72.8	< 0.020	< 10	0.0078	0.10	< 0.10	< 0.50	< 0.050	21.5	< 0.0050	1.03	< 0.50	15.3	< 0.010	103	< 0.010	< 0.10	< 10	0.989	< 0.50	< 3.0
	FR_MW-1B_QSW_04072016_N	2016 08 16	< 3.0	71.6	< 10	22.2	< 0.10	1.04	1.05	0.17	< 0.10	87.1	< 0.020	< 10	0.0118	< 0.10	< 0.10	< 0.50	< 0.050	21.8	< 0.0050	0.961	< 0.50	19.3	< 0.010	123	< 0.010	< 0.10	< 10	1.16	< 0.50	< 3.0

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

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QA/QC: KC 2020 09 03

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S6 Study Area																																			
FR_KB-3A	FR_KB-3A_2019-06-10_NP	2019 06 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC-4_2019-06-10_NP	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB_3A_2019-07-30	2019 07 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-3A_2019-10-18	2019 10 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-3A-2019-12-11	2019 12 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_KB-3B	FR_KB-3B_2019-02-25	2019 02 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0164	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-3B_2019-03-25	2019 03 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-3B_2019-06-10_NP	2019 06 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB_3B_2019-07-30	2019 07 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-3B_2019-10-18	2019 10 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_KB-3B-2019-12-11	2019 12 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC4-2019-12-11	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_MW-SK1A	FR_MW_SK1-A_WG_Q1_2019_NP	2019 03 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-SK1A_WG_2019-06-13_N_17	2019 06 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-SK1A_QTR_2019-07-01_N	2019 07 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC2_QTR_2019-07-01_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-SK1A_QTR_2019-10-07_N	2019 10 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_MW-SK1B	FR_MW_SK1-B_WG_Q1_2019_NP	2019 03 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-SK1B_WG_2019-06-13_N_16	2019 06 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-SK1B_QTR_2019-07-01_N	2019 07 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-SK1B_20191024	2019 10 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-SK1B_QTR_2019-10-07_N	2019 11 07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S8 Study Area																																			
FR_MW-1B	FR_MW-1B_Q_01062013_N	2013 08 29	14,700	0.679	8.70	381	1.14	-	32.9	2.11	180,000	27.0	8.15	28.8	24,500	12.4	32.2	42,300	1,280	0.130	2.78	44.7	-	6,040	28.1	45,800	0.860	1,400	247	0.655	0.292	37.9	2.47	59.4	178
	FR_MW-1B_Q_01092013_N	2013 10 31	25,900	0.83	17.8	629	2.15	< 1.0	40	4.24	359,000	49.8	17.8	58.2	47,700	28.3	52.9	81,400	2,660	0.082	3.14	91.0	-	8,490	30.8	40,100	1.43	1,610	382	1.15	0.29	112	4.38	100	348
	FR_MW-1B_Q_01012014_N	2014 03 14	343	0.237	0.18	122	< 0.050	-	10.9	0.033	105,000	0.69	0.217	0.51	294	0.161	25.0	35,000	12.7	< 0.010	1.55	0.75	-	1,140	38.4	2,630	< 0.010	2,180	170	0.011	< 0.050	8.8	1.72	1.38	< 3.0
	FR_MW-1B_Q_01042014_N	2014 05 14	41.7	0.23	0.11	105	< 0.10	< 0.50	10	0.016	91,800	0.18	< 0.10	0.68	45	< 0.050	21.6	31,700	2.48	< 0.010	1.28	< 0.50	-	962	35.9	1,930	< 0.010	1,540	147	< 0.010	< 0.10	13	1.34	< 1.0	< 3.0
	FR_MW-1B_QSW_02072014_N	2014 08 25	187	0.22	0.20	104	< 0.10	< 0.50	12	0.044	78,800	0.43	0.17	0.61	248	0.253	17.2	24,700	14.6	< 0.010	1.11	0.94	-	1,240	21.7	2,440	< 0.010	1,170	136	< 0.010	< 0.10	< 10	1.07	1.0	5.1
	FR_MW-1B_QSW_02102014_N	2014 11 06	397	0.21	0.23	101	< 0.10	< 0.50	11	0.049	82,300	0.81	0.22	0.69	434	0.263	16.8	26,200	20.3	< 0.010	1.02	0.83	-	1,140	23.9	2,680	0.018	1,190	138	0.013	< 0.10	21	1.17	1.5	3.9
	FR_MW-1B_QSW_02012015_N	2015 01 21	-	-	-	-	-	< 0.50	-	0.014	-	0.23	-	-	-	-	-	-	-	-	-	-	-	963	33.3	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QSW_02042015_N	2015 04 14	-	-	-	-	-	< 0.050	-	0.0149	-	0.24	-	-	-	-	-	-	-	-	-	-	-	1,090	36.8	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QSW_02072015_N	2015 07 03	-	-	-	-	-	< 0.050	-	0.0157	-	0.37	-	-	-	-	-	-	-	-	-	-	-	1,070	14.2	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QSW_02102015_N	2015 10 08	-	-	-	-	-	< 0.050	-	0.0116	-	0.22	-	-	-	-	-	-	-	-	-	-	-	1,200	24.6	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QSW_04012016_N	2016 02 23	150	0.15	0.12	127	< 0.10	< 0.050	< 10	0.0205	119,000	0.37	< 0.10	< 0.50	111	0.055	28.3	40,800	3.88	< 0.0050	0.992	< 0.50	-	1,150	46.2	2,130	< 0.010	1,640	187	< 0.010	< 0.10	15	2.07	0.76	< 3.0
	FR_MW-1B_QSW_04042016_N	2016 05 19	225	0.18	0.14	75.7	0.025	< 0.050	< 10	0.0169	68,300	0.43	< 0.10	< 0.50	179	0.092	21.9	22,100	5.95	< 0.0050	1.06	< 0.50	-	1,020	15.9	2,480	< 0.010	1,030	108	< 0.010	< 0.10	10	1.04	0.89	< 3.0
	FR_MW-1B_QSW_04072016_N	2016 08 16	196	0.22	0.15	90.4	< 0.020	< 0.050	< 10	0.0238	73,300	0.42	0.10	< 0.50	208	0.123	22.5	22,700	8.53	< 0.0050	1.00	0.54	-	1,130	18.9	2,570	< 0.010	1,070	127	< 0.010	< 0.10	< 10	1.21	0.85	< 3.0

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.
Associated Caro file(s): 7081099.
Associated Historical Data file(s): Teck Coal database.
All terms defined within the body of SNC-Lavalin's report.

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-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with chloride.
[d] Standard varies with hardness.
[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.
[g] Sample collected in 2018 but Teck sample ID reads 2019.
[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15
[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.
[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date	pH (lab)	Hardness	Turbidity	Total Anions	Total Cations	Conductivity	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Oxidation Reduction Potential	Cation Anion Balance	Field Temperature	Field Conductivity	Field Turbidity	Dissolved Oxygen	pH (field)	Field ORP	Total Alkalinity	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Nitrate+Nitrite (as N)	Kjeldahl Nitrogen-N	Nitrogen	Total Nitrogen-N	Chloride	Fluoride	Sulfate	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Bromide	Total Acidity	Acidity (pH 8.3)	Ortho-Phosphate	Total Organic Carbon	Total Phosphorous as P
		(yyyy mm dd)	pH	mg/L	NTU	meq/L	meq/L	µS/cm	mg/L	mg/L	mg/L	mV	%	C	µS/cm	NTU	mg/L	pH	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S8 Study Area																																									
FR_MW-1B	FR_MW-1B_QSW_03102016_N	2016 11 17	8.18	327	1.86	7.32	6.6	662	462	1.4	0.58	332	-	5.9	591.4	-	7.96	8.05	-80.4	174	< 0.0050	13.5	< 0.0010	-	0.072	-	-	0.49	170	137	174	< 1.0	< 1.0	-	-	< 0.050	-	1.6	0.0026	0.69	0.0054
	FR_MW-1B_QSW_02012017_N	2017 02 23	7.84	420	4.02	9	8.49	795	534	2.3	0.75	353	-	3.1	707.3	-	8.31	7.89	47.7	177	< 0.0050	20.8	< 0.0010	-	< 0.050	-	-	0.55	142	191	177	< 1.0	< 1.0	-	-	< 0.050	-	3.8	0.0016	0.99	0.0085
	FR_MW-1B_QSW_03042017_N	2017 06 22	8.44	188	3.58	4.12	3.82	417	275	1	1.96	314	-3.7	4	388.1	-	6.64	7.95	130.6	122	< 0.0050	4.87	< 0.0010	-	0.277	-	-	< 0.50	138	64.2	101	20.8	< 1.0	-	-	< 0.050	-	1.7	0.0016	1.37	0.0053
	FR_MW-1B_QTR_2017-09-11_N	2017 09 19	8.19	381	0.75	7.72	7.7	705	531	< 1.0	0.52	283	-0.1	7.5	665.1	-	6.34	7.95	180.5	147	0.0106	14.7	< 0.0010	-	< 0.050	-	-	< 0.50	139	180	147	< 1.0	< 1.0	-	-	< 0.050	-	2.2	< 0.0010	1.15	0.0027
	FR_MW-1B_QTR_2017-10-02	2017 11 21	8.27	411	2.58	8.04	8.3	712	499	2	0.62	267	1.6	6	648.8	-	7.45	7.71	232.1	185	0.0071	11.8	< 0.0010	-	0.111	-	-	< 0.50	145	168	185	< 1.0	< 1.0	-	-	< 0.050	-	1.7	0.0031	0.57	0.0054
	FR_MW-1B_QTR_2018-01-01_N	2018 02 14	7.94	456	6.04	11.3	9.21	872	599	3.8	0.67	224	-10	2.8	784.7	-	9.19	7.67	272.8	277	< 0.0050	17.5	< 0.0010	-	< 0.050	-	-	< 0.50	132	218	277	< 1.0	< 1.0	-	-	< 0.050	-	6.1	0.0022	0.65	0.0050
	FR_MW-1B_QTR_2018-04-02_N	2018 06 13	8.37	261	2.35	5.09	5.28	470	322	1.6	0.75	219	1.9	4.4	453.1	-	8.12	7.63	223.3	148	< 0.0050	5.64	0.0011	-	< 0.10	-	-	< 0.50	193	82.5	142	5.6	< 1.0	-	-	< 0.050	-	< 1.0	0.0021	0.93	0.0054
	FR_MW-1B_QTR_2018-07-02_N	2018 08 01	8.46	268	3.03	6.06	5.43	518	381	5.9	0.76	320	-5.5	6.4	481.9	-	6.72	7.89	147.1	166	< 0.0050	6.65	< 0.0010	-	0.161	-	-	< 0.50	195	109	158	7.6	< 1.0	-	-	< 0.050	-	< 1.0	0.0030	0.79	0.0061
	WG_2018-07-02_014																																								
	QA/QC RPD%		3	14	2	*	*	0	3	*	*	*	*	-	-	-	-	-	-	3	*	0	*	-	*	-	-	*	7	1	2	*	*	-	-	*	-	*	*	*	5
	FR_MW-1B_QTR_2018-10-01_N	2018 12 19	8.31	419	5.47	9.47	8.47	759	527	4.4	< 0.50	358	-5.6	4.6	702	-	9.38	7.67	249.8	202	0.0195	16.5	< 0.0010	-	0.219	-	-	0.65	164	203	198	4.2	< 1.0	-	-	< 0.050	-	< 1.0	0.0261	< 0.50	0.0069
	WG_2018-10-01_021																																								
	QA/QC RPD%		0	1	24	*	*	0	5	*	*	*	*	-	-	-	-	-	-	7	*	0	*	-	*	-	-	2	1	0	5	*	*	-	-	*	-	*	100	*	8
	FR_MW-1B_QTR_2019-01-07_N	2019 03 22	7.96	436	2.77	8.9	8.81	790	566	1.8	1.05	445	-0.5	-	-	-	-	-	-	172	0.0116	17.0	< 0.0010	-	0.402	-	-	0.73	168	202	172	< 1.0	< 1.0	-	-	< 0.050	-	2.3	0.0029	0.95	0.0049
	FR_MW-1B_QTR_2019-04-01_N	2019 05 30	8.37	254	1.96	5.38	5.14	520	314	2.4	< 0.50	252	-2.3	3.8	443.3	-	10.9	7.89	198.9	148	< 0.0050	6.01	< 0.0010	-	< 0.050	-	-	< 0.50	193	95.9	142	5.4	< 1.0	-	-	< 0.050	-	< 1.0	< 0.0010	< 0.50	0.0062
	FR_MW-1B_QTR_2019-07-01_N	2019 07 25	8.3	247	1.7	5.26	5	488	314	< 1.0	< 0.50	321	-2.5	5.6	405.4	-	7.46	7.87	137	154	0.0056	5.73	< 0.0010	-	0.073	-	-	< 0.50	199	84.5	152	2.2	< 1.0	-	-	< 0.050	-	1.8	0.0021	< 0.50	0.0021
	FR_MW-1B_QTR_2019-10-07_N	2019 11 07	8.24	397	2.38	8.22	8.01	645	516	2.5	< 0.50	400	-1.3	5.5	752.6	-	9.29	7.89	97.9	175	< 0.0050	12.8	< 0.0010	-	< 0.050	-	-	0.56	131	182	175	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0048	< 0.50	0.0049
	FR_MW-1B_QTR_2020-01-06_N	2020 02 27	8.29	476	0.51	9.96	9.62	883	661	1.2	0.66	345	-1.7	2.5	918	-	8.44	7.72	159.1	178	< 0.0050	19.8	< 0.0010	-	< 0.25	-	-	0.73	133	238	176	2.0	< 1.0	-	-	< 0.050	-	5.6	0.0021	0.58	< 0.0020
	FR_DC2_QTR_2020-01-06_N	Duplicate	8.32	466	0.54	9.99	9.42	873	672	< 1.0	0.76	364	-2.9	-	-	-	-	-	-	176	< 0.0050	20.4	< 0.0010	-	< 0.25	-	-	0.78	136	239	169	6.8	< 1.0	-	-	< 0.050	-	5.7	0.0024	0.71	< 0.0020
	QA/QC RPD%		0	2	6	*	*	1	2	*	*	*	*	-	-	-	-	-	-	1	*	3	*	-	*	-	-	7	2	0	4	*	*	-	-	*	-	2	*	*	*
	FR_MW-1B_QTR_2020-04-06_N	2020 05 29	8.38	260	2.16	5.72	5.28	500	373	4.1	1.33	431	-4	-	-	-	-	-	-	155	< 0.0050	7.49	< 0.0010	-	< 0.050	-	-	< 0.50	137	99.5	< 1.0	< 1.0	155	-	-	< 0.050	-	< 1.0	0.0025	1.34	0.0046
FR_GCMW-1A	GCMW-1A-170811	2017 08 11	8.29	53.8	637.7	-	-	714	506	-	-	-	-	10.7	593	-	3.12	8.22	67.3	374	0.248	0.147	0.0118	0.159	1.21	-	1.37	20.2	1,220	39.6	372	1.7	< 1.0	-	-	-	-	-	-	-	0.639
	FR_GCMW-1A_WG_201712151246	2017 12 15	8.21	43	1,970	10.6	7.54	765	1,320	669	6.46	264	-17	-	-	-	-	-	-	446	0.297	0.948	0.0831	-	3.5	-	-	10.7	1,330	60.3	446	< 1.0	< 1.0	-	-	0.066	-	< 1.0	0.0051	111	1.72
	FR_GCMW-1A_WG_201802261345_NP_3	2018 02 26	8.21	40.6	2,850	9.92	9.93	853	1,420	1,090	5.57	270	0.1	-	-	-	-	-	-	376	0.425	3.35	0.377	-	10	-	-	11.8	1,270	83.6	376	< 1.0	< 1.0	-	-	0.054	-	< 1.0	0.0060	202	3.59
	FR_GCMW-1A_WG_2018-11-09_NP	2018 11 09	8.41	41.4	-	-	-	695	656	220	5.27	-	-	-	-	-	-	-	-	339	0.385	2.55	0.141	2.70	-	-	-	13.5	1,580	43.9	-	-	< 5.0	403	5.5	-	-	-	-	12	-
	FR_GCMW-1A_2019-03-27	2019 03 27	8.42	24.9	21.2	7.29	7.11	651	397	9.7	2.96	344	-1.3	-	-	-	-	-	-	338	0.130	< 0.025	< 0.0050	-	0.53	-	-	15.9	1,850	< 1.5	329	8.8	< 1.0	-	-	< 0.25	-	< 1.0	0.0488	2.87	0.0935
	FR_GCMW-1A_2019-08-13	2019 08 13	8.53	27.1	8.96	7.55	7.94	685	406	7.4	3.34	229	2.5	-	-	-	-	-	-	343	0.243	0.0694	< 0.0010	-	0.878	-	-	18.8	***2,270***	1.64	329	14.2	< 1.0	-	-	0.126	-	< 1.0	0.0456	3.42	0.0481
	FR_GCMW-1A-2019-10-10	2019 10 10	8.46	26.9	0.31	7.61	7.61	637	416	1.6	2.21	251	0	-	-	-	-	-	-	351	0.257	0.0266	0.0022	-	0.407	-	-	17	1,780	0.71	341	10.6	< 1.0	-	-	0.082	-	< 1.0	0.0535	2.15	0.0491
	FR_GCMW-1A-2019-12-09	2019 12 09	8.5	42.3	5.43	7.65	8.01	667	454	4.5	3.14	304	2.3	-	-	-	-	-	-	349	0.299	0.197	0.0115	-	0.534	-	-	17.3	***2,110***	3.45	333	15.8	< 1.0	-	-	0.076	-	< 1.0	0.0520	3.17	0.0429
	FR_GCMW-1A-2020-01-22	2020 01 22	8.52	44.6	5.34	8.17	7.46	673	432	2.2	3.65	299	-4.5	-	-	-	-	-	-	365	0.264	0.715	0.0515	-	0.62	-	-	16.6	1,720	12.1	349	16.2	< 1.0	-	-	0.089	-	< 1.0	0.0411	3.35	0.0437
FR_GCMW-1B	GCMW-1B-170811																									-	8.57	18.7	810	494	303	< 1.0	< 1.0	-	-	-	-	-	-	-	0.0282
	FR_GCMW-1B_WG_201712151330	2017 12 15	8.29	41.2	1,190	8.99	7.31	727	704	758	4.75	243	-10	-	-	-	-	-	-	364	0.246	1.53	0.111	-	1.7	-	-	7.58	1,160	63.3	359	5.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0087	43	1.10
	FR_GCMW-1B_WG_201802261403_NP_4	2018 02 26	8.19	73.5	< 0.10	7.56	8.86	830	1,370	1,760	4.37	274	7.9	3.5	732.4	-	5	8.14	107.3	263	0.368	3.27	0.334	-	7.89	-	-	8.93	1,200	83.5	263	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0054	125	7.35
	FR_GCMW-1B_WG_2018-11-09_NP	2018 11 09	8.31	83.8	-	-	-	714	479	1,400	6.28	-	-	-	-	-	-	-	-	293	0.313	4.98	0.167	5.15	-	-	-	8.32	1,190	78	-	-	< 5.0	351	< 5.0	-	-	-	-	< 10	-
	FR_GCMW-1B_QTR_2018-10-01_NP	2018 12 14	8.27	130	159	8.97	8.36	791	546	164	3.69	263	-3.5	5.7	703.3	-	2.81	8.04	285.1	296	0.308	8.50	0.204	-	1.12	-	-	9.29	1,120	102	296	< 1.0	< 1.0	-	-	0.183	-	< 1.0	0.0195	5.9	0.220

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																													
			Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S8 Study Area																																
FR_MW-1B	FR_MW-1B_QSW_03102016_N	2016 11 17	< 3.0	84.9	< 10	27.8	< 0.10	1.05	1.20	0.13	< 0.10	108	< 0.020	< 10	0.0110	0.11	< 0.10	< 0.50	< 0.050	21.7	< 0.0050	0.789	< 0.50	***31.7***	< 0.010	143	< 0.010	< 0.10	< 10	1.38	< 0.50	< 3.0
	FR_MW-1B_QSW_02012017_N	2017 02 23	< 1.0	106	< 10	37.7	0.25	1.12	1.70	0.14	< 0.10	143	< 0.020	< 10	0.0157	0.10	< 0.10	< 0.20	< 0.050	38.1	< 0.0050	1.02	< 0.50	***50.2***	< 0.010	184	< 0.010	< 0.10	< 10	2.25	< 0.50	< 1.0
	FR_MW-1B_QSW_03042017_N	2017 06 22	5.8	49.4	< 50	15.8	< 0.50	0.91	0.82	< 0.50	< 0.50	66.0	< 0.10	< 50	< 0.025	< 0.50	< 0.50	< 1.0	< 0.25	19.5	< 0.0050	1.02	< 2.5	13	< 0.050	88.2	< 0.050	< 0.50	< 10	0.860	< 2.5	< 5.0
	FR_MW-1B_QTR_2017-09-11_N	2017 09 19	5.0	95.8	< 10	34.4	< 0.10	1.32	1.37	0.17	< 0.10	131	< 0.020	< 10	0.0175	< 0.10	< 0.10	< 0.50	< 0.050	28.7	< 0.0050	0.968	< 0.50	***47.1***	< 0.010	166	< 0.010	< 0.10	< 10	1.90	< 0.50	< 3.0
	FR_MW-1B_QTR_2017-10-02	2017 11 21	< 3.0	98.7	< 10	39.9	< 0.10	1.12	1.43	0.12	< 0.10	126	< 0.020	< 10	0.0142	0.12	< 0.10	2.32	0.128	22.3	< 0.0050	0.894	< 0.50	***42***	< 0.010	171	< 0.010	< 0.10	< 10	1.76	< 0.50	< 3.0
	FR_MW-1B_QTR_2018-01-01_N	2018 02 14	< 3.0	118	< 10	39.5	< 0.10	1.05	1.47	0.13	< 0.10	129	< 0.020	< 10	0.0144	< 0.10	< 0.10	< 0.50	< 0.050	29.2	< 0.0050	1.04	< 0.50	***57***	< 0.010	184	< 0.010	< 0.10	< 10	2.44	< 0.50	< 3.0
	FR_MW-1B_QTR_2018-04-02_N	2018 06 13	< 3.0	65.8	< 10	23.4	0.12	1.02	1.07	0.16	< 0.10	80.5	< 0.020	< 10	0.0120	< 0.10	< 0.10	< 0.50	< 0.050	19.2	< 0.0050	1.08	< 0.50	***20.6***	< 0.010	108	< 0.010	< 0.10	< 10	1.22	< 0.50	11.8
	FR_MW-1B_QTR_2018-07-02_N	2018 08 01	< 3.0	70.8	< 10	22.1	< 0.10	1.06	1.05	0.15	< 0.10	90.9	< 0.020	< 10	0.0137	0.14	< 0.10	< 0.50	< 0.050	19.1	< 0.0050	0.980	< 0.50	***24***	< 0.010	110	< 0.010	< 0.10	< 10	1.50	< 0.50	< 1.0
	WG_2018-07-02_014	Duplicate	< 3.0	77.4	< 10	27.8	< 0.10	1.19	1.13	0.18	< 0.10	97.7	< 0.020	< 10	0.0132	0.15	< 0.10	< 0.50	< 0.050	21.0	< 0.0050	0.997	< 0.50	***25.1***	< 0.010	128	< 0.010	< 0.10	< 10	1.50	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_MW-1B_QTR_2018-10-01_N	2018 12 19	< 3.0	106	< 10	37.8	< 0.10	1.08	1.41	0.14	< 0.10	128	< 0.020	< 10	0.0130	0.15	< 0.10	< 0.50	< 0.050	26.3	< 0.0050	1.03	< 0.50	***47.6***	< 0.010	170	< 0.010	< 0.10	< 10	2.19	< 0.50	1.3
	WG_2018-10-01_021	Duplicate	< 3.0	105	< 10	36.7	< 0.10	1.05	1.40	0.14	< 0.10	128	< 0.020	< 10	0.0125	0.15	< 0.10	< 0.50	< 0.050	25.4	< 0.0050	1.01	< 0.50	***49.3***	< 0.010	171	< 0.010	< 0.10	< 10	2.22	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_MW-1B_QTR_2019-01-07_N	2019 03 22	< 3.0	105	< 10	42.4	< 0.10	1.17	1.77	0.17	< 0.10	130	< 0.020	< 10	0.0158	0.11	< 0.10	< 0.50	< 0.050	36.7	< 0.0050	1.01	< 0.50	***44.6***	< 0.010	171	< 0.010	< 0.10	< 10	2.49	< 0.50	< 1.0
	FR_MW-1B_QTR_2019-04-01_N	2019 05 30	11.6	62.9	< 10	23.6	0.73	0.966	0.997	0.18	< 0.10	80.9	< 0.020	< 10	0.0105	0.14	< 0.10	< 0.50	< 0.050	20.5	< 0.0050	1.09	< 0.50	19.8	< 0.010	107	< 0.010	< 0.10	< 10	1.27	< 0.50	< 1.0
	FR_MW-1B_QTR_2019-07-01_N	2019 07 25	11.4	62.8	< 10	21.8	0.25	0.955	0.956	0.15	< 0.10	70.6	< 0.020	< 10	0.0090	0.20	< 0.10	< 0.50	< 0.050	17.3	< 0.0050	1.00	< 0.50	18.5	< 0.010	106	< 0.010	< 0.10	< 10	1.24	< 0.50	< 1.0
	FR_MW-1B_QTR_2019-10-07_N	2019 11 07	< 3.0	100	< 10	35.4	< 0.10	1.20	1.29	0.18	< 0.10	125	< 0.020	< 10	0.0125	0.14	< 0.10	< 0.20	< 0.050	23.7	< 0.0050	1.14	< 0.50	***40.1***	< 0.010	183	< 0.010	< 0.10	< 10	1.97	< 0.50	< 1.0
	FR_MW-1B_QTR_2020-01-06_N	2020 02 27	< 3.0	118	< 10	44.3	< 0.10	1.32	1.72	0.18	< 0.10	138	< 0.020	< 10	0.0148	< 0.10	< 0.10	< 0.20	< 0.050	42.4	< 0.0050	1.23	< 0.50	***51.1***	< 0.010	189	< 0.010	< 0.10	< 10	2.76	< 0.50	< 1.0
	FR_DC2_QTR_2020-01-06_N	Duplicate	< 3.0	115	< 10	43.5	< 0.10	1.31	1.66	0.17	< 0.10	138	< 0.020	< 10	0.0134	< 0.10	< 0.10	0.22	< 0.050	40.0	< 0.0050	1.20	< 0.50	***49.1***	< 0.010	181	< 0.010	< 0.10	< 10	2.71	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_MW-1B_QTR_2020-04-06_N	2020 05 29	11.9	63.3	12	24.8	1.18	1.09	1.04	0.21	< 0.10	75.6	< 0.020	< 10	0.0123	0.13	< 0.10	0.32	< 0.050	23.1	< 0.0050	1.08	< 0.50	***25.8***	< 0.010	110	< 0.010	< 0.10	< 10	1.36	< 0.50	1.0
FR_GCMW-1A	GCMW-1A-170811	2017 08 11	69.9	16.5	45	3.03	23.8	2.56	167	1.15	0.68	63.8	< 0.10	180	0.013	< 0.50	0.16	0.31	< 0.10	218	< 0.010	29.1	2.25	1.05	< 0.050	89.1	0.065	0.85	< 5.0	5.39	1.7	< 4.0
	FR_GCMW-1A_WG_201712151246	2017 12 15	4.0	12.5	11	2.89	49.7	1.99	152	0.24	1.73	66.0	< 0.020	114	0.0054	< 0.10	0.13	< 0.50	< 0.050	213	< 0.0050	23.2	1.40	3.31	< 0.020	104	< 0.010	< 0.10	< 10	4.19	0.76	< 3.0
	FR_GCMW-1A_WG_201802261345_NP_3	2018 02 26	74.2	11.8	132	2.73	60.7	2.00	208	0.24	1.19	68.8	< 0.020	204	0.0131	0.13	0.16	2.09	0.123	269	< 0.0050	18.3	1.94	4.53	< 0.010	118	< 0.010	< 0.10	< 10	4.14	0.97	6.7
	FR_GCMW-1A_WG_2018-11-09_NP	2018 11 09	7.0	11.3	< 50	3.23	44.5	1.41	158	< 0.50	1.03	83.2	< 0.50	142	< 0.025	< 0.50	< 0.50	< 1.0	< 0.25	234	< 0.0050	28.9	< 2.5	7.31	< 0.050	-	< 0.050	< 0.50	< 1.5	1.77	< 2.5	< 5.0
	FR_GCMW-1A_2019-03-27	2019 03 27	4.3	6.67	22	2.02	35.5	1.32	151	0.12	2.08	61.7	< 0.020	187	0.0139	< 0.10	< 0.10	< 0.20	< 0.050	266	< 0.0050	36.5	0.61	0.32	< 0.010	93.2	< 0.010	< 0.10	< 10	0.560	< 0.50	< 1.0
	FR_GCMW-1A_2019-08-13	2019 08 13	3.6	7.06	19	2.29	70.1	1.14	169	< 0.10	2.39	77.0	< 0.020	180	0.0314	< 0.10	< 0.10	< 0.50	< 0.050	266	< 0.0050	43.1	< 0.50	0.082	< 0.010	139	< 0.010	< 0.10	< 10	0.527	< 0.50	< 1.0
	FR_GCMW-1A-2019-10-10	2019 10 10	3.8	7.14	34	2.20	67.6	1.18	162	< 0.10	2.30	88.3	< 0.020	194	< 0.015	< 0.10	< 0.10	0.27	< 0.050	256	< 0.0050	43.9	0.52	< 0.050	< 0.010	128	< 0.010	< 0.10	< 10	0.318	< 0.50	< 1.0
	FR_GCMW-1A-2019-12-09	2019 12 09	4.1	10.2	53	4.10	73.1	1.30	163	< 0.10	2.00	120	< 0.020	174	0.0106	< 0.10	< 0.10	< 0.20	< 0.050	244	< 0.0050	41.6	< 0.50	1.2	< 0.010	144	< 0.010	< 0.10	< 10	0.318	< 0.50	2.2
	FR_GCMW-1A-2020-01-22	2020 01 22	3.5	11.1	47	4.08	71.5	1.32	150	< 0.10	1.85	119	< 0.020	173	0.0162	< 0.10	< 0.10	0.22	< 0.050	229	< 0.0050	42.5	0.58	1.21	< 0.010	166	< 0.010	< 0.10	< 10	0.533	< 0.50	< 1.0
FR_GCMW-1B	GCMW-1B-170811	2017 08 11	39.1	34.5	< 10	9.37	51.0	3.47	397	1.06	0.81	138	< 0.10	124	< 0.010	< 0.50	0.18	1.14	< 0.10	209	< 0.010	21.4	1.44	***47.9***	< 0.050	319	0.041	< 0.20	< 5.0	9.46	< 1.0	6.7
	FR_GCMW-1B_WG_201712151330	2017 12 15	5.2	11.5	< 10	3.03	37.4	1.98	148	0.16	1.24	45.8	< 0.020	93	0.0056	< 0.10	0.11	< 0.50	< 0.050	218	< 0.0050	18.4	1.15	6.39	< 0.010	112	< 0.010	< 0.10	< 10	3.70	< 0.50	< 3.0
	FR_GCMW-1B_WG_201802261403_NP_4	2018 02 26	< 3.0	20.6	< 10	5.35	57.5	2.30	169	0.24	0.63	66.8	< 0.020	95	0.0055	< 0.10	0.10	< 0.50	< 0.050	215	< 0.0050	19.8	1.04	18.3	< 0.010	200	0.010	< 0.10	< 10	5.62	0.81	< 3.0
	FR_GCMW-1B_WG_2018-11-09_NP	2018 11 09	7.4	22.3	< 50	6.83	78.3	1.89	141	< 0.50	0.63	83.9	< 0.50	97	< 0.025	< 0.50	< 0.50	< 1.0	< 0.25	231	< 0.0050	22.2	< 2.5	13.4	< 0.050	-	< 0.050	< 0.50	< 1.5	2.76	< 2.5	< 5.0
	FR_GCMW-1B_QTR_2018-10-01_NP	2018 12 14	356	34.7	525	10.6	120	2.48	129	0.12	0.86	133	0.041	102	0.115	0.92	0.32	1.00	0.593	253	< 0.0050	21.7	1.69	19.8	0.013	549	0.019	< 0.10	< 10	2.91	1.89	5.2

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S8 Study Area																																			
FR_MW-1B	FR_MW-1B_QSW_03102016_N	2016 11 17	87.8	0.19	0.16	115	< 0.020	< 0.050	< 10	0.0250	88,800	0.24	< 0.10	< 0.50	97	0.062	23.9	29,100	6.01	< 0.0050	0.853	< 0.50	-	1,060	29.4	1,990	< 0.010	1,160	151	< 0.010	< 0.10	< 10	1.47	0.70	< 3.0
	FR_MW-1B_QSW_02012017_N	2017 02 23	80.3	0.23	0.17	139	< 0.020	< 0.050	< 10	0.0239	103,000	0.26	< 0.10	< 0.50	131	0.076	36.5	36,400	6.20	< 0.0050	0.954	< 0.50	-	1,180	43.9	1,770	< 0.010	1,690	177	< 0.010	< 0.10	< 10	2.16	0.51	< 3.0
	FR_MW-1B_QSW_03042017_N	2017 06 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2017-09-11_N	2017 09 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2017-10-02	2017 11 21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2018-01-01_N	2018 02 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2018-04-02_N	2018 06 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2018-07-02_N	2018 08 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WG_2018-07-02_014	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2018-10-01_N	2018 12 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WG_2018-10-01_021	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2019-01-07_N	2019 03 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2019-04-01_N	2019 05 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2019-07-01_N	2019 07 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2019-10-07_N	2019 11 07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2020-01-06_N	2020 02 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC2_QTR_2020-01-06_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_MW-1B_QTR_2020-04-06_N	2020 05 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_GCMW-1A	GCMW-1A-170811	2017 08 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1A_WG_201712151246	2017 12 15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1A_WG_201802261345_NP_3	2018 02 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1A_WG_2018-11-09_NP	2018 11 09	3,510	0.60	3.56	214	0.53	-	172	1.30	36,600	8.96	3.51	16.0	8,030	6.90	213	7,100	290	< 0.050	22.1	14.7	-	2,620	7.87	-	0.220	154,000	-	0.251	< 0.50	16.0	2.70	25.1	80
	FR_GCMW-1A_2019-03-27	2019 03 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1A_2019-08-13	2019 08 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1A-2019-10-10	2019 10 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1A-2019-12-09	2019 12 09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1A-2020-01-22	2020 01 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_GCMW-1B	GCMW-1B-170811	2017 08 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B_WG_201712151330	2017 12 15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B_WG_201802261403_NP_4	2018 02 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B_WG_2018-11-09_NP	2018 11 09	4,120	0.71	6.18	263	0.78	-	122	2.52	105,000	14.5	5.64	20.6	15,100	10.8	202	21,300	615	< 0.050	15.7	23.5	-	3,290	13.7	-	0.294	138,000	-	0.293	0.77	20.8	5.11	31.2	137
	FR_GCMW-1B_QTR_2018-10-01_NP	2018 12 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Physical Parameters											Field Parameters						Dissolved Inorganics																					
			pH (lab)	Hardness	Turbidity	Total Anions	Total Cations	Conductivity	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Oxidation Reduction Potential	Cation Anion Balance	Field Temperature	Field Conductivity	Field Turbidity	Dissolved Oxygen	pH (field)	Field ORP	Total Alkalinity	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Nitrate+Nitrite (as N)	Kjeldahl Nitrogen-N	Nitrogen	Total Nitrogen-N	Chloride	Fluoride	Sulfate	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Bromide	Total Acidity	Acidity (pH 8.3)	Ortho-Phosphate	Total Organic Carbon	Total Phosphorous as P
			pH	mg/L	NTU	meq/L	meq/L	µS/cm	mg/L	mg/L	mg/L	mV	%	C	µS/cm	NTU	mg/L	pH	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S8 Study Area																																									
FR_GCMW-1B	FR_GCMW-1B_2019-03-27	2019 03 27	8.38	84.3	26.1	8.2	8.21	751	464	23.4	6.53	358	0.1	2.61	753.2	37.2	0.28	8.23	43.2	361	0.157	< 0.025	0.130	-	0.483	-	-	10.6	1,090	29.5	353	8.2	< 1.0	-	-	< 0.25	-	< 1.0	0.0067	7.60	0.0402
	FR_GCMW_1B_2019-05-31_NP	2019 05 31	8.64	90	17.4	7.99	8.94	759	448	6.2	5.76	225	5.6	-	-	-	-	-	-	353	0.0739	< 0.005	< 0.0010	-	0.385	-	-	13.2	1,370	23.6	328	25.2	< 1.0	-	-	0.143	-	< 1.0	< 0.0010	6.29	0.0321
	FR_GCMW-1B_QTR_2019-07-01_N	2019 07 26	8.57	80.3	20.7	8.76	8.02	754	489	30	6.97	314	-4.4	-	-	-	-	-	-	398	0.0413	0.0082	< 0.0010	-	0.462	-	-	14	1,510	16	381	17.4	< 1.0	-	-	0.122	-	< 1.0	< 0.0010	9.54	0.0717
	FR_GCMW-1B_2019-08-13	2019 08 13	8.51	85.6	8.15	8.58	9.86	751	453	1.9	6.71	451	6.9	13.9	770.4	5.79	0.29	8.12	-178	384	0.0702	0.0338	< 0.0010	-	0.344	-	-	16.4	1,980	15.9	368	16.4	< 1.0	-	-	0.144	-	< 1.0	0.0061	6.87	0.0195
	FR_GCMW-1B_QTR_2019-10-07_N	2019 10 03	8.55	82.3	4.9	8.45	8.32	728	442	1.3	7.02	193	-0.8	-	-	-	-	-	-	390	0.0769	0.0081	< 0.0010	-	0.361	-	-	13	1,570	9.91	370	20.0	< 1.0	-	-	0.102	-	< 1.0	0.0087	6.52	0.025
	FR_GCMW-1B-2019-12-09	2019 12 09	8.25	83.9	5.23	8.33	8.66	701	496	6.9	9.23	239	1.9	3.8	716.8	12	0.52	8.26	-189	391	0.127	< 0.005	< 0.0010	-	0.375	-	-	11.7	1,690	5.25	391	< 1.0	< 1.0	-	-	0.074	-	< 1.0	0.0071	8.70	0.0184
	FR_GCMW-1B-2020-01-22	2020 01 22	8.42	81.1	3.35	8.77	8.12	706	475	2.5	9.3	280	-3.9	-	-	-	-	-	-	411	0.0878	< 0.005	< 0.0010	-	0.416	-	-	12.4	1,500	6.58	398	13.0	< 1.0	-	-	0.088	-	< 1.0	0.0111	9.15	0.0167
	FR_GCMW-1B_2020-05-25	2020 05 25	8.54	57.4	5.17	8.36	8.82	606	445	2.9	5.67	273	2.7	-	-	-	-	-	-	382	0.124	0.0051	< 0.0010	-	0.324	-	-	16.9	1,560	7.82	363	19.0	< 1.0	-	-	0.081	-	< 1.0	0.0110	5.41	0.0220
FR_GCMW-2	GCMW-2-170811	2017 08 11	8.12	849	0.8	-	-	1,370	1,130	-	-	-	-	9.5	1,446	-	4.15	7.13	122.1	233	< 0.020	20.3	0.154	20.4	< 0.050	-	20.4	1.23	180	432	233	< 1.0	< 1.0	-	-	-	-	-	-	-	< 0.0020
	FR_GCMW-2_WG_201712141310	2017 12 14	7.79	817	28.1	16.9	16.6	1,460	1,060	27.7	0.59	334	-1	-	-	-	-	-	-	238	0.0090	48.2	0.0034	-	0.272	-	-	1.02	128	416	238	< 1.0	< 1.0	-	-	< 0.050	-	5.3	0.0088	1.47	0.0241
	FR_GCMW-2_WG_201802141258_N_11	2018 02 14	7.85	923	1.27	19.9	18.7	1,670	1,320	1.6	< 0.50	239	-3.2	3.6	1,524	-	3.19	7.32	265.7	239	< 0.0050	63.2	0.0052	-	< 0.050	-	-	< 2.5	180	511	239	< 1.0	< 1.0	-	-	< 0.25	-	7.7	0.0021	< 0.50	0.0041
	FR_GCMW-2_QTR_2018-10-01_NP	2018 12 14	7.87	821	1.67	18.1	16.6	1,460	1,230	3.2	0.71	286	-4.2	5	1,331	-	3.61	7.37	226.4	227	0.0319	55.6	0.0041	-	< 0.050	-	-	1.34	204	459	227	< 1.0	< 1.0	-	-	< 0.050	-	6.3	0.0111	0.65	0.0071
	FR_GCMW-2_QTR_2019-01-07_N	2019 03 13	7.72	947	1.73	22.3	19.2	1,760	1,470	2.3	< 0.50	469	-7.6	3.5	1,517	-	3.83	7.37	264.8	222	0.0597	83.5	< 0.0050	-	< 0.050	-	-	< 2.5	130	574	222	< 1.0	< 1.0	-	-	< 0.25	-	9.5	0.0020	< 0.50	0.0039
	FR_GCMW-2_QTR_2019-04-01_N	2019 06 14	8.15	623	1.46	13.3	12.7	1,170	817	1.6	0.8	433	-2.6	6	1,096	-	6.38	7.42	181.3	198	< 0.0050	35.7	< 0.0050	-	< 0.050	-	-	< 2.5	220	327	198	< 1.0	< 1.0	-	-	< 0.25	-	5.7	< 0.0010	0.67	0.0022
	FR_GCMW-2_QTR_2019-07-01_N	2019 07 26	8.21	591	0.68	12.8	12.1	1,110	867	1.8	2.31	483	-3.1	8	945	-	4	7.41	54.3	216	0.0080	31.3	< 0.0050	-	< 0.050	-	-	< 2.5	260	300	216	< 1.0	< 1.0	-	-	< 0.25	-	8.8	0.0020	2.54	0.0044
	FR_GCMW-2_QTR_2019-10-07_N	2019 11 07	7.93	799	0.72	16.4	16.2	1,120	1,050	2.8	< 0.50	387	-0.5	6.4	1,388	-	4.61	7.32	164.3	243	< 0.0050	42.7	< 0.0050	-	< 0.050	-	-	< 2.5	180	408	243	< 1.0	< 1.0	-	-	< 0.25	-	4.9	0.0027	< 0.50	0.0027
	FR_GCMW-2_QTR_2020-01-06_N	2020 02 10	8.05	971	0.77	19.6	19.7	1,600	1,300	< 1.0	0.63	309	0.3	4.1	1,670	-	5.05	7.67	214.9	229	< 0.0050	67.3	< 0.0050	-	< 0.050	-	-	< 2.5	150	489	229	< 1.0	< 1.0	-	-	< 0.25	-	8.4	0.0052	2.93	0.0724
	FR_GCMW-2_QTR_2020-04-06_N	2020 06 04	8.22	548	0.94	11.4	11.2	969	792	1.6	1.46	422	-1.3	-	-	-	-	-	-	205	0.0086	22.4	0.0016	-	< 0.25	-	-	0.66	156	275	205	< 1.0	< 1.0	-	-	< 0.050	-	2.7	0.0019	0.86	0.0059
FR_CB-1A	FR_CB-1A_WG_2019-11-05_NP[g]	201																																							
	FR_CB-1A_2019-04-05	2019 04 05	7.89	265	21.1	7.16	6.26	600	315	8.8	2.13	364	-6.7	-	-	-	-	-	-	310	0.938	0.0094	0.0013	-	1.39	-	-	32.5	218	1.19	310	< 1.0	< 1.0	-	-	< 0.050	-	6.3	< 0.0010	3.02	0.0215
	FR_DC4_2019-04-05	Duplicate	7.89	266	20.4	7.03	6.32	602	315	10	2.17	419	-5.3	-	-	-	-	-	-	304	0.913	0.0076	0.0012	-	1.27	-	-	32.5	340	1.06	304	< 1.0	< 1.0	-	-	< 0.050	-	6.0	< 0.0010	3.00	0.0191
	QA/QC RPD%		0	0	3	*	*	0	0	13	*	*	*	-	-	-	-	-	-	2	3	*	*	-	9	-	-	0	44	*	2	*	*	-	-	*	-	5	*	1	12
	FR_CB_1A_2019-05-31_NP	2019 05 31	8.27	304	17.9	6.11	7.14	579	315	15	1.4	267	7.8	-	-	-	-	-	-	256	1.21	0.0181	0.0030	-	1.84	-	-	34.1	403	0.7	256	< 1.0	< 1.0	-	-	< 0.050	-	3.6	< 0.0010	2.36	0.0746
	FR_CB_1A_2019-08-12	2019 08 12	8.15	284	20.4	6.59	6.55	595	313	1.9	1.68	382	-0.3	-	-	-	-	-	-	276	1.07	< 0.005	< 0.0010	-	1.06	-	-	37.2	411	0.37	276	< 1.0	< 1.0	-	-	< 0.050	-	10.4	< 0.0010	1.81	0.0096
	FR_CB-1A-2019-10-03	2019 10 03	8.25	286	9.57	6.68	6.6	585	330	3.2	1.47	69.6	-0.6	-	-	-	-	-	-	278	1.01	0.0105	< 0.0010	-	1.21	-	-	38.3	413	0.97	278	< 1.0	< 1.0	-	-	< 0.050	-	6.5	< 0.0010	1.45	0.015
	FR_CB-1A-2019-12-10	2019 12 10	8.32	274	17.7	6.67	6.34	587	269	< 1.0	2.45	492	-2.6	-	-	-	-	-	-	278	0.966	< 0.005	< 0.0010	-	0.991	-	-	39.1	400	< 0.30	271	7.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0012	2.10	0.0108
	FR_CB-1A -2020-01-23																																								
FR_CB-1B	FR_CB-1B_WG_2019-11-05_NP[g]	201																																							
	FR_CB-1B_2019-04-05	2019 04 05	7.94	267	19.6	7.6	6.2	597	300	9.5	2.01	323	-10	-	-	-	-	-	-	330	0.929	< 0.005	< 0.0010	-	1.25	-	-	35.5	209	< 0.30	330	< 1.0	< 1.0	-	-	< 0.050	-	5.4	< 0.0010	3.25	0.0068
	FR_CB-1B_2019-05-29	2019 05 29	8.37	286	17.8	6.67	6.67	664	320	15.6	2.06	297	0	-	-	-	-	-	-	282	1.04	< 0.005	< 0.0010	-	1.18	-	-	36	379	< 0.30	276	6.4	< 1.0	-	-	< 0.050	-	4.7	< 0.0010	2.18	0.0217
	FR_CB_1B_2019-08-14	2019 08 14	8.14	283	20.9	6.5	6.5	568	324	2.9	1.04	417	0.1	-	-	-	-	-	-	268	0.829	< 0.005	< 0.0010	-	1	-	-	39.5	416	< 0.30	268	< 1.0	< 1.0	-	-	< 0.050	-	6.0	< 0.0010	1.39	0.0067
	FR_CB-1B-2019-10-03	2019 10 03	8.3	292	18.6	6.46	6.75	577	322	4.4	1.5	166	2.2	-	-	-	-	-	-	267	1.21	< 0.005	< 0.0010	-	1.13	-	-	39.1	407	< 0.30	267	< 1.0	< 1.0	-	-	< 0.050	-	3.8	< 0.0010	1.50	0.012
	FR_CB-1B-2019-12-10	2019 12 10	8.3	279	12.2	6.8	6.46	594	289	3.5	2.38	475	-2.5	-	-	-	-	-	-	282	1.04	< 0.005	< 0.0010	-	1.12	-	-	40.8	284	< 0.30	277	5.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0010	2.25	0.0062
	FR_CB-1B-2020-01-23	2020 01 23	7.75	270	18.2	11.7	6.24	588	319	8.5	2.24	426	-31	-	-	-	-	-	-	267	0.974	< 0.025	< 0.0050	-	1.11	-	-	224	1,980	< 1.5	267	< 1.0	< 1.0	-	-	< 0.25	-	7.0	< 0.0010	2.39	0.0125

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.
Associated Caro file(s): 7081099.
Associated Historical Data file(s): Teck Coal database.
All terms defined within the body of SNC-Lavalin's report.

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RDL	Denotes reported detection limit.
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with chloride.
[d] Standard varies with hardness.
[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.
[g] Sample collected in 2018 but Teck sample ID reads 2019.
[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15
[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.
[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Dissolved Metals																													
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S8 Study Area																																
FR_GCMW-1B	FR_GCMW-1B_2019-03-27	2019 03 27	25.6	23.1	< 10	6.47	73.7	1.94	149	0.22	1.06	101	< 0.020	88	0.0119	0.11	0.19	0.40	< 0.050	158	< 0.0050	27.3	2.61	2.85	< 0.010	220	< 0.010	< 0.10	< 10	2.31	< 0.50	2.0
	FR_GCMW_1B_2019-05-31_NP	2019 05 31	9.2	24.1	164	7.27	144	1.78	163	0.23	2.04	94.5	< 0.020	81	< 0.025	< 0.10	0.25	< 0.50	< 0.050	126	< 0.0050	31.0	2.68	2	< 0.010	213	< 0.010	< 0.10	< 10	2.14	< 0.50	1.2
	FR_GCMW-1B_QTR_2019-07-01_N	2019 07 26	6.8	21.9	289	6.22	238	1.56	146	0.14	2.53	96.0	< 0.020	96	< 0.010	< 0.10	0.29	< 0.50	< 0.050	111	< 0.0050	35.8	2.62	0.419	< 0.010	175	< 0.010	< 0.10	< 10	1.50	< 0.50	< 1.0
	FR_GCMW-1B_2019-08-13	2019 08 13	9.0	22.4	154	7.22	296	1.71	186	0.15	3.20	113	< 0.020	98	0.0334	< 0.10	0.34	< 0.50	< 0.050	147	< 0.0050	43.2	2.75	0.113	< 0.010	192	< 0.010	< 0.10	< 10	1.33	< 0.50	< 1.0
	FR_GCMW-1B_QTR_2019-10-07_N	2019 10 03	10.8	21.8	162	6.74	286	1.58	152	< 0.10	2.92	101	< 0.020	82	< 0.0050	< 0.10	0.26	< 0.20	< 0.050	94.2	< 0.0050	41.1	1.84	0.14	< 0.010	162	< 0.010	< 0.10	< 10	0.822	< 0.50	< 1.0
	FR_GCMW-1B-2019-12-09	2019 12 09	11.8	22.6	360	6.66	298	1.59	159	< 0.10	3.03	123	< 0.020	63	0.0141	< 0.10	0.23	< 0.20	< 0.050	74.8	< 0.0050	44.2	1.76	0.182	< 0.010	177	< 0.010	0.18	< 10	0.645	< 0.50	< 1.0
	FR_GCMW-1B-2020-01-22	2020 01 22	10.1	22.4	239	6.12	292	1.60	148	< 0.10	2.22	119	< 0.020	67	0.0090	< 0.10	0.21	< 0.20	< 0.050	76.4	< 0.0050	43.7	1.72	0.098	< 0.010	169	< 0.010	0.20	< 10	0.527	< 0.50	< 1.0
	FR_GCMW-1B_2020-05-25	2020 05 25	6.5	16.4	109	3.99	222	1.41	175	< 0.10	1.84	93.5	< 0.020	122	0.0097	< 0.10	0.14	< 0.20	< 0.050	201	< 0.0050	49.2	< 0.50	< 0.050	< 0.010	134	< 0.010	< 0.10	< 10	0.285	< 0.50	1.8
FR_GCMW-2	GCMW-2-170811	2017 08 11	< 5.0	190	< 10	90.7	19.6	4.39	4.96	0.60	< 0.50	93.7	< 0.10	29.4	0.034	0.59	0.11	0.44	< 0.10	162	< 0.010	2.65	4.46	***136***	< 0.050	290	0.048	< 0.20	< 5.0	7.68	< 1.0	< 4.0
	FR_GCMW-2_WG_201712141310	2017 12 14	< 3.0	185	< 10	86.3	2.65	3.63	3.47	0.46	< 0.10	101	< 0.020	16	0.0626	< 0.10	< 0.10	< 0.50	< 0.050	148	< 0.0050	1.98	3.42	***136***	< 0.010	272	< 0.010	< 0.10	< 10	7.34	< 0.50	< 3.0
	FR_GCMW-2_WG_201802141258_N_11	2018 02 14	< 3.0	217	< 10	92.5	4.28	3.45	3.92	0.45	< 0.10	90.1	< 0.020	14	0.0536	0.17	< 0.10	< 0.50	< 0.050	150	< 0.0050	2.02	3.40	***181***	< 0.010	324	< 0.010	< 0.10	< 10	7.95	< 0.50	< 3.0
	FR_GCMW-2_QTR_2018-10-01_NP	2018 12 14	< 3.0	188	< 10	85.6	1.92	3.38	3.50	0.44	< 0.10	73.5	< 0.020	17	0.0535	< 0.10	< 0.10	< 0.50	< 0.050	152	< 0.0050	1.99	3.20	***129***	< 0.010	277	< 0.010	< 0.10	< 10	7.36	< 0.50	1.6
	FR_GCMW-2_QTR_2019-01-07_N	2019 03 13	< 3.0	210	< 10	103	1.45	3.44	4.23	0.42	< 0.10	78.0	< 0.020	14	0.0634	0.12	< 0.10	< 0.50	< 0.050	199	< 0.0050	1.92	3.43	***121***	< 0.010	337	< 0.010	< 0.10	< 10	8.26	< 0.50	2.5
	FR_GCMW-2_QTR_2019-04-01_N	2019 06 14	< 3.0	133	< 10	70.5	0.32	3.19	3.13	0.47	0.12	62.1	< 0.020	16	0.0471	0.12	< 0.10	1.73	0.076	130	< 0.0050	1.88	2.22	***73.8***	< 0.010	203	< 0.010	< 0.10	< 10	5.92	< 0.50	2.4
	FR_GCMW-2_QTR_2019-07-01_N	2019 07 26	3.3	131	< 10	64.2	3.03	3.25	3.80	0.41	< 0.10	58.0	< 0.020	18	0.0412	0.18	< 0.10	< 0.50	< 0.050	105	< 0.0050	1.99	2.25	***80.6***	< 0.010	206	< 0.010	< 0.10	< 10	5.79	< 0.50	1.8
	FR_GCMW-2_QTR_2019-10-07_N	2019 11 07	< 3.0	181	< 10	84.4	0.38	3.87	3.52	0.49	< 0.10	74.5	< 0.020	17	0.0541	< 0.10	< 0.10	0.21	< 0.050	144	< 0.0050	2.05	2.54	***97.9***	< 0.010	287	< 0.010	< 0.10	< 10	7.37	< 0.50	2.4
	FR_GCMW-2_QTR_2020-01-06_N	2020 02 10	< 3.0	212	< 10	107	1.27	3.98	4.63	0.37	< 0.10	77.2	< 0.020	16	0.0774	0.12	< 0.10	0.62	0.058	188	< 0.0050	1.81	3.48	***134***	< 0.010	305	< 0.010	0.17	< 10	8.11	< 0.50	2.5
	FR_GCMW-2_QTR_2020-04-06_N	2020 06 04	< 3.0	122	< 10	58.9	0.14	3.09	3.04	0.38	< 0.10	56.0	< 0.020	18	0.0344	0.11	< 0.10	0.28	< 0.050	132	< 0.0050	1.87	2.07	***70.4***	< 0.010	188	< 0.010	< 0.10	< 10	5.36	< 0.50	2.6
FR_CB-1A	FR_CB-1A_WG_2019-11-05_NP[g]	2018 11 05	3.8	64.7	< 10	27.8	96.9	4.14	29.9	1.34	0.38	2,680	< 0.10	32	0.0257	< 0.10	0.35	0.31	< 0.050	247	0.0186	3.27	1.45	0.218	< 0.010	-	0.013	< 0.10	0.40	0.783	< 0.50	3.7
	FR_CB-1A_2019-04-05	2019 04 05	1.1	62.8	1,210	26.2	39.3	3.73	18.4	< 0.10	0.46	4,040	< 0.020	30	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.05													
	FR_DC4_2019-04-05	Duplicate	1.8	62.5	1,260	26.7	40.6	3.78	19.4	< 0.10	0.47	4,130	< 0.020	32	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.05													
	QA/QC RPD%		*	0	4	2	3	1	5	*	*	2	*	6	*	*	*	*	*	0	*	2	3	*	*	3	*	*	*	2	*	0
	FR_CB_1A_2019-05-31_NP	2019 05 31	< 3.0	70.2	871	31.2	33.9	3.59	19.4	< 0.10	0.21	4,830	< 0.020	28	0.0079	< 0.10	< 0.10	< 0.50	< 0.050	140	< 0.0050	2.01	1.04	0.08	< 0.010	953	< 0.010	< 0.10	< 10	0.067	< 0.50	3.7
	FR_CB_1A_2019-08-12	2019 08 12	< 3.0	69.1	1,470	27.2	21.3	3.28	16.1	< 0.10	0.22	4,100	< 0.020	30	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	126	< 0.0050	1.68	< 0.50	< 0.050	< 0.010	827	< 0.010	< 0.10	< 10	0.050	< 0.50	2.1
	FR_CB-1A-2019-10-03	2019 10 03	< 3.0	66.2	1,520	29.4	22.9	3.52	16.3	< 0.10	0.26	4,380	< 0.020	31	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	123	< 0.0050	1.72	< 0.50	< 0.050	< 0.010	859	< 0.010	< 0.10	< 10	0.039	< 0.50	3.1
	FR_CB-1A-2019-12-10	2019 12 10	< 1.0	63.4	1,500	28.1	18.5	3.22	14.5	< 0.10	0.20	4,410	< 0.020	28	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.05													
	FR_CB-1A -2020-01-23	2020 01 23	11.0	63.2	1,480	27.1	19.6	3.38	15.1	< 0.10	0.27	4,170	< 0.020	26	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.05													
FR_CB-1B	FR_CB-1B_WG_2019-11-05_NP[g]	2018 11 05	< 1.0	66.0	< 10	28.3	51.1	3.73	18.0	1.00	0.22	4,180	< 0.10	30	0.0207	< 0.10	0.27	0.35	< 0.050	180	< 0.0050	2.82	1.06	0.136	< 0.010	-	< 0.010	< 0.10	< 0.30	0.420	< 0.50	4.5
	FR_CB-1B_2019-04-05	2019 04 05	< 1.0	63.2	1,330	26.4	17.6	3.67	16.2	< 0.10	0.31	4,240	< 0.020	29	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.05													
	FR_CB-1B_2019-05-29	2019 05 29	< 3.0	66.9	1,430	28.8	18.7	3.69	16.5	< 0.10	0.17	4,390	< 0.020	30	0.0114	< 0.10	< 0.10	< 0.50	< 0.050	124	< 0.0050	9.00	< 0.50	< 0.050	< 0.010	936	< 0.010	0.11	< 10	0.035	< 0.50	3.1
	FR_CB_1B_2019-08-14	2019 08 14	< 3.0	65.4	1,390	29.1	15.2	3.36	15.8	< 0.10	0.19	4,170	< 0.020	30	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.05													
	FR_CB-1B-2019-10-03	2019 10 03	< 3.0	68.0	1,480	29.6	17.3	3.49	15.3	< 0.10	0.31	4,430	< 0.020	31	< 0.0050	< 0.10	< 0.10	0.25	< 0.050	118	< 0.0050	1.86	< 0.50	< 0.050	< 0.010	850	< 0.010	< 0.10	< 10	0.045	< 0.50	2.3
	FR_CB-1B-2019-12-10	2019 12 10	1.1	64.1	1,180	28.8	26.2	3.41	15.4	0.11	1.02	4,160	< 0.020	28	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.05													
	FR_CB-1B-2020-01-23	2020 01 23	< 3.0	63.5	1,400	27.1	17.5	3.29	14.0	< 0.10	0.37	4,160	< 0.020	27	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	101	< 0.0050	1.76	0.76	< 0.050	< 0.010	783	< 0.010	< 0.10	< 10	0.038	< 0.50	3.9

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S8 Study Area																																			
FR_GCMW-1B	FR_GCMW-1B_2019-03-27	2019 03 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW_1B_2019-05-31_NP	2019 05 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B_QTR_2019-07-01_N	2019 07 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B_2019-08-13	2019 08 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B_QTR_2019-10-07_N	2019 10 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B-2019-12-09	2019 12 09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B-2020-01-22	2020 01 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B_2020-05-25	2020 05 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_GCMW-2	GCMW-2-170811	2017 08 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-2_WG_201712141310	2017 12 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-2_WG_201802141258_N_11	2018 02 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-2_QTR_2018-10-01_NP	2018 12 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-2_QTR_2019-01-07_N	2019 03 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-2_QTR_2019-04-01_N	2019 06 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-2_QTR_2019-07-01_N	2019 07 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-2_QTR_2019-10-07_N	2019 11 07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-2_QTR_2020-01-06_N	2020 02 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-2_QTR_2020-04-06_N	2020 06 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_CB-1A	FR_CB-1A_WG_2019-11-05_NP[g]	2018 11 05	1,120	1.12	0.99	2,620	< 0.50	-	< 50	0.184	73,900	2.26	1.00	4.1	2,020	1.34	206	28,300	142	0.0106	3.58	4.0	-	4,140	0.33	-	0.063	30,000	-	0.052	< 0.50	5.6	1.07	5.1	16
	FR_CB-1A_2019-04-05	2019 04 05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC4_2019-04-05	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB_1A_2019-05-31_NP	2019 05 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB_1A_2019-08-12	2019 08 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1A-2019-10-03	2019 10 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1A-2019-12-10	2019 12 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1A -2020-01-23	2020 01 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_CB-1B	FR_CB-1B_WG_2019-11-05_NP[g]	2018 11 05	268	0.84	0.64	3,820	< 0.50	-	< 50	0.084	70,200	0.90	0.52	< 2.5	1,570	0.51	160	26,900	67.5	< 0.0050	2.83	< 2.5	-	3,280	< 0.25	-	< 0.050	16,600	-	< 0.050	< 0.50	2.3	0.494	< 2.5	< 15
	FR_CB-1B_2019-04-05	2019 04 05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1B_2019-05-29	2019 05 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB_1B_2019-08-14	2019 08 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1B-2019-10-03	2019 10 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1B-2019-12-10	2019 12 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1B-2020-01-23	2020 01 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

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All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab) pH	Hardness mg/L	Turbidity NTU	Total Anions meq/L	Total Cations meq/L	Conductivity µS/cm	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Dissolved Organic Carbon mg/L	Oxidation Reduction Potential mV	Cation Anion Balance %	Field Temperature C	Field Conductivity µS/cm	Field Turbidity NTU	Dissolved Oxygen mg/L	pH (field) pH	Field ORP mV	Total Alkalinity mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Nitrate+Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Nitrogen mg/L	Total Nitrogen-N mg/L	Chloride mg/L	Fluoride µg/L	Sulfate mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Bromide mg/L	Total Acidity mg/L	Acidity (pH 8.3) mg/L	Ortho-Phosphate mg/L	Total Organic Carbon mg/L	Total Phosphorous as P mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S8 Study Area																																									
FR_CB-1C	FR_CB-1C_WG_2018-11-05_NP[g]	201																																							
	FR_CB-1C_2019-02-27	2019 02 27	7.77	1,550	36.2	31.7	31.6	2,510	2,060	44.6	1.24	376	-0.1	-	-	-	-	-	-	283	0.107	142	0.013	-	< 0.050	-	-	< 5.0	310	764	283	< 1.0	< 1.0	-	-	< 0.50	-	11.5	0.0042	1.26	0.0450
	FR_CB_1C_2019-03-28	2019 03 28	7.63	1,210	6.36	21.8	25.3	2,010	1,700	4.1	1.13	360	7.4	-	-	-	-	-	-	256	0.139	78.4	< 0.0050	-	< 0.050	-	-	3.4	280	528	256	< 1.0	< 1.0	-	-	< 0.25	-	9.5	0.0059	1.14	0.0187
	FR_CB-1C_2019-05-29																																								
	FR_CB_1C_2019-08-12	2019 08 12	8.09	899	0.31	19.9	18.8	1,590	1,290	< 1.0	1.16	445	-2.8	-	-	-	-	-	-	306	0.181	50.4	0.0319	-	< 0.25	-	-	10.6	410	473	306	< 1.0	< 1.0	-	-	< 0.25	-	15.4	0.0087	1.23	0.0096
	FR_CB-1C_2019_10_01	2019 10 01	7.96	377	1.28	9.94	8.96	842	542	< 1.0	1.03	338	-5.2	-	-	-	-	-	-	293	0.239	11.3	0.0073	-	< 0.050	-	-	18.1	437	132	293	< 1.0	< 1.0	-	-	< 0.050	-	10.5	0.0111	1.02	0.0145
	FR_CB-1C -2020-01-24	2020 01 24	7.9	1,380	6.56	26	28.2	2,060	1,860	12.2	0.75	441	4.2	-	-	-	-	-	-	283	0.131	91.9	< 0.0050	-	< 0.050	-	-	9.7	300	646	283	< 1.0	< 1.0	-	-	< 0.25	-	11.6	0.0057	1.04	0.0103
FR_CB-2A	FR_CB-2A_WG_2019-11-05_NP[g]	201																																							
	FR_CB-2A_2019-02-27	2019 02 27	8.57	18.4	< 0.10	24.9	9.26	825	494	7,220	1.89	272	-46	-	-	-	-	-	-	1,220	0.795	< 0.025	0.174	-	18	-	-	11.5	1,410	5.6	1,190	28.2	< 1.0	-	-	< 0.25	-	< 1.0	0.0244	1.80	10.7
	FR_CB-2A_2019-04-11	2019 04 11	8.7	17.6	< 0.10	11	8.85	765	486	2,110	2.82	321	-11	-	-	-	-	-	-	525	0.651	< 0.025	< 0.0050	-	4.77	-	-	13.7	1,490	3.8	490	35.4	< 1.0	-	-	< 0.25	-	< 1.0	0.0227	120	3.30
	FR_CB_2A_2019-08-14	2019 08 14	8.79	15.1	17.1	9.74	9.25	832	521	4.1	1.21	236	-2.6	-	-	-	-	-	-	466	0.455	< 0.0050	< 0.0010	-	0.581	-	-	12.6	1,490	< 0.30	429	37.2	< 1.0	-	-	0.063	-	< 1.0	0.0154	1.28	0.0307
	FR_CB-2A_2019_10_01	2019 10 01	8.76	14.8	21	9.93	9.99	824	500	14.7	0.59	294	0.3	-	-	-	-	-	-	476	0.641	< 0.0050	< 0.0010	-	0.708	-	-	12.6	1,140	< 0.30	434	42.2	< 1.0	-	-	0.058	-	< 1.0	0.0171	1.20	0.0240
	FR_DC1_2019_10_01	Duplicate	8.74	14.4	27	9.74	9.9	821	501	13.8	< 0.50	249	0.8	-	-	-	-	-	-	467	0.632	< 0.0050	< 0.0010	-	0.651	-	-	12.6	1,130	0.3	427	40.0	< 1.0	-	-	0.072	-	< 1.0	0.0182	1.06	0.0292
	QA/QC RPD%		0	3	25	*	*	0	0	6	*	*	*	-	-	-	-	-	-	2	1	*	*	-	8	-	-	0	1	*	2	5	*	-	-	*	-	*	6	*	20
	FR_CB-2A-2019-12-09	2019 12 09	8.78	13.8	10.5	9.34	9.33	829	554	1.8	1.08	275	-0.1	-	-	-	-	-	-	445	0.625	< 0.0050	< 0.0010	-	0.6	-	-	12.5	1,740	< 0.30	406	39.6	< 1.0	-	-	0.057	-	< 1.0	0.0164	1.29	0.0219
	FR_CB-2A-2020-01-22	2020 01 22	8.86	13.6	8.33	9.86	8.92	814	522	1.4	0.91	288	-5	-	-	-	-	-	-	472	0.623	0.0113	< 0.0010	-	0.601	-	-	12.6	1,500	< 0.30	425	46.4	< 1.0	-	-	0.066	-	< 1.0	0.0162	0.95	0.0194
FR_CB-4A	FR_CB-4A_2019-12-04	2019 04 12	7.93	558	226	12.1	12	969	757	222	5.69	324	-0.2	-	-	-	-	-	-	307	0.0942	4.85	< 0.0050	-	1.13	-	-	13	150	252	307	< 1.0	< 1.0	-	-	< 0.25	-	8.3	0.0015	7.85	0.244
	FR_CB-4A-2020-02-11	2020 11 02	7.74	475	14.9	12	11	954	521	10.8	2.16	465	-4.4	-	-	-	-	-	-	281	0.211	8.50	0.0360	-	0.492	-	-	7.21	324	268	281	< 1.0	< 1.0	-	-	< 0.050	-	7.5	0.0022	2.20	0.0306
FR_CB-4B	FR_CB-4B_2019-12-05	2019 05 12	7.76	1,160	83.2	23.3	23.6	1,830	1,490	129	2.87	338	0.6	-	-	-	-	-	-	324	0.0874	50.4	0.0126	-	< 0.050	-	-	3.9	< 100	631	324	< 1.0	< 1.0	-	-	< 0.25	-	14.4	< 0.0010	4.43	0.150
	FR_CB-4B_2_2019-12-05	Duplicate	7.74	1,150	90.5	23.4	23.4	1,840	1,570	129	3.33	360	0	-	-	-	-	-	-	327	0.0763	50.4	0.0115	-	< 0.050	-	-	3.9	< 100	631	327	< 1.0	< 1.0	-	-	< 0.25	-	14.0	< 0.0010	3.25	0.115
	QA/QC RPD%		0	1	8	*	*	1	5	0	15	*	*	-	-	-	-	-	-	1	14	0	*	-	*	-	-	*	*	0	1	*	*	-	-	*	-	3	*	31	26
	FR_CB-4B-2020-02-11	2020 11 02	7.39	1,440	7.42	30.6	29.5	2,140	1,940	5.9	2.74	337	-1.8	-	-	-	-	-	-	358	0.0975	82.5	0.136	-	< 0.050	-	-	4.2	110	838	358	< 1.0	< 1.0	-	-	< 0.25	-	26.7	0.0020	2.66	0.0117
FR_CB-5A	FR_CB-5A_2019-12-02	2019 02 12	8.14	264	97.5	5.88	5.6	472	254	97.9	1.54	446	-2.5	-	-	-	-	-	-	283	0.0488	0.0073	< 0.0010	-	0.341	-	-	< 0.50	190	10.1	283	< 1.0	< 1.0	-	-	< 0.050	-	2.2	< 0.0010	5.86	0.150
	FR_CB-5A-2020-02-05	2020 05 02	8.32	276	4.83	5.84	5.81	446	279	6.3	1.12	341	-0.3	-	-	-	-	-	-	283	0.0242	< 0.0050	< 0.0010	-	0.159	-	-	< 0.50	290	8.51	278	5.0	< 1.0	-	-	0.061	-	4.6	0.0016	1.09	0.0297
FR_CB-5B	FR_CB-5B_2019-12-03	2019 03 12	7.67	287	36.8	6.3	5.98	519	303	40.4	2.84	458	-2.6	-	-	-	-	-	-	271	0.0463	< 0.0050	< 0.0010	-	0.151	-	-	2.43	494	37.9	271	< 1.0	< 1.0	-	-	< 0.050	-	12.1	< 0.0010	5.49	0.0317
	FR_CB-5B-2020-02-05	2020 05 02	8.27	282	112	5.47	5.89	453	314	130	0.85	277	3.7	-	-	-	-	-	-	259	0.0495	< 0.0050	< 0.0010	-	0.287	-	-	1.28	722	10.8	259	< 1.0	< 1.0	-	-	< 0.050	-	3.4	0.0051	2.23	0.111
FR_CB-6A	FR_CB-6A_2019-12-03	2019 03 12	8.09	283	84.3	6.52	6.08	522	301	105	1.51	309	-3.5	-	-	-	-	-	-	295	0.0809	0.0067	< 0.0010	-	0.319	-	-	1.53	989	25.4	295	< 1.0	< 1.0	-	-	< 0.050	-	3.2	0.0019	4.39	0.0882
FR_CB-6B	FR_CB-6B-2020-02-05	2020 05 02	8.27	278	7.48	5.91	5.94	468	305	5.1	1.3	259	0.2	-	-	-	-	-	-	278	0.115	< 0.0050	< 0.0010	-	0.248	-	-	0.72	964	14.1	278	< 1.0	< 1.0	-	-	< 0.050	-	4.4	0.0018	1.21	0.0217
S10 Study Area																																		-	-						
FR_HMW1D	GA-HMW-1D_L1238132	2012 11 09	7.9	2,390	5.14	47.2	48.2	3,220	3,260	14.2	1.23	394	-	-	-	-	-	-	-	432	0.968	129	0.041	-	< 0.050	-	-	3.3	< 400	1,410	432	< 1.0	< 1.0	-	-	< 1.0	-	29.1	0.0058	1.82	0.0148
	FRO12_0101201301																																								
	FRO12_0104201301	2013 05 28	7.64	2,230	4.58	49.4	45	3,520	3,650	14.7	1.36	401	-	4.4	2,663	-	2.13	7.23	69.6	413	0.856	149	< 0.020	-	< 0.050	-	-	3.8	< 400	1,460	413	< 1.0	< 1.0	-	-	< 1.0	-	36.2	0.0041	1.10	0.0113
	FR_HMW1D-WG-201309251520	2013 09 25	7.81	2,420	0.72	53	48.8	3,710	4,100	1.5	0.9	412	-	4.1	3,719	-	3.22	7.68	83.6	401	0.881	176	< 0.020	-	< 0.050	-	-	3.4	< 400	1,550	401	< 1.0	< 1.0	-	-	< 1.0	-	11.4	0.0040	0.89	0.0058
	WG-201309251525-FD-5																																								
	QA/QC RPD%		1	0	3	*	*	1	1	*	*	*	-	-	-	-	-	-	-	2	0	1	*	-	*	-	-	6	*	1	2	*	*	-	-	*	-	1	*	*	16

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

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[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																													
			Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S8 Study Area																																
FR_CB-1C	FR_CB-1C_WG_2018-11-05_NP[g]	2018 11 05	12.1	269	25	128	379	5.57	12.1	1.09	0.56	119	< 0.10	33	0.0994	< 0.10	0.92	0.47	< 0.050	285	< 0.0050	7.46	15.2	***233***	< 0.010	-	0.012	< 0.10	0.34	11.7	< 0.50	6.8
	FR_CB-1C_2019-02-27	2019 02 27	< 5.0	333	< 50	174	279	5.98	12.5	0.97	< 0.50	132	< 0.10	< 50	0.244	< 0.50	< 0.50	< 1.0	< 0.25	458	< 0.0050	7.48	29.1	***195***	< 0.050	539	< 0.050	< 0.50	< 10	16.7	< 2.5	9.2
	FR_CB_1C_2019-03-28	2019 03 28	< 1.0	254	< 10	140	359	5.09	21.9	0.60	0.81	184	< 0.020	32	0.0744	< 0.10	0.53	< 0.20	< 0.050	391	< 0.0050	14.3	12.0	***158***	< 0.010	541	0.018	< 0.10	< 10	11.7	< 0.50	3.2
	FR_CB-1C_2019-05-29	2019 05 29	< 3.0	175	28	96.0	433	3.65	28.1	0.42	1.07	301	< 0.020	33	0.0378	< 0.10	0.50	0.67	< 0.050	358	< 0.0050	17.0	5.77	***93.6***	< 0.010	503	0.017	< 0.10	< 10	8.49	< 0.50	1.2
	FR_CB_1C_2019-08-12	2019 08 12	< 3.0	191	34	102	422	3.68	16.2	0.63	0.76	399	< 0.020	31	0.0716	< 0.10	0.56	< 0.50	< 0.050	282	< 0.0050	10.3	10.7	***141***	< 0.010	549	0.025	< 0.10	< 10	10.6	0.66	1.5
	FR_CB-1C_2019_10_01	2019 10 01	< 3.0	69.5	101	49.3	281	2.29	30.8	0.18	1.84	333	< 0.020	31	< 0.0090	< 0.10	0.27	< 0.20	< 0.050	310	< 0.0050	18.9	2.56	***30***	< 0.010	379	< 0.010	0.11	< 10	3.38	< 0.50	< 1.0
	FR_CB-1C -2020-01-24	2020 01 24	< 5.0	285	< 50	161	489	4.98	14.0	0.77	< 0.50	300	< 0.10	< 50	0.066	< 0.50	0.73	< 1.0	< 0.25	371	< 0.0050	7.10	22.6	***154***	< 0.050	555	< 0.050	< 0.50	< 10	14.5	< 2.5	< 5.0
FR_CB-2A	FR_CB-2A_WG_2019-11-05_NP[g]	2018 11 05	11.9	7.18	< 10	2.17	7.64	1.84	207	0.83	2.00	51.8	< 0.10	357	0.0167	< 0.10	0.12	0.36	< 0.050	783	0.0203	1.61	0.74	2.85	< 0.010	-	0.030	< 0.10	0.32	1.04	4.80	1.2
	FR_CB-2A_2019-02-27	2019 02 27	13.2	4.30	< 50	1.86	27.4	1.54	202	0.68	1.82	96.7	< 0.10	382	< 0.025	< 0.50	< 0.50	< 1.0	< 0.25	546	< 0.0050	3.84	< 2.5	0.76	< 0.050	165	< 0.050	< 0.50	< 10	1.26	6.3	< 5.0
	FR_CB-2A_2019-04-11	2019 04 11	8.8	3.94	< 10	1.88	18.7	1.40	195	0.30	1.25	148	< 0.020	365	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	534	< 0.0050	2.54	< 0.50	0.087	< 0.010	235	< 0.010	< 0.10	< 10	0.796	3.05	< 1.0
	FR_CB_2A_2019-08-14	2019 08 14	7.0	3.29	< 10	1.67	9.34	1.08	205	< 0.10	0.63	203	< 0.020	412	< 0.0050	< 0.10	< 0.10	0.89	< 0.050	582	< 0.0050	0.650	< 0.50	< 0.050	< 0.010	267	< 0.010	< 0.10	< 10	0.136	0.64	< 1.0
	FR_CB-2A_2019_10_01	2019 10 01	6.8	3.13	< 10	1.70	8.30	1.11	221	< 0.10	0.73	232	< 0.020	403	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	572	< 0.0050	0.462	< 0.50	0.063	< 0.010	269	< 0.010	< 0.10	< 10	0.102	< 0.50	< 1.0
	FR_DC1_2019_10_01	Duplicate	6.4	3.07	< 10	1.64	8.22	1.10	219	< 0.10	0.69	234	< 0.020	390	< 0.0050	< 0.10	< 0.10	0.21	< 0.050	556	< 0.0050	0.337	< 0.50	0.053	< 0.010	275	< 0.010	< 0.10	< 10	0.077	< 0.50	< 1.0
	QA/QC RPD%		6	2	*	4	1	1	1	*	6	1	*	3	*	*	*	*	*	3	*	31	*	*	*	2	*	*	*	28	*	*
	FR_CB-2A-2019-12-09	2019 12 09	6.9	3.01	< 10	1.53	8.24	1.04	206	< 0.10	0.56	237	< 0.020	349	< 0.0050	< 0.10	< 0.10	0.27	< 0.050	528	< 0.0050	0.221	< 0.50	< 0.050	< 0.010	288	< 0.010	< 0.10	< 10	0.055	< 0.50	< 1.0
	FR_CB-2A-2020-01-22	2020 01 22	6.0	3.12	< 10	1.42	7.45	1.10	197	< 0.10	0.54	235	< 0.020	370	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	511	< 0.0050	0.248	< 0.50	< 0.050	< 0.010	291	< 0.010	< 0.10	< 10	0.061	< 0.50	< 1.0
FR_CB-4A	FR_CB-4A_2019-12-04	2019 04 12	2.4	145	< 10	47.9	102	2.12	19.0	7.37	0.51	289	< 0.020	55	0.0527	< 0.10	0.50	2.45	0.067	48.0	< 0.0050	20.5	4.84	***50.1***	0.029	464	< 0.010	0.26	< 10	22.9	0.57	10.0
	FR_CB-4A-2020-02-11	2020 11 02	< 3.0	111	48	47.9	121	1.72	34.0	0.63	0.24	313	< 0.020	104	< 0.015	< 0.10	0.15	0.30	< 0.050	92.5	< 0.0050	4.68	1.26	1.01	< 0.010	495	< 0.010	0.16	< 10	4.38	< 0.50	2.0
FR_CB-4B	FR_CB-4B_2019-12-05	2019 05 12	2.0	268	379	119	323	3.17	5.51	0.29	0.35	119	< 0.020	15	0.0580	< 0.10	1.40	0.72	< 0.050	116	< 0.0050	3.08	6.63	***178***	< 0.010	241	0.013	0.19	< 10	7.92	< 0.50	7.8
	FR_CB-4B_2_2019-12-05	2019 05 12	1.3	267	388	118	317	3.10	5.55	0.28	0.29	115	< 0.020	14	0.0544	< 0.10	1.44	0.53	< 0.050	119	< 0.0050	2.93	6.63	***183***	< 0.010	247	0.011	0.10	< 10	7.51	< 0.50	6.9
	QA/QC RPD%		*	0	2	1	2	2	1	*	*	3	*	*	6	*	3	*	*	3	*	5	0	3	*	2	*	*	*	5	*	12
	FR_CB-4B-2020-02-11	2020 11 02	< 3.0	331	93	149	1,090	3.95	13.7	0.27	< 0.20	110	< 0.040	< 20	0.026	< 0.20	1.40	< 0.40	< 0.10	207	< 0.0050	2.11	4.0	***117***	< 0.020	363	< 0.020	< 0.20	< 10	6.23	< 1.0	8.2
FR_CB-5A	FR_CB-5A_2019-12-02	2019 02 12	2.9	62.7	< 10	26.1	88.0	1.70	6.18	1.14	0.60	123	< 0.020	28	0.0518	< 0.10	0.65	0.69	< 0.050	18.0	< 0.0050	4.05	2.38	1.85	< 0.010	247	0.017	0.18	< 10	0.727	< 0.50	4.5
	FR_CB-5A-2020-02-05	2020 05 02	< 3.0	65.4	115	27.3	116	1.40	5.86	0.18	0.58	157	< 0.020	24	0.0165	< 0.10	0.49	0.22	< 0.050	14.9	< 0.0050	2.29	1.45	0.26	< 0.010	228	< 0.010	0.19	< 10	0.600	< 0.50	2.9
FR_CB-5B	FR_CB-5B_2019-12-03	2019 03 12	4.7	66.5	12	29.3	112	1.56	4.74	0.33	0.83	112	< 0.020	28	0.0235	0.15	0.42	1.03	0.075	16.0	< 0.0050	2.94	1.73	0.355	< 0.010	229	0.016	0.32	< 10	1.47	< 0.50	9.6
	FR_CB-5B-2020-02-05	2020 05 02	< 3.0	66.6	< 10	28.2	144	1.30	4.80	< 0.10	0.65	142	< 0.020	25	0.0142	< 0.10	0.46	0.23	< 0.050	13.1	< 0.0050	2.45	1.32	0.091	< 0.010	228	0.010	< 0.10	< 10	1.25	< 0.50	3.3
FR_CB-6A	FR_CB-6A_2019-12-03	2019 03 12	3.5	68.0	< 10	27.6	191	2.71	7.69	0.46	0.57	135	< 0.020	37	0.0216	< 0.10	0.94	1.48	0.591	21.0	< 0.0050	15.7	2.82	0.497	< 0.010	335	0.028	0.22	< 10	2.25	< 0.50	57.7
FR_CB-6B	FR_CB-6B-2020-02-05	2020 05 02	< 3.0	64.0	116	28.8	277	1.97	6.95	< 0.10	0.72	191	< 0.020	33	< 0.0050	< 0.10	0.96	< 0.20	0.057	15.2	< 0.0050	2.69	1.63	< 0.050	< 0.010	386	0.010	< 0.10	< 10	1.33	< 0.50	6.5
S10 Study Area																																
FR_HMW1D	GA-HMW-1D_L1238132	2012 11 09	< 15	530	< 30	258	518	9.7	2.7	0.55	< 0.50	21.6	< 0.50	54	0.054	< 0.50	4.59	< 2.5	< 0.25	80.1	< 0.010	0.78	28.9	9.10	< 0.050	347	< 0.050	< 0.50	19	9.96	< 5.0	< 15
	FRO12_0101201301	2013 03 28	< 3.0	517	< 30	260	545	9.1	2.3	0.45	< 0.20	19.0	< 0.20	52	0.043	< 0.20	5.11	0.97	< 0.10	101	< 0.010	0.87	31.7	4.46	< 0.020	377	< 0.020	< 0.20	< 10	10.6	< 2.0	4.8
	FRO12_0104201301	2013 05 28	< 3.0	480	< 30	251	513	8.8	2.5	0.44	< 0.20	18.1	< 0.20	50	0.051	< 0.20	4.76	< 0.50	< 0.10	80.6	< 0.010	0.83	29.7	14.6	< 0.020	349	< 0.020	< 0.20	< 10	10.3	< 2.0	5.2
	FR_HMW1D-WG-201309251520	2013 09 25	< 3.0	518	< 30	274	514	9.28	2.44	0.45	0.21	18.5	< 0.20	53	0.055	< 0.20	4.19	< 0.50	< 0.10	84.3	< 0.010	0.81	35.5	***168***	< 0.020	364	< 0.020	< 0.20	24	11.4	< 2.0	5.6
	WG-201309251525-FD-5	Duplicate	< 3.0	519	< 30	271	515	8.56	2.38	0.42	0.24	17.9	< 0.20	52	0.051	< 0.20	4.97	< 0.50	< 0.10	84.2	< 0.010	0.77	34.2	***167***	< 0.020	348	< 0.020	< 0.20	26	10.9	< 2.0	6.3
	QA/QC RPD%		*	0	*	1	0	8	2	*	*	3	*	2	8	*	17	*	*	0	*	5	4	1	*	4	*	*	8	4	*	12

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Total Metals																																
Sample Location	**Sample ID**	**Sample Date (yyyy mm dd)**	**Aluminum µg/L**	**Antimony µg/L**	**Arsenic µg/L**	**Barium µg/L**	**Beryllium µg/L**	**Bismuth µg/L**	**Boron µg/L**	**Cadmium µg/L**	**Calcium µg/L**	**Chromium µg/L**	**Cobalt µg/L**	**Copper µg/L**	**Iron µg/L**	**Lead µg/L**	**Lithium µg/L**	**Magnesium µg/L**	**Manganese µg/L**	**Mercury µg/L**	**Molybdenum µg/L**	**Nickel µg/L**	**Phosphorous µg/L**	**Potassium µg/L**	**Selenium µg/L**	**Silicon µg/L**	**Silver µg/L**	**Sodium µg/L**	**Strontium µg/L**	**Thallium µg/L**	**Tin µg/L**	**Titanium µg/L**	**Uranium µg/L**	**Vanadium µg/L**	**Zinc[f] µg/L**
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S8 Study Area																																			
FR_CB-1C	FR_CB-1C_WG_2018-11-05_NP[g]	2018 11 05	811	1.13	1.32	127	< 0.10	-	36	0.371	302,000	2.02	1.76	3.34	2,190	1.66	309	133,000	497	0.0171	8.29	21.2	-	5,890	187	-	0.058	12,400	-	0.067	0.13	9.06	13.3	4.10	20.8
	FR_CB-1C_2019-02-27	2019 02 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB_1C_2019-03-28	2019 03 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1C_2019-05-29	2019 05 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB_1C_2019-08-12	2019 08 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1C_2019_10_01	2019 10 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-1C -2020-01-24	2020 01 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_CB-2A	FR_CB-2A_WG_2019-11-05_NP[g]	2018 11 05	6,130	0.79	3.56	246	0.78	-	384	1.20	67,000	12.5	2.82	21.9	6,610	7.34	619	8,300	290	< 0.50[h]	1.86	13.0	-	3,700	2.76	-	0.315	198,000	-	0.273	< 0.50	21.7	2.17	30.1	81
	FR_CB-2A_2019-02-27	2019 02 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-2A_2019-04-11	2019 04 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB_2A_2019-08-14	2019 08 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-2A_2019_10_01	2019 10 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC1_2019_10_01	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-2A-2019-12-09	2019 12 09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_CB-2A-2020-01-22	2020 01 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_CB-4A	FR_CB-4A_2019-12-04	2019 04 12	2,270	5.73	1.95	436	0.227	< 0.050	54	0.431	133,000	6.48	1.90	11.9	3,970	5.74	41.3	54,300	206	< 0.0050	17.5	11.9	-	3,090	39.4	5,930	0.115	23,200	441	0.086	0.36	12	18.8	10.7	45.2
	FR_CB-4A-2020-02-11	2020 11 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	1.11	-	-	-	-	-	-	-	-	-	-
FR_CB-4B	FR_CB-4B_2019-12-05	2019 05 12	1,000	0.61	1.22	144	0.117	< 0.050	16	0.336	257,000	4.17	2.25	5.99	2,910	4.86	119	120,000	408	< 0.0050	3.19	10.8	-	3,520	149	4,870	0.043	6,810	253	0.055	2.26	< 10	7.57	4.85	29.0
	FR_CB-4B_2_2019-12-05	2019 05 12	1,480	0.69	1.30	159	< 0.10	< 0.25	< 50	0.381	261,000	5.15	2.60	6.8	2,980	5.73	115	139,000	442	< 0.0050	3.65	12.7	-	3,930	137	5,680	0.054	7,400	276	0.062	2.83	25	7.88	6.4	46
	QA/QC RPD%		39	*	6	10	*	*	*	13	2	21	14	13	2	16	3	15	8	*	13	16	-	11	8	15	*	8	9	12	22	*	4	28	45
	FR_CB-4B-2020-02-11	2020 11 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	112	-	-	-	-	-	-	-	-	-	-
FR_CB-5A	FR_CB-5A_2019-12-02	2019 02 12	1,200	1.28	1.43	212	0.105	< 0.050	28	0.232	66,400	3.15	1.42	5.71	2,300	2.80	16.6	30,300	142	< 0.0050	3.52	5.48	-	2,190	1.65	6,260	0.035	7,470	234	0.061	0.58	< 10	0.808	5.19	21.0
	FR_CB-5A-2020-02-05	2020 05 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	0.314	-	-	-	-	-	-	-	-	-	-
FR_CB-5B	FR_CB-5B_2019-12-03	2019 03 12	308	0.50	0.92	125	0.045	< 0.050	29	0.0904	68,300	2.58	0.63	3.36	581	1.85	14.2	30,700	133	< 0.0050	2.92	2.73	-	1,630	0.273	5,510	0.010	5,600	239	0.035	0.63	< 10	1.52	1.68	14.6
	FR_CB-5B-2020-02-05	2020 05 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0075	-	-	-	-	0.267	-	-	-	-	-	-	-	-	-	-
FR_CB-6A	FR_CB-6A_2019-12-03	2019 03 12	1,150	0.66	1.10	180	0.077	< 0.050	36	0.138	82,700	7.06	1.48	9.34	1,670	32.9	18.5	31,600	255	< 0.0050	14.2	6.45	-	3,000	0.408	6,640	0.031	9,070	373	0.054	0.78	22	2.30	4.90	74.6
FR_CB-6B	FR_CB-6B-2020-02-05	2020 05 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	0.129	-	-	-	-	-	-	-	-	-	-
S10 Study Area																																			
FR_HMW1D	GA-HMW-1D_L1238132	2012 11 09	61	0.58	< 0.50	25.4	< 0.50	< 2.5	56	0.053	524,000	< 0.50	5.01	< 2.5	93	< 0.25	84.2	250,000	548	< 0.010	0.91	30.8	< 300	8,800	9.43	2,640	< 0.050	2,400	353	< 0.050	< 0.50	20	10.3	< 5.0	< 15
	FRO12_0101201301	2013 03 28	7.1	0.51	< 0.20	19.1	< 0.20	< 1.0	53	0.049	522,000	< 0.20	5.26	< 1.0	< 30	< 0.10	107	266,000	566	< 0.010	0.90	33.1	< 300	9,500	4.44	2,450	< 0.020	2,400	396	< 0.020	< 0.20	< 10	10.7	< 2.0	< 6.0
	FRO12_0104201301	2013 05 28	83.0	0.54	< 0.20	22.3	< 0.20	< 1.0	52	0.051	488,000	< 0.20	4.99	< 1.0	113	< 0.10	85.1	268,000	526	< 0.010	0.79	31.9	-	9,500	14.1	2,680	< 0.020	2,700	360	< 0.020	< 0.20	< 10	10.4	< 2.0	6.3
	FR_HMW1D-WG-201309251520	2013 09 25	17.8	0.47	0.61	19.3	< 0.20	< 1.0	56	0.056	535,000	0.25	5.52	< 1.0	< 30	< 0.10	91.8	285,000	555	< 0.010	0.89	37.1	-	9,160	172	2,340	< 0.020	2,460	380	< 0.020	< 0.20	27	11.9	< 2.0	6.5
	WG-201309251525-FD-5	Duplicate	17.6	0.43	0.42	19.6	< 0.20	< 1.0	51	0.060	529,000	< 0.20	5.26	< 1.0	< 30	< 0.10	85.5	278,000	536	< 0.010	0.79	35.5	-	8,900	171	2,370	< 0.020	2,420	351	< 0.020	< 0.20	29	11.2	< 2.0	7.0
	QA/QC RPD%		1	*	*	2	*	*	9	7	1	*	5	*	*	*	7	2	3	*	12	4	-	3	1	1	*	2	8	*	*	7	6	*	7

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

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All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

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n/a Denotes no applicable standard/guideline.

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* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
			pH (lab)	Hardness	Turbidity	Total Anions	Total Cations	Conductivity	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Oxidation Reduction Potential	Cation Anion Balance	Field Temperature	Field Conductivity	Field Turbidity	Dissolved Oxygen	pH (field)	Field ORP	Total Alkalinity	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Nitrate+Nitrite (as N)	Kjeldahl Nitrogen-N	Nitrogen	Total Nitrogen-N	Chloride	Fluoride	Sulfate	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Bromide	Total Acidity	Acidity (pH 8.3)	Ortho-Phosphate	Total Organic Carbon	Total Phosphorous as P
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH	mg/L	NTU	meq/L	meq/L	µS/cm	mg/L	mg/L	mg/L	mV	%	C	µS/cm	NTU	mg/L	pH	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S10 Study Area																																									
FR_HMW1D	FR_HMW1D_Q_01102013_N	2013 12 09	7.65	2,560	4.04	57.2	51.6	3,940	4,170	7.617.6	0.92	415	-	2.6	3,518	-	5.54	7.41	-	408	0.949	203	0.021	-	< 0.050	-	-	3.3	< 400	1,660	408	< 1.0	< 1.0	-	-	< 1.0	-	14.1	0.0037	1.45	0.0099
	FR_HMW1D_Q_01012014_N	2014 03 12	7.78	2,640	4.22	56.3	53.1	3,890	4,030	23.1	1.09	438	-	3.7	3,551	-	3.29	7.04	14.5	399	0.953	197	< 0.020	-	< 0.050	-	-	3.6	690	1,640	399	< 1.0	< 1.0	-	-	< 1.0	-	25.0	0.0036	4.39	0.0217
	FR_HMW1D_Q_01042014_N	2014 05 13	7.8	2,580	0.71	54.6	52	3,920	4,220	5.2	1.08	301	-	4.9	3,719	-	2.27	7.82	-33.5	389	1.04	181	< 0.020	-	< 0.050	-	-	4	< 400	1,620	389	< 1.0	< 1.0	-	-	< 1.0	-	23.0	0.0033	1.02	0.0039
	FR_HMW1D_QSW_02072014_N	2014 09 30	7.85	2,490	0.22	56.1	50.3	3,790	3,860	< 1.0	1.21	389	-	7.3	3,655	-	3.41	6.88	38.3	432	0.571	161	< 0.020	-	< 0.050	-	-	10.8	< 400	1,710	432	< 1.0	< 1.0	-	-	< 1.0	-	31.9	< 0.0010	1.16	< 0.0020
	FR_HMW1D_QSW_02102014_N	2014 10 22	7.9	2,550	0.73	55.6	51.4	3,870	4,150	4	1.37	383	-	4.2	3,765	-	1.09	6.89	178.9	331	0.547	170	< 0.020	-	< 0.050	-	-	5.7	< 400	1,760	331	< 1.0	< 1.0	-	-	< 1.0	-	34.6	< 0.0010	1.59	0.0026
	FR_HMW1D_QSW_02012015_N	2015 01 19	7.75	2,280	-	-	-	3,880	3,800	1.3	1.38	-	-	3.2	-	-	-	7.23	-	407	0.572	175	< 0.020	-	< 0.050	-	-	4.2	< 400	1,780	-	-	-	-	-	< 1.0	-	-	-	1.16	< 0.0020
	FR_HMW1D-WQ-201501191415	Duplicate	7.76	2,500	-	-	-	3,870	3,830	1.5	1.26	-	-	-	-	-	-	-	-	400	0.603	171	0.023	-	< 0.050	-	-	4.4	< 400	1,740	-	-	-	-	-	< 1.0	-	-	-	1.29	< 0.0020
	QA/QC RPD%		0	9	-	-	-	0	1	*	*	-	-	-	-	-	-	-	-	2	5	2	*	-	*	-	-	5	*	2	-	-	-	-	-	*	-	-	-	*	*
	FR_HMW1D_QSW_02042015_N	2015 04 14	7.36	2,480	-	-	-	3,810	3,860	1.6	1.22	-	-	3.6	3,530	-	-	7.07	-	374	0.449	169	< 0.020	-	< 0.050	-	-	3.6	< 400	1,650	-	-	-	-	-	< 1.0	-	-	-	1.02	0.0027
	FR_HMW1D_QSW_02072015_N	2015 07 03	7.45	2,610	-	-	-	3,830	4,440	1.9	0.96	-	-	5.1	3,683	-	-	7.06	-	401	0.471	172	0.023	-	< 0.050	-	-	4.3	< 400	1,730	-	-	-	-	-	< 1.0	-	-	-	0.87	0.0023
	FR_HMW1D_QSW_02102015_N	2015 10 09	7.53	2,490	-	-	-	3,780	4,110	4.4	0.99	-	-	4.1	3,803	-	-	7.26	-	443	0.321	157	0.023	-	0.236	-	-	3.7	< 400	1,710	-	-	-	-	-	< 1.0	-	-	-	1.10	0.0029
	FR_HMW1D_QSW_04012016_N	2016 02 22	7.39	2,510	0.22	54.7	50.4	3,990	4,070	1.7	1.12	325	-	4.1	3,468	-	2.66	7.01	195.8	409	0.399	165	< 0.020	-	0.841	-	-	3.4	< 400	1,660	409	< 1.0	< 1.0	-	-	< 1.0	-	52.0	0.0038	1.10	0.0035
	FR_HMW1D_QSW_04042016_N	2016 05 18	7.82	2,560	0.23	52.9	51.6	3,910	3,870	1.6	0.91	362	-	4	3,470	-	0.89	6.89	173	413	0.389	157	< 0.020	-	0.568	-	-	3.4	< 400	1,600	413	< 1.0	< 1.0	-	-	< 1.0	-	28.5	0.0032	0.96	0.0035
	FR_HMW1D_QSW_04072016_N	2016 08 15	7.52	2,530	0.57	55.9	50.8	4,060	3,970	1.8	1.44	379	-	4.9	3,567	-	2.67	7.46	135	444	0.315	160	< 0.020	-	0.686	-	-	3.9	< 400	1,700	444	< 1.0	< 1.0	-	-	< 1.0	-	43.2	0.0032	1.30	0.0029
	FR_HMW1D_QSW_03102016_N	2016 11 22	7.29	2,690	0.42	57.4	54.1	3,870	4,090	1.5	1.16	326	-	5	35.08	-	2.05	6.97	-43.3	455	0.188	156	< 0.020	-	0.721	-	-	3.7	< 400	1,780	455	< 1.0	< 1.0	-	-	< 1.0	-	46.2	0.0032	1.56	0.0027
	FR_HMW1D_QSW_02012017_N	2017 02 27	7.07	2,470	0.45	53.7	49.8	3,760	3,710	2.5	1.39	356	-	4.4	3,367	-	1.97	7.06	48.5	427	0.317	157	0.0170	-	0.474	-	-	2.5	190	1,630	427	< 1.0	< 1.0	-	-	< 0.25	-	72.7	0.0139	1.47	0.025
	FR_HMW1D_QSW_03042017_N	2017 06 22	7.65	2,340	0.69	55.2	47	3,780	3,550	1.4	1.82	359	-8	3.9	3,638	-	1.89	7.18	139.6	400	0.228	155	0.011	-	< 0.25	-	-	< 5.0	< 200	1,730	400	< 1.0	< 1.0	-	-	< 0.50	-	44.1	0.0025	1.63	0.0022
	FR_HMW1D_QTR_2017-09-11_N	2017 09 18	7.8	2,660	0.48	56	53.4	3,660	3,650	< 1.0	0.91	340	-2.4	3.8	3,542	-	0.05	7.03	173.9	374	0.173	155	0.0123	-	< 0.050	-	-	< 2.5	140	1,800	374	< 1.0	< 1.0	-	-	< 0.25	-	20.0	0.0034	1.03	0.0053
	FR_HMW1D_QTR_2017-10-02_N	2017 11 14	7.85	2,760	0.51	56.2	55.4	3,640	3,340	1.8	1.16	339	-0.7	3.6	3,627	-	0.31	6.77	204.6	348	0.207	151	0.018	-	< 0.050	-	-	< 5.0	< 200	1,840	348	< 1.0	< 1.0	-	-	< 0.50	-	26.3	0.0029	1.29	0.0048
	WG_2017-10-02_002	Duplicate	7.88	2,920	0.56	56.4	58.7	3,680	3,990	1	1.05	283	2	-	-	-	-	-	-	341	0.208	153	0.020	-	< 0.050	-	-	< 5.0	< 200	1,860	341	< 1.0	< 1.0	-	-	< 0.50	-	28.6	0.0034	1.27	0.0049
	QA/QC RPD%		0	6	9	*	*	1	18	*	*	*	*	-	-	-	-	-	-	2	0	1	11	-	*	-	-	*	*	1	2	*	*	-	-	*	-	8	*	*	*
	FR_HMW1D_QTR_2018-01-01_N	2018 01 24	7.51	2,670	0.78	55.2	53.6	4,030	3,970	2.4	1.66	359	-1.5	3.2	3,589	-	0.42	6.84	257.1	406	0.342	152	< 0.010	-	0.329	-	-	< 5.0	< 200	1,740	406	< 1.0	< 1.0	-	-	< 0.10	-	27.9	0.0033	1.61	0.0066
	FR_HMW1D_QTR_2018-04-02_N	2018 06 12	7.85	2,740	0.51	57.6	55	3,960	4,150	1.7	1.13	263	-2.3	4	3,712	-	1.37	6.67	230.4	446	0.241	148	0.032	-	< 0.050	-	-	< 5.0	260	1,830	446	< 1.0	< 1.0	-	-	< 0.50	-	19.0	0.0026	1.16	0.0046
	FR_HMW1D_QTR_2018-07-02_N	2018 07 18	7.9	2,730	0.7	56.4	54.7	3,690	4,090	2.2	1.25	393	-1.5	4.2	3,535	-	0.24	6.82	142.7	294	0.174	150	0.016	-	< 0.050	-	-	< 5.0	290	1,910	294	< 1.0	< 1.0	-	-	< 0.50	-	5.6	0.0011	1.13	0.0049
	FR_HMW1D_QTR_2018-10-01_N	2018 12 11	7.9	2,690	0.33	55.5	54	3,630	4,100	3	1.13	411	-1.4	3.7	3,265	-	4.66	7.01	246.3	375	0.155	134	0.020	-	0.537	-	-	< 5.0	260	1,850	375	< 1.0	< 1.0	-	-	< 0.50	-	40.6	0.0203	1.07	0.0456
	FR_HMW1D_QTR_2019-01-07_N	2019 03 13	7.43	2,600	0.79	62.8	52.3	3,890	4,090	4	0.86	349	-9.2	3.6	3,383	-	0.35	6.91	243.4	411	0.217	151	< 0.010	-	< 0.050	-	-	< 5.0	< 200	2,110	411	< 1.0	< 1.0	-	-	< 0.50	-	27.7	0.0034	0.87	0.0039
	FR_HMW1D_QTR_2019-04-01_N	2019 05 29	7.89	2,790	0.68	58.1	56	3,990	3,840	4.2	1.29	421	-1.8	9.9	3,484	-	0.16	6.88	288.8	396	0.208	133	0.047	-	< 0.050	-	-	< 5.0	280	1,950	396	< 1.0	< 1.0	-	-	< 0.50	-	32.6	0.0026	1.84	< 0.0020
	FR_HMW1D_QTR_2019-07-01_N	2019 07 25	8	2,710	0.85	55.7	54.4	3,930	3,880	3.4	0.69	334	-1.1	4.8	3,233	-	2.53	6.93	198.4	393	0.121	133	0.019	-	< 0.25	-	-	< 5.0	320	1,840	393	< 1.0	< 1.0	-	-	< 0.50	-	32.2	0.0034	0.76	0.0035
	FR_HMW1D_QTR_2019-10-07_N	2019 10 23	7.85	2,570	0.8	55.6	51.7	3,340	3,810	6.2	0.89	433	-3.6	4	3,820	-	0.96	7.01	73	426	0.0757	122	0.0175	-	< 0.050	-	-	2.6	220	1,840	426	< 1.0	< 1.0	-	-	< 0.25	-	24.1	0.0048	1.02	0.0042
	FR_DC1_QTR_2019-10-07_N	Duplicate	7.85	2,500	0.92	55.4	50.1	3,230	3,970	4.4	0.94	460	-5	-	-	-	-	-	-	430	0.0510	122	0.0154	-	< 0.050	-	-	2.5	220	1,830	430	< 1.0	< 1.0	-	-	< 0.25	-	30.2	0.0046	0.78	0.0043
	QA/QC RPD%		0	3	14	*	*	3	4	*	*	*	*	-	-	-	-	-	-	1	39	0	13	-	*	-	-	4	0	1	1	*	*	-	-	*	-	22	*	*	*
	HMW1D_QTR_2020-01-06_N	2020 03 02	7.9	2,710	0.65	54.9	54.4	3,490	3,930	4.1	1.33	374	-0.4	3.5	3,748	-	2.5	7.33	176.2	417	0.0185	105	0.0194	-	< 0.050	-	-	2.5	160	1,870	417	< 1.0	< 1.0	-	-	< 0.25	-	58.1	0.0035	1.29	0.0052
	FR_HMW1D_QTR_2020-04-06_N	2020 05 14	7.9	2,760	0.63	49.6	55.4	2,390	3,960	4.5	1.03	361	5.5	-	-	-	-	-	-	209	0.0319	113	0.0275	-	< 0.050	-	-	2.8	220	1,790	209	< 1.0	< 1.0	-	-	< 0.25	-	12.1	0.0018	0.90	< 0.0020
FR_HMW1S	GA-HMW-1S_L1238132																																								
	FRO12_0101201302																																								
	FRO12_0104201302																																								

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

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*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

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[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Dissolved Metals																													
Sample Location	**Sample ID**	**Sample Date (yyyy mm dd)**	**Dissolved Aluminum µg/L**	**Dissolved Calcium mg/L**	**Dissolved Iron µg/L**	**Dissolved Magnesium mg/L**	**Dissolved Manganese µg/L**	**Dissolved Potassium mg/L**	**Dissolved Sodium mg/L**	**Antimony µg/L**	**Arsenic µg/L**	**Barium µg/L**	**Beryllium µg/L**	**Boron µg/L**	**Cadmium µg/L**	**Chromium µg/L**	**Cobalt µg/L**	**Copper µg/L**	**Lead µg/L**	**Lithium µg/L**	**Mercury µg/L**	**Molybdenum µg/L**	**Nickel µg/L**	**Selenium µg/L**	**Silver µg/L**	**Strontium µg/L**	**Thallium µg/L**	**Tin µg/L**	**Titanium µg/L**	**Uranium µg/L**	**Vanadium µg/L**	**Zinc[f] µg/L**
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																
FR_HMW1D	FR_HMW1D_Q_01102013_N	2013 12 09	9.8	555	< 30	286	557	10.2	2.63	0.45	< 0.20	20.4	< 0.20	46	0.070	< 0.20	3.99	< 0.50	< 0.10	74.8	< 0.010	0.82	40.6	***184***	< 0.020	367	< 0.020	< 0.20	21	11.9	< 2.0	6.1
	FR_HMW1D_Q_01012014_N	2014 03 12	< 3.0	569	< 20	296	433	8.00	2.11	0.38	< 0.20	14.9	< 0.20	44	0.053	< 0.20	2.47	< 0.50	< 0.10	78.3	< 0.010	0.74	34.2	***125***	< 0.020	351	< 0.020	< 0.20	20	11.6	< 2.0	5.6
	FR_HMW1D_Q_01042014_N	2014 05 13	< 5.0	554	< 50	292	544	8.32	2.20	< 0.50	< 0.50	15.3	< 0.50	53	< 0.050	< 0.50	5.15	< 1.0	< 0.25	86.9	< 0.010	0.76	36.1	***23.8***	< 0.050	374	< 0.050	< 0.50	16	12.2	< 5.0	5.7
	FR_HMW1D_QSW_02072014_N	2014 09 30	< 3.0	533	< 20	280	600	8.21	7.74	0.62	< 0.20	12.7	< 0.20	56	0.103	0.31	5.42	< 0.50	< 0.10	84.0	< 0.010	1.02	36.6	***110***	< 0.020	376	0.035	< 0.20	27	12.4	< 2.0	8.2
	FR_HMW1D_QSW_02102014_N	2014 10 22	< 5.0	551	< 50	284	612	7.70	5.97	< 0.50	< 0.50	14.3	< 0.50	< 50	0.118	< 0.50	5.38	1.5	< 0.25	81.4	< 0.010	0.88	36.0	***66.5***	< 0.050	357	< 0.050	< 0.50	29	11.8	< 5.0	9.6
	FR_HMW1D_QSW_02012015_N	2015 01 19	< 3.0	495	< 20	255	588	8.47	3.76	0.54	< 0.20	14	< 0.20	50	0.1	< 0.20	5.17	< 0.50	< 0.10	81.4	< 0.010	0.87	34.1	***103***	< 0.020	354	0.034	< 0.20	27	12.4	< 2.0	7.9
	FR_HMW1D-WQ-201501191415	Duplicate	3.1	520	< 20	292	600	8.64	3.84	0.51	< 0.20	14.3	< 0.20	50	0.107	< 0.20	5.23	< 0.50	< 0.10	80.4	< 0.010	0.81	34.6	***101***	< 0.020	353	0.027	< 0.20	26	11.4	< 2.0	8.6
	QA/QC RPD%		*	5	*	14	2	2	2	6	*	2	*	0	7	*	1	*	*	1	*	7	1	2	*	0	*	*	4	8	*	8
	FR_HMW1D_QSW_02042015_N	2015 04 14	< 3.0	529	< 20	281	573	7.90	2.92	0.44	< 0.20	14.1	< 0.20	45	0.085	< 0.20	4.95	< 0.50	< 0.10	73.8	< 0.0050	0.76	33.3	***20.5***	< 0.020	356	0.025	< 0.20	18	12.5	< 1.0	7.1
	FR_HMW1D_QSW_02072015_N	2015 07 03	< 3.0	565	< 20	290	574	8.00	2.75	0.39	< 0.20	13.8	< 0.20	50	0.071	< 0.20	4.97	< 0.50	< 0.10	86.6	< 0.0050	0.78	33.6	***90.7***	< 0.020	353	0.023	< 0.20	< 10	12.1	< 1.0	6.7
	FR_HMW1D_QSW_02102015_N	2015 10 09	< 3.0	555	< 20	269	677	7.25	2.67	0.38	< 0.20	13.9	< 0.20	48	0.087	< 0.20	4.88	0.54	< 0.10	73.7	< 0.0050	0.67	32.3	5.17	< 0.020	334	< 0.020	< 0.20	< 10	10.9	< 1.0	7.6
	FR_HMW1D_QSW_04012016_N	2016 02 22	< 3.0	551	< 20	274	583	7.42	2.41	0.41	< 0.20	13.5	< 0.20	42	0.088	< 0.20	4.93	< 0.50	< 0.10	94.0	< 0.0050	0.75	34.0	***57.5***	< 0.020	357	0.023	< 0.20	14	12.9	< 1.0	7.0
	FR_HMW1D_QSW_04042016_N	2016 05 18	< 3.0	550	< 20	289	560	7.97	2.62	0.43	< 0.20	13.0	< 0.040	47	0.080	< 0.20	4.23	< 0.50	< 0.10	97.1	< 0.0050	0.77	32.0	***44.8***	< 0.020	344	< 0.020	< 0.20	< 10	11.8	< 1.0	6.6
	FR_HMW1D_QSW_04072016_N	2016 08 15	< 3.0	541	< 20	285	576	6.49	2.29	0.40	< 0.20	12.1	< 0.040	44	0.066	< 0.20	4.82	< 0.50	< 0.10	77.8	< 0.0050	0.70	33.0	15	< 0.020	333	< 0.020	< 0.20	< 10	11.4	< 1.0	6.3
	FR_HMW1D_QSW_03102016_N	2016 11 22	< 5.0	591	< 50	295	763	7.45	2.68	< 0.50	< 0.50	14.9	< 0.10	< 50	0.071	< 0.50	5.82	< 1.0	< 0.25	86.7	< 0.0050	0.68	38.0	9.55	< 0.050	356	< 0.050	< 0.50	< 10	12.5	< 2.5	9.7
	FR_HMW1D_QSW_02012017_N	2017 02 27	< 1.0	506	< 10	294	588	7.27	2.62	0.41	0.13	13.4	< 0.020	48	0.0769	< 0.10	4.60	0.23	< 0.050	87.1	< 0.0050	0.753	30.7	***61.5***	< 0.010	345	0.019	< 0.10	< 10	10.5	< 0.50	8.9
	FR_HMW1D_QSW_03042017_N	2017 06 22	< 5.0	522	< 50	251	580	6.92	2.30	< 0.50	< 0.50	12.2	< 0.10	< 50	0.079	< 0.50	4.62	< 1.0	< 0.25	91.0	< 0.0050	0.71	31.8	***34.3***	< 0.050	328	< 0.050	< 0.50	< 10	9.94	< 2.5	8.0
	FR_HMW1D_QTR_2017-09-11_N	2017 09 18	< 3.0	569	< 20	300	623	6.98	2.44	0.42	< 0.20	12.0	< 0.040	48	0.071	< 0.20	4.90	< 0.50	< 0.10	91.0	< 0.0050	0.71	32.6	***70.1***	< 0.020	346	< 0.020	< 0.20	< 10	12.8	< 1.0	7.0
	FR_HMW1D_QTR_2017-10-02_N	2017 11 14	< 3.0	585	< 20	314	601	7.45	2.29	0.38	< 0.20	12.6	< 0.040	56	0.081	< 0.20	4.69	< 0.50	< 0.10	87.3	< 0.0050	0.87	32.5	***94.3***	< 0.020	354	< 0.020	< 0.20	< 10	11.2	< 1.0	< 7.0
	WG_2017-10-02_002	Duplicate	< 3.0	632	< 20	326	695	7.57	2.49	0.39	< 0.20	12.2	< 0.040	45	0.075	< 0.20	4.88	< 0.50	< 0.10	96.2	< 0.0050	0.76	33.3	***95.6***	< 0.020	346	< 0.020	< 0.20	< 10	11.4	< 1.0	6.8
	QA/QC RPD%																															
	FR_HMW1D_QTR_2018-01-01_N	2018 01 24	< 5.0	564	< 50	305	513	8.03	2.38	< 0.50	< 0.50	13.5	< 0.10	< 50	0.084	< 0.50	4.63	< 1.0	< 0.25	86.5	< 0.0050	0.94	36.2	***118***	< 0.050	337	< 0.050	< 0.50	< 10	13.2	< 2.5	7.7
	FR_HMW1D_QTR_2018-04-02_N	2018 06 12	< 3.0	561	< 20	325	583	7.06	2.37	0.36	< 0.20	11.2	< 0.040	51	0.085	< 0.20	4.80	1.12	< 0.10	92.6	< 0.0050	0.72	35.3	7.31	< 0.020	327	< 0.020	< 0.20	< 10	12.8	< 1.0	6.8
	FR_HMW1D_QTR_2018-07-02_N	2018 07 18	< 3.0	570	< 20	316	642	6.56	2.33	0.41	< 0.20	10.5	< 0.040	48	0.082	< 0.20	4.86	< 0.50	< 0.10	84.5	< 0.0050	0.76	34.1	13.7	< 0.020	325	< 0.020	< 0.20	< 10	12.6	< 1.0	7.0
	FR_HMW1D_QTR_2018-10-01_N	2018 12 11	< 3.0	573	< 10	305	700	7.09	2.46	0.39	< 0.10	11.8	< 0.020	52	0.0934	< 0.10	4.87	< 0.50	< 0.050	86.9	< 0.0050	0.757	32.9	***61.7***	< 0.010	344	0.015	< 0.10	< 10	12.9	< 0.50	7.3
	FR_HMW1D_QTR_2019-01-07_N	2019 03 13	< 3.0	533	< 20	308	538	6.92	2.33	0.38	< 0.20	11.0	< 0.040	44	0.080	< 0.20	4.54	< 0.50	< 0.10	82.7	< 0.0050	0.74	33.4	***119***	< 0.020	343	< 0.020	< 0.20	< 10	12.4	< 1.0	6.1
	FR_HMW1D_QTR_2019-04-01_N	2019 05 29	< 5.0	575	< 50	328	569	6.84	2.33	< 0.50	< 0.50	11.0	< 0.10	< 50	0.059	< 0.50	4.85	< 1.0	< 0.25	88.7	< 0.0050	0.87	35.2	***55.4***	< 0.050	335	< 0.050	< 0.50	< 10	12.7	< 2.5	6.0
	FR_HMW1D_QTR_2019-07-01_N	2019 07 25	< 3.0	569	< 20	313	582	6.65	2.26	0.35	< 0.20	10.9	< 0.040	46	0.082	< 0.20	4.77	< 0.50	< 0.10	81.7	< 0.0050	0.77	34.5	***23.5***	< 0.020	326	< 0.020	< 0.20	< 10	12.8	< 1.0	6.8
	FR_HMW1D_QTR_2019-10-07_N	2019 10 23	< 3.0	548	< 20	293	680	6.20	2.11	0.38	< 0.20	13.0	< 0.040	47	0.104	< 0.20	4.48	< 0.40	< 0.10	78.2	< 0.0050	0.77	30.9	5.89	< 0.020	334	< 0.020	< 0.20	< 10	11.1	< 1.0	6.7
	FR_DC1_QTR_2019-10-07_N	Duplicate	< 3.0	534	< 20	282	654	5.84	2.05	0.39	< 0.20	13.0	< 0.040	50	0.075	< 0.20	4.30	< 0.40	< 0.10	80.8	< 0.0050	0.74	29.4	5.91	< 0.020	303	< 0.020	< 0.20	< 10	10.9	< 1.0	6.4
	QA/QC RPD%		*	3	*	4	4	6	3	*	*	0	*	6	32	*	4	*	*	3	*	4	5	0	*	10	*	*	*	2	*	5
	HMW1D_QTR_2020-01-06_N	2020 03 02	< 3.0	552	< 20	323	743	6.63	2.37	0.37	< 0.20	11.9	< 0.040	50	0.095	< 0.20	4.84	1.38	< 0.10	85.3	< 0.0050	0.67	31.6	14.5	< 0.020	333	< 0.020	< 0.20	< 10	13.2	< 1.0	8.3
	FR_HMW1D_QTR_2020-04-06_N	2020 05 14	< 3.0	608	< 20	301	696	6.47	2.26	0.39	< 0.20	10.0	< 0.040	48	0.105	< 0.20	5.00	< 0.40	< 0.10	81.7	< 0.0050	0.68	32.5	17.1	< 0.020	366	< 0.020	< 0.20	< 10	12.0	< 1.0	8.6
FR_HMW1S	GA-HMW-1S_L1238132	2012 11 09	< 15	500	< 30	231	412	9.2	2.3	< 0.50	< 0.50	13.6	< 0.50	56	0.128	< 0.50	5.82	< 2.5	< 0.25	89.1	< 0.010	0.68	32.3	9.51	< 0.050	373	0.052	< 0.50	18	8.83	< 5.0	< 15
	FRO12_0101201302	2013 03 28	< 3.0	503	< 30	244	513	9.6	2.2	0.44	< 0.20	14.3	< 0.20	56	0.144	< 0.20	7.21	0.83	< 0.10	114	< 0.010	0.76	36.0	6.00	< 0.020	406	0.059	< 0.20	< 10	8.78	< 2.0	7.6
	FRO12_0104201302	2013 05 29	< 3.0	502	< 30	243	543	8.8	2.3	0.41	< 0.20	14.0	< 0.20	57	0.213	< 0.20	8.21	< 0.50	< 0.10	97.9	< 0.010	0.72	40.4	9.07	< 0.020	383	0.042	< 0.20	11	9.39	< 2.0	14.0

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																			
FR_HMW1D	FR_HMW1D_Q_01102013_N	2013 12 09	55.4	0.53	< 0.20	19.9	< 0.20	< 1.0	51	0.071	566,000	< 0.20	5.49	< 1.0	78	< 0.10	86.9	295,000	534	< 0.010	0.87	37.1	-	9,220	185	2,470	< 0.020	2,360	382	< 0.020	< 0.20	23	12.5	< 2.0	6.4
	FR_HMW1D_Q_01012014_N	2014 03 12	52.5	0.47	0.22	19.4	< 0.20	< 1.0	50	0.068	584,000	< 0.20	5.49	< 1.0	195	0.15	91.9	308,000	543	< 0.010	0.86	39.1	-	9,200	146	2,410	< 0.020	2,400	407	0.020	< 0.20	21	13.2	< 2.0	6.8
	FR_HMW1D_Q_01042014_N	2014 05 13	< 15	< 0.50	< 0.50	16.3	< 0.50	< 2.5	56	0.067	558,000	< 0.50	5.47	< 2.5	< 50	< 0.25	89.1	298,000	576	< 0.010	0.79	36.8	-	8,450	25.1	2,420	< 0.050	2,230	390	< 0.050	< 0.50	16	12.6	< 5.0	< 15
	FR_HMW1D_QSW_02072014_N	2014 09 30	< 6.0	0.64	< 0.20	13.0	< 0.20	< 1.0	54	0.113	537,000	< 0.20	5.68	< 1.0	< 20	< 0.10	85.3	286,000	625	< 0.010	1.08	37.5	-	8,420	113	2,390	< 0.020	7,800	384	0.034	< 0.20	27	12.3	< 2.0	8.7
	FR_HMW1D_QSW_02102014_N	2014 10 22	22	0.52	< 0.50	15.3	< 0.50	< 2.5	< 50	0.161	561,000	< 0.50	5.56	< 2.5	< 50	< 0.25	85.5	287,000	627	< 0.010	0.85	37.2	-	7,730	67.8	2,520	< 0.050	6,240	373	< 0.050	< 0.50	30	12.4	< 5.0	< 15
	FR_HMW1D_QSW_02012015_N	2015 01 19	-	-	-	-	-	< 1.0	-	0.113	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	8,570	103	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D-WQ-201501191415	Duplicate	-	-	-	-	-	< 1.0	-	0.094	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	8,480	97.2	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	*	-	18	-	*	-	-	-	-	-	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QSW_02042015_N	2015 04 14	-	-	-	-	-	< 0.10	-	0.092	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	7,770	20.2	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QSW_02072015_N	2015 07 03	-	-	-	-	-	< 0.10	-	0.077	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	8,040	89	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QSW_02102015_N	2015 10 09	-	-	-	-	-	< 0.10	-	0.082	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	7,310	5.37	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QSW_04012016_N	2016 02 22	< 6.0	0.42	< 0.20	13.9	< 0.20	< 0.10	44	0.085	559,000	< 0.20	5.23	< 1.0	< 20	< 0.10	95.3	286,000	620	< 0.0050	0.75	35.5	-	7,900	57.9	2,410	< 0.020	2,620	360	0.025	< 0.20	14	13.1	< 1.0	7.3
	FR_HMW1D_QSW_04042016_N	2016 05 18	< 6.0	0.45	< 0.20	11.9	< 0.040	< 0.10	52	0.071	567,000	< 0.20	4.33	< 1.0	< 20	< 0.10	103	300,000	518	< 0.0050	0.80	29.5	-	7,140	46.8	2,530	< 0.020	2,400	358	0.021	< 0.20	< 10	12.3	< 1.0	6.1
	FR_HMW1D_QSW_04072016_N	2016 08 15	8.4	0.46	< 0.20	13.5	< 0.040	< 0.10	51	0.086	601,000	< 0.20	5.59	< 1.0	< 20	< 0.10	86.4	322,000	650	< 0.0050	0.79	37.5	-	7,250	17	2,860	< 0.020	2,570	370	0.020	< 0.20	< 10	12.5	< 1.0	8.1
	FR_HMW1D_QSW_03102016_N	2016 11 22	< 15	0.55	< 0.50	15.2	< 0.10	< 0.25	59	0.046	650,000	< 0.50	5.76	< 2.5	< 50	< 0.25	101	321,000	788	< 0.0050	0.82	39.0	-	7,250	10.7	2,900	< 0.050	2,850	392	< 0.050	< 0.50	< 10	14.1	< 2.5	< 15
	FR_HMW1D_QSW_02012017_N	2017 02 27	4.3	0.51	0.22	14.1	< 0.020	< 0.050	49	0.0820	523,000	< 0.10	4.94	< 0.50	12	< 0.050	90.2	319,000	643	< 0.0050	0.801	32.3	-	7,700	60.4	2,850	< 0.010	2,840	360	0.020	< 0.10	< 10	11.0	< 0.50	6.1
	FR_HMW1D_QSW_03042017_N	2017 06 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2017-09-11_N	2017 09 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2017-10-02_N	2017 11 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WG_2017-10-02_002	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2018-01-01_N	2018 01 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2018-04-02_N	2018 06 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2018-07-02_N	2018 07 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2018-10-01_N	2018 12 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2019-01-07_N	2019 03 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2019-04-01_N	2019 05 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2019-07-01_N	2019 07 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2019-10-07_N	2019 10 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC1_QTR_2019-10-07_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	HMW1D_QTR_2020-01-06_N	2020 03 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1D_QTR_2020-04-06_N	2020 05 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_HMW1S	GA-HMW-1S_L1238132	2012 11 09	< 15	< 0.50	< 0.50	13.8	< 0.50	< 2.5	58	0.145	499,000	< 0.50	5.99	< 2.5	< 30	< 0.25	92.0	230,000	426	< 0.010	0.73	33.0	< 300	9,200	9.52	2,500	< 0.050	2,300	370	0.067	< 0.50	19	9.10	< 5.0	< 15
	FRO12_0101201302	2013 03 28	< 6.0	0.45	< 0.20	13.9	< 0.20	< 1.0	55	0.148	511,000	< 0.20	7.40	1.4	< 30	< 0.10	116	253,000	524	< 0.010	0.78	37.3	< 300	10,100	6.20	2,490	< 0.020	2,400	424	0.053	< 0.20	< 10	9.13	< 2.0	9.1
	FRO12_0104201302	2013 05 29	< 6.0	0.47	< 0.20	14.2	< 0.20	< 1.0	61	0.218	510,000	< 0.20	8.52	< 1.0	< 30	< 0.10	108	250,000	558	< 0.010	0.71	40.1	-	9,300	11.2	2,450	< 0.020	2,500	408	0.054	< 0.20	11	9.91	< 2.0	13.6

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab)	Hardness	Turbidity	Total Anions	Total Cations	Conductivity	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Oxidation Reduction Potential	Cation Anion Balance	Field Temperature	Field Conductivity	Field Turbidity	Dissolved Oxygen	pH (field)	Field ORP	Total Alkalinity	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Nitrate+Nitrite (as N)	Kjeldahl Nitrogen-N	Nitrogen	Total Nitrogen-N	Chloride	Fluoride	Sulfate	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Bromide	Total Acidity	Acidity (pH 8.3)	Ortho-Phosphate	Total Organic Carbon	Total Phosphorous as P
			pH	mg/L	NTU	meq/L	meq/L	µS/cm	mg/L	mg/L	mg/L	mV	%	C	µS/cm	NTU	mg/L	pH	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S10 Study Area																																									
FR_HMW1S	FR_HMW1S-201309271230	2013 09 27	7.69	2,320	0.37	49	46.7	3,410	3,400	< 1.0	0.96	399	-	4.3	3,342	-	1.66	7.04	72.6	420	1.30	159	< 0.020	-	< 0.050	-	-	3.1	< 400	1,400	420	< 1.0	< 1.0	-	-	< 1.0	-	11.2	< 0.0010	0.99	< 0.0020
	FR_HMW1S_Q_01102013_N	2013 12 09	7.59	2,510	0.4	55.1	50.5	3,800	4,040	< 1.0	0.84	414	-	2.3	3,476	-	5.99	7.15	-81.2	414	1.32	212	< 0.020	-	0.801	-	-	3.5	< 400	1,520	414	< 1.0	< 1.0	-	-	< 1.0	-	21.4	< 0.0010	0.84	< 0.0020
	FR_HMW1S_Q_01012014_N	2014 03 12	7.8	2,590	0.17	55.1	52.2	3,860	3,880	< 1.0	1.02	475	-	3.8	3,548	-	3.75	7.08	12.3	390	1.51	227	< 0.020	-	< 0.050	-	-	3.8	560	1,490	390	< 1.0	< 1.0	-	-	< 1.0	-	22.1	< 0.0010	0.96	< 0.0020
	FR_HMW1S_Q_01042014_N	2014 05 13	7.79	2,580	0.23	54.7	52	3,970	4,410	< 1.0	0.94	287	-	4.2	3,666	-	6.24	7.75	-8.4	407	1.73	206	0.027	-	< 0.050	-	-	4.4	< 400	1,520	407	< 1.0	< 1.0	-	-	< 1.0	-	21.5	< 0.0010	0.96	< 0.0020
	FD_Q_01042014_007	Duplicate	7.74	2,560	0.26	55.8	51.6	3,960	4,230	< 1.0	1.04	295	-	-	-	-	-	-	-	396	1.34	211	< 0.020	-	< 0.050	-	-	4	< 400	1,570	396	< 1.0	< 1.0	-	-	< 1.0	-	21.6	< 0.0010	1.07	< 0.0020
	QA/QC RPD%		1	1	*	*	*	0	4	*	*	*	-	-	-	-	-	-	-	3	25	2	*	-	*	-	-	10	*	3	3	*	*	-	-	*	-	0	*	*	*
	FR_HMW1S_QSW_02072014_N	2014 09 30	7.84	2,480	0.13	55.5	50	3,810	3,790	1.1	1.16	411	-	4	3,683	-	5.51	7.09	30.9	405	1.15	184	< 0.020	-	0.315	-	-	3.4	< 400	1,640	405	< 1.0	< 1.0	-	-	< 1.0	-	32.3	< 0.0010	1.11	< 0.0020
	FR_HMW1S_QSW_02102014_N	2014 10 22	7.91	2,490	0.2	55.2	50.3	3,860	4,030	1.2	1.45	300	-	4	3,768	-	1.11	6.88	176	376	1.23	188	< 0.020	-	< 0.050	-	-	3.1	< 400	1,640	376	< 1.0	< 1.0	-	-	< 1.0	-	34.0	< 0.0010	1.23	< 0.0020
	FR_HMW1S_QSW_02012015_N	2015 01 19	7.78	2,400	-	-	-	3,920	3,840	< 1.0	1.13	-	-	3.3	-	-	-	7.1	-	400	1.25	199	< 0.020	-	< 0.050	-	-	3.6	< 400	1,580	-	-	-	-	-	< 1.0	-	-	-	0.83	0.0020
	FR_HMW1S_QSW_02042015_N	2015 04 14	7.38	2,460	-	-	-	3,890	3,740	< 1.0	1.16	-	-	3.5	3,583	-	-	7.09	-	390	1.14	195	< 0.020	-	< 0.050	-	-	3.5	< 400	1,570	-	-	-	-	-	< 1.0	-	-	-	1.14	< 0.0020
	FD_QSW_02042015_006	Duplicate	7.37	2,440	-	-	-	3,870	3,860	1.8	1.11	-	-	-	-	-	-	-	-	346	1.25	199	< 0.020	-	< 0.050	-	-	3.8	< 400	1,610	-	-	-	-	-	< 1.0	-	-	-	1.15	< 0.0020
	QA/QC RPD%		0	1	-	-	-	1	3	*	*	-	-	-	-	-	-	-	-	12	9	2	*	-	*	-	-	8	*	3	-	-	-	-	-	*	-	-	-	*	*
	FR_HMW1S_QSW_02072015_N	2015 07 03	7.4	2,550	-	-	-	3,840	4,260	2.4	0.86	-	-	4.6	3,719	-	-	6.93	-	393	1.1	189	< 0.020	-	0.241	-	-	3.3	< 400	1,660	-	-	-	-	-	< 1.0	-	-	-	0.82	< 0.0020
	FR_HMW1S_QSW_02102015_N	2015 10 09	7.77	2,430	-	-	-	3,780	4,060	< 1.0	1	-	-	3.9	3,761	-	-	7.30	-	409	1.16	177	< 0.020	-	0.48	-	-	3.6	< 400	1,640	-	-	-	-	-	< 1.0	-	-	-	0.77	< 0.0020
	FD_QSW_02102015_014	Duplicate	7.9	2,480	-	-	-	3,790	3,980	1.9	1.1	-	-	-	-	-	-	-	-	412	1.18	175	0.032	-	1.24	-	-	3.3	< 400	1,620	-	-	-	-	-	< 1.0	-	-	-	0.85	< 0.0020
	QA/QC RPD%		2	2	-	-	-	0	2	*	*	-	-	-	-	-	-	-	-	1	2	1	*	-	88	-	-	9	*	1	-	-	-	-	-	*	-	-	-	*	*
	FR_HMW1S_QSW_04012016_N	2016 02 22	7.36	2,500	0.15	57	50.4	4,030	3,970	1.2	0.85	324	-	3.3	3,417	-	2.7	7.19	125	408	1.25	212	< 0.020	-	1.8	-	-	3.5	< 400	1,620	408	< 1.0	< 1.0	-	-	< 1.0	-	50.0	< 0.0010	0.98	< 0.0020
	FR_DC1_04012016_004	Duplicate	7.36	2,500	0.15	56	50.4	4,010	3,960	< 1.0	0.94	326	-	-	-	-	-	-	-	410	1.24	207	< 0.020	-	1.73	-	-	3.3	< 400	1,580	410	< 1.0	< 1.0	-	-	< 1.0	-	50.8	< 0.0010	0.90	< 0.0020
	QA/QC RPD%		0	0	*	*	*	0	0	*	*	*	-	-	-	-	-	-	-	0	1	2	*	-	4	-	-	6	*	2	0	*	*	-	-	*	-	2	*	*	*
	FR_HMW1S_QSW_04042016_N	2016 05 18	7.76	2,590	0.28	54.7	52.2	3,960	3,900	6	0.81	367	-	5.3	3,456	-	2.09	6.96	183.9	399	1.10	185	< 0.020	-	1.68	-	-	3.5	< 400	1,610	399	< 1.0	< 1.0	-	-	< 1.0	-	30.8	< 0.0010	0.79	< 0.0020
	FR_HMW1S_QSW_04072016_N	2016 08 15	7.64	2,640	0.18	55.3	53.1	4,030	4,010	< 1.0	1	370	-	4.5	3,558	-	1.79	7.12	150.4	425	1.11	172	< 0.020	-	1.43	-	-	3.8	< 400	1,650	425	< 1.0	< 1.0	-	-	< 1.0	-	35.3	< 0.0010	1.41	< 0.0020
	FR_HMW1S_QSW_03102016_N	2016 11 22	7.35	2,680	0.31	54.7	53.9	3,810	4,020	< 1.0	1.01	328	-	3.5	3,505	-	1.68	7	-54.5	423	0.965	169	< 0.020	-	1.66	-	-	3.4	< 400	1,640	423	< 1.0	< 1.0	-	-	< 1.0	-	41.3	< 0.0010	1.16	< 0.0020
	FR_HMW1S_QSW_02012017_N	2017 02 27	7.05	2,450	0.19	52.5	49.3	3,730	3,850	< 1.0	1.26	353	-	4.3	3,347	-	1.32	7.08	57.8	414	1.18	174	0.0088	-	1.27	-	-	< 2.5	210	1,530	414	< 1.0	< 1.0	-	-	< 0.25	-	75.6	0.0101	1.22	0.0109
	FR_HMW1S_QSW_03042017_N	2017 06 22	7.84	2,360	0.3	51.7	47.5	3,680	3,760	< 1.0	2.25	483	-4.3	3.7	3,612	-	1.52	7.04	144.1	248	1.00	163	< 0.010	-	0.844	-	-	< 5.0	< 200	1,690	248	< 1.0	< 1.0	-	-	< 0.50	-	37.2	< 0.0010	1.61	< 0.0020
	FD_QSW_03042017_034	Duplicate	7.83	2,330	0.22	52.4	46.9	3,760	4,130	1	2.32	483	-5.5	-	-	-	-	-	-	363	1.02	157	0.010	-	1.05	-	-	< 5.0	< 200	1,630	363	< 1.0	< 1.0	-	-	< 0.50	-	38.5	< 0.0010	1.91	< 0.0020
	QA/QC RPD%		0	1	*	*	*	2	9	*	*	*	*	-	-	-	-	-	-	38	2	4	*	-	22	-	-	*	*	4	38	*	*	-	-	*	-	3	*	*	*
	FR_HWM1S_QTR_2017-09-11_N	2017 09 18	7.86	2,550	0.28	54.8	51.2	3,580	3,740	< 1.0	0.97	332	-3.4	3.6	3,482	-	0.19	7.03	181.7	350	0.942	158	< 0.0050	-	0.422	-	-	< 2.5	160	1,750	350	< 1.0	< 1.0	-	-	0.31	-	19.8	< 0.0010	0.93	0.0022
	FR_HWM1S_QTR_2017-10-02_N	2017 11 14	7.93	2,870	0.29	54.6	57.8	3,630	3,510	< 1.0	0.99	325	2.9	3.6	3,425	-	0.54	6.88	78.8	342	0.947	156	< 0.010	-	< 0.050	-	-	< 5.0	< 200	1,760	342	< 1.0	< 1.0	-	-	< 0.50	-	21.0	< 0.0010	0.99	0.0014
	FR_HMW1S_QTR_2018-01-01_N	2018 01 25	7.88	2,780	0.48	54.4	56	3,890	3,660	1	1.55	348	1.5	3.1	3,776	-	0.22	6.83	209.8	403	0.91	150	0.020	-	0.342	-	-	< 5.0	< 200	1,710	403	< 1.0	< 1.0	-	-	0.17	-	28.0	< 0.0010	1.40	0.0018
	FR_HMW1S_QTR_2018-04-02_N	2018 06 12	7.91	2,610	0.25	57.6	52.5	3,880	4,000	< 1.0	0.82	271	-4.6	3.6	3,636	-	0.54	6.67	195.8	429	0.87	157	0.024	-	2.47	-	-	< 5.0	300	1,810	429	< 1.0	< 1.0	-	-	< 0.50	-	16.6	< 0.0010	0.83	0.0011
	FR_DC1_QTR_2018-04-02_NP	Duplicate	7.89	2,620	0.36	56.6	52.6	3,850	4,060	1.5	0.89	216	-3.7	-	-	-	-	-	-	426	0.88	155	0.018	-	< 0.050	-	-	< 5.0	280	1,780	426	< 1.0	< 1.0	-	-	< 0.50	-	15.8	0.0011	0.88	0.0023
	QA/QC RPD%		0	0	*	*	*	1	1	*	*	*	*	-	-	-	-	-	-	1	1	1	29	-	*	-	-	*	7	2	1	*	*	-	-	*	-	5	*	*	*
	FR_HMW1S_QTR_2018-07-02_N	2018 07 18	7.98	2,580	0.3	53.7	51.8	3,620	3,830	< 1.0	0.88	391	-1.8	4.1	3,433	-	1	6.84	134.9	289	0.90	149	< 0.010	-	< 0.050	-	-	< 5.0	380	1,790	289	< 1.0	< 1.0	-	-	< 0.50	-	3.8	< 0.0010	1.00	0.0027
	FR_HMW1S_QTR_2018-10-01_N	2018 12 11	7.94	2,510	0.43	50.1	50.4	3,600	3,680	1.5	1.02	335	0.3	3.3	3,298	-	2.34	6.94	260	349	0.782	127	< 0.010	-	0.96	-	-	< 5.0	260	1,640	349	< 1.0	< 1.0	-	-	< 0.50	-	38.0	0.0147	1.14	0.0099
	FR_HMW1S_QTR_2019-01-07_N	2019 03 13	7.35	2,560	0.28	58.8	51.5	3,840	3,820	3.2	0.81	359	-6.6	3.4	3,313	-	4.86	7.07	253	411	0.938	141	< 0.010	-	0.145	-	-	< 5.0	< 200	1,940	411	< 1.0	< 1.0	-	-	< 0.50	-	31.6	< 0.0010	1.06	< 0.0020
	FR_HMW1S_QTR_2019-04-01_N	2019 05 29	7.93	2,750	0.3	51.6	55.2	3,890	3,790	6.4	1.37	318	3.4	6.1	3,431	-	0.21	6.89	279.7	369	0.780	120	0.0053	-	0.726	-	-	2.7	240	1,710	369	< 1.0	< 1.0	-	-	< 0.25	-	33.4	< 0.0010	1.41	< 0.0020

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

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All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

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* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Dissolved Metals																													
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																
FR_HMW1S	FR_HMW1S-201309271230	2013 09 27	< 3.0	505	< 30	256	523	8.97	2.30	0.36	< 0.20	14.7	< 0.20	52	0.235	< 0.20	7.97	< 0.50	< 0.10	88.2	< 0.010	0.79	39.9	***51.9***	< 0.020	363	0.056	< 0.20	11	9.78	< 2.0	12.3
	FR_HMW1S_Q_01102013_N	2013 12 09	< 3.0	553	< 30	274	498	9.73	2.35	0.45	< 0.20	14.8	< 0.20	48	0.192	< 0.20	7.34	< 0.50	< 0.10	83.4	< 0.010	0.78	39.6	***160***	< 0.020	399	0.055	< 0.20	21	10.5	< 2.0	10.0
	FR_HMW1S_Q_01012014_N	2014 03 12	< 3.0	570	< 20	283	518	9.68	2.33	0.48	< 0.20	13.8	< 0.20	51	0.203	< 0.20	7.61	< 0.50	< 0.10	104	< 0.010	0.80	40.4	***158***	< 0.020	449	0.063	< 0.20	20	10.6	< 2.0	11.5
	FR_HMW1S_Q_01042014_N	2014 05 13	< 5.0	556	< 50	289	430	8.88	2.42	< 0.50	< 0.50	14.1	< 0.50	60	0.135	< 0.50	5.55	< 1.0	< 0.25	101	< 0.010	0.91	40.8	***148***	< 0.050	385	< 0.050	< 0.50	16	11.6	< 5.0	7.1
	FD_Q_01042014_007	Duplicate	< 5.0	555	< 50	286	433	9.58	2.17	< 0.50	< 0.50	13.3	< 0.50	55	0.141	< 0.50	5.62	< 1.0	< 0.25	97.2	< 0.010	0.91	41.3	***149***	< 0.050	402	0.051	< 0.50	16	11.3	< 5.0	7.7
	QA/QC RPD%		*	0	*	1	1	8	11	*	*	6	*	9	4	*	1	*	*	4	*	0	1	1	*	4	*	*	0	3	*	8
	FR_HMW1S_QSW_02072014_N	2014 09 30	< 3.0	531	< 20	280	396	8.53	2.11	0.33	< 0.20	11.8	< 0.20	46	0.121	< 0.20	5.04	< 0.50	< 0.10	70.1	< 0.010	0.85	40.0	***236***	< 0.020	357	0.043	< 0.20	27	11.1	< 2.0	6.1
	FR_HMW1S_QSW_02102014_N	2014 10 22	< 5.0	537	< 50	280	395	8.59	2.14	< 0.50	< 0.50	12.8	< 0.50	< 50	0.128	< 0.50	5.12	1.3	< 0.25	88.6	< 0.010	0.89	41.9	***215***	< 0.050	369	< 0.050	< 0.50	32	11.2	< 5.0	7.7
	FR_HMW1S_QSW_02012015_N	2015 01 19	< 3.0	500	< 20	281	421	9.79	2.26	0.43	< 0.20	13.3	< 0.20	49	0.134	< 0.20	5.11	< 0.50	< 0.10	92.9	< 0.010	0.77	39	***202***	< 0.020	391	0.044	< 0.20	26	10.5	< 2.0	7.2
	FR_HMW1S_QSW_02042015_N	2015 04 14	< 3.0	522	< 20	282	394	9.32	2.19	0.38	< 0.20	12.5	< 0.20	43	0.118	< 0.20	5.03	< 0.50	< 0.10	81.1	< 0.0050	0.84	39.7	***199***	< 0.020	381	0.043	< 0.20	18	11.4	< 1.0	6.7
	FD_QSW_02042015_006	Duplicate	< 3.0	515	< 20	281	410	9.49	2.22	0.38	< 0.20	12.4	< 0.20	48	0.112	< 0.20	5.1	< 0.50	< 0.10	90.9	< 0.0050	0.86	40.2	***195***	< 0.020	389	0.042	< 0.20	17	11.4	< 1.0	6.3
	QA/QC RPD%		*	1	*	0	4	2	1	*	*	1	*	11	5	*	1	*	*	11	*	2	1	2	*	2	*	*	6	0	*	6
	FR_HMW1S_QSW_02072015_N	2015 07 03	< 3.0	550	< 20	286	398	9.16	2.23	0.34	< 0.20	12.5	< 0.20	48	0.121	< 0.20	5.02	< 0.50	< 0.10	91.2	< 0.0050	0.87	41.2	***220***	< 0.020	359	0.039	< 0.20	< 10	11.2	< 1.0	5.4
	FR_HMW1S_QSW_02102015_N	2015 10 09	< 3.0	537	< 20	264	395	8.68	2.22	0.36	< 0.20	12.2	< 0.20	49	0.124	< 0.20	4.97	0.65	< 0.10	83.1	< 0.0050	0.92	41.4	***161***	< 0.020	349	0.04	< 0.20	< 10	11.1	< 1.0	6.1
	FD_QSW_02102015_014	Duplicate	< 3.0	542	< 20	274	399	8.71	2.2	0.32	< 0.20	12	< 0.20	47	0.12	< 0.20	5.09	0.7	< 0.10	82.4	< 0.0050	0.92	40.9	***159***	< 0.020	342	0.039	< 0.20	< 10	10.7	< 1.0	6.2
	QA/QC RPD%		*	1	*	4	1	0	1	*	*	2	*	4	3	*	2	*	*	1	*	0	1	1	*	2	*	*	*	4	*	2
	FR_HMW1S_QSW_04012016_N	2016 02 22	< 3.0	543	< 20	278	402	8.92	2.21	0.37	< 0.20	11.9	< 0.20	42	0.122	< 0.20	5.02	< 0.50	< 0.10	112	< 0.0050	0.80	41.2	***198***	< 0.020	386	0.044	< 0.20	14	11.0	< 1.0	6.2
	FR_DC1_04012016_004	Duplicate	< 3.0	544	< 20	277	408	8.93	2.23	0.36	< 0.20	12.0	< 0.20	44	0.118	< 0.20	5.08	< 0.50	< 0.10	115	< 0.0050	0.80	41.2	***199***	< 0.020	386	0.044	< 0.20	15	11.0	< 1.0	6.2
	QA/QC RPD%		*	0	*	0	1	0	1	*	*	1	*	5	3	*	1	*	*	3	*	0	0	1	*	0	*	*	7	0	*	0
	FR_HMW1S_QSW_04042016_N	2016 05 18	< 3.0	550	< 20	295	392	9.29	2.31	0.39	< 0.20	12.3	< 0.040	47	0.113	< 0.20	4.68	< 0.50	< 0.10	107	< 0.0050	0.90	38.6	***178***	< 0.020	362	0.041	< 0.20	< 10	10.9	< 1.0	6.2
	FR_HMW1S_QSW_04072016_N	2016 08 15	< 3.0	564	< 20	299	404	8.67	2.41	0.30	< 0.20	11.9	< 0.040	52	0.120	< 0.20	5.02	< 0.50	< 0.10	93.0	< 0.0050	0.96	42.2	***197***	< 0.020	358	0.036	< 0.20	< 10	11.1	< 1.0	5.3
	FR_HMW1S_QSW_03102016_N	2016 11 22	< 3.0	556	< 20	313	454	9.07	2.47	0.35	< 0.20	14.1	< 0.040	45	0.147	< 0.20	5.72	< 0.50	< 0.10	87.5	< 0.0050	0.96	48.2	***191***	< 0.020	340	0.040	< 0.20	< 10	11.9	< 1.0	7.2
	FR_HMW1S_QSW_02012017_N	2017 02 27	< 1.0	526	< 10	276	379	8.52	2.37	0.33	0.10	12.4	< 0.020	46	0.109	< 0.10	4.08	< 0.20	< 0.050	101	< 0.0050	0.909	38.7	***236***	< 0.010	370	0.032	< 0.10	< 10	10.3	< 0.50	7.8
	FR_HMW1S_QSW_03042017_N	2017 06 22	< 5.0	518	< 50	258	368	8.43	2.17	< 0.50	< 0.50	12.0	< 0.10	< 50	0.120	< 0.50	4.65	< 1.0	< 0.25	97.5	< 0.0050	0.95	41.0	***239***	< 0.050	333	< 0.050	< 0.50	< 10	9.59	< 2.5	5.9
	FD_QSW_03042017_034	Duplicate	< 5.0	510	< 50	256	368	8.38	2.16	< 0.50	< 0.50	11.8	< 0.10	< 50	0.121	< 0.50	4.72	< 1.0	< 0.25	96.1	< 0.0050	0.89	40.8	***231***	< 0.050	328	< 0.050	< 0.50	< 10	9.79	< 2.5	5.3
	QA/QC RPD%		*	2	*	1	0	1	0	*	*	2	*	*	1	*	1	*	*	1	*	7	0	3	*	2	*	*	*	2	*	11
	FR_HWM1S_QTR_2017-09-11_N	2017 09 18	< 3.0	533	< 20	295	360	8.25	2.16	0.35	< 0.20	10.8	< 0.040	42	0.109	< 0.20	4.38	< 0.50	< 0.10	86.8	< 0.0050	0.93	39.1	***262***	< 0.020	323	0.035	< 0.20	< 10	11.9	< 1.0	5.6
	FR_HWM1S_QTR_2017-10-02_N	2017 11 14	< 3.0	621	< 20	321	374	8.87	2.38	0.34	< 0.20	10.8	< 0.040	45	0.119	< 0.20	4.63	< 0.50	< 0.10	106	< 0.0050	0.88	40.7	***236***	< 0.020	348	0.033	< 0.20	< 10	10.9	< 1.0	< 5.5
	FR_HMW1S_QTR_2018-01-01_N	2018 01 25	< 3.0	571	< 20	330	395	8.70	2.45	0.35	< 0.20	12.1	< 0.040	45	0.118	< 0.20	4.75	0.85	< 0.10	91.9	< 0.0050	0.92	42.1	***203***	< 0.020	362	0.032	< 0.20	< 10	11.1	< 1.0	5.4
	FR_HMW1S_QTR_2018-04-02_N	2018 06 12	< 3.0	532	< 20	311	366	7.98	2.24	0.34	< 0.20	10.1	< 0.040	49	0.121	< 0.20	4.77	< 0.50	< 0.10	95.4	< 0.0050	0.92	42.9	***262***	< 0.020	316	0.032	< 0.20	< 10	12.0	< 1.0	5.4
	FR_DC1_QTR_2018-04-02_NP	Duplicate	5.0	533	< 20	312	361	7.68	2.26	0.34	< 0.20	10.1	< 0.040	49	0.121	< 0.20	4.72	< 0.50	< 0.10	95.3	< 0.0050	0.93	42.0	***254***	< 0.020	320	0.035	< 0.20	< 10	12.3	< 1.0	5.5
	QA/QC RPD%		*	0	*	0	1	4	1	*	*	0	*	0	0	*	1	*	*	0	*	1	2	3	*	1	*	*	*	2	*	2
	FR_HMW1S_QTR_2018-07-02_N	2018 07 18	< 3.0	520	< 20	311	366	7.63	2.21	0.34	< 0.20	10.1	< 0.040	46	0.114	< 0.20	4.63	< 0.50	< 0.10	84.9	< 0.0050	0.90	41.0	***255***	< 0.020	300	0.031	< 0.20	< 10	11.9	< 1.0	5.5
	FR_HMW1S_QTR_2018-10-01_N	2018 12 11	< 3.0	528	< 20	289	344	7.28	2.19	0.33	< 0.20	12.0	< 0.040	47	0.117	< 0.20	4.31	< 0.50	< 0.10	84.9	< 0.0050	0.91	41.5	***238***	< 0.020	303	0.037	< 0.20	< 10	12.4	< 1.0	5.2
	FR_HMW1S_QTR_2019-01-07_N	2019 03 13	< 3.0	540	< 20	295	335	7.43	2.14	0.34	< 0.20	10.3	< 0.040	45	0.125	< 0.20	4.12	< 0.50	< 0.10	94.0	< 0.0050	0.98	40.1	***214***	< 0.020	335	0.033	< 0.20	< 10	12.0	< 1.0	4.9
	FR_HMW1S_QTR_2019-04-01_N	2019 05 29	< 3.0	572	< 20	320	369	7.89	2.30	0.34	< 0.20	10.8	< 0.040	48	0.103	< 0.20	4.52	< 0.50	< 0.10	100	< 0.0050	0.92	42.6	***194***	< 0.020	328	0.030	< 0.20	< 10	12.5	< 1.0	9.5

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

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[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517- 2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																			
FR_HMW1S																																			
	FR_HMW1S_Q_01102013_N	2013 12 09	< 6.0	0.48	< 0.20	14.3	< 0.20	< 1.0	51	0.200	555,000	< 0.20	7.61	< 1.0	< 30	< 0.10	91.5	282,000	519	< 0.010	0.77	40.7	-	10,100	164	2,390	< 0.020	2,430	410	0.060	< 0.20	21	10.8	< 2.0	10.1
	FR_HMW1S_Q_01012014_N	2014 03 12	< 6.0	0.50	< 0.20	13.8	< 0.20	< 1.0	54	0.198	578,000	< 0.20	7.84	< 1.0	< 20	< 0.10	105	285,000	538	< 0.010	0.76	41.9	-	9,920	165	2,330	< 0.020	2,420	454	0.063	< 0.20	19	10.9	< 2.0	11.7
	FR_HMW1S_Q_01042014_N	2014 05 13	< 15	< 0.50	< 0.50	13.1	< 0.50	< 2.5	54	0.137	547,000	< 0.50	5.75	< 2.5	< 50	< 0.25	97.3	290,000	441	< 0.010	0.80	41.6	-	9,640	150	2,230	< 0.050	2,160	411	< 0.050	< 0.50	16	11.5	< 5.0	< 15
	FD_Q_01042014_007	Duplicate	< 15	< 0.50	< 0.50	14.0	< 0.50	< 2.5	54	0.137	558,000	< 0.50	5.79	< 2.5	< 50	< 0.25	97.6	296,000	441	< 0.010	0.77	41.4	-	9,280	152	2,260	< 0.050	2,170	406	< 0.050	< 0.50	16	11.8	< 5.0	< 15
	QA/QC RPD%		*	*	*	7	*	*	0	0	2	*	1	*	*	*	0	2	0	*	4	0	-	4	1	1	*	0	1	*	*	0	3	*	*
	FR_HMW1S_QSW_02072014_N	2014 09 30	< 6.0	0.41	< 0.20	12.8	< 0.20	< 1.0	48	0.137	546,000	< 0.20	5.52	< 1.0	< 20	< 0.10	80.1	288,000	437	< 0.010	0.89	43.8	-	9,280	257	2,220	< 0.020	2,310	382	0.042	< 0.20	27	11.7	< 2.0	6.8
	FR_HMW1S_QSW_02102014_N	2014 10 22	< 15	< 0.50	< 0.50	12.9	< 0.50	< 2.5	< 50	0.147	546,000	< 0.50	5.41	< 2.5	< 50	< 0.25	89.1	292,000	401	< 0.010	0.84	42.4	-	8,830	219	2,230	< 0.050	2,260	377	< 0.050	< 0.50	32	11.3	< 5.0	< 15
	FR_HMW1S_QSW_02012015_N	2015 01 19	-	-	-	-	-	< 1.0	-	0.137	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	9,690	204	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QSW_02042015_N	2015 04 14	-	-	-	-	-	< 0.10	-	0.127	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	9,320	205	-	-	-	-	-	-	-	-	-	-
	FD_QSW_02042015_006	Duplicate	-	-	-	-	-	< 0.10	-	0.13	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	9,440	200	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	*	-	2	-	*	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QSW_02072015_N	2015 07 03	-	-	-	-	-	< 0.10	-	0.117	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	9,190	217	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QSW_02102015_N	2015 10 09	-	-	-	-	-	< 0.10	-	0.135	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	9,010	166	-	-	-	-	-	-	-	-	-	-
	FD_QSW_02102015_014	Duplicate	-	-	-	-	-	< 0.10	-	0.126	-	< 0.20	-	-	-	-	-	-	-	-	-	-	-	8,910	160	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	*	-	7	-	*	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QSW_04012016_N	2016 02 22	< 6.0	0.36	< 0.20	12.2	< 0.20	< 0.10	44	0.124	547,000	< 0.20	5.20	< 1.0	< 20	< 0.10	115	283,000	410	< 0.0050	0.81	42.4	-	9,200	208	2,270	< 0.020	2,260	392	0.044	< 0.20	15	11.0	< 1.0	6.7
	FR_DC1_04012016_004	Duplicate	< 6.0	0.39	< 0.20	12.8	< 0.20	< 0.10	48	0.117	546,000	< 0.20	5.40	< 1.0	< 20	< 0.10	118	291,000	431	< 0.0050	0.84	43.8	-	9,460	210	2,290	< 0.020	2,370	393	0.044	< 0.20	14	11.2	< 1.0	6.5
	QA/QC RPD%		*	*	*	5	*	*	9	6	0	*	4	*	*	*	3	3	5	*	4	3	-	3	1	1	*	5	0	*	*	7	2	*	3
	FR_HMW1S_QSW_04042016_N	2016 05 18	9.2	0.39	< 0.20	12.3	< 0.040	< 0.10	48	0.106	537,000	< 0.20	4.71	< 1.0	31	0.40	105	285,000	391	< 0.0050	0.89	38.8	-	9,130	179	2,240	< 0.020	2,320	359	0.039	< 0.20	< 10	10.8	< 1.0	8.2
	FR_HMW1S_QSW_04072016_N	2016 08 15	< 6.0	0.36	< 0.20	12.1	< 0.040	< 0.10	50	0.110	534,000	< 0.20	4.89	< 1.0	< 20	< 0.10	88.9	293,000	398	< 0.0050	0.92	41.6	-	8,520	192	2,380	< 0.020	2,330	345	0.039	< 0.20	< 10	10.8	< 1.0	6.3
	FR_HMW1S_QSW_03102016_N	2016 11 22	< 6.0	0.42	< 0.20	14.1	< 0.040	< 0.10	50	0.151	577,000	< 0.20	6.07	< 1.0	< 20	0.10	99.5	338,000	481	< 0.0050	0.99	51.1	-	9,520	193	2,510	< 0.020	2,660	352	0.046	< 0.20	< 10	12.5	< 1.0	9.4
	FR_HMW1S_QSW_02012017_N	2017 02 27	< 3.0	0.42	0.19	12.7	< 0.020	< 0.050	48	0.112	516,000	< 0.10	4.28	< 0.50	< 10	< 0.050	100	270,000	389	< 0.0050	0.914	39.9	-	9,310	200	2,300	< 0.010	2,450	379	0.034	< 0.10	< 10	10.7	< 0.50	5.0
	FR_HMW1S_QSW_03042017_N	2017 06 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FD_QSW_03042017_034	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HWM1S_QTR_2017-09-11_N	2017 09 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HWM1S_QTR_2017-10-02_N	2017 11 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QTR_2018-01-01_N	2018 01 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QTR_2018-04-02_N	2018 06 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC1_QTR_2018-04-02_NP	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QTR_2018-07-02_N	2018 07 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QTR_2018-10-01_N	2018 12 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QTR_2019-01-07_N	2019 03 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QTR_2019-04-01_N	2019 05 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab) pH	Hardness mg/L	Turbidity NTU	Total Anions meq/L	Total Cations meq/L	Conductivity µS/cm	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Dissolved Organic Carbon mg/L	Oxidation Reduction Potential mV	Cation Anion Balance %	Field Temperature C	Field Conductivity µS/cm	Field Turbidity NTU	Dissolved Oxygen mg/L	pH (field) pH	Field ORP mV	Total Alkalinity mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Nitrate+Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Nitrogen mg/L	Total Nitrogen-N mg/L	Chloride mg/L	Fluoride µg/L	Sulfate mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Bromide mg/L	Total Acidity mg/L	Acidity (pH 8.3) mg/L	Ortho-Phosphate mg/L	Total Organic Carbon mg/L	Total Phosphorous as P mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S10 Study Area																																									
FR_HMW1S	FR_HMW1S_QTR_2019-07-01_N	2019 07 25	7.94	2,670	0.2	55.1	53.7	3,890	4,050	3.4	1.56	399	-1.3	6.1	3,237	-	4.49	7.02	187.9	396	0.823	135	< 0.010	-	< 0.25	-	-	< 5.0	310	1,810	396	< 1.0	< 1.0	-	-	< 0.50	-	33.5	< 0.0010	1.03	< 0.0020
	FR_HMW1S_QTR_2019-10-07_N	2019 10 23	7.94	2,460	0.38	53.1	49.5	3,140	3,700	3.2	0.76	390	-3.5	3.5	3,688	-	0.2	7.02	130.2	416	0.807	123	< 0.010	-	< 0.050	-	-	< 5.0	270	1,730	416	< 1.0	< 1.0	-	-	< 0.50	-	21.5	< 0.0010	0.80	< 0.0020
	HMW1S_QTR_2020-01-06_N	2020 03 02	8.01	2,580	0.48	54	51.9	3,470	3,770	2.4	1.31	342	-1.9	3.4	3,613	-	0.99	7.59	141.8	396	0.753	110	< 0.0050	-	< 0.050	-	-	4	180	1,830	396	< 1.0	< 1.0	-	-	< 0.25	-	43.7	0.0127	1.20	0.0056
	FR_HMW1S_QTR_2020-04-06_N	2020 05 14	7.93	2,580	0.24	48.3	51.9	2,440	3,710	4.5	0.95	461	3.5	-	-	-	-	-	-	210	0.692	116	< 0.0050	-	< 0.050	-	-	< 2.5	240	1,720	210	< 1.0	< 1.0	-	-	< 0.25	-	10.4	< 0.0010	0.83	< 0.0020
FR_HMW2	GA-HMW-2_L1238132	2012 11 09	7.86	2,400	31.1	48	48.5	3,490	3,490	51.7	1.17	386	-	-	-	-	-	-	-	393	0.0448	**236**	0.033	-	< 0.050	-	-	10.4	< 400	1,100	393	< 1.0	< 1.0	-	-	< 1.0	-	33.3	0.0139	4.78	0.0533
	FRO12_0101201303	2013 03 28	7.61	2,420	186	53	49.3	3,880	3,630	437	1.02	420	-	5.9	3,019	-	8.06	7.23	131.6	407	0.0905	**259**	0.040	-	0.333	-	-	10.3	< 400	1,250	407	< 1.0	< 1.0	-	-	< 1.0	-	36.1	0.0054	4.03	0.142
	FRO12_0101201316FD	Duplicate	7.83	2,440	194	51.8	49.6	3,890	3,620	529	0.93	234	-	-	-	-	-	-	-	410	0.0935	**251**	0.027	-	< 0.050	-	-	10.3	< 400	1,220	410	< 1.0	< 1.0	-	-	< 1.0	-	37.6	0.0079	7.02	0.329
	QA/QC RPD%		3	1	4	*	*	0	0	19	*	*	-	-	-	-	-	-	-	1	3	3	39	-	*	-	-	0	*	2	1	*	*	-	-	*	-	4	38	54	79
	FRO12_0104201303	2013 05 29	7.77	2,440	545	50.4	49.7	3,770	4,040	1,100	1.23	423	-	7.2	3,305	-	9.5	7.42	71.3	419	0.0859	221	0.038	-	< 0.10	-	-	10.1	< 400	1,250	419	< 1.0	< 1.0	-	-	< 1.0	-	24.8	0.0061	9.7	0.263
	FR_HMW2-201309301159	2013 09 30	7.85	2,570	32.8	56.5	51.7	4,020	3,950	54.4	0.77	421	-	-	-	-	-	-	-	384	0.312	**257**	0.288	-	< 0.050	-	-	8.4	< 400	1,450	384	< 1.0	< 1.0	-	-	< 1.0	-	34.3	0.0057	2.54	0.0419
	FR_HMW2_67YUIKLO.,Q_01012014_N	2014 03 12	7.62	2,470	591	53.8	49.8	3,770	3,910	576	0.88	487	-	2.6	3,493	-	6.2	7.12	14.9	396	0.0659	216	0.074	-	< 0.050	-	-	8	790	1,450	396	< 1.0	< 1.0	-	-	< 1.0	-	28.3	0.0114	19.1	0.723
	FR_HMW2_QSW_02072014_N	2014 08 25	7.73	2,570	1,080	56.7	52.3	3,930	3,940	1,240	0.67	391	-	8.2	3,425	-	5.32	6.93	109.3	404	0.119	**224**	0.129	-	< 0.050	-	-	7.4	480	1,560	404	< 1.0	< 1.0	-	-	< 1.0	-	31.3	0.0135	71.4	2.03
	FR_HMW2_QSW_02102014_N	2014 10 23	7.91	2,660	947	54.6	54.4	3,930	4,130	962	1.48	356	-	4	3,806	-	5.63	6.91	219.8	298	0.0321	210	0.024	-	< 0.050	-	-	6.2	< 400	1,610	298	< 1.0	< 1.0	-	-	< 1.0	-	34.3	0.0105	47.2	0.952
	FR_HMW2_QSW_02042015_N	2015 04 14	7.33	2,430	-	-	-	3,800	3,820	4.8	0.72	-	-	2.5	3,543	-	-	6.99	-	327	0.062	179	< 0.020	-	< 0.050	-	-	4.4	< 400	1,600	-	-	-	-	-	< 1.0	-	-	-	1.05	0.0080
	FR_HMW2_QSW_02072015_N	2015 07 03	7.27	2,570	-	-	-	3,770	4,400	303	0.65	-	-	4.1	-	-	-	6.99	-	384	0.0117	172	< 0.020	-	< 0.050	-	-	4.8	< 400	1,710	-	-	-	-	-	< 1.0	-	-	-	6.98	0.295
	FR_HMW2_QSW_02102015_N	2015 10 08	7.85	2,530	-	-	-	3,840	4,090	253	0.63	-	-	4.4	3,887	-	-	7.09	-	406	< 0.0050	186	< 0.020	-	< 0.050	-	-	4.7	< 400	1,720	-	-	-	-	-	< 1.0	-	-	-	7.82	0.170
	FR_HMW2_QSW_04012016_N	2016 02 23	7.07	2,480	61.3	52.9	49.9	3,810	3,790	60.8	< 0.50	351	-	1.8	3,473	-	4.79	7.05	218.5	409	< 0.0050	154	0.021	-	0.671	-	-	3.7	< 400	1,610	409	< 1.0	< 1.0	-	-	< 1.0	-	65.0	0.0103	4.14	0.0845
	FR_HMW2_QSW_04042016_N	2016 05 18	7.2	2,560	320	53.4	51.4	3,830	3,860	382	< 0.50	364	-	4.3	3,344	-	3.22	6.85	183.1	410	< 0.0050	145	< 0.020	-	0.612	-	-	3	< 400	1,670	410	< 1.0	< 1.0	-	-	< 1.0	-	229	0.0117	6.20	0.198
	FR_HMW2_QSW_04072016_N	2016 08 15	7.35	2,660	86.6	55.7	53.4	4,000	4,060	85.5	0.61	370	-	4.9	3,491	-	4.81	7.1	153.8	408	< 0.0050	151	< 0.020	-	0.436	-	-	3.4	< 400	1,760	408	< 1.0	< 1.0	-	-	< 1.0	-	47.8	0.0115	4.77	0.131
	FR_HMW2_QSW_03102016_N	2016 11 22	7.27	2,710	656	56.5	54.4	3,740	3,990	854	0.76	345	-	2.3	3,473	-	4.1	6.97	-35.4	401	< 0.0050	148	< 0.020	-	0.932	-	-	2.9	< 400	1,820	401	< 1.0	< 1.0	-	-	< 1.0	-	187	0.0104	12.9	0.929
	FR_HMW2_QSW_02012017_N	2017 02 27	7.06	2,410	696	51.6	48.5	3,570	3,480	663	0.9	354	-	2.8	3,149	-	2.81	7.03	55.2	432	0.0120	116	0.0107	-	0.109	-	-	< 2.5	130	1,670	432	< 1.0	< 1.0	-	-	< 0.25	-	68.8	0.0209	37.1	1.00
	FR_HMW2_QSW_03042017_N	2017 06 21	7.68	2,530	7.31	51.6	50.9	3,370	3,800	10.1	1.06	357	-0.7	6	3,440	-	2.24	6.97	65.3	416	< 0.0050	100	0.0067	-	1.37	-	-	< 2.5	100	1,730	416	< 1.0	< 1.0	-	-	< 0.25	-	33.2	0.0069	1.20	0.0124
	FR_HMW2_QTR_2017-09-11_N	2017 09 19	7.83	2,570	13.6	52.1	51.7	3,520	3,380	10.4	0.62	335	-0.4	1.7	3,352	-	8.04	7.18	182.1	287	0.0121	103	0.0064	-	< 0.050	-	-	< 2.5	120	1,880	287	< 1.0	< 1.0	-	-	< 0.25	-	24.2	0.0065	1.33	0.0224
	FR_HWM2_QTR_2017-10-02_N	2017 11 14	7.8	2,770	4.57	53.1	55.6	3,510	3,590	5.2	0.65	343	2.3	2	3,435	-	0.67	6.59	210.7	332	0.0072	109	0.0100	-	< 0.050	-	-	< 2.5	110	1,860	332	< 1.0	< 1.0	-	-	< 0.25	-	26.4	0.0082	1.16	0.0137
	FR_HMW2_QTR_2018-01-01_N	2018 01 30	7.84	2,540	53.8	50.3	51	3,640	3,380	70.9	1.36	317	0.7	2.2	3,335	-	3.84	6.9	175.9	385	0.0082	96.5	< 0.0050	-	0.156	-	-	< 2.5	< 100	1,720	385	< 1.0	< 1.0	-	-	< 0.25	-	30.6	0.0106	6.1	0.0696
	FR_HMW2_QTR_2018-04-02_N	2018 06 06	8.02	2,350	0.27	50.7	47.3	3,350	3,340	1.3	< 0.50	292	-3.5	4.4	3,246	-	5.05	6.76	228.2	374	0.0074	72.0	0.0059	-	0.36	-	-	< 2.5	230	1,830	374	< 1.0	< 1.0	-	-	< 0.25	-	13.6	0.0075	< 0.50	0.0095
	FR_HMW2_QTR_2018-07-02_N	2018 08 01	7.94	2,510	93.2	54.4	50.5	3,010	3,670	144	0.6	347	-3.7	7.4	3,125	-	6.25	7.03	209.3	403	0.0066	69.5	0.0070	-	< 0.050	-	-	< 2.5	180	1,990	403	< 1.0	< 1.0	-	-	< 0.25	-	5.9	0.0087	0.82	0.125
	FR_HMW2_QTR_2018-10-01_N	2018 12 17	7.78	2,630	15.4	48.2	52.9	3,260	3,550	19.8	0.97	432	4.7	1.8	3,043	-	7.91	6.98	214.9	403	0.0118	66.5	0.0071	-	< 0.050	-	-	< 2.5	170	1,700	403	< 1.0	< 1.0	-	-	< 0.25	-	21.1	0.0269	1.04	0.0257
	FR_HMW2_QTR_2019-01-07_N	2019 03 11	7.17	2,330	19.4	48.5	46.8	3,350	3,360	18.7	0.7	376	-1.8	1.9	2,766	-	7.07	6.88	224.7	410	0.109	73.3	0.0127	-	< 0.050	-	-	< 2.5	110	1,690	410	< 1.0	< 1.0	-	-	< 0.25	-	19.8	0.0086	1.13	0.0139
	FR_HMW2_QTR_2019-04-01_N	2019 05 29	7.89	2,370	18.5	49.1	47.7	3,380	3,200	29	0.87	421	-1.4	4.9	3,035	-	8.29	6.96	262.5	381	0.0091	75.2	0.0164	-	< 0.050	-	-	< 2.5	200	1,730	381	< 1.0	< 1.0	-	-	< 0.25	-	29.3	0.0094	2.12	0.0366
	FR_HMW2_QTR_2019-07-01_N	2019 07 25	7.94	2,280	49.3	47.4	45.8	3,300	3,190	69.2	1.96	444	-1.7	4.9	2,655	-	9.65	7.04	173.8	398	0.0125	79.3	0.0106	-	< 0.050	-	-	< 2.5	220	1,620	398	< 1.0	< 1.0	-	-	< 0.25	-	32.5	0.0098	5.56	0.0702
	FR_HMW2_QTR_2019-10-07_N	2019 10 22	7.92	2,300	11.9	48	46.2	2,730	3,220	26.4	0.6	346	-1.9	3.6	3,427	-	9.93	6.97	57.7	358	< 0.0050	57.5	< 0.0050	-	< 0.050	-	-	< 2.5	250	1,760	358	< 1.0	< 1.0	-	-	< 0.25	-	28.0	0.0169	1.02	0.0302
	FR_HMW2_QTR_2020-01-06_N	2020 03 03	7.65	2,270	12.6	46.2	45.6	3,120	3,220	27	1.91	449	-0.6	-	-	-	-	-	-	405	< 0.0050	80.5	< 0.0050	-	< 0.050	-	-	3.6	150	1,550	405	< 1.0	< 1.0	-	-	< 0.25	-	40.3	0.0108	1.71	0.0329
	FR_HMW2_QTR_2020-04-06_N	2020 06 04	7.88	2,140	10.6	45	43.1	2,960	3,070	16	1.18	502	-2.1	-	-	-	-	-	-	359	0.0053	48.9	0.0052	-	< 0.25	-	-	< 2.5	130	1,650	359	< 1.0	< 1.0	-	-	< 0.25	-	18.9	0.0066	1.24	0.0189

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																													
			Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																
FR_HMW1S	FR_HMW1S_QTR_2019-07-01_N	2019 07 25	< 3.0	559	< 20	310	353	7.63	2.20	0.34	< 0.20	9.83	< 0.040	44	0.117	< 0.20	4.33	< 0.50	< 0.10	84.2	< 0.0050	1.07	43.0	***213***	< 0.020	343	0.030	< 0.20	< 10	12.8	< 1.0	6.0
	FR_HMW1S_QTR_2019-10-07_N	2019 10 23	< 3.0	523	< 20	281	370	7.18	2.03	0.33	< 0.20	10.7	< 0.040	45	0.119	< 0.20	4.50	0.47	< 0.10	78.2	< 0.0050	0.88	40.7	***109***	< 0.020	299	0.027	< 0.20	< 10	10.7	< 1.0	5.1
	HMW1S_QTR_2020-01-06_N	2020 03 02	4.2	512	< 20	316	354	7.70	2.33	0.34	< 0.20	10.4	< 0.040	46	0.113	< 0.20	4.21	0.51	< 0.10	87.4	< 0.0050	0.90	40.7	***218***	< 0.020	311	0.031	< 0.20	< 10	12.4	< 1.0	6.3
	FR_HMW1S_QTR_2020-04-06_N	2020 05 14	< 3.0	561	< 20	287	328	7.08	2.04	0.32	< 0.20	9.06	< 0.040	44	0.122	< 0.20	3.93	< 0.40	< 0.10	84.7	< 0.0050	0.93	39.6	***205***	< 0.020	332	0.029	< 0.20	< 10	12.2	< 1.0	5.3
FR_HMW2	GA-HMW-2_L1238132	2012 11 09	< 15	596	< 30	222	315	6.9	6.4	< 0.50	< 0.50	44.6	< 0.50	< 50	0.260	< 0.50	1.14	< 2.5	< 0.25	124	< 0.010	1.07	22.7	***184***	< 0.050	322	< 0.050	< 0.50	19	10.6	< 5.0	< 15
	FRO12_0101201303	2013 03 28	5.1	583	< 30	235	522	6.5	16.2	< 0.20	0.26	26.6	< 0.20	51	0.334	< 0.20	1.30	0.95	< 0.10	163	< 0.010	0.99	24.7	***226***	< 0.020	397	0.049	< 0.20	< 10	10.8	< 2.0	8.3
	FRO12_0101201316FD	Duplicate	1,200	588	681	235	522	6.3	14.0	0.26	0.51	41.4	< 0.20	49	0.338	0.52	1.65	1.27	1.48	156	< 0.010	1.08	25.0	***222***	< 0.020	382	0.057	< 0.20	35	11.3	< 2.0	11.6
	QA/QC RPD%																															
	FRO12_0104201303	2013 05 29	6.5	591	< 30	234	575	6.1	19.2	< 0.20	0.24	28.2	< 0.20	53	0.392	< 0.20	1.93	< 0.50	0.10	146	< 0.010	1.15	26.0	***224***	< 0.020	430	0.038	< 0.20	11	11.7	< 2.0	8.4
	FR_HMW2-201309301159	2013 09 30	3.4	583	< 30	270	310	7.58	3.60	< 0.20	< 0.20	22.2	< 0.20	60	0.480	< 0.20	0.52	< 0.50	< 0.10	151	< 0.010	0.56	30.0	***516***	< 0.020	356	0.111	< 0.20	30	11.3	< 2.0	8.7
	FR_HMW2_67YUIKLO.,Q_01012014_N	2014 03 12	4.7	561	< 20	259	143	7.73	5.82	< 0.20	0.22	37.0	< 0.20	57	0.261	< 0.20	< 0.20	< 0.50	< 0.10	138	< 0.010	0.77	22.8	***267***	< 0.020	367	0.091	< 0.20	20	10.6	< 2.0	4.6
	FR_HMW2_QSW_02072014_N	2014 08 25	11.4	567	< 50	281	548	6.71	15.8	< 0.50	0.52	32.7	< 0.50	< 50	0.506	< 0.50	0.61	< 1.0	< 0.25	130	< 0.010	0.96	26.3	***329***	< 0.050	420	0.095	< 0.50	< 10	12.3	< 5.0	7.0
	FR_HMW2_QSW_02102014_N	2014 10 23	5,230	583	3,950	291	278	9.50	5.86	< 0.50	1.58	148	< 0.50	59	0.492	7.53	2.81	3.8	2.28	136	< 0.010	1.97	29.2	***385***	0.066	394	0.193	< 0.50	85	12.3	12.6	25.3
	FR_HMW2_QSW_02042015_N	2015 04 14	3.1	543	< 20	261	235	7.10	2.57	< 0.20	< 0.20	14.2	< 0.20	54	0.327	< 0.20	0.46	< 0.50	< 0.10	126	< 0.0050	0.33	26.1	***461***	< 0.020	327	0.096	< 0.20	17	11.1	< 1.0	8.7
	FR_HMW2_QSW_02072015_N	2015 07 03	5.6	582	< 50	271	345	6.71	3.24	< 0.50	< 0.50	33	< 0.50	57	0.384	< 0.50	0.56	< 1.0	< 0.25	138	< 0.0050	0.59	22.7	***430***	< 0.050	330	0.065	< 0.50	< 10	11.5	< 2.5	6.6
	FR_HMW2_QSW_02102015_N	2015 10 08	3.9	576	< 20	265	69.2	6.77	2.32	< 0.20	< 0.20	22.2	< 0.20	55	0.27	0.24	< 0.20	0.61	< 0.10	127	< 0.0050	0.51	24.2	***530***	< 0.020	315	0.066	< 0.20	< 10	11.1	< 1.0	5.5
	FR_HMW2_QSW_04012016_N	2016 02 23	6.2	547	< 20	272	16.7	8.27	2.10	< 0.20	< 0.20	25.5	< 0.20	61	0.164	< 0.20	< 0.20	< 0.50	< 0.10	144	< 0.0050	0.37	20.2	***434***	< 0.020	324	0.065	< 0.20	15	10.5	< 1.0	5.8
	FR_HMW2_QSW_04042016_N	2016 05 18	3.6	562	< 20	281	187	7.29	3.28	< 0.20	< 0.20	31.7	< 0.040	53	0.295	< 0.20	0.24	< 0.50	< 0.10	147	< 0.0050	0.57	19.1	***451***	< 0.020	335	0.065	< 0.20	< 10	11.4	< 1.0	5.8
	FR_HMW2_QSW_04072016_N	2016 08 15	3.2	565	< 20	303	134	7.99	2.70	< 0.20	< 0.20	26.6	< 0.040	59	0.220	< 0.20	0.33	< 0.50	< 0.10	133	< 0.0050	0.59	18.8	***465***	< 0.020	341	0.057	< 0.20	< 10	11.8	< 1.0	4.7
	FR_HMW2_QSW_03102016_N	2016 11 22	6.6	569	< 50	312	54.5	8.27	2.67	< 0.50	< 0.50	36.1	< 0.10	51	0.125	< 0.50	< 0.50	< 1.0	< 0.25	124	< 0.0050	0.60	19.0	***509***	< 0.050	318	0.083	< 0.50	< 10	11.9	< 2.5	6.3
	FR_HMW2_QSW_02012017_N	2017 02 27	1.5	492	< 10	287	211	7.27	2.69	0.10	0.18	16.5	< 0.020	54	0.265	< 0.10	0.42	0.21	< 0.050	134	< 0.0050	0.529	16.4	***547***	< 0.010	317	0.046	< 0.10	< 10	10.2	< 0.50	8.2
	FR_HMW2_QSW_03042017_N	2017 06 21	2.0	516	< 10	302	305	7.40	2.45	< 0.10	0.15	12.8	< 0.020	50	0.339	< 0.10	0.57	< 0.20	< 0.050	130	0.0064	0.407	19.0	***574***	< 0.010	291	0.052	< 0.10	< 10	10.2	< 0.50	7.7
	FR_HMW2_QTR_2017-09-11_N	2017 09 19	< 3.0	537	< 20	300	35.0	7.79	1.96	< 0.20	0.20	12.6	< 0.040	48	0.205	< 0.20	< 0.20	< 0.50	< 0.10	128	< 0.0050	0.48	17.4	***674***	< 0.020	292	0.064	< 0.20	< 10	10.9	< 1.0	6.6
	FR_HWM2_QTR_2017-10-02_N	2017 11 14	< 3.0	586	< 20	317	63.8	8.12	2.15	< 0.20	< 0.20	12.2	< 0.040	48	0.252	< 0.20	0.20	< 0.50	< 0.10	150	< 0.0050	0.40	17.6	***657***	< 0.020	302	0.057	< 0.20	< 10	10.9	< 1.0	6.7
	FR_HMW2_QTR_2018-01-01_N	2018 01 30	< 3.0	530	< 20	296	85.1	7.83	2.08	< 0.20	< 0.20	14.0	< 0.040	51	0.254	< 0.20	0.23	< 0.50	< 0.10	129	< 0.0050	0.55	17.1	***650***	< 0.020	328	0.058	< 0.20	< 10	10.7	< 1.0	7.9
	FR_HMW2_QTR_2018-04-02_N	2018 06 06	< 3.0	473	< 20	284	85.3	7.55	1.94	< 0.20	< 0.20	12.2	< 0.040	46	0.254	< 0.20	0.31	< 0.50	< 0.10	121	< 0.0050	0.44	16.8	***891***	< 0.020	281	0.058	< 0.20	< 10	10.2	< 1.0	7.1
	FR_HMW2_QTR_2018-07-02_N	2018 08 01	3.1	527	< 20	291	62.5	7.29	1.97	< 0.20	< 0.20	11.9	< 0.040	50	0.241	< 0.20	0.21	1.07	< 0.10	127	< 0.0050	0.34	14.8	***705***	< 0.020	279	0.053	< 0.20	< 10	10.6	< 1.0	6.4
	FR_HMW2_QTR_2018-10-01_N	2018 12 17	1.5	555	< 10	303	139	7.90	2.41	< 0.10	0.16	13.4	< 0.020	52	0.287	< 0.10	0.26	0.50	< 0.050	154	< 0.0050	0.283	13.1	***725***	< 0.010	287	0.048	< 0.10	< 10	9.46	< 0.50	7.6
	FR_HMW2_QTR_2019-01-07_N	2019 03 11	< 3.0	491	< 20	268	115	7.07	2.26	< 0.20	< 0.20	12.3	< 0.040	54	0.280	< 0.20	0.22	< 0.50	< 0.10	138	< 0.0050	0.53	16.0	***522***	< 0.020	285	0.064	< 0.20	< 10	10.3	< 1.0	8.2
	FR_HMW2_QTR_2019-04-01_N	2019 05 29	< 3.0	492	< 20	278	193	7.03	2.20	< 0.20	< 0.20	12.5	< 0.040	51	0.360	< 0.20	0.24	< 0.50	< 0.10	136	< 0.0050	0.43	15.9	***510***	< 0.020	270	0.056	< 0.20	< 10	10.5	< 1.0	8.3
	FR_HMW2_QTR_2019-07-01_N	2019 07 25	32.7	476	62	264	141	7.16	2.24	< 0.20	< 0.20	14.0	< 0.040	47	0.334	< 0.20	0.27	0.52	< 0.10	119	< 0.0050	0.59	17.2	***407***	< 0.020	284	0.054	< 0.20	< 10	10.7	< 1.0	8.7
	FR_HMW2_QTR_2019-10-07_N	2019 10 22	< 3.0	465	< 20	277	48.2	7.48	1.72	< 0.20	< 0.20	13.9	< 0.040	50	0.241	< 0.20	0.25	1.69	< 0.10	132	< 0.0050	1.60	16.0	***745***	< 0.020	249	0.053	< 0.20	< 10	9.90	< 1.0	10.6
	FR_HMW2_QTR_2020-01-06_N	2020 03 03	< 3.0	459	< 10	273	59.3	7.43	3.03	0.11	0.12	12.0	< 0.020	50	0.239	< 0.10	0.15	0.24	< 0.050	140	< 0.0050	0.465	14.0	***607***	< 0.010	257	0.051	< 0.10	< 10	9.49	< 0.50	8.2
	FR_HMW2_QTR_2020-04-06_N	2020 06 04	31.7	434	52	257	33.7	7.56	2.26	0.12	0.12	12.3	< 0.020	45	0.232	< 0.10	0.21	0.41	0.077	131	< 0.0050	0.456	15.2	***747***	< 0.010	235	0.037	< 0.10	< 10	9.62	< 0.50	9.1

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Total Metals																																
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																			
FR_HMW1S	FR_HMW1S_QTR_2019-07-01_N	2019 07 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QTR_2019-10-07_N	2019 10 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	HMW1S_QTR_2020-01-06_N	2020 03 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW1S_QTR_2020-04-06_N	2020 05 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_HMW2	GA-HMW-2_L1238132	2012 11 09	947	< 0.50	0.52	67.3	< 0.50	< 2.5	52	0.313	600,000	0.98	1.80	< 2.5	1,050	1.19	127	217,000	363	< 0.010	1.28	23.2	< 300	7,100	183	4,750	< 0.050	6,300	319	0.063	< 0.50	50	10.5	< 5.0	< 15
	FRO12_0101201303	2013 03 28	10,700	0.31	3.76	193	0.92	< 1.0	58	0.621	599,000	4.07	7.18	6.3	7,710	15.5	161	244,000	1,220	< 0.050	1.72	33.9	330	9,000	212	23,300	0.105	16,000	437	0.195	0.52	81	14.4	8.6	48.8
	FRO12_0101201316FD	Duplicate	13,300	0.34	4.95	246	1.21	< 1.0	59	0.688	579,000	4.48	8.25	7.3	10,000	21.8	156	234,000	1,380	< 0.050	1.73	35.7	460	9,400	216	26,700	0.116	14,500	430	0.250	0.52	93	15.2	10.2	60.7
	QA/QC RPD%		22	*	27	24	27	*	2	10	3	10	14	15	26	34	3	4	12	*	1	5	33	4	2	14	10	10	2	25	0	14	5	17	22
	FRO12_0104201303	2013 05 29	14,100	0.33	4.36	245	1.42	< 1.0	68	0.787	597,000	4.67	6.86	6.9	9,130	21.2	157	243,000	999	< 0.010	1.61	37.2	-	8,400	234	29,700	0.126	20,500	473	0.208	0.37	61	17.4	8.9	70.5
	FR_HMW2-201309301159	2013 09 30	730	< 0.20	0.53	37.2	< 0.20	< 1.0	61	0.481	582,000	0.99	1.66	1.5	749	0.87	144	268,000	424	< 0.010	0.80	30.4	-	7,120	500	3,450	< 0.020	3,550	351	0.129	0.42	42	10.9	< 2.0	13.5
	FR_HMW2_67YUIKLO.,Q_01012014_N	2014 03 12	7,530	0.49	4.76	398	0.45	< 1.0	70	1.19	590,000	15.6	12.1	12.6	12,200	6.55	155	266,000	1,030	< 0.050	4.48	45.3	-	9,600	285	17,200	0.186	6,270	413	0.304	1.02	185	12.1	22.4	67.2
	FR_HMW2_QSW_02072014_N	2014 08 25	16,100	0.83	9.23	744	1.01	< 2.5	67	1.84	610,000	33.4	20.7	26.0	26,300	13.6	138	284,000	1,690	0.103	7.83	66.3	-	11,000	336	25,600	0.411	15,500	490	0.563	0.72	195	14.2	48.2	141
	FR_HMW2_QSW_02102014_N	2014 10 23	13,300	0.69	8.28	586	0.86	< 2.5	69	1.48	608,000	27.1	14.6	22.2	22,800	12.3	149	291,000	1,010	0.066	6.57	59.0	-	11,300	389	18,300	0.345	6,450	440	0.501	0.52	133	13.8	38.2	123
	FR_HMW2_QSW_02042015_N	2015 04 14	-	-	-	-	-	< 0.10	-	0.346	-	0.66	-	-	-	-	-	-	-	-	-	-	-	7,490	481	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QSW_02072015_N	2015 07 03	-	-	-	-	-	< 0.25	-	0.889	-	12.4	-	-	-	-	-	-	-	-	-	-	-	8,330	402	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QSW_02102015_N	2015 10 08	-	-	-	-	-	< 0.10	-	0.592	-	6.48	-	-	-	-	-	-	-	-	-	-	-	7,540	525	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QSW_04012016_N	2016 02 23	1,710	0.23	1.21	87.6	< 0.20	< 0.10	67	0.297	550,000	3.29	1.80	2.9	2,560	1.33	147	287,000	146	0.0061	1.05	24.9	-	8,850	447	5,660	0.039	2,170	337	0.112	0.24	62	10.9	5.0	18.9
	FR_HMW2_QSW_04042016_N	2016 05 18	2,430	0.26	1.70	157	0.155	< 0.10	56	0.517	548,000	4.44	3.08	4.4	4,070	1.99	145	283,000	416	0.0155	1.50	26.4	-	7,780	436	7,810	0.072	2,940	329	0.132	< 0.20	61	11.3	8.0	26.6
	FR_HMW2_QSW_04072016_N	2016 08 15	1,760	0.21	1.10	101	0.115	< 0.10	64	0.314	574,000	3.46	1.98	2.6	2,460	1.11	139	293,000	234	< 0.0050	1.20	22.5	-	8,310	449	5,280	0.034	2,670	354	0.102	< 0.20	37	11.7	5.7	17.7
	FR_HMW2_QSW_03102016_N	2016 11 22	11,100	0.79	9.88	708	0.82	< 0.25	63	1.43	625,000	26.4	26.2	26.8	21,800	13.3	140	342,000	1,870	0.066	5.95	74.3	-	10,700	541	15,100	0.289	2,970	385	0.451	0.53	63	14.2	36.3	151
	FR_HMW2_QSW_02012017_N	2017 02 27	8,940	0.74	6.80	766	0.633	0.166	70	1.35	529,000	17.5	11.7	19.8	20,000	9.94	157	308,000	926	< 0.20	4.60	47.8	-	9,360	515	13,500	0.313	2,980	389	0.410	0.57	44	11.6	32.5	109
	FR_HMW2_QSW_03042017_N	2017 06 21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2017-09-11_N	2017 09 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HWM2_QTR_2017-10-02_N	2017 11 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2018-01-01_N	2018 01 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2018-04-02_N	2018 06 06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2018-07-02_N	2018 08 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2018-10-01_N	2018 12 17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2019-01-07_N	2019 03 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2019-04-01_N	2019 05 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2019-07-01_N	2019 07 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2019-10-07_N	2019 10 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2020-01-06_N	2020 03 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW2_QTR_2020-04-06_N	2020 06 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD Concentration greater than CSR Aquatic Life (AW) standard

BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab) pH	Hardness mg/L	Turbidity NTU	Total Anions meq/L	Total Cations meq/L	Conductivity µS/cm	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Dissolved Organic Carbon mg/L	Oxidation Reduction Potential mV	Cation Anion Balance %	Field Temperature C	Field Conductivity µS/cm	Field Turbidity NTU	Dissolved Oxygen mg/L	pH (field) pH	Field ORP mV	Total Alkalinity mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Nitrate+Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Nitrogen mg/L	Total Nitrogen-N mg/L	Chloride mg/L	Fluoride µg/L	Sulfate mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Bromide mg/L	Total Acidity mg/L	Acidity (pH 8.3) mg/L	Ortho-Phosphate mg/L	Total Organic Carbon mg/L	Total Phosphorous as P mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S10 Study Area																																									
FR_HMW3	GA-HMW-3_L1238132	2012 11 08	7.95	665	30.7	13.4	13.5	1,030	760	51.2	0.93	387	-	-	-	-	-	-	-	389	0.320	1.80	< 0.010	-	0.576	-	-	2	270	259	389	< 1.0	< 1.0	-	-	< 0.50	-	11.8	0.0038	6.70	0.0754
	FRO12_0101201304	2013 03 27	7.98	889	1.51	18.1	18	1,430	1,120	6.5	0.93	430	-	5	1,376	-	1.72	7.53	64.3	330	0.161	28.2	0.016	-	< 0.050	-	-	1.9	390	452	330	< 1.0	< 1.0	-	-	< 0.50	-	12.4	0.0081	1.17	0.0041
	FRO12_0104201304	2013 05 28	7.81	775	8.32	16.3	15.6	1,340	1,070	14.7	0.83	388	-	4.6	1,156	-	1.61	7.55	61.2	291	0.0732	28.4	0.017	-	< 0.050	-	-	2.2	260	405	291	< 1.0	< 1.0	-	-	< 0.50	-	13.1	0.0077	0.84	0.0180
	FRO12_0104201315FD																																								
	QA/QC RPD%		0	1	43	*	*	0	1	21	*	*	-	-	-	-	-	-	-	1	6	0	6	-	*	-	-	10	0	0	1	*	*	-	-	*	-	21	20	*	18
	FR_HMW3_Q_01062013_N	2013 08 29	8.02	601	7.23	12.2	12.2	1,020	775	14.7	0.64	385	-	5.8	938	-	0.83	7.46	39.4	236	< 0.0050	18.8	0.015	-	< 0.050	-	-	1.4	440	290	236	< 1.0	< 1.0	-	-	< 0.50	-	5.9	0.0058	2.26	0.0270
	FD_Q_01062013_008																																								
	QA/QC RPD%		2	2	17	*	*	0	1	5	*	*	-	-	-	-	-	-	-	1	*	1	14	-	*	-	-	13	9	1	1	*	*	-	-	*	-	28	3	*	24
	FR_HMW3-201309271258	2013 09 27	7.98	596	2.13	12.1	11.7	989	689	4.6	0.74	39,500	-	4.8	984	-	1.7	7.43	74.7	238	0.0892	18.6	0.014	-	< 0.050	-	-	1.3	310	286	238	< 1.0	< 1.0	-	-	< 0.50	-	1.1	0.0050	1.34	0.0108
	FR_HMW3_Q_01102013_N	2013 12 09	7.88	552	3.58	11.5	11.2	953	711	8.58.5	< 0.50	401	-	4	839.9	-	8.11	7.87	-	234	0.0813	15.1	0.028	-	0.217	-	-	2.7	310	270	234	< 1.0	< 1.0	-	-	< 0.50	-	2.8	0.0041	0.80	0.0151
	FR_HMW3_Q_01012014_N	2014 03 12	8.08	555	0.58	10.9	11.2	919	678	1.1	0.82	415	-	2.7	831.2	-	2.61	7.38	20.4	236	0.0789	11.2	0.064	-	< 0.050	-	-	1.8	540	255	236	< 1.0	< 1.0	-	-	< 0.50	-	3.4	0.0072	0.91	0.0096
	FR_HMW3_Q_01042014_N	2014 05 13	8.12	684	0.51	14	13.8	1,160	907	1.5	0.73	273	-	5.4	1,127	-	7.89	8.17	-39.9	233	0.0979	23.1	0.039	-	< 0.050	-	-	1.7	260	368	233	< 1.0	< 1.0	-	-	< 0.50	-	2.4	0.0077	< 0.50	0.0094
	FR_HMW3_QSW_02072014_N	2014 08 25	8.05	472	0.58	9.98	9.72	839	505	1.9	< 0.50	369	-	7.9	746	-	33.73	7.74	76.1	217	0.104	12.4	0.027	-	< 0.050	-	-	3.6	470	223	217	< 1.0	< 1.0	-	-	< 0.50	-	3.9	0.0025	< 0.50	0.0074
	FD_QSW_02072014_001	Duplicate	7.93	470	0.25	10.2	9.67	832	549	1.6	0.51	349	-	-	-	-	-	-	-	218	0.103	12.8	0.025	-	< 0.050	-	-	3.8	430	229	218	< 1.0	< 1.0	-	-	< 0.50	-	5.1	0.0020	0.53	0.0069
	QA/QC RPD%		2	0	*	*	*	1	8	*	*	*	-	-	-	-	-	-	-	0	1	3	8	-	*	-	-	5	9	3	0	*	*	-	-	*	-	*	*	*	7
	FR_HMW3_QSW_02102014_N	2014 10 22	8.26	492	0.56	9.75	10.1	871	623	2.8	1.09	346	-	4.7	828	-	3.74	7.54	170.3	218	0.107	9.98	0.056	-	< 0.050	-	-	3.3	310	220	218	< 1.0	< 1.0	-	-	< 0.50	-	5.9	0.0040	0.92	0.0069
	FR_HMW3_QSW_02012015_N	2015 01 21	7.96	506	-	-	-	928	694	5.8	0.92	-	-	-	-	-	-	-	-	223	0.164	15.1	0.0277	-	< 0.050	-	-	2.9	290	243	-	-	-	-	-	< 0.25	-	-	-	3.17	0.0110
	FR_HMW3_QSW_02042015_N	2015 04 14	8.38	589	-	-	-	1,050	777	3.8	0.76	-	-	3.5	946	-	-	7.47	-	252	0.109	15.6	0.0236	-	< 0.050	-	-	2.6	290	304	-	-	-	-	-	< 0.25	-	-	-	0.97	0.0071
	FR_HMW3_QSW_02072015_N	2015 07 03	7.86	487	-	-	-	808	636	2.3	0.51	-	-	4.1	784.2	-	-	7.65	-	203	0.0732	11.5	0.0101	-	0.134	-	-	1.9	271	204	-	-	-	-	-	< 0.10	-	-	-	0.64	0.0076
	FR_HMW3_QSW_02102015_N	2015 10 08	8.21	504	-	-	-	907	655	2.2	0.56	-	-	5.3	875	-	-	7.48	-	241	0.0686	13	0.036	-	< 0.050	-	-	1.8	290	231	-	-	-	-	-	< 0.25	-	-	-	0.63	0.0067
	FR_HMW3_QSW_04012016_N	2016 02 22	7.8	579	1.26	12	11.8	1,040	747	3.5	0.63	326	-	5.3	946	-	2.89	7.42	68.2	252	0.160	12.0	0.0519	-	0.318	-	-	2.4	310	288	252	< 1.0	< 1.0	-	-	< 0.25	-	11.8	0.0027	1.17	0.0089
	FR_HMW3_QSW_04042016_N	2016 05 19	8.14	503	20.1	10	10.2	893	663	58	0.58	345	-	3.8	795	-	2.67	7.5	155.7	197	0.500	14.8	0.0080	-	0.948	-	-	1.1	290	239	197	< 1.0	< 1.0	-	-	< 0.25	-	2.8	0.0046	8.97	0.0812
	FD_QSW_04042016_005																																								
	QA/QC RPD%		1	2	23	*	*	1	5	13	*	*	-	-	-	-	-	-	-	2	149	6	62	-	72	-	-	1	0	2	2	*	*	-	-	*	-	*	*	75	26
	FR_HMW3_QSW_04072016_N	2016 08 15	8.09	453	1.75	9.63	9.2	857	643	2	0.67	343	-	5.3	736	-	2.28	8.01	34.3	221	0.102	10.1	0.0132	-	< 0.050	-	-	1.16	330	214	221	< 1.0	< 1.0	-	-	< 0.25	-	3.7	0.0026	0.75	0.0074
	FR_DC1_04072016_016																																								
	QA/QC RPD%		0	1	1	*	*	0	5	*	*	*	-	-	-	-	-	-	-	0	14	2	3	-	*	-	-	4	0	2	0	*	*	-	-	*	-	*	*	*	18
	FR_HMW3_QSW_03102016_N	2016 11 17	7.96	554	3.13	12.5	11.3	994	715	5.4	0.63	346	-	4.3	899	-	1.08	7.28	-109	378	0.159	4.03	0.0075	-	0.278	-	-	2.16	290	219	378	< 1.0	< 1.0	-	-	< 0.25	-	23.0	0.0019	0.90	0.0114
	FR_HMW3_QSW_02012017_N	2017 02 27	7.31	736	1.71	15.4	14.9	1,250	979	2.9	1.26	337	-	4.3	1,105	-	0.91	7.36	47.8	282	0.0521	19.6	0.0425	-	< 0.050	-	-	1	248	402	282	< 1.0	< 1.0	-	-	< 0.050	-	21.1	0.0108	1.65	0.0197
	FR_HMW3_QSW_03042017_N	2017 06 22	8.24	355	0.82	7.82	7.19	718	546	1	1.54	481	-4.2	3.5	687.3	-	2.84	7.53	174.2	157	0.0188	9.17	0.0030	-	0.281	-	-	< 0.50	210	193	157	< 1.0	< 1.0	-	-	< 0.050	-	4.3	0.0047	0.93	0.0050
	FR_HMW3_QTR_2017-09-11_N	2017 09 19	8.25	414	2.12	8.47	8.39	756	559	5.2	0.58	274	-0.5	5.5	703.6	-	1.24	7.73	74.9	180	0.0716	7.60	0.0120	-	< 0.050	-	-	< 0.50	259	208	180	< 1.0	< 1.0	-	-	< 0.050	-	3.3	0.0015	0.85	0.0108
	FR_HWM3_QTR_2017-10-02_N	2017 11 14	8.4	489	1.04	9.58	9.89	827	584	1	0.5	299	1.6	5.3	755.4	-	2.01	7.35	-14.4	201	0.0705	8.70	0.0059	-	0.303	-	-	0.57	240	236	190	11.0	< 1.0	-	-	< 0.050	-	2.0	0.0022	0.72	0.0059
	FR_HMW3_QTR_2018-01-01_N	2018 01 25	8.19	487	1.66	9.76	9.85	881	617	1	1.04	333	0.4	3.2	842.5	-	2.23	7.35	25.2	194	0.0873	8.43	0.0069	-	0.353	-	-	< 0.50	228	253	194	< 1.0	< 1.0	-	-	< 0.050	-	2.8	0.0010	0.99	0.0072
	FR_HMW3_QTR_2018-04-02_N	2018 06 07	7.99	451	0.53	10.6	9.11	907	680	< 1.0	0.75	286	-7.6	3.3	862	-	3.32	6.92	101.2	203	0.0668	14.7	0.0049	-	0.439	-	-	0.52	292	263	203	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	0.0021	0.67	0.0062
	FR_HMW3_QTR_2018-07-02_N	2018 07 18	8	431	0.63	8.66	8.72	787	572	< 1.0	0.62	297	0.3	4.6	709	-	2.19	7.31	33.5	189	0.117	8.92	0.0072	-	0.226	-	-	< 0.50	319	203	189	< 1.0	< 1.0	-	-	< 0.050	-	3.1	< 0.0010	0.63	0.0050

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Dissolved Metals																													
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																
FR_HMW3	GA-HMW-3_L1238132	2012 11 08	5.7	168	< 30	59.5	505	4.0	2.6	0.23	0.17	69.9	< 0.10	47	0.097	0.13	0.79	< 0.50	< 0.050	77.0	< 0.010	1.27	5.38	1.24	< 0.010	141	0.024	< 0.10	14	4.18	< 1.0	7.3
	FRO12_0101201304	2013 03 27	< 3.0	218	< 30	83.5	721	4.3	2.0	0.21	0.11	74.4	< 0.10	37	0.128	< 0.10	0.93	< 0.50	< 0.050	80.9	< 0.010	1.01	6.71	0.97	< 0.010	166	0.023	< 0.10	< 10	4.14	< 1.0	< 3.0
	FRO12_0104201304	2013 05 28	< 3.0	186	< 30	75.4	610	3.6	< 2.0	0.24	0.11	57.1	< 0.10	37	0.111	< 0.10	0.80	< 0.50	< 0.050	62.7	< 0.010	1.10	6.52	***33.1***	< 0.010	159	0.026	< 0.10	< 10	4.03	< 1.0	< 3.0
	FRO12_0104201315FD	Duplicate	< 3.0	187	< 30	77.6	581	3.8	< 2.0	0.28	0.13	60.8	< 0.10	34	0.117	< 0.10	0.74	< 0.50	< 0.050	50.7	< 0.010	1.08	6.12	***33.7***	< 0.010	158	0.025	< 0.10	< 10	3.96	< 1.0	< 3.0
	QA/QC RPD%																															
	FR_HMW3_Q_01062013_N	2013 08 29	9.3	147	< 10	56.8	199	3.26	1.46	0.458	< 0.10	42.7	< 0.050	31.8	0.057	0.11	0.473	0.47	< 0.030	52.3	< 0.010	1.28	3.17	***60***	< 0.010	122	0.022	< 0.050	< 1.0	2.91	< 0.50	2.3
	FD_Q_01062013_008	Duplicate	6.3	143	< 10	56.3	209	3.31	1.53	0.459	0.12	43.7	< 0.050	32.8	0.053	< 0.10	0.493	0.42	< 0.030	55.5	< 0.010	1.32	3.13	***59***	< 0.010	128	0.024	< 0.050	< 1.0	2.93	< 0.50	1.7
	QA/QC RPD%		38	3	*	1	5	2	5	*	*	2	*	3	7	*	4	*	*	6	*	3	1	2	*	5	*	*	*	1	*	*
	FR_HMW3-201309271258	2013 09 27	< 3.0	141	< 30	56.0	66.5	2.67	1.07	0.36	< 0.10	35.2	< 0.10	28	0.048	< 0.10	0.13	< 0.50	< 0.050	38.3	< 0.010	1.06	2.50	***56.2***	< 0.010	105	0.016	< 0.10	< 10	2.52	< 1.0	3.2
	FR_HMW3_Q_01102013_N	2013 12 09	< 3.0	133	< 30	53.3	22.7	2.48	2.15	0.39	< 0.10	31.2	< 0.10	25	0.040	< 0.10	< 0.10	< 0.50	< 0.050	35.4	< 0.010	1.28	2.35	***49.7***	< 0.010	120	0.016	< 0.10	16	2.71	< 1.0	< 3.0
	FR_HMW3_Q_01012014_N	2014 03 12	< 3.0	136	< 10	52.5	185	2.46	1.99	0.27	0.12	32.0	< 0.10	26	0.057	< 0.10	0.20	< 0.50	< 0.050	39.1	< 0.010	0.992	2.49	***45.7***	< 0.010	113	0.014	< 0.10	15	2.52	< 1.0	< 3.0
	FR_HMW3_Q_01042014_N	2014 05 13	< 3.0	163	< 10	67.3	276	2.86	1.60	0.24	0.11	40.4	< 0.10	26	0.061	< 0.10	0.30	< 0.50	< 0.050	41.5	< 0.010	0.990	2.94	***57.8***	< 0.010	150	0.016	< 0.10	15	3.13	< 1.0	< 3.0
	FR_HMW3_QSW_02072014_N	2014 08 25	< 3.0	109	< 10	48.3	26.6	2.25	5.18	0.34	< 0.10	25.3	< 0.10	24	0.026	< 0.10	< 0.10	< 0.50	< 0.050	30.9	< 0.010	1.27	1.68	***50.6***	< 0.010	106	0.011	< 0.10	< 10	2.19	< 1.0	5.0
	FD_QSW_02072014_001	Duplicate	< 3.0	108	< 10	48.9	24.4	2.21	4.98	0.33	< 0.10	24.6	< 0.10	23	0.026	< 0.10	< 0.10	< 0.50	< 0.050	30.1	< 0.010	1.19	1.61	***51.8***	< 0.010	105	0.011	< 0.10	< 10	2.16	< 1.0	< 3.0
	QA/QC RPD%																															
	FR_HMW3_QSW_02102014_N	2014 10 22	< 3.0	117	< 10	48.2	84.2	2.28	4.77	0.29	0.11	27.1	< 0.10	24	0.041	< 0.10	0.15	< 0.50	< 0.050	30.9	< 0.010	1.17	1.89	***38.5***	< 0.010	107	0.011	< 0.10	14	2.34	< 1.0	< 3.0
	FR_HMW3_QSW_02012015_N	2015 01 21	< 3.0	123	< 10	48.4	216	2.44	4.25	0.28	0.11	30.2	< 0.10	23	0.046	< 0.10	0.49	< 0.50	< 0.050	34.7	< 0.010	1.12	2.28	***54.4***	< 0.010	112	0.012	< 0.10	15	2.38	< 1.0	< 3.0
	FR_HMW3_QSW_02042015_N	2015 04 14	< 3.0	141	< 10	57.5	243	2.56	3.69	0.22	0.11	34.4	< 0.10	23	0.0615	< 0.10	0.33	< 0.50	< 0.050	37	< 0.0050	1.06	2.43	***48.3***	< 0.010	131	0.02	< 0.10	12	3.12	< 0.50	< 3.0
	FR_HMW3_QSW_02072015_N	2015 07 03	< 3.0	118	< 10	46.9	192	2.20	2	0.26	0.12	26.7	< 0.10	23	0.032	< 0.10	0.27	< 0.50	< 0.050	31.4	< 0.0050	1.13	1.79	***50.9***	< 0.010	95.6	0.011	< 0.10	< 10	2.04	< 0.50	< 3.0
	FR_HMW3_QSW_02102015_N	2015 10 08	< 3.0	122	< 10	48	194	2.32	1.77	0.26	0.12	29.6	< 0.10	26	0.0496	< 0.10	0.25	< 0.50	< 0.050	32.6	< 0.0050	1.16	1.81	***48.9***	< 0.010	117	0.02	< 0.10	< 10	2.48	< 0.50	< 3.0
	FR_HMW3_QSW_04012016_N	2016 02 22	< 3.0	141	< 10	54.8	395	2.72	2.68	0.21	0.12	34.9	< 0.10	23	0.0592	< 0.10	0.52	< 0.50	< 0.050	32.6	< 0.0050	1.04	2.50	***33.4***	< 0.010	123	0.014	< 0.10	11	2.85	< 0.50	< 3.0
	FR_HMW3_QSW_04042016_N	2016 05 19	4.0	118	< 10	50.3	111	2.23	1.51	0.28	< 0.10	31.4	< 0.020	18	0.0321	< 0.10	0.14	< 0.50	< 0.050	32.6	< 0.0050	1.06	1.84	***38.3***	< 0.010	102	0.013	< 0.10	< 10	2.15	< 0.50	< 3.0
	FD_QSW_04042016_005	Duplicate	3.2	123	< 10	50.1	129	2.22	1.67	0.28	0.11	31.4	< 0.020	19	0.0357	< 0.10	0.14	< 0.50	< 0.050	33.8	< 0.0050	1.03	1.93	***34.7***	< 0.010	102	0.012	< 0.10	< 10	2.12	< 0.50	< 3.0
	QA/QC RPD%																															
	FR_HMW3_QSW_04072016_N	2016 08 15	< 3.0	109	< 10	44.1	215	2.31	1.69	0.28	0.11	30.3	< 0.020	20	0.0336	< 0.10	0.35	< 0.50	< 0.050	31.9	< 0.0050	1.15	1.66	***44.4***	< 0.010	102	0.014	< 0.10	< 10	2.16	< 0.50	< 3.0
	FR_DC1_04072016_016	Duplicate	< 3.0	106	< 10	47.0	210	2.40	1.79	0.26	0.11	29.8	< 0.020	21	0.0335	< 0.10	0.35	< 0.50	< 0.050	31.3	< 0.0050	1.13	1.63	***43.5***	< 0.010	102	0.012	< 0.10	< 10	2.02	< 0.50	< 3.0
	QA/QC RPD%																															
	FR_HMW3_QSW_03102016_N	2016 11 17	< 3.0	135	< 10	52.6	232	2.82	3.10	0.19	0.14	42.5	< 0.020	30	0.0580	< 0.10	0.40	< 0.50	< 0.050	57.2	< 0.0050	1.07	2.37	9.01	< 0.010	127	0.019	< 0.10	< 10	3.36	< 0.50	< 3.0
	FR_HMW3_QSW_02012017_N	2017 02 27	1.4	177	< 10	71.3	247	3.16	2.24	0.18	< 0.10	51.4	< 0.020	28	0.0918	< 0.10	0.26	< 0.20	< 0.050	53.0	< 0.0050	0.901	3.32	***44.4***	< 0.010	178	0.015	< 0.10	< 10	3.47	< 0.50	5.5
	FR_HMW3_QSW_03042017_N	2017 06 22	< 5.0	84.9	< 50	34.8	50.1	1.83	0.93	< 0.50	< 0.50	24.0	< 0.10	< 50	< 0.025	< 0.50	< 0.50	< 1.0	< 0.25	24.5	< 0.0050	1.08	< 2.5	***44.6***	< 0.050	86.3	< 0.050	< 0.50	< 10	1.56	< 2.5	< 5.0
	FR_HMW3_QTR_2017-09-11_N	2017 09 19	< 3.0	98.2	52	41.0	106	1.99	1.32	0.22	0.11	28.2	< 0.020	17	0.0353	< 0.10	0.17	< 0.50	< 0.050	27.3	< 0.0050	1.02	1.33	***56.3***	< 0.010	105	0.012	< 0.10	< 10	2.03	< 0.50	< 3.0
	FR_HWM3_QTR_2017-10-02_N	2017 11 14	< 3.0	119	81	46.9	96.5	1.78	1.33	0.19	0.12	29.9	< 0.020	14	0.0377	0.10	0.17	< 0.50	< 0.050	27.2	< 0.0050	1.01	1.43	***66.1***	< 0.010	122	0.012	< 0.10	< 10	1.86	< 0.50	< 3.0
	FR_HMW3_QTR_2018-01-01_N	2018 01 25	< 3.0	118	108	46.4	116	1.91	1.42	0.20	0.15	32.1	< 0.020	15	0.0295	< 0.10	0.18	< 0.50	< 0.050	30.9	< 0.0050	1.04	1.41	***61.2***	< 0.010	131	0.017	< 0.10	< 10	2.04	< 0.50	< 3.0
	FR_HMW3_QTR_2018-04-02_N	2018 06 07	< 3.0	102	< 20	47.7	68.6	1.83	1.04	< 0.20	< 0.20	28.6	< 0.040	< 20	0.026	< 0.20	< 0.20	< 0.50	< 0.10	28.8	< 0.0050	1.01	1.4	***73.5***	< 0.020	98.8	< 0.020	< 0.20	< 10	2.15	< 1.0	< 2.0
	FR_HMW3_QTR_2018-07-02_N	2018 07 18	< 3.0	98.3	41	45.0	84.7	1.95	1.22	0.19	< 0.10	27.5	< 0.020	15	0.0250	< 0.10	0.17	< 0.50	< 0.050	27.6	< 0.0050	1.02	1.24	***62.9***	< 0.010	101	0.013	< 0.10	< 10	1.98	< 0.50	1.5

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[i]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																			
FR_HMW3	GA-HMW-3_L1238132	2012 11 08	696	0.27	0.46	91.7	< 0.10	< 0.50	44	0.149	171,000	1.40	1.09	1.49	891	0.589	76.7	61,000	518	< 0.010	1.34	6.76	-	4,200	1.30	3,510	0.022	2,500	142	0.047	< 0.10	31	4.34	2.5	8.0
	FRO12_0101201304	2013 03 27	37.0	0.23	0.14	73.4	< 0.10	< 0.50	40	0.122	216,000	< 0.10	0.96	0.58	40	< 0.050	89.8	83,900	735	< 0.010	1.04	7.13	-	4,500	0.97	2,100	< 0.010	2,100	176	0.026	< 0.10	< 10	4.46	< 1.0	3.9
	FRO12_0104201304	2013 05 28	161	0.25	0.17	57.5	< 0.10	< 0.50	40	0.126	189,000	0.42	0.80	< 1.0	168	0.148	62.8	79,100	581	< 0.010	1.13	6.87	-	4,100	31.5	2,470	0.029	< 2,000	163	0.028	< 0.10	14	4.11	< 1.0	4.6
	FRO12_0104201315FD	Duplicate	153	0.25	0.21	64.6	< 0.10	< 0.50	38	0.126	187,000	< 0.50	0.81	< 0.50	131	0.129	60.3	77,300	589	< 0.010	1.09	6.63	-	4,000	31.9	2,360	< 0.010	< 2,000	157	0.025	< 0.10	12	3.88	< 1.0	4.4
	QA/QC RPD%		5	*	*	12	*	*	5	0	1	*	1	*	25	*	4	2	1	*	4	4	-	2	1	5	*	*	4	*	*	15	6	*	*
	FR_HMW3_Q_01062013_N	2013 08 29	107	0.458	0.17	47.7	< 0.050	-	31.7	0.064	141,000	0.80	0.584	1.08	268	0.158	50.5	55,600	211	< 0.010	1.32	3.72	-	3,230	59.8	2,090	< 0.010	1,450	126	0.024	< 0.050	2.1	2.80	< 0.50	3.8
	FD_Q_01062013_008	Duplicate	217	0.482	0.21	51.1	< 0.050	-	32.2	0.068	145,000	1.17	0.625	2.85	294	0.427	53.2	56,900	224	< 0.010	1.43	4.08	-	3,350	61.9	2,240	0.025	1,520	131	0.036	< 0.050	6.4	3.06	0.81	7.1
	QA/QC RPD%		68	*	*	7	*	-	2	6	3	38	7	90	9	92	5	2	6	*	8	9	-	4	3	7	*	5	4	*	*	101	9	*	*
	FR_HMW3-201309271258	2013 09 27	86.8	0.47	0.18	37.9	< 0.10	< 0.50	32	0.062	143,000	0.46	0.23	0.56	83	0.181	41.9	56,700	95.7	< 0.010	1.12	2.94	-	2,990	56.6	1,840	0.019	1,160	122	0.021	< 0.10	12	2.85	< 1.0	4.5
	FR_HMW3_Q_01102013_N	2013 12 09	73.1	0.45	0.18	33.9	< 0.10	< 0.50	26	0.066	137,000	0.21	0.22	0.59	96	0.110	36.9	54,900	127	< 0.010	1.34	2.81	-	2,630	49.4	1,820	< 0.010	2,420	124	0.020	< 0.10	19	2.84	< 1.0	3.8
	FR_HMW3_Q_01012014_N	2014 03 12	10.3	0.30	0.14	32.1	< 0.10	< 0.50	29	0.059	137,000	0.14	0.26	0.59	18	0.067	40.8	53,700	210	< 0.010	1.13	2.61	-	2,490	44.5	1,630	< 0.010	2,050	118	0.014	< 0.10	16	2.52	< 1.0	< 3.0
	FR_HMW3_Q_01042014_N	2014 05 13	46.7	0.29	0.17	39.8	< 0.10	< 0.50	26	0.087	159,000	0.41	0.36	0.91	122	0.317	40.7	63,400	290	< 0.010	0.998	3.18	-	2,660	54.2	1,640	< 0.010	1,500	142	0.016	< 0.10	16	2.95	< 1.0	5.8
	FR_HMW3_QSW_02072014_N	2014 08 25	10.8	0.36	0.12	25.1	< 0.10	< 0.50	25	0.032	110,000	0.11	< 0.10	< 0.50	16	< 0.050	30.5	50,200	26.2	< 0.010	1.24	1.70	-	2,270	53	1,460	< 0.010	5,170	108	0.012	< 0.10	< 10	2.26	< 1.0	3.7
	FD_QSW_02072014_001	Duplicate	19.4	0.38	0.11	25.5	< 0.10	< 0.50	24	0.035	111,000	0.14	< 0.10	< 0.50	22	< 0.050	30.6	50,200	27.7	< 0.010	1.27	1.73	-	2,270	53.1	1,490	< 0.010	5,290	108	0.012	< 0.10	< 10	2.25	< 1.0	3.3
	QA/QC RPD%		57	*	*	2	*	*	*	9	1	*	*	*	*	*	0	0	6	*	2	*	-	0	0	2	*	2	0	*	*	*	0	*	*
	FR_HMW3_QSW_02102014_N	2014 10 22	12.3	0.35	0.13	27.1	< 0.10	< 0.50	27	0.044	117,000	< 0.10	0.15	< 0.50	21	< 0.050	36.7	48,300	84.3	< 0.010	1.18	1.85	-	2,410	38.1	1,560	< 0.010	4,670	107	0.014	< 0.10	15	2.34	< 1.0	< 3.0
	FR_HMW3_QSW_02012015_N	2015 01 21	-	-	-	-	-	< 0.50	-	0.055	-	0.15	-	-	-	-	-	-	-	-	-	-	-	2,330	52.4	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QSW_02042015_N	2015 04 14	-	-	-	-	-	< 0.050	-	0.0584	-	0.11	-	-	-	-	-	-	-	-	-	-	-	2,530	47	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QSW_02072015_N	2015 07 03	-	-	-	-	-	< 0.050	-	0.0359	-	0.12	-	-	-	-	-	-	-	-	-	-	-	2,320	51.1	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QSW_02102015_N	2015 10 08	-	-	-	-	-	< 0.050	-	0.0535	-	0.16	-	-	-	-	-	-	-	-	-	-	-	2,450	50.9	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QSW_04012016_N	2016 02 22	22.4	0.22	0.22	34.8	< 0.10	< 0.050	23	0.0627	136,000	0.14	0.51	< 0.50	143	0.072	32.6	53,900	373	< 0.0050	1.03	2.34	-	2,620	33.3	1,690	< 0.010	2,560	121	0.015	< 0.10	12	2.74	< 0.50	< 3.0
	FR_HMW3_QSW_04042016_N	2016 05 19	597	0.37	0.76	57.1	0.041	< 0.050	27	0.125	132,000	1.53	1.72	2.07	1,300	0.859	55.8	53,300	627	0.0068	1.31	4.47	-	3,060	26.8	2,670	0.207	4,390	117	0.042	0.16	14	2.58	2.52	10.5
	FD_QSW_04042016_005	Duplicate	526	0.39	0.43	43.7	0.037	< 0.050	21	0.103	124,000	1.17	1.08	7.56	847	0.809	34.5	51,300	268	0.0067	1.10	3.72	-	2,330	34.5	2,360	0.097	1,710	104	0.030	0.15	13	2.19	1.61	9.8
	QA/QC RPD%		13	*	*	27	*	*	*	19	6	27	46	114	42	6	47	4	80	1	17	18	-	27	25	12	72	88	12	*	*	7	16	*	7
	FR_HMW3_QSW_04072016_N	2016 08 15	22.3	0.31	0.20	31.1	< 0.020	< 0.050	20	0.0411	109,000	< 0.10	0.35	< 0.50	204	0.083	31.8	43,800	212	< 0.0050	1.21	1.72	-	2,300	45.2	1,620	< 0.010	1,670	105	0.015	< 0.10	< 10	2.20	< 0.50	< 3.0
	FR_DC1_04072016_016	Duplicate	16.0	0.29	0.18	29.9	< 0.020	< 0.050	22	0.0378	107,000	0.11	0.37	< 0.50	174	< 0.050	31.4	46,800	218	< 0.0050	1.14	1.72	-	2,410	44.6	1,580	< 0.010	1,760	104	0.013	< 0.10	< 10	2.07	< 0.50	< 3.0
	QA/QC RPD%		33	*	*	4	*	*	*	8	2	*	6	*	16	*	1	7	3	*	6	*	-	5	1	2	*	5	1	*	*	*	6	*	*
	FR_HMW3_QSW_03102016_N	2016 11 17	23.8	0.28	0.22	42.2	< 0.020	< 0.050	32	0.0617	142,000	< 0.10	0.44	< 0.50	290	< 0.050	61.5	55,200	248	< 0.0050	1.16	2.57	-	2,850	7.33	2,260	< 0.010	3,280	136	0.019	< 0.10	< 10	3.57	< 0.50	< 3.0
	FR_HMW3_QSW_02012017_N	2017 02 27	17.5	0.26	0.15	53.9	< 0.020	< 0.050	30	0.0959	177,000	0.12	0.31	< 0.50	45	0.054	53.9	69,000	259	< 0.0050	0.965	3.49	-	3,220	36.4	1,840	< 0.010	2,300	184	0.016	< 0.10	< 10	3.63	< 0.50	< 3.0
	FR_HMW3_QSW_03042017_N	2017 06 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2017-09-11_N	2017 09 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HWM3_QTR_2017-10-02_N	2017 11 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2018-01-01_N	2018 01 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2018-04-02_N	2018 06 07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2018-07-02_N	2018 07 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.
Associated Caro file(s): 7081099.
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QA/QC RPD Denotes quality assurance/quality control relative percent difference.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
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BOLD Concentration greater than CSR Aquatic Life (AW) standard
BLUE Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with pH.
[c] Standard varies with chloride.
[d] Standard varies with hardness.
[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.
[g] Sample collected in 2018 but Teck sample ID reads 2019.
[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15
[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.
[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Physical Parameters											Field Parameters						Dissolved Inorganics																					
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab)	Hardness	Turbidity	Total Anions	Total Cations	Conductivity	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Oxidation Reduction Potential	Cation Anion Balance	Field Temperature	Field Conductivity	Field Turbidity	Dissolved Oxygen	pH (field)	Field ORP	Total Alkalinity	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Nitrate+Nitrite (as N)	Kjeldahl Nitrogen-N	Nitrogen	Total Nitrogen-N	Chloride	Fluoride	Sulfate	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Bromide	Total Acidity	Acidity (pH 8.3)	Ortho-Phosphate	Total Organic Carbon	Total Phosphorous as P
			pH	mg/L	NTU	meq/L	meq/L	µS/cm	mg/L	mg/L	mg/L	mV	%	C	µS/cm	NTU	mg/L	pH	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.31-18.5[b]	400	0.2-2.0[c]	400	n/a	n/a	n/a	1,500	2,000-3,000[d]	1,280-4,290[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	10,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a[j]	n/a	n/a	n/a	n/a	6.08-223.8[i]	0.389-39.95[j]	n/a	n/a	n/a	n/a	n/a	n/a	4,990	n/a	n/a	n/a	n/a	n/a	78	n/a	n/a	n/a	n/a	n/a
S10 Study Area																																									
FR_HMW3	FR_HMW3_QTR_2018-10-01_N	2018 12 11	8.33	471	6.06	9.66	9.54	823	634	10.6	< 0.50	293	-0.6	3.3	749	-	4.75	7.39	94.5	186	0.159	9.90	< 0.0050	-	0.35	-	-	< 2.5	290	251	181	4.4	< 1.0	-	-	< 0.25	-	6.0	0.0107	< 0.50	0.562
	WG_2018-10-01_020	Duplicate	8.03	458	4.44	9.57	9.28	820	653	4.7	< 0.50	492	-1.6	-	-	-	-	-	-	186	0.147	9.69	< 0.0050	-	0.381	-	-	< 2.5	280	247	186	< 1.0	< 1.0	-	-	< 0.25	-	6.4	0.0073	< 0.50	0.448
	QA/QC RPD%		4	3	31	*	*	0	3	*	*	*	*	-	-	-	-	-	-	0	8	2	*	-	8	-	-	*	4	2	3	*	*	-	-	*	-	6	38	*	23
	FR_HMW3_QTR_2019-01-07_N	2019 03 11	7.7	482	3.61	10	9.76	878	630	1.6	< 0.50	335	-1.3	1.8	722.3	-	6.45	7.46	32.4	186	0.207	9.13	0.0073	-	0.098	-	-	0.54	290	270	186	< 1.0	< 1.0	-	-	< 0.050	-	4.5	< 0.0010	< 0.50	0.0037
	FR_DC1_QTR_2019-01-07_N	Duplicate	7.59	479	2.82	10.1	9.7	890	673	2.4	< 0.50	358	-2	-	-	-	-	-	-	191	0.186	9.08	0.0068	-	0.28	-	-	0.54	289	270	191	< 1.0	< 1.0	-	-	< 0.050	-	3.3	0.0010	< 0.50	0.0032
	QA/QC RPD%		1	1	25	*	*	1	7	*	*	*	*	-	-	-	-	-	-	3	11	1	7	-	*	-	-	0	0	0	3	*	*	-	-	*	-	*	*	*	*
	FR_HMW3_QTR_2019-04-01_N	2019 05 16	8.35	487	4.61	8.79	9.86	800	538	3.5	< 0.50	315	5.8	2.5	678.6	-	9.93	7.45	-19.7	176	0.0753	9.36	0.0024	-	0.273	-	-	< 0.50	287	220	173	2.6	< 1.0	-	-	< 0.050	-	4.6	< 0.0010	< 0.50	0.0090
	FR_DC2_QTR_2019-04-01_N	Duplicate	8.36	446	4.03	8.84	9.02	807	557	4.1	< 0.50	348	1	-	-	-	-	-	-	179	0.0743	9.38	0.0023	-	< 0.050	-	-	< 0.50	288	220	176	2.8	< 1.0	-	-	< 0.050	-	5.2	< 0.0010	< 0.50	0.0104
	QA/QC RPD%		0	9	13	*	*	1	3	*	*	*	*	-	-	-	-	-	-	2	1	0	*	-	*	-	-	*	0	0	2	*	*	-	-	*	-	*	*	*	14
	FR_HMW3_QTR_2019-07-01_N	2019 07 24	8.16	347	5.29	7.3	7.03	677	469	4.4	< 0.50	412	-1.9	3.8	324.2	-	0.25	8.2	-199	182	0.134	7.02	0.0019	-	< 0.050	-	-	< 0.50	302	151	182	< 1.0	< 1.0	-	-	< 0.050	-	4.2	< 0.0010	0.73	0.0109
	FR_HMW3_QTR_2019-10-07_N	2019 10 23	8.2	466	6.97	9.49	9.43	781	608	6.4	0.55	302	-0.3	5	819	-	11.2	7.56	-28.7	192	0.113	9.25	0.0087	-	0.155	-	-	< 0.50	275	239	192	< 1.0	< 1.0	-	-	< 0.050	-	5.6	< 0.0010	0.59	0.0089
	FR_DC2_QTR_2019-10-07_N	Duplicate	8.16	462	7.57	9.6	9.34	775	606	8.2	< 0.50	400	-1.4	-	-	-	-	-	-	197	0.156	9.33	0.0080	-	0.069	-	-	< 0.50	277	240	197	< 1.0	< 1.0	-	-	< 0.050	-	5.9	< 0.0010	< 0.50	0.0119
	QA/QC RPD%		0	1	8	*	*	1	0	25	*	*	*	-	-	-	-	-	-	3	32	1	8	-	*	-	-	*	1	0	3	*	*	-	-	*	-	5	*	*	29
	FR_HMW3_QTR_2020-01-06_N	2020 03 02	8.07	502	6.55	10.8	10.2	862	716	6.7	0.69	475	-3.1	2	869.9	-	3.77	7.73	3.1	213	0.136	8.50	0.0090	-	0.179	-	-	0.61	196	285	213	< 1.0	< 1.0	-	-	< 0.050	-	10.2	< 0.0010	0.95	0.022
	FR_HMW3_QTR_2020-04-06_N	2020 05 15	8.22	552	2.83	10.9	11.1	819	758	4.5	< 0.50	334	1.1	-	-	-	-	-	-	195	0.0543	10.9	0.0066	-	< 0.050	-	-	< 0.50	272	298	195	< 1.0	< 1.0	-	-	< 0.050	-	1.6	0.0044	1.01	0.0106
Blanks																											-														
FR_HMW3	WG_2018-07-02_013	2018 07 18	4.91	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	467	0	-	-	-	-	-	-	< 1.0	0.0067	< 0.005	< 0.0010	-	< 0.050	-	-	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	-	-	< 0.050	-	2.2	< 0.0010	< 0.50	< 0.0010
FR_09-01-B	WG_2018-10-01_019	2018 12 13	5.68	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	329	0	-	-	-	-	-	-	< 1.0	0.0067	< 0.005	< 0.0010	-	< 0.050	-	-	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	< 0.0010	< 0.50	< 0.0020
FR_KB-3A	FR_FLD_2019-02-26	2019 02 26	5.38	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	447	0	-	-	-	-	-	-	< 1.0	0.0067	< 0.005	< 0.0010	-	-	-	-	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	-	-	< 0.050	-	2.0	< 0.0010	< 0.50	< 0.0020
FR_CB-2A	FR_FLD_2019_10_01	2019 10 01	5.41	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	485	0	-	-	-	-	-	-	< 1.0	< 0.0050	< 0.005	< 0.0010	-	< 0.050	-	-	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	-	-	< 0.050	-	< 1.0	< 0.0010	< 0.50	< 0.0020
FR_KB-2	FR_FLD4_2019-10-21	2019 10 21	5.54	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	490	0	-	-	-	-	-	-	< 1.0	< 0.0050	< 0.005	< 0.0010	-	< 0.050	-	-	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	-	-	< 0.050	-	1.4	< 0.0010	< 0.50	< 0.0020
FR_CB-5B	FR_CB-5B-S_2019-12-03	2019 03 12	5.52	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	479	0	-	-	-	-	-	-	< 1.0	< 0.0050	< 0.005	< 0.0010	-	< 0.050	-	-	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	-	-	< 0.050	-	1.5	< 0.0010	< 0.50	< 0.0020
FR_HMW3	FR_DC2_QTR_2019-04-01_FB-HG	2019 05 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_HMW1S	FR_FLD_QTR_2019-10-07_N	2019 10 23	5.58	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	406	0	-	-	-	-	-	-	< 1.0	< 0.0050	< 0.005	< 0.0010	-	< 0.050	-	-	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	-	-	< 0.050	-	1.2	< 0.0010	< 0.50	< 0.0020

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
QA/QC RPD	Denotes quality assurance/quality control relative percent difference.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																													
			Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	90	50	10,000	1.5	12,000	0.5-4[d]	10[e]	40	20-90[d]	40-160[d]	n/a	0.25	10,000	250-1,500[d]	20	0.5-15[d]	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]															0.8-10.4[i]	100 (Cr +6)	n/a	n/a	n/a	2,530	n/a	n/a	517-2,972[i]	700	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																
FR_HMW3	FR_HMW3_QTR_2018-10-01_N	2018 12 11	< 3.0	114	248	45.5	109	2.02	1.45	0.18	0.14	35.7	< 0.020	15	0.0225	< 0.10	0.23	< 0.50	< 0.050	25.7	< 0.0050	1.09	1.25	***62.9***	< 0.010	132	< 0.010	< 0.10	< 10	2.07	< 0.50	< 1.0
	WG_2018-10-01_020	Duplicate	< 3.0	110	242	44.5	109	1.87	1.47	0.17	0.15	30.8	< 0.020	16	0.0263	< 0.10	0.24	< 0.50	< 0.050	27.9	< 0.0050	1.03	1.22	***62.1***	< 0.010	122	< 0.010	< 0.10	< 10	1.97	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_HMW3_QTR_2019-01-07_N	2019 03 11	< 10	115	270	47.1	116	1.72	1.61	< 1.0	< 1.0	31.9	< 0.20	< 100	0.052	< 1.0	< 1.0	< 2.0	< 0.50	27	< 0.0050	0.94	< 5.0	***62.3***	< 0.10	126	< 0.10	< 1.0	< 10	2.01	< 5.0	< 10
	FR_DC1_QTR_2019-01-07_N	Duplicate	< 3.0	114	268	47.0	116	1.82	1.50	0.17	0.17	32.0	< 0.020	17	0.0289	< 0.10	0.22	< 0.50	< 0.050	27.1	< 0.0050	1.04	1.33	***71.3***	< 0.010	130	0.010	< 0.10	< 10	2.03	< 0.50	1.1
	QA/QC RPD%																															
	FR_HMW3_QTR_2019-04-01_N	2019 05 16	< 3.0	115	266	48.7	80.5	1.87	1.28	0.17	0.14	28.5	< 0.020	12	0.0189	0.12	0.18	< 0.50	< 0.050	22.6	0.0132	1.08	1.18	***55.5***	< 0.010	125	< 0.010	< 0.10	< 10	1.89	< 0.50	5.0
	FR_DC2_QTR_2019-04-01_N	Duplicate	< 3.0	106	227	43.7	76.3	1.70	1.24	0.17	0.14	27.6	< 0.020	13	0.0217	< 0.10	0.17	< 0.50	< 0.050	22.6	< 0.0050	1.05	1.13	***51.7***	< 0.010	116	< 0.010	< 0.10	< 10	1.71	< 0.50	< 1.0
	QA/QC RPD%																															
	FR_HMW3_QTR_2019-07-01_N	2019 07 24	7.3	82.3	308	34.2	60.8	1.75	1.05	0.21	0.17	26.0	< 0.020	13	0.0178	0.13	0.16	< 0.50	< 0.050	21.5	< 0.0050	1.12	0.94	***42***	< 0.010	94.3	< 0.010	< 0.10	< 10	1.50	< 0.50	1.1
	FR_HMW3_QTR_2019-10-07_N	2019 10 23	3.4	114	254	44.0	76.2	1.95	1.07	0.19	0.14	36.8	< 0.020	14	0.0335	< 0.10	0.15	< 0.20	< 0.050	22.4	< 0.0050	1.03	1.32	***60.6***	< 0.010	128	0.010	< 0.10	< 10	1.81	< 0.50	1.3
	FR_DC2_QTR_2019-10-07_N	Duplicate	4.2	112	316	44.1	89.5	1.97	1.16	0.19	0.20	38.4	< 0.020	16	0.0281	< 0.10	0.17	< 0.20	< 0.050	24.5	< 0.0050	1.03	1.24	***59.2***	< 0.010	127	0.011	< 0.10	< 10	1.79	< 0.50	1.0
	QA/QC RPD%																															
	FR_HMW3_QTR_2020-01-06_N	2020 03 02	3.2	115	392	52.2	114	1.96	1.43	0.15	0.19	41.1	< 0.020	15	0.0354	< 0.10	0.18	3.60	0.075	26.1	< 0.0050	0.867	1.35	***59.9***	< 0.010	124	< 0.010	0.13	< 10	2.03	< 0.50	2.8
	FR_HMW3_QTR_2020-04-06_N	2020 05 15	9.5	133	74	53.4	83.3	1.90	1.17	0.15	0.10	34.4	< 0.020	15	0.0386	< 0.10	0.12	< 0.20	< 0.050	27.7	< 0.0050	0.851	1.38	***84.7***	< 0.010	146	0.011	< 0.10	< 10	2.23	< 0.50	2.3
Blanks																																
FR_HMW3	WG_2018-07-02_013	2018 07 18	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
FR_09-01-B	WG_2018-10-01_019	2018 12 13	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.50	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
FR_KB-3A	FR_FLD_2019-02-26	2019 02 26	< 1.0	< 0.050	< 10	< 0.0050	< 0.10	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
FR_CB-2A	FR_FLD_2019_10_01	2019 10 01	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
FR_KB-2	FR_FLD4_2019-10-21	2019 10 21	< 1.0	< 0.050	< 10	< 0.0050	< 0.10	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
FR_CB-5B	FR_CB-5B-S_2019-12-03	2019 03 12	< 1.0	< 0.050	< 10	< 0.0050	< 0.10	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
FR_HMW3	FR_DC2_QTR_2019-04-01_FB-HG	2019 05 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_HMW1S	FR_FLD_QTR_2019-10-07_N	2019 10 23	< 3.0	< 0.050	< 10	< 0.10	< 0.10	< 0.050	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

Associated Caro file(s): 7081099.

Associated Historical Data file(s): Teck Coal database.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with pH.

[c] Standard varies with chloride.

[d] Standard varies with hardness.

[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

[f] There is no zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.

[g] Sample collected in 2018 but Teck sample ID reads 2019.

[h] Screening criteria have been multiplied by 10 in accordance with CSR TG15

[i] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L Hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[j] Criteria in not considered applicable and has not been applied.

TABLE 1: Summary of Analytical Results for Groundwater - Privileged and Confidential

			Total Metals																																
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
Primary Screening Criteria: CSR Aquatic Life (AW)[a]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)[h]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.8-10.4[i]	n/a	100 (Cr +6)	n/a	n/a	n/a	n/a	2,530	n/a	n/a	n/a	n/a	517-2,972[j]	n/a	n/a	700	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3,520	n/a	n/a
S10 Study Area																																			
FR_HMW3	FR_HMW3_QTR_2018-10-01_N	2018 12 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WG_2018-10-01_020	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2019-01-07_N	2019 03 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC1_QTR_2019-01-07_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2019-04-01_N	2019 05 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC2_QTR_2019-04-01_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2019-07-01_N	2019 07 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2019-10-07_N	2019 10 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_DC2_QTR_2019-10-07_N	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2020-01-06_N	2020 03 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR_HMW3_QTR_2020-04-06_N	2020 05 15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blanks																																			
FR_HMW3	WG_2018-07-02_013	2018 07 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_09-01-B	WG_2018-10-01_019	2018 12 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_KB-3A	FR_FLD_2019-02-26	2019 02 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_CB-2A	FR_FLD_2019_10_01	2019 10 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_KB-2	FR_FLD4_2019-10-21	2019 10 21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_CB-5B	FR_CB-5B-S_2019-12-03	2019 03 12	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 50	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 5.0	< 0.10	< 0.0050	< 0.050	< 0.50	-	< 50	< 0.050	< 100	< 0.010	< 50	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	9.4
FR_HMW3	FR_DC2_QTR_2019-04-01_FB-HG	2019 05 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_HMW1S	FR_FLD_QTR_2019-10-07_N	2019 10 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated ALS file(s): L1237947, L1570051, L1570709, L1600339, L1636950, L2237606, L2238699, L2242795, L2244162, L2245057, L2248235, L2248391, L2249360, L2250608, L2256457, L2275412, L2282357, L2283636, L2283637, L2289256, L2290261, L2292060, L2292416, L2316991, L2317812, L2318940, L2320330, L2320494, L2321426, L2328940, L2363724, L2368293, L2369147, L2370485, L2371345, L2372101, L2376287, L2379531, L2394923, L2394416, L2395505.

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[j] Criteria in not considered applicable and has not been applied.

TABLE 2: Summary of Analytical Results for Seep, Shallow Groundwater and Surface Water in the Upper Fording River - Privileged and Confidential

			Physical Parameters										Field Parameters								Dissolved Inorganics																				
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab)	Hardness	Turbidity	Total Anions	Total Cations	Conductivity	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Oxidation Reduction Potential	Field Temperature	Field Conductivity	Field Turbidity	Field DO	pH (field)	Field ORP	Field TDS	Field Salinity (Field)	Total Alkalinity	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Nitrate+Nitrite Nitrogen	Kjeldahl Nitrogen-N	Nitrogen	Chloride	Fluoride	Sulfate	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Hydroxide	Bromide	Acidity (as CaCO3)	Ortho-Phosphate	Total Organic Carbon	Total Phosphorous as P
			pH	mg/L	NTU	meq/L	meq/L	µS/cm	mg/L	mg/L	mg/L	mV	C	µS/cm	NTU	mg/L	pH	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Primary Screening Criteria																																									
BCWQG Aquatic Life Long-term Average (AW)[a]			6.5-9.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	0.365-1.97[c]	3	0.02-0.06[d]	n/a	n/a	n/a	150	n/a	128-429[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[b]			6.5-9.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	1.9-24.5[c]	32.8	0.06-0.18[d]	n/a	n/a	n/a	600	450-1,870[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)			n/a	n/a	n/a	n/a	n/a	n/a	1,000	n/a	n/a	n/a	n/a	n/a	n/a	6 / 9[i]	n/a	n/a	n/a	n/a	n/a	n/a	18.8-22.4[j]	0.047-0.177[d]	n/a	n/a	n/a	n/a	n/a	499	n/a	n/a	n/a	n/a	n/a	n/a	7.8	n/a	n/a	n/a	n/a
Shallow Groundwater Locations																																									
RG_FRDP2	RG_FRDP_2_WG_2019_12_04_NP	2019 12 04	8.11	604	0.44	11.9	12.2	991	790	1.2	0.55	457	2.7	1,025	2.91	9.77	7.17	236.3	-	-	197	0.0067	***14.1***	< 0.0050	14.1	< 0.050	14.1	< 2.5	< 100	333	197	< 1.0	< 1.0	240	< 5.0	< 5.0	< 0.25	6.1	0.0059	< 0.50	0.0097
	RG_DP_A_WG_2019_12_04_NP	Duplicate	8.15	598	0.32	11.8	12.1	975	826	1.9	< 0.50	425	-	-	-	-	-	-	-	-	194	0.0070	***14.3***	< 0.0050	14.3	< 0.050	14.3	< 2.5	< 100	334	194	< 1.0	< 1.0	236	< 5.0	< 5.0	< 0.25	4.2	0.0064	< 0.50	0.011
	QA/QC RPD%		0	1	*	*	*	2	4	*	*	*	-	-	-	-	-	-	-	-	2	*	1	3	0	*	1	*	*	0	2	*	*	2	*	*	*	*	8	*	*
RG_FRDP4	RG_FRDP_4_WG_2019_12_04_NP	2019 12 04	8.19	564	0.14	10.7	11.4	922	771	1.1	< 0.50	452	6.4	955	1.68	6.92	7.44	196.7	-	-	197	0.0058	***12.4***	< 0.0010	12.4	< 0.050	12.4	1.35	159	283	197	< 1.0	< 1.0	240	< 5.0	< 5.0	< 0.050	4.2	0.0036	< 0.50	0.0035
RG_FRDP5	RG_FRDP_5_WG_2019_12_04_NP	2019 12 04	8.03	551	2.68	10.4	11.2	914	687	4.2	1.32	321	3.6	948	3.91	**0.43**	6.99	5.9	-	-	235	0.0208	***10.9***	0.0017	10.9	< 0.050	10.9	1.08	91	234	235	< 1.0	< 1.0	286	< 5.0	< 5.0	< 0.050	11.9	0.0071	1.31	0.011
RG_FRDP8	RG_FRDP_8_WG_2019_12_04_NP	2019 12 04	8.03	530	73.7	10.8	11.1	894	678	16.4	3.27	314	3.9	950	9.84	**3.32**	7.09	-89.6	-	-	322	0.150	***3.44***	0.0203	3.46	0.742	4.21	3.09	53	192	322	< 1.0	< 1.0	393	< 5.0	< 5.0	< 0.050	14.8	< 0.0010	3.48	0.017
RG_FRDP13	RG_FRDP_13_WG_2019_12_04_NP	2019 12 04	8.08	751	13.1	14.6	15.2	1,200	**1,020**	85.3	< 0.50	435	4.1	1,249	27	**3.05**	7.32	50	-	-	289	0.0082	***32.2***	< 0.0050	32.2	< 0.050	32.2	< 2.5	< 100	312	289	< 1.0	< 1.0	352	< 5.0	< 5.0	< 0.25	8.1	0.0093	3.36	0.880
Seep Locations																																									
RG_FRSP1	RG_FRSP1_WG_2019_12_03_NP	2019 12 03	8.06	709	0.20	15.2	14.4	1,190	948	< 1.0	0.64	480	4.4	1,268	0.49	8.52	7.48	206.7	-	-	312	0.0111	***34.0***	< 0.0050	34.0	< 0.050	34.0	< 2.5	100	314	312	< 1.0	< 1.0	380	< 5.0	< 5.0	< 0.25	9.8	0.0038	0.55	0.0034
	RG_FRSP1_WG_2020_02_27_NP	2020 02 27	8.17	972	5.15	18.3	19.7	1,440	**1,210**	14.6	0.95	387	3.11	1,120	-	6.54	7.71	183	1,251	0.97	317	0.0267	***47.7***	< 0.0050	47.7	< 0.25	47.7	< 2.5	110	408	317	< 1.0	< 1.0	387	< 5.0	< 5.0	< 0.25	16.0	0.0038	2.30	0.026
RG_FRSP2																						< 0.0050	***35.7***	< 0.0050	35.7	< 0.050	35.7	< 2.5	130	317	326	< 1.0	< 1.0	397	< 5.0	< 5.0	< 0.25	10.1	0.0037	0.51	< 0.0020
	RG_FRSP2_WG_2020_02_27_NP	2020 02 27	8.17	956	0.37	18.6	19.3	1,470	**1,220**		8	471	4.82	1,250	-	7.46	7.64	183	1,322	1.03	316	0.0133	***49.9***	< 0.0050	49.9	< 0.25	49.9	< 2.5	< 100	420	316	< 1.0	< 1.0	385	< 5.0	< 5.0	< 0.25	17.4	0.0037	0.77	0.0036
RG_FRSP3																						< 0.0050	***36.1***	< 0.0050	36.1	< 0.050	36.1	< 2.5	< 100	318	330	< 1.0	< 1.0	403	< 5.0	< 5.0	< 0.25	9.2	0.0030	0.61	< 0.0020
	RG_FRSP3_WG_2020_02_27_NP	2020 02 27	8.24	958	3.15	18.5	19.4	1,470	**1,200**	10.8	0.77	432	3.96	1,208	-	8.25	7.79	208.2	1,313	1.02	319	0.0130	***49.3***	< 0.0050	49.3	< 0.25	49.3	< 2.5	< 100	413	319	< 1.0	< 1.0	389	< 5.0	< 5.0	< 0.25	13.9	0.0060	1.24	0.0090
RG_FRSP4	RG_FRSP4_WG_2019_12_03_NP	2019 12 03	8.06	746	0.18	16.2	15.1	1,220	**1,060**	< 1.0	0.70	450	5.9	1,324	1.47	8.27	7.45	173	-	-	342	< 0.0050	***38.3***	< 0.0050	38.3	< 0.050	38.3	< 2.5	140	320	342	< 1.0	< 1.0	417	< 5.0	< 5.0	< 0.25	10.9	0.0031	0.59	< 0.0020
	RG_FRSP4_WG_2020_02_27_NP	2020 02 27	8.18	983	0.19	18.9	19.9	1,500	**1,260**	< 1.0	0.68	418	5.09	1,272	-	8.66	7.69	221.7	1,335	1.05	327	0.0111	***50.9***	< 0.0050	50.9	< 0.25	50.9	< 2.5	100	418	327	< 1.0	< 1.0	399	< 5.0	< 5.0	< 0.25	16.6	0.0031	0.70	0.0030
RG_FRSP5																						< 0.0050	***38.8***	< 0.0050	38.8	< 0.050	38.8	< 2.5	< 100	314	335	< 1.0	< 1.0	408	< 5.0	< 5.0	< 0.25	11.3	0.0035	0.60	< 0.0020
	RG_FRSP5_WG_2020_02_27_NP	2020 02 27	8.24	907	0.27	18.2	18.4	1,460	**1,180**	< 1.0	0.73	379	4.92	1,243	-	8.56	7.69	216.5	1,310	1.03	307	0.0110	***50.2***	< 0.0050	50.2	< 0.25	50.2	3.6	< 100	404	307	< 1.0	< 1.0	374	< 5.0	< 5.0	< 0.25	16.9	0.0037	0.79	0.0070
RG_FRSP6																						< 0.0050	***38.2***	< 0.0050	38.2	< 0.050	38.2	< 2.5	130	310	350	< 1.0	< 1.0	427	< 5.0	< 5.0	< 0.25	11.1	0.0037	0.66	< 0.0020
	RG_FRSP6_WG_2020_02_27_NP	2020 02 27	8.21	902	< 0.10	18.3	18.3	1,430	**1,150**		2	413	4.8	1,218	-	8.43	7.69	231.1	1,289	1.01	327	0.0114	***49.0***	< 0.0050	49.0	< 0.25	49.0	5.2	< 100	389	327	< 1.0	< 1.0	399	< 5.0	< 5.0	< 0.25	16.9	0.0041	0.83	0.0034
Fording Flow and Load Accretion																																									
RG_FORDING1	RG_FORDING1_WS_2019-10-24_NP	2019 10 24	8.3	425	0.42	8.68	8.67	717	523	5.6	0.85	422	1.9	774.45	-	-	***10.15***				9	< 0.0050	***10.5***	0.0034	10.5	< 0.050	10.5	3.41	162	185	197	2.4	< 1.0	240	< 5.0	< 5.0	< 0.050	< 1.0	< 0.0010	0.88	0.0024
RG_FORDING2	RG_FORDING2_WS_2019-10-24_NP	2019 10 24	8.28	420	0.59	8.47	8.50	703	523	3.7	0.89	416	1.6	899	-	-	8.32	-	-	-	197	< 0.0050	***10.9***	0.0030	10.9	< 0.050	10.9	1.38	164	178	197	< 1.0	< 1.0	240	< 5.0	< 5.0	< 0.050	< 1.0	0.0026	1.40	0.0024
RG_FORDING3	RG_FORDING3_WS_2019-10-24_NP	2019 10 24	8.26	422	0.93	8.61	8.55	710	537	3.9	0.62	429	1.4	917	-	-	8.30	-	-	-	201	< 0.0050	***11.0***	0.0030	11.0	< 0.050	11.0	1.24	161	181	201	< 1.0	< 1.0	245	< 5.0	< 5.0	< 0.050	2.2	0.0011	0.79	0.0036
RG_FORDING4	RG_FORDING4_WS_2019-10-24_NP	2019 10 24	8.29	502	0.18	10.4	10.2	830	668	1.7	< 0.50	396	1.8	1,065	-	-	8.36	-	-	-	219	< 0.0050	***15.1***	< 0.0050	15.1	< 0.050	15.1	< 2.5	160	238	219	< 1.0	< 1.0	267	< 5.0	< 5.0	< 0.25	< 1.0	< 0.0010	0.58	< 0.0020
RG_FORDING5	RG_FORDING5_WS_2019-10-24_NP	2019 10 24	8.28	518	0.22	10.6	10.5	838	657	1.2	< 0.50	426	1.6	1,069	-	-	8.30	-	-	-	224	< 0.0050	***15.4***	< 0.0050	15.4	< 0.050	15.4	< 2.5	170	240	224	< 1.0	< 1.0	273	< 5.0	< 5.0	< 0.25	< 1.0	< 0.0010		20
RG_FORDING6	RG_FORDING6_WS_2019-10-24_NP	2019 10 24	8.25	556	0.25	11.4	11.2	894	701	< 1.0	< 0.50	452	2.4	1,146	-	-	8.17	-	-	-	232	0.0059	***17.2***	< 0.0050	17.2	< 0.050	17.2	< 2.5	170	267	232	< 1.0	< 1.0	284	< 5.0	< 5.0	< 0.25	< 1.0	< 0.0010		20
RG_FORDING7	RG_FORDING7_WS_2019-10-24_NP	2019 10 24	8.26	576	0.23	11.9	11.6	926	758	1.7	< 0.50	468	5	1,170	-	-	8.04	-	-	-	234	0.0132	***18.3***	< 0.0050	18.3	< 0.050	18.3	< 2.5	170	282	234	< 1.0	< 1.0	286	< 5.0	< 5.0	< 0.25	< 1.0	< 0.0010	0.53	< 0.0020
RG_FORDING8	RG_FORDING8_WS_2019-10-25_NP	2019 10 25	8.11	582	0.11	11.8	11.8	921	749	< 1.0	< 0.50	401	4.9	944	-	-	8.05	-	-	-	235	0.0121	***17.9***	0.0021	17.9	< 0.050	17.9	1.37	176	277	235	< 1.0	< 1.0	287	< 5.0	< 5.0	< 0.050	1.9	0.0019	< 0.50	0.0020
RG_FORDING9	RG_FORDING9_WS_2019-10-25_NP	2019 10 25	8.08	579	0.10	11.8	11.7	919	715	< 1.0	< 0.50	498	5.1	943	-	-	8.04	-	-	-	237	< 0.0050	***17.8***	0.0024	17.8	< 0.050	17.8	1.45	164	276	237	< 1.0	< 1.0	289	< 5.0	< 5.0	< 0.050	1.8	0.0019	< 0.50	< 0.0020
	RG_DC1_2019-10-25	Duplicate	8.1	574	0.13	11.8	11.6	921	724	< 1.0	< 0.50	523	-	-	-	-	-	-	-	-	237	0.0059	***17.8***	0.0027	17.8	0.056	17.8	1.4	175	276	237	< 1.0	< 1.0	289	< 5.0	< 5.0	< 0.050	1.7	0.0024	0.56	< 0.0020
	QA/QC RPD%		0	1	*	*	*	0	1	*	*	*	-	-	-	-	-	-	-	-	0	*	0	3	0	*	0	*	6	0	0	*	*	0	*	*	*	*	*	*	*
RG_FORDING10	RG_FORDING10_WS_2019-10-25_NP	2019 10 25	8.1	600	0.13	12.3	12.1	949	757	< 1.0	< 0.50	309	5.2	975	-	-	8.10	-	-	-	251	< 0.0050	***18.8***	0.0046	18.8	< 0.050	18.8	1.36	171	284	251	< 1.0	< 1.0	306	< 5.0	< 5.0	< 0.050	1.8	0.0025	< 0.50	0.0021
RG_FORDING11	RG_FORDING11_WS_2019-10-25_NP	2019 10 25	8.27	589	0.28	12.3	11.9	924	768	< 1.0	0.77	425	6.9	933	-	-	8.52	-	-	-	229	0.0060	***12.3***	0.0112	12.3	< 0.050	12.3	1.28	207	327	229	< 1.0	< 1.0	279	< 5.0	< 5.0	< 0.050	< 1.0	0.0017	0.90	< 0.0020
RG_FORDING12	RG_FORDING12_WS_2019-10-25_NP	2019 10 25	8.27	574	0.30	12.1	11.6	927	765	< 1.0	0.90	467	3	929	-	-	8.47	-	-	-	217	0.0132	***12.4***	0.0125	12.4	< 0.050	12.4	1.3	212	328	217	< 1.0	< 1.0	265	< 5.0	< 5.0	< 0.050	< 1.0	0.0024	0.78	0.0033
RG_FORDING13	RG_FORDING13_WS_2019-10-25_NP	2019 10 25	8.27	590	0.35	12.1	11.9	930	748	3.6	0.74	442	4	916	-	-	8.39	-	-	-	217	0.0127	***12.4***	0.0121	12.4	< 0.050	12.4	1.29	208	329	217	< 1.0	< 1.0	264	< 5.0	< 5.0	< 0.050	< 1.0	0.0044	1.06	0.0038
RG_FORDING14	RG_FORDING14_WS_2019-10-25_NP	2019 10 25	8.25	454	0.28	8.86	9.19	727	514	1.2	0.61	392	6	723	-	-	8.49	-	-	-	194	0.0099	***10.9***	0.0093	10.9	0.360	11.3	1.05	199	200	194	< 1.0	< 1.0	236	< 5.0	< 5.0	< 0.050	< 1.0	< 0.0010	0.58	< 0.0020
	RG_DC1-5_2019-10-25	Duplicate	8.25	428	0.35	8.93	8.67	718	542	< 1.0	0.57	396	-	-	-	-	-	-	-	-	198	0.0090	***10.9***	0.0096	10.9	< 0.050	10.9	1.05	215	200	198	< 1.0	< 1.0	241	< 5.0	< 5.0	< 0.050	< 1.0	0.0014	0.64	< 0.0020
	QA/QC RPD%		0	6	*	*	*	1	5	*	*	*	-	-	-	-	-	-	-	-	2	*	0	3	0	*	4	*	8	0	2	*	*	2	*	*	*	*	*	*	*

Associated ALS file(s): L2371365, L2372312, L2372504, L2392199, L2392797, L2422351, L2422552.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than BCWQG Aquatic Life Long-term Average (AW) guideline
SHADED	Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").

[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").

[c] Guideline is pH and temperature dependent.

[d] Guideline is chloride dependent.

[e] Guideline is hardness dependent.

[f] Guideline is temperature, pH, DOC and hardness dependent.

[g] Guideline is pH dependent.

[h] Total mercury guideline is based on the % of methylmercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.

[i] Criteria as minimum values. Criteria for early life stages is 9 mg/L and criteria for other life sates is 6 mg/L. Criteria for other life stages has been applied.

[j] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark. e.g. Nitrate equation valid up to 500 mg/L hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[k] Guideline applicable to total concentration, applied to dissolved concentration as a conservative comparison.

TABLE 2: Summary of Analytical Results for Seep, Shallow Groundwater and Surface Water in the Upper Fording River - Privileged and Confidential

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Total Metals																																	
			Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Sulphur µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc µg/L
Primary Screening Criteria																																				
BCWQG Aquatic Life Long-term Average (AW)[a]			n/a	9	n/a	1,000	0.13	n/a	1,200	n/a	n/a	1 (Cr(+6))	4	n/a	n/a	3-19.6[e]	n/a	n/a	767-2,600[e]	0.02[h]	1,000	25-150[e]					0.05-1.5[e]	n/a	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[b]			n/a	n/a	5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	110	n/a	1,000	3-417[e]	n/a	n/a	815-3,390[e]	n/a	2,000	n/a	n/a	n/a	n/a	n/a	0.1-3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-340.5[e]
Secondary Screening Criteria: Costa and de Bruyn (2021)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.041[j]	n/a	10 (Cr(+6))	n/a	n/a	n/a	n/a	253	n/a	n/a	n/a	n/a	136.9-164.5[j]	n/a	n/a	70	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	352	n/a	n/a
Shallow Groundwater Locations																																				
RG_FRDP2	RG_FRDP_2_WG_2019_12_04_NP	2019 12 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	RG_DP_A_WG_2019_12_04_NP	Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_FRDP4	RG_FRDP_4_WG_2019_12_04_NP	2019 12 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_FRDP5	RG_FRDP_5_WG_2019_12_04_NP	2019 12 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_FRDP8	RG_FRDP_8_WG_2019_12_04_NP	2019 12 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_FRDP13	RG_FRDP_13_WG_2019_12_04_NP	2019 12 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Seep Locations																																				
RG_FRSP1																									***96.9***	2,490	< 0.010	2,950	197	103,000	< 0.010	< 0.10	< 0.30	4.10	< 0.50	< 3.0
	RG_FRSP1_WG_2020_02_27_NP	2020 02 27	55.6	0.29	0.15	113	< 0.020	< 0.050	17	0.0704	207,000	0.27	0.17	< 0.50	88	0.098	55.1	94,500	3.44	< 0.0050	0.487	0.59	< 50	2,730	***142***	2,650	< 0.010	3,160	225	156,000	< 0.010	< 0.10	1.04	5.32	< 0.50	3.6
RG_FRSP2																									***101***	2,530	< 0.010	2,890	198	107,000	< 0.010	0.15	< 0.30	4.44	< 0.50	< 3.0
	RG_FRSP2_WG_2020_02_27_NP	2020 02 27	20.7	0.20	0.13	132	< 0.020	< 0.050	18	0.0761	212,000	0.20	0.16	< 0.50	45	< 0.050	55.8	102,000	0.90	< 0.0050	0.553	< 0.50	< 50	3,050	***151***	2,660	< 0.010	3,500	229	167,000	0.020	< 0.10	< 0.30	6.03	< 0.50	< 3.0
RG_FRSP3																									***100***	2,450	< 0.010	2,890	197	107,000	< 0.010	< 0.10	< 0.30	4.41	< 0.50	< 3.0
	RG_FRSP3_WG_2020_02_27_NP	2020 02 27	47.5	0.16	0.14	124	< 0.020	< 0.050	18	0.148	229,000	0.26	0.16	< 0.50	66	0.066	55.3	102,000	2.01	< 0.0050	0.559	0.56	< 50	3,090	***152***	2,670	< 0.010	3,450	241	159,000	< 0.010	< 0.10	0.96	4.55	< 0.50	8.6
RG_FRSP4																									***107***	2,420	< 0.010	2,890	192	107,000	< 0.010	0.29	< 0.30	4.83	< 0.50	3.4
	RG_FRSP4_WG_2020_02_27_NP	2020 02 27	< 3.0	0.14	< 0.10	137	< 0.020	< 0.050	18	0.0517	222,000	0.17	0.13	< 0.50	< 10	< 0.050	56.0	103,000	< 0.10	< 0.0050	0.611	< 0.50	< 50	3,160	***157***	2,680	< 0.010	3,400	229	166,000	< 0.010	< 0.10	< 0.30	6.26	< 0.50	< 3.0
RG_FRSP5																									***109***	2,490	< 0.010	3,040	180	108,000	< 0.010	< 0.10	< 0.30	4.88	< 0.50	< 3.0
	RG_FRSP5_WG_2020_02_27_NP	2020 02 27	18.6	0.13	0.13	154	< 0.020	< 0.050	17	0.0566	212,000	0.21	0.12	< 0.50	28	< 0.050	52.5	100,000	1.01	< 0.0050	0.593	< 0.50	< 50	3,020	***150***	2,700	< 0.010	3,990	224	159,000	< 0.010	< 0.10	< 0.30	5.85	< 0.50	< 3.0
RG_FRSP6																									***107***	2,470	< 0.010	2,990	181	102,000	< 0.010	< 0.10	< 0.30	4.73	< 0.50	< 3.0
	RG_FRSP6_WG_2020_02_27_NP	2020 02 27	4.8	0.12	0.12	175	< 0.020	< 0.050	16	0.0594	208,000	0.18	0.11	< 0.50	< 10	< 0.050	50.2	103,000	0.21	< 0.0050	0.517	< 0.50	< 50	3,180	***144***	2,700	< 0.010	4,630	217	148,000	< 0.010	< 0.10	< 0.30	5.66	< 0.50	< 3.0
Fording Flow and Load Accretion																																				
RG_FORDING1	RG_FORDING1_WS_2019-10-24_NP	2019 10 24	5.4	< 0.10	< 0.10	106	< 0.020	< 0.050	< 10	0.0208	103,000	0.12	< 0.10	< 0.50	11	< 0.050	20.7	42,000	1.42	< 0.0050	0.845	0.74	< 50	1,170	***44.4***	2,140	< 0.010	3,790	142	65,600	< 0.010	0.10	< 0.30	2.05	< 0.50	< 3.0
RG_FORDING2	RG_FORDING2_WS_2019-10-24_NP	2019 10 24	6.4	< 0.10	0.13	104	< 0.020	< 0.050	< 10	0.0290	98,900	0.15	< 0.10	< 0.50	14	< 0.050	21.7	40,300	1.63	< 0.0050	0.792	0.79	< 50	1,150	***43.4***	2,070	< 0.010	1,890	137	62,200	< 0.010	< 0.10	< 0.30	1.98	< 0.50	< 3.0
RG_FORDING3	RG_FORDING3_WS_2019-10-24_NP	2019 10 24	15.5	< 0.10	< 0.10	103	< 0.020	< 0.050	< 10	0.0220	102,000	0.20	0.11	< 0.50	33	0.067	22.3	41,800	2.75	< 0.0050	0.762	0.88	< 50	1,180	***45.9***	2,150	< 0.010	1,930	142	65,300	< 0.010	< 0.10	< 0.30	2.09	< 0.50	3.7
RG_FORDING4	RG_FORDING4_WS_2019-10-24_NP	2019 10 24	< 3.0	< 0.10	< 0.10	98.6	< 0.020	< 0.050	< 10	0.0180	120,000	0.11	0.11	< 0.50	< 10	< 0.050	28.7	49,900	1.42	< 0.0050	0.797	0.84	< 50	1,370	***60.3***	2,090	< 0.010	2,020	144	81,200	< 0.010	< 0.10	< 0.30	2.57	< 0.50	< 3.0
RG_FORDING5	RG_FORDING5_WS_2019-10-24_NP	2019 10 24	4.4	0.10	< 0.10	99.8	< 0.020	< 0.050	< 10	0.0244	123,000	0.15	0.13	< 0.50	11	< 0.050	30.2	51,400	2.29	< 0.0050	0.781	0.93	< 50	1,460	***61.6***	2,150	< 0.010	2,030	149	83,700	< 0.010	< 0.10	< 0.30	2.69	< 0.50	< 3.0
RG_FORDING6	RG_FORDING6_WS_2019-10-24_NP	2019 10 24	3.7	0.12	0.11	93.0	< 0.020	< 0.050	< 10	0.0266	134,000	0.13	0.15	< 0.50	13	< 0.050	34.8	57,400	3.97	< 0.0050	0.852	1.18	< 50	1,630	***68.8***	2,190	< 0.010	2,120	158	91,600	< 0.010	< 0.10	< 0.30	3.01	< 0.50	< 3.0
RG_FORDING7	RG_FORDING7_WS_2019-10-24_NP	2019 10 24	3.4	0.12	< 0.10	95.3	< 0.020	< 0.050	< 10	0.0396	137,000	***3.58***	0.19	0.81	32	0.172	36.3	59,900	4.90	< 0.0050	0.880	2.76	< 50	1,680	***75.6***	2,240	< 0.010	2,130	159	99,600	< 0.010	< 0.10	< 0.30	3.16	< 0.50	< 3.0
RG_FORDING8	RG_FORDING8_WS_2019-10-25_NP	2019 10 25	3.5	0.11	< 0.10	91.8	< 0.020	< 0.050	11	0.0322	133,000	0.11	0.15	< 0.50	11	< 0.050	32.6	58,400	4.06	< 0.0050	0.761	0.96	< 50	1,690	***71.4***	2,120	< 0.010	2,070	160	99,500	< 0.010	0.12	< 0.30	3.12	< 0.50	< 3.0
RG_FORDING9	RG_FORDING9_WS_2019-10-25_NP	2019 10 25	< 3.0	0.12	0.10	95.1	< 0.020	< 0.050	12	0.0337	130,000	0.13	0.14	< 0.50	13	< 0.050	32.4	60,400	3.26	< 0.0050	0.788	1.02	< 50	1,780	***73.6***	2,190	< 0.010	2,110	158	101,000	< 0.010	< 0.10	< 0.30	3.14	< 0.50	< 3.0
	RG_DC1_2019-10-25	Duplicate	4.0	0.11	0.11	90.8	< 0.020	< 0.050	12	0.0332	131,000	0.14	0.14	< 0.50	< 10	< 0.050	32.3	58,500	3.07	< 0.0050	0.800	1.00	< 50	1,710	***72.2***	2,120	< 0.010	2,050	157	99,900	< 0.010	< 0.10	< 0.30	3.16	< 0.50	< 3.0
	QA/QC RPD%		*	*	*	5	*	*	*	1	1	*	*	*	*	*	0	3	6	*	2	*	*	4	2	3	*	3	1	1	*	*	*	1	*	*
RG_FORDING10	RG_FORDING10_WS_2019-10-25_NP	2019 10 25	4.1	0.16	< 0.10	103	< 0.020	< 0.050	13	0.0440	139,000	0.15	0.13	< 0.50	< 10	< 0.050	38.4	61,100	1.64	< 0.0050	0.956	1.98	< 50	2,010	***75.7***	1,960	< 0.010	2,100	161	99,000	< 0.010	< 0.10	< 0.30	3.83	< 0.50	< 3.0
RG_FORDING11	RG_FORDING11_WS_2019-10-25_NP	2019 10 25	3.9	0.30	0.12	72.0	< 0.020	< 0.050	< 10	0.0546	129,000	0.12	0.10	0.77	23	0.107	33.8	64,600	4.66	< 0.0050	1.95	6.91	< 50	1,830	***78.7***	1,700	< 0.010	1,590	162	122,000	0.013	< 0.10	< 0.30	3.97	< 0.50	3.6
RG_FORDING12	RG_FORDING12_WS_2019-10-25_NP	2019 10 25	3.5	0.29	0.11	70.9	< 0.020	< 0.050	< 10	0.0592	127,000	0.12	< 0.10	1.23	21	< 0.050	33.1	63,100	5.78	< 0.0050	1.59	6.62	< 50	1,810	***77.2***	1,680	< 0.010	1,540	159	118,000	< 0.010	< 0.10	< 0.30	3.95	< 0.50	< 3.0
RG_FORDING13	RG_FORDING13_WS_2019-10-25_NP	2019 10 25	4.3	0.30	0.11	69.6	< 0.020	< 0.050	< 10	0.0735	127,000	0.14	0.10	< 0.50	22	< 0.050	32.8	62,600	7.20	< 0.0050	1.57	6.74	< 50	1,760	***77.0***	1,650	< 0.010	1,490	160	116,000	< 0.010	< 0.10	< 0.30	3.94	< 0.50	< 3.0
RG_FORDING14	RG_FORDING14_WS_2019-10-25_NP	2019 10 25	5.5	0.25	0.10	74.6	< 0.020	< 0.050	< 10	0.0630	103,000	0.11	0.12	< 0.50	34	< 0.050	30.2	41,200	11.7	< 0.0050	1.34	3.34	< 50	1,550	***36.8***	1,670	< 0.010	1,530	155	72,400	< 0.010	0.11	< 0.30	2.65	< 0.50	< 3.0
	RG_DC1-5_2019-10-25	Duplicate	3.7	0.28	0.12	74.2	< 0.020	< 0.050	< 10	0.0604	103,000	0.10	0.12	< 0.50	31	< 0.050	30.5	40,400	11.1	< 0.0050	1.39	3.27	< 50	1,550	***35.9***	1,640	< 0.010	1,490	154	71,800	< 0.010	< 0.10	< 0.30	2.68	< 0.50	< 3.0
	QA/QC RPD%		*	*	*	1	*	*	*	4	0	*	*	*	*	*	1	2	5	*	4	2	*	0	2	2	*	3	1	1	*	*	*	1	*	*

Associated ALS file(s): L2392199, L2392797, L2422351, L2422552.

All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.

BOLD	Concentration greater than BCWQG Aquatic Life Long-term Average (AW) guideline
SHADED	Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").

[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").

[c] Guideline is pH and temperature dependent.

[d] Guideline is chloride dependent.

[e] Guideline is hardness dependent.

[f] Guideline is temperature, pH, DOC and hardness dependent.

[g] Guideline is pH dependent.

[h] Total mercury guideline is based on the % of methylmercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.

[i] Criteria as minimum values. Criteria for early life stages is 9 mg/L and criteria for other life sates is 6 mg/L. Criteria for other life stages has been applied.

[j] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[k] Guideline applicable to total concentration, applied to dissolved concentration as a conservative comparison.

TABLE 2: Summary of Analytical Results for Seep, Shallow Groundwater and Surface Water in the Upper Fording River - Privileged and Confidential

			Dissolved Metals																											
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Thallium µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc µg/L
Primary Screening Criteria																														
BCWQG Aquatic Life Long-term Average (AW)^{a}			8.98-50^{g}	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0176-457^{e}	n/a	n/a	0.2-1.5^{f}	n/a	n/a	n/a	n/a	n/a	2^{k}	n/a	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)^{b}			27.4-100^{g}	n/a	350 (max)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.038-2.8^{e}	n/a	n/a	0.9-10^{f}	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.041^{j}	10 (Cr(+6))	n/a	n/a	n/a	253	n/a	n/a	148.8-164.5^{j}	70	n/a	n/a	n/a	352	n/a	n/a
Shallow Groundwater Locations																														
RG_FRDP2	RG_FRDP_2_WG_2019_12_04_NP	2019 12 04	1.4	131	< 10	67.6	0.27	1.90	2.01	0.14	< 0.10	85.3	< 0.020	10	0.0366	0.15	< 0.10	***0.25***	< 0.050	34.4	< 0.0050	1.10	< 0.50	***105***	< 0.010	< 0.010	< 0.30	3.68	< 0.50	1.9
	RG_DP_A_WG_2019_12_04_NP	Duplicate	1.3	129	< 10	66.6	0.27	1.89	1.95	0.15	< 0.10	84.0	< 0.020	< 10	0.0388	0.10	< 0.10	***0.22***	< 0.050	35.3	< 0.0050	1.10	< 0.50	***102***	< 0.010	< 0.010	< 0.30	3.68	< 0.50	6.2
	QA/QC RPD%		*	2	*	1	*	1	3	*	*	2	*	*	6	*	*	*	*	3	*	0	*	3	*	*	*	0	*	*
RG_FRDP4	RG_FRDP_4_WG_2019_12_04_NP	2019 12 04	< 1.0	124	< 10	61.5	< 0.10	2.09	2.06	0.12	< 0.10	88.4	< 0.020	13	0.0446	0.14	< 0.10	< 0.20	< 0.050	43.8	< 0.0050	1.08	< 0.50	***83.7***	< 0.010	< 0.010	< 0.30	3.29	< 0.50	< 1.0
RG_FRDP5	RG_FRDP_5_WG_2019_12_04_NP	2019 12 04	< 1.0	140	171	48.8	552	1.56	1.80	0.10	0.15	189	< 0.020	< 10	0.170	< 0.10	0.48	***0.36***	0.089	24.1	< 0.0050	0.367	2.41	***67.0***	< 0.010	0.011	< 0.30	1.50	< 0.50	2.0
RG_FRDP8	RG_FRDP_8_WG_2019_12_04_NP	2019 12 04	1.3	141	**5,890**	43.4	2,300	1.14	1.82	< 0.10	0.54	201	< 0.020	< 10	0.0532	< 0.10	2.84	< 0.20	< 0.050	14.8	< 0.0050	0.839	5.66	***25.0***	< 0.010	0.024	< 0.30	0.280	< 0.50	4.7
RG_FRDP13	RG_FRDP_13_WG_2019_12_04_NP	2019 12 04	< 1.0	172	< 10	78.1	6.01	2.48	3.06	< 0.10	0.12	159	< 0.020	15	0.0300	0.14	0.17	< 0.20	< 0.050	50.5	< 0.0050	0.422	< 0.50	***122***	< 0.010	< 0.010	< 0.30	4.38	< 0.50	< 1.0
Seep Locations																														
RG_FRSP1																								***131***	0.021	< 0.010	< 0.30	4.08	< 0.50	< 1.0
																								162	< 0.010	< 0.010	< 0.30	3.91	< 0.50	1.7
RG_FRSP2	RG_FRSP2_WG_2019_12_03_NP	2019 12 03	< 1.0	165	< 10	77.9	< 0.10	2.52	2.95	< 0.10	< 0.10	118	< 0.020	17	0.0566	0.16	0.15	***0.27***	< 0.050	51.6	< 0.0050	0.507	< 0.50	***133***	< 0.010	< 0.010	< 0.30	4.47	< 0.50	< 1.0
																								204	< 0.010	< 0.010	< 0.30	5.95	< 0.50	< 1.0
RG_FRSP3																								***137***	< 0.010	< 0.010	< 0.30	4.36	< 0.50	< 1.0
																								158	< 0.010	< 0.010	< 0.30	6.05	< 0.50	2.1
RG_FRSP4																								***143***	< 0.010	< 0.010	< 0.30	4.80	< 0.50	< 1.0
																								170	< 0.010	< 0.010	< 0.30	6.17	< 0.50	< 1.0
RG_FRSP5																								***142***	< 0.010	< 0.010	< 0.30	4.85	< 0.50	< 1.0
																								191	< 0.010	< 0.010	< 0.30	6.01	< 0.50	< 1.0
RG_FRSP6																								***142***	< 0.010	< 0.010	< 0.30	4.77	< 0.50	< 1.0
																								192	< 0.010	< 0.010	< 0.30	5.73	< 0.50	< 1.0
Fording Flow and Load Accretion																														
RG_FORDING1	RG_FORDING1_WS_2019-10-24_NP	2019 10 24	< 1.0	102	< 10	41.3	0.90	1.22	3.49	0.16	< 0.10	106	< 0.020	< 10	0.0209	0.12	< 0.10	0.33	< 0.050	20.1	< 0.0050	0.854	0.56	***48.8***	< 0.010	< 0.010	< 0.30	2.15	< 0.50	< 1.0
RG_FORDING2	RG_FORDING2_WS_2019-10-24_NP	2019 10 24	1.3	102	< 10	39.9	1.00	1.24	1.94	0.10	< 0.10	110	< 0.020	< 10	0.0186	0.12	< 0.10	0.27	< 0.050	20.7	< 0.0050	0.817	0.50	***54.2***	< 0.010	< 0.010	< 0.30	2.13	< 0.50	1.7
RG_FORDING3	RG_FORDING3_WS_2019-10-24_NP	2019 10 24	< 1.0	102	< 10	40.5	1.19	1.22	1.91	< 0.10	< 0.10	106	< 0.020	< 10	0.0171	0.13	< 0.10	0.20	< 0.050	21.0	< 0.0050	0.782	0.52	***50.1***	< 0.010	< 0.010	< 0.30	2.15	< 0.50	1.6
RG_FORDING4	RG_FORDING4_WS_2019-10-24_NP	2019 10 24	1.3	119	< 10	49.9	1.33	1.54	2.07	0.10	< 0.10	101	< 0.020	11	0.0226	0.31	0.12	0.44	0.094	27.9	< 0.0050	0.757	0.75	***68.0***	< 0.010	< 0.010	< 0.30	2.69	< 0.50	1.1
RG_FORDING5	RG_FORDING5_WS_2019-10-24_NP	2019 10 24	< 1.0	123	< 10	51.0	2.00	1.54	2.08	0.10	< 0.10	100	< 0.020	11	0.0246	0.12	0.12	0.20	< 0.050	28.7	< 0.0050	0.763	0.74	***68.0***	< 0.010	< 0.010	< 0.30	2.76	< 0.50	< 1.0
RG_FORDING6	RG_FORDING6_WS_2019-10-24_NP	2019 10 24	< 1.0	130	< 10	56.3	3.77	1.72	2.03	0.17	< 0.10	96.3	< 0.020	12	0.0299	0.11	0.14	< 0.20	< 0.050	32.8	< 0.0050	0.797	0.87	***75.6***	< 0.010	< 0.010	< 0.30	3.07	< 0.50	1.0
RG_FORDING7	RG_FORDING7_WS_2019-10-24_NP	2019 10 24	< 1.0	135	< 10	57.6	4.46	1.77	2.09	0.16	< 0.10	97.8	< 0.020	12	0.0296	0.11	0.14	***0.48***	< 0.050	33.8	< 0.0050	0.825	0.94	***81.5***	< 0.010	< 0.010	< 0.30	3.27	< 0.50	1.4
RG_FORDING8	RG_FORDING8_WS_2019-10-25_NP	2019 10 25	1.3	135	13	59.5	4.09	1.84	2.14	0.17	< 0.10	97.3	< 0.020	12	0.0349	0.12	0.15	< 0.20	< 0.050	36.4	< 0.0050	0.808	0.95	***83.6***	< 0.010	< 0.010	< 0.30	3.16	< 0.50	1.2
RG_FORDING9	RG_FORDING9_WS_2019-10-25_NP	2019 10 25	1.7	134	< 10	59.4	3.18	1.88	2.05	0.13	< 0.10	97.8	< 0.020	12	0.0398	0.12	0.14	< 0.20	< 0.050	36.4	< 0.0050	0.802	0.98	***81.9***	< 0.010	< 0.010	< 0.30	3.19	< 0.50	< 1.0
	RG_DC1_2019-10-25	Duplicate	1.2	131	< 10	60.1	3.23	1.91	2.15	0.12	< 0.10	97.6	< 0.020	12	0.0385	0.15	0.15	0.22	< 0.050	34.5	< 0.0050	0.857	1.02	***84.6***	< 0.010	< 0.010	< 0.30	3.24	< 0.50	1.5
	QA/QC RPD%		*	2	*	1	2	2	5	*	*	0	*	*	3	*	*	*	*	5	*	7	*	3	*	*	*	2	*	*
RG_FORDING10	RG_FORDING10_WS_2019-10-25_NP	2019 10 25	< 1.0	135	< 10	63.6	1.40	2.23	2.17	0.21	< 0.10	109	< 0.020	14	0.0447	0.14	0.13	< 0.20	< 0.050	40.8	< 0.0050	0.976	2.04	***89.1***	< 0.010	< 0.010	< 0.30	3.84	< 0.50	1.7
RG_FORDING11	RG_FORDING11_WS_2019-10-25_NP	2019 10 25	1.1	128	27	65.2	4.59	1.97	1.65	0.31	< 0.10	77.2	< 0.020	< 10	0.0524	0.11	0.11	0.55	< 0.050	36.0	< 0.0050	1.65	7.41	***86.9***	< 0.010	< 0.010	< 0.30	3.97	< 0.50	2.4
RG_FORDING12	RG_FORDING12_WS_2019-10-25_NP	2019 10 25	1.4	122	18	65.5	5.76	2.00	1.56	0.31	< 0.10	76.1	< 0.020	< 10	0.0600	0.10	< 0.10	0.34	< 0.050	34.2	< 0.0050	1.62	6.77	***85.7***	< 0.010	0.010	< 0.30	3.85	< 0.50	2.2
RG_FORDING13	RG_FORDING13_WS_2019-10-25_NP	2019 10 25	1.9	128	20	65.5	7.30	1.99	1.63	0.36	0.10	74.4	< 0.020	< 10	0.0694	< 0.10	0.10	***1.04***	< 0.050	35.8	< 0.0050	1.62	6.93	***87.8***	< 0.010	0.011	< 0.30	4.06	< 0.50	2.8
RG_FORDING14	RG_FORDING14_WS_2019-10-25_NP	2019 10 25	1.4	112	29	42.5	11.4	1.70	1.59	0.29	< 0.10	79.1	< 0.020	11	0.0671	< 0.10	0.12	< 0.20	< 0.050	35.9	< 0.0050	1.52	3.36	***42.5***	< 0.010	< 0.010	< 0.30	2.98	< 0.50	1.8
	RG_DC1-5_2019-10-25	Duplicate	2.4	102	27	42.2	11.2	1.69	1.58	0.26	< 0.10	80.4	< 0.020	< 10	0.0605	< 0.10	0.11	0.41	< 0.050	32.0	< 0.0050	1.34	3.34	***40.8***	< 0.010	< 0.010	< 0.30	2.71	< 0.50	1.8
	QA/QC RPD%		*	9	*	1	2	1	1	*	*	2	*	*	10	*	*	*	*	11	*	13	1	4	*	*	*	9	*	*

Associated ALS file(s): L2392199, L2392797, L2422351, L2422552.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than BCWQG Aquatic Life Long-term Average (AW) guideline
SHADED	Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").

[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").

[c] Guideline is pH and temperature dependent.

[d] Guideline is chloride dependent.

[e] Guideline is hardness dependent.

[f] Guideline is temperature, pH, DOC and hardness dependent.

[g] Guideline is pH dependent.

[h] Total mercury guideline is based on the % of methylmercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.

[i] Criteria as minimum values. Criteria for early life stages is 9 mg/L and criteria for other life sates is 6 mg/L. Criteria for other life stages has been applied.

[j] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[k] Guideline applicable to total concentration, applied to dissolved concentration as a conservative comparison.

TABLE 2: Summary of Analytical Results for Seep, Shallow Groundwater and Surface Water in the Upper Fording River - Privileged and Confidential

			Physical Parameters										Field Parameters								Dissolved Inorganics																				
Sample Location	Sample ID	Sample Date (yyyy mm dd)	pH (lab)	Hardness	Turbidity	Total Anions	Total Cations	Conductivity	Total Dissolved Solids	Total Suspended Solids	Dissolved Organic Carbon	Oxidation Reduction Potential	Field Temperature	Field Conductivity	Field Turbidity	Field DO	pH (field)	Field ORP	Field TDS	Field Salinity (Field)	Total Alkalinity	Ammonia, Total (as N)	Nitrate (as N)	Nitrite (as N)	Nitrate+Nitrite Nitrogen	Kjeldahl Nitrogen-N	Nitrogen	Chloride	Fluoride	Sulfate	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Hydroxide	Bromide	Acidity (as CaCO3)	Ortho-Phosphate	Total Organic Carbon	Total Phosphorous as P
			pH	mg/L	NTU	meq/L	meq/L	µS/cm	mg/L	mg/L	mg/L	mV	C	µS/cm	NTU	mg/L	pH	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Primary Screening Criteria																																									
BCWQG Aquatic Life Long-term Average (AW)[a]			6.5-9.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	0.365-1.97[c]	3	0.02-0.06[d]	n/a	n/a	n/a	150	n/a	128-429[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[b]			6.5-9.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.5-9	n/a	n/a	n/a	n/a	1.9-24.5[c]	32.8	0.06-0.18[d]	n/a	n/a	n/a	600	450-1,870[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)			n/a	n/a	n/a	n/a	n/a	n/a	1,000	n/a	n/a	n/a	n/a	n/a	n/a	6 / 9[i]	n/a	n/a	n/a	n/a	n/a	n/a	18.8-22.4[j]	0.047-0.177[d]	n/a	n/a	n/a	n/a	n/a	499	n/a	n/a	n/a	n/a	n/a	n/a	7.8	n/a	n/a	n/a	n/a
Greenhouse Side Channel																																									
RG_FRSC1	RG_FRSC1_WS_2020_02_28_NP	2020 02 28	7.92	792	0.14	-	-	1,240	**1,040**	< 1.0	0.68	397	4.18	1,430	-	9.48	7.79	166.5	1,543	1.22	295	0.0166	***37.4***	< 0.0010	37.4	< 0.25	37.4	2.67	158	346	295	< 1.0	< 1.0	360	< 5.0	< 5.0	< 0.050	9.0	0.0022	0.66	< 0.0020
	RG_DUP1_WS_2020_02_28_NP	Duplicate	7.97	802	0.14	16.9	16.2	1,270	**1,030**	< 1.0	0.61	490	-	-	-	-	-	-	-	-	287	0.0121	***49.7***	0.0015	49.7	< 0.25	49.7	3.68	150	362	287	< 1.0	< 1.0	350	< 5.0	< 5.0	< 0.050	8.5	0.0023	0.69	< 0.0020
	QA/QC RPD%		1	1	*	*	*	2	1	*	*	*	-	-	-	-	-	-	-	-	3	*	28	3	28	*	28	32	*	5	3	*	*	3	*	*	*	6	*	*	*
RG_FRSC2	RG_FRSC2_WS_2020_02_28_NP	2020 02 28	8.34	785	0.15	15.9	15.9	1,300	**1,010**		9	306	4.32	1,249	-	10.47	7.78	203.4	1,342	1.05	295	0.0128	***37.5***	< 0.0010	37.5	< 0.25	37.5	2.59	156	347	288	7.4	< 1.0	351	< 5.0	< 5.0	< 0.050	9.1	0.0023	0.66	< 0.0020
RG_FRSC3	RG_FRSC3_WS_2020_02_28_NP	2020 02 28	7.95	800	< 0.10	14.0	16.2	1,240	**1,070**	< 1.0	0.65	429	4.66	1,376	-	9.68	7.66	210.4	1,463	1.15	197	0.0125	***38.5***	0.0012	38.5	< 0.25	38.5	2.37	157	350	197	< 1.0	< 1.0	240	< 5.0	< 5.0	< 0.050	9.4	0.0017	0.64	< 0.0020
RG_FRSC4	RG_FRSC4_WS_2020_02_28_NP	2020 02 28	8.31	811	0.40	16.2	16.4	1,350	**1,120**	< 1.0	0.71	337	4.5	1,500	-	10.95	7.8	215.8	1,602	1.26	295	0.0117	***41.4***	0.0020	41.4	1.12	42.5	2.77	155	351	291	3.8	< 1.0	355	< 5.0	< 5.0	< 0.050	8.5	0.0014	0.74	< 0.0020
RG_FRSC5	RG_FRSC5_WS_2020_02_28_NP	2020 02 28	8.25	870	0.31	17.2	17.6	1,440	**1,150**		6	461	5.23	1,466	-	11.02	7.75	211.8	1,531	1.21	296	0.0122	***49.7***	0.0024	49.7	< 0.25	49.7	3.74	150	364	296	< 1.0	< 1.0	362	< 5.0	< 5.0	< 0.050	10.2	0.0018	0.92	0.0034
RG_FRSC6	RG_FRSC6_WS_2020_02_28_NP	2020 02 28	8.3	877	0.23	17.5	17.7	1,440	**1,160**	< 1.0	0.77	472	4.92	1,642	-	9.15	7.45	221.4	1,731	1.37	319	0.0107	***49.3***	0.0013	49.3	< 0.25	49.3	3.66	150	360	317	2.0	< 1.0	387	< 5.0	< 5.0	< 0.050	10.9	0.0033	0.76	0.0033
Field Bank																																									
RG_FRDP2_WG_2019_12_04_NP	RG_DP_FIELD_WG_2019_12_04_NP	2019 12 04	***5.44***	-	< 0.10	-	-	< 2.0	< 10	< 1.0	-	422	-	-	-	-	-	-	-	-	< 1.0	< 0.0050	< 0.0050	< 0.0010	< 0.0051	< 0.050	< 0.050	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	1.7	< 0.0010		20
RG_FRSC5_WS_2020_02_28_NP	RG_BLNK1_WS_2020_02_28_NP	2020 02 28	***5.35***	-	< 0.10	-	-	< 2.0	< 10	< 1.0	-	497	-	-	-	-	-	-	-	-	< 1.0	0.0098	< 0.0050	< 0.0010	< 0.0051	< 0.050	< 0.050	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	1.4	< 0.0010		20
Filter Blank																																									
-																																									
RG_FRDP2_WG_2019_12_04_NP	RG_DP_FILTER_WG_2019_12_04_NP	2019 12 04	-	< 0.50	-	-	-	-	-	-	< 0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Bank																																									
	RG_TRP_2019-10-25	2019 10 25	***5.45***	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	408	-	-	-	-	-	-	-	-	< 1.0	< 0.0050	< 0.0050	< 0.0010	< 0.0051	< 0.050	< 0.050	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	1.6	< 0.0010		20
	RG_TRP1_2019-10-23	2019 10 23	***5.58***	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	409	-	-	-	-	-	-	-	-	< 1.0	< 0.0050	< 0.0050	< 0.0010	< 0.0051	< 0.050	< 0.050	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	2.1	< 0.0010		20
	RG_DP_TRIP_WG_2019_12_04_NP	2019 12 04	***5.14***	< 0.50	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	423	-	-	-	-	-	-	-	-	< 1.0	< 0.0050	< 0.0050	< 0.0010	< 0.0051	< 0.050	< 0.050	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	1.9	< 0.0010		20
	RG_TRP1_2020_02_27	2020 02 27	***5.33***	0.87	< 0.10	< 0	< 0	< 2.0	< 10	< 1.0	< 0.50	417	-	-	-	-	-	-	-	-	< 1.0	0.0159	< 0.0050	< 0.0010	< 0.0051	< 0.050	< 0.050	< 0.50	< 20	< 0.30	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	1.2	< 0.0010		20

Associated ALS file(s): L2371365, L2372312, L2372504, L2392199, L2392797, L2422351, L2422552.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

BOLD	Concentration greater than BCWQG Aquatic Life Long-term Average (AW) guideline
SHADED	Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").

[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").

[c] Guideline is pH and temperature dependent.

[d] Guideline is chloride dependent.

[e] Guideline is hardness dependent.

[f] Guideline is temperature, pH, DOC and hardness dependent.

[g] Guideline is pH dependent.

[h] Total mercury guideline is based on the % of methylmercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.

[i] Criteria as minimum values. Criteria for early life stages is 9 mg/L and criteria for other life sates is 6 mg/L. Criteria for other life stages has been applied.

[j] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[k] Guideline applicable to total concentration, applied to dissolved concentration as a conservative comparison.

TABLE 2: Summary of Analytical Results for Seep, Shallow Groundwater and Surface Water in the Upper Fording River - Privileged and Confidential

			Total Metals																																	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium µg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Phosphorous µg/L	Potassium µg/L	Selenium µg/L	Silicon µg/L	Silver µg/L	Sodium µg/L	Strontium µg/L	Sulphur µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc µg/L
Primary Screening Criteria																																				
BCWQG Aquatic Life Long-term Average (AW)[a]			n/a	9	n/a	1,000	0.13	n/a	1,200	n/a	n/a	1 (Cr(+6))	4	n/a	n/a	3-19.6[e]	n/a	n/a	767-2,600[e]	0.02[h]	1,000	25-150[e]					0.05-1.5[e]	n/a	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[b]			n/a	n/a	5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	110	n/a	1,000	3-417[e]	n/a	n/a	815-3,390[e]	n/a	2,000	n/a	n/a	n/a	n/a	n/a	0.1-3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-340.5[e]
Secondary Screening Criteria: Costa and de Bruyn (2021)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.041[j]	n/a	10 (Cr(+6))	n/a	n/a	n/a	n/a	253	n/a	n/a	n/a	n/a	136.9-164.5[j]	n/a	n/a	70	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	352	n/a	n/a
Greenhouse Side Channel																																				
RG_FRSC1	RG_FRSC1_WS_2020_02_28_NP	2020 02 28	3.6	< 0.10	0.13	126	< 0.020	< 0.050	14	0.0452	190,000	0.16	0.15	< 0.50	< 10	< 0.050	44.1	84,300	0.54	< 0.0050	0.630	< 0.50	< 50	2,300	***115***	2,530	< 0.010	3,270	222	136,000	< 0.010	< 0.10	< 0.30	4.59	< 0.50	< 3.0
	RG_DUP1_WS_2020_02_28_NP	Duplicate	< 3.0	< 0.10	0.11	131	< 0.020	< 0.050	15	0.0498	181,000	0.16	0.15	< 0.50	< 10	< 0.050	45.4	81,500	0.56	< 0.0050	0.631	< 0.50	< 50	2,280	***115***	2,470	< 0.010	3,200	222	131,000	< 0.010	< 0.10	< 0.30	4.56	< 0.50	< 3.0
	QA/QC RPD%		*	*	*	4	*	*	*	10	5	*	*	*	*	*	3	3	4	*	0	*	*	1	0	2	*	2	0	4	*	*	*	1	*	*
RG_FRSC2	RG_FRSC2_WS_2020_02_28_NP	2020 02 28	< 3.0	< 0.10	0.12	129	< 0.020	< 0.050	15	0.0438	185,000	0.15	0.15	< 0.50	< 10	< 0.050	45.1	83,500	0.31	< 0.0050	0.641	< 0.50	< 50	2,320	***116***	2,540	< 0.010	3,230	218	137,000	< 0.010	< 0.10	< 0.30	4.71	< 0.50	< 3.0
RG_FRSC3	RG_FRSC3_WS_2020_02_28_NP	2020 02 28	< 3.0	< 0.10	0.13	130	< 0.020	< 0.050	14	0.0511	185,000	0.20	0.15	< 0.50	14	< 0.050	46.0	84,300	0.19	< 0.0050	0.661	< 0.50	< 50	2,380	***120***	2,530	< 0.010	3,240	220	137,000	< 0.010	< 0.10	< 0.30	4.74	0.52	48.1
RG_FRSC4	RG_FRSC4_WS_2020_02_28_NP	2020 02 28	4.0	< 0.10	0.13	129	< 0.020	< 0.050	13	0.0531	186,000	0.18	0.15	< 0.50	< 10	< 0.050	48.4	87,100	0.31	< 0.0050	0.661	< 0.50	< 50	2,510	***128***	2,640	< 0.010	3,400	220	134,000	< 0.010	< 0.10	< 0.30	5.08	0.50	< 3.0
RG_FRSC5	RG_FRSC5_WS_2020_02_28_NP	2020 02 28	6.7	< 0.10	0.12	140	< 0.020	< 0.050	13	0.0522	194,000	0.20	0.11	< 0.50	12	< 0.050	49.8	90,300	0.53	< 0.0050	0.576	< 0.50	< 50	2,610	***145***	2,460	< 0.010	3,690	214	134,000	< 0.010	< 0.10	< 0.30	5.70	< 0.50	< 3.0
RG_FRSC6	RG_FRSC6_WS_2020_02_28_NP	2020 02 28	< 3.0	< 0.10	0.12	140	< 0.020	< 0.050	13	0.0530	191,000	0.16	0.11	< 0.50	< 10	< 0.050	50.0	89,000	0.22	< 0.0050	0.602	< 0.50	< 50	2,570	***144***	2,500	< 0.010	3,740	212	133,000	< 0.010	< 0.10	< 0.30	5.69	< 0.50	< 3.0
Field Bank																																				
RG_FRDP2_WG_2019_12_04_NP	RG_DP_FIELD_WG_2019_12_04_NP	2019 12 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_FRSC5_WS_2020_02_28_NP	RG_BLNK1_WS_2020_02_28_NP	2020 02 28	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 50	< 0.10	< 0.10	< 0.50[a]	< 10	< 0.050	< 1.0	< 5.0	< 0.10	< 0.0050	< 0.050	< 0.50	< 50	< 100	< 0.050	< 50	< 0.010	< 50	< 0.20	< 500	< 0.010	< 0.10	< 0.30	< 0.01	< 0.50	< 3.0
Filter Blank																																				
-	RG_EBLK_2019-10-25	2019 10 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_FRDP2_WG_2019_12_04_NP	RG_DP_FILTER_WG_2019_12_04_NP	2019 12 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Bank																																				
	RG_TRP_2019-10-25	2019 10 25	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 50	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 5.0	< 0.10	< 0.0050	< 0.050	< 0.50	< 50	< 100	< 0.050	< 50	< 0.010	< 50	< 0.20	< 500	< 0.010	< 0.10	< 0.30	< 0.01	< 0.50	< 3.0
	RG_TRP1_2019-10-23	2019 10 23	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 50	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 5.0	< 0.10	< 0.0050	< 0.050	< 0.50	< 50	< 100	< 0.050	< 50	< 0.010	< 50	< 0.20	< 500	< 0.010	< 0.10	< 0.30	< 0.01	< 0.50	< 3.0
	RG_DP_TRIP_WG_2019_12_04_NP	2019 12 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	RG_TRP1_2020_02_27	2020 02 27	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 50	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 5.0	< 0.10	< 0.0050	< 0.050	< 0.50	< 50	< 100	< 0.050	< 50	< 0.010	< 50	< 0.20	< 500	< 0.010	< 0.10	< 0.30	< 0.01	< 0.50	< 3.0

Associated ALS file(s): L2392199, L2392797, L2422351, L2422552.

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[d] Guideline is chloride dependent.

[e] Guideline is hardness dependent.

[f] Guideline is temperature, pH, DOC and hardness dependent.

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e.g. Nitrate equation valid up to 500 mg/L hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.

[k] Guideline applicable to total concentration, applied to dissolved concentration as a conservative comparison.

TABLE 2: Summary of Analytical Results for Seep, Shallow Groundwater and Surface Water in the Upper Fording River - Privileged and Confidential

			Dissolved Metals																											
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Aluminum µg/L	Dissolved Calcium mg/L	Dissolved Iron µg/L	Dissolved Magnesium mg/L	Dissolved Manganese µg/L	Dissolved Potassium mg/L	Dissolved Sodium mg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Boron µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Selenium µg/L	Silver µg/L	Thallium µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc µg/L
Primary Screening Criteria																														
BCWQG Aquatic Life Long-term Average (AW)[a]			8.98-50[g]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0176-457[e]	n/a	n/a	0.2-1.5[f]	n/a	n/a	n/a	n/a	n/a	2[k]	n/a	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[b]			27.4-100[g]	n/a	350 (max)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.038-2.8[e]	n/a	n/a	0.9-10[f]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Secondary Screening Criteria: Costa and de Bruyn (2021)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.041[j]	10 (Cr(+6))	n/a	n/a	n/a	253	n/a	n/a	148.8-164.5[j]	70	n/a	n/a	n/a	352	n/a	n/a
Greenhouse Side Channel																														
RG_FRSC1																								***125***	< 0.010	< 0.010	< 0.30	4.54	< 0.50	< 1.0
	RG_DUP1_WS_2020_02_28_NP	Duplicate	< 1.0	185	< 10	82.8	0.44	2.32	3.16	< 0.10	< 0.10	137	< 0.020	13	0.0510	0.16	0.15	< 0.20	< 0.050	47.7	< 0.0050	0.611	< 0.50	***126***	< 0.010	< 0.010	< 0.30	4.56	< 0.50	< 1.0
	QA/QC RPD%		*	2	*	0	*	1	3	*	*	1	*	*	6	*	*	*	*	6	*	4	*	1	*	*	*	0	*	*
RG_FRSC2																								***126***	< 0.010	< 0.010	< 0.30	4.65	< 0.50	< 1.0
RG_FRSC3																								***137***	< 0.010	< 0.010	< 0.30	4.57	< 0.50	< 1.0
RG_FRSC4																								***147***	< 0.010	< 0.010	< 0.30	5.11	< 0.50	< 1.0
RG_FRSC5																								***166***	< 0.010	< 0.010	< 0.30	5.89	< 0.50	< 1.0
RG_FRSC6																								***160***	< 0.010	< 0.010	< 0.30	5.51	< 0.50	1.3
Field Bank																														
RG_FRDP2_WG_2019_12_04_NP	RG_DP_FIELD_WG_2019_12_04_NP	2019 12 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_FRSC5_WS_2020_02_28_NP	RG_BLNK1_WS_2020_02_28_NP	2020 02 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Filter Blank																														
-	RG_EBLK_2019-10-25	2019 10 25	< 1.0	< 0.050	< 10	< 0.0050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	***0.23***	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.010	< 0.30	< 0.010	< 0.50	< 1.0
RG_FRDP2_WG_2019_12_04_NP	RG_DP_FILTER_WG_2019_12_04_NP	2019 12 04	1.4	< 0.050	< 10	< 0.0050	0.37	< 0.10	< 0.050	< 0.10	< 0.10	0.13	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	0.61	0.060	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.010	< 0.30	< 0.010	< 0.50	1.0
Trip Bank																														
	RG_TRP_2019-10-25	2019 10 25	< 1.0	< 0.050	< 10	< 0.0050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	***0.52***	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.010	< 0.30	< 0.010	< 0.50	< 1.0
	RG_TRP1_2019-10-23	2019 10 23	< 1.0	< 0.050	< 10	< 0.0050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.010	< 0.30	< 0.010	< 0.50	< 1.0
	RG_DP_TRIP_WG_2019_12_04_NP	2019 12 04	< 1.0	< 0.050	< 10	< 0.0050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.010	< 0.30	< 0.010	< 0.50	< 1.0
	RG_TRP1_2020_02_27	2020 02 27	< 1.0	0.350	< 10	< 0.0050	< 0.10	< 0.10	< 0.050	< 0.10	< 0.10	< 0.10	< 0.020	< 10	< 0.0050	< 0.10	< 0.10	< 0.20	< 0.050	< 1.0	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.010	< 0.010	< 0.30	< 0.010	< 0.50	1.7

Associated ALS file(s): L2392199, L2392797, L2422351, L2422552.
All terms defined within the body of SNC-Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard/guideline.
*	RPDs are not calculated where one or more concentrations are less than five times RDL.
RDL	Denotes reported detection limit.

BOLD	Concentration greater than BCWQG Aquatic Life Long-term Average (AW) guideline
SHADED	Concentration greater than BCWQG Aquatic Life Short-term Maximum (AW) guideline
BLUE	Concentration greater than Secondary Screening Criteria: Costa and de Bruyn (2021)

[a] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic").
[b] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute").
[c] Guideline is pH and temperature dependent.
[d] Guideline is chloride dependent.
[e] Guideline is hardness dependent.
[f] Guideline is temperature, pH, DOC and hardness dependent.
[g] Guideline is pH dependent.
[h] Total mercury guideline is based on the % of methylmercury present. WQG = 0.0001 / (MeHg/total Hg), where MeHg is mass (or concentration) of methyl mercury and THg. Guideline shown assumes MeHg<0.5% of Total Hg.
[i] Criteria as minimum values. Criteria for early life stages is 9 mg/L and criteria for other life sates is 6 mg/L. Criteria for other life stages has been applied.
[j] For calculated benchmarks in which the dependant parameter (hardness and/or pH, chloride, DOC) falls outside the prescript upper bound, the upper bound value has been used for calculating the benchmark.
e.g. Nitrate equation valid up to 500 mg/L hardness, where sample hardness value >500 mg/L, 500 mg/L used for calculation.
[k] Guideline applicable to total concentration, applied to dissolved concentration as a conservative comparison.

TABLE 3: Summary of Analytical Results for Groundwater - Speciated Selenium - Privileged and Confidential

			Speciated Selenium										
Sample Location	**Sample ID**	**Sample Date (yyyy mm dd)**	**Unknown selenium species* µg/L**	**Se(IV) – selenite SeO3(-2) µg/L**	**Selenium (Total Recoverable) µg/L**	**Selenium (Dissolved) µg/L**	**Dimethylseleneoxide µg/L**	**Unknown parameter from Brooks. µg/L**	**SeCN – selenocyanate SeCN(-1) µg/L**	**Selenosulfate, SeSO3 µg/L**	**Se(VI) – selenate SeO4(-2) µg/L**	**MeSe(IV) – methylseleninic acid CH3SeO2H µg/L**	**SeMe – selenomethionine CH3SeCH2CH2CH(NH2)CO2H µg/L**
FR_09-01-A	FR_09-01-A_QTR_2018-10-01_N	2018 12 13	0	0	35.7	33.6	0	0	0	0	20.5	0	0
FR_09-01-B	FR_09-01-B_QTR_2018-10-01_N	2018 12 13	0	0	42.1	39.7	0	0	0	0	19	0	0
FR_09-02-A	FR_09-02-A_QTR_2018-10-01_N	2018 12 13	0	0	47.3	48.2	0	0	0	0	4.19	0	0
FR_09-02-B	FR_09-02-B_QTR_2018-10-01_N	2018 12 13	0	0	45.1	44.9	0	0	0	0	33.1	0	0
FR_MW_CH1-A	FR_MW_CH1-A_WG_2020_03_02_NP	2020 03 02	0	0.015	0.753	0.753	0	0	0	0	0.677	0	0
FR_MW_FRRD1	FR_MW_FRRD1_WG_2020_03_02_NP	2020 03 02	0	0.04	0.483	0.471	0	0	0	0	0.338	0	0
FR_MW_STPNW	FR_MW_STPNW_WG_2020_03_03_NP	2020 03 03	0	0	0.076	0.066	0	0	0	0	0	0	0
FR_MW_STPSW-A	FR_MW_STPSW-A_WG_2020_03_03_NP	2020 03 03	0	0.189	12.2	12.5	0	0	0	0	12.1	0	0
FR_MW_STPSW-B	FR_MW_STPSW-B_WG_2020_03_03_NP	2020 03 03	0	0.07	45.6	45.5	0	0	0	0	48.2	0	0
RG_FRSP1	RG_FRSP1_WG_2020_02_27_NP	2020 02 27	0	0.011	138	138	0	0	0	0	130	0	0
RG_FRSP2	RG_FRSP2_WG_2020_02_27_NP	2020 02 27	0	0	141	141	0	0	0	0	138	0	0
RG_FRSP3	RG_FRSP3_WG_2020_02_27_NP	2020 02 27	0	0.043	141	143	0	0	0	0	81.5	0	0
RG_FRSP4	RG_FRSP4_WG_2020_02_27_NP	2020 02 27	0	0	145	144	0	0	0	0	139	0	0
RG_FRSP5	RG_FRSP5_WG_2020_02_27_NP	2020 02 27	0	0	141	144	0	0	0	0	129	0	0
RG_FRSP6	RG_FRSP6_WG_2020_02_27_NP	2020 02 27	0	0	136	134	0	0	0	0	128	0	0

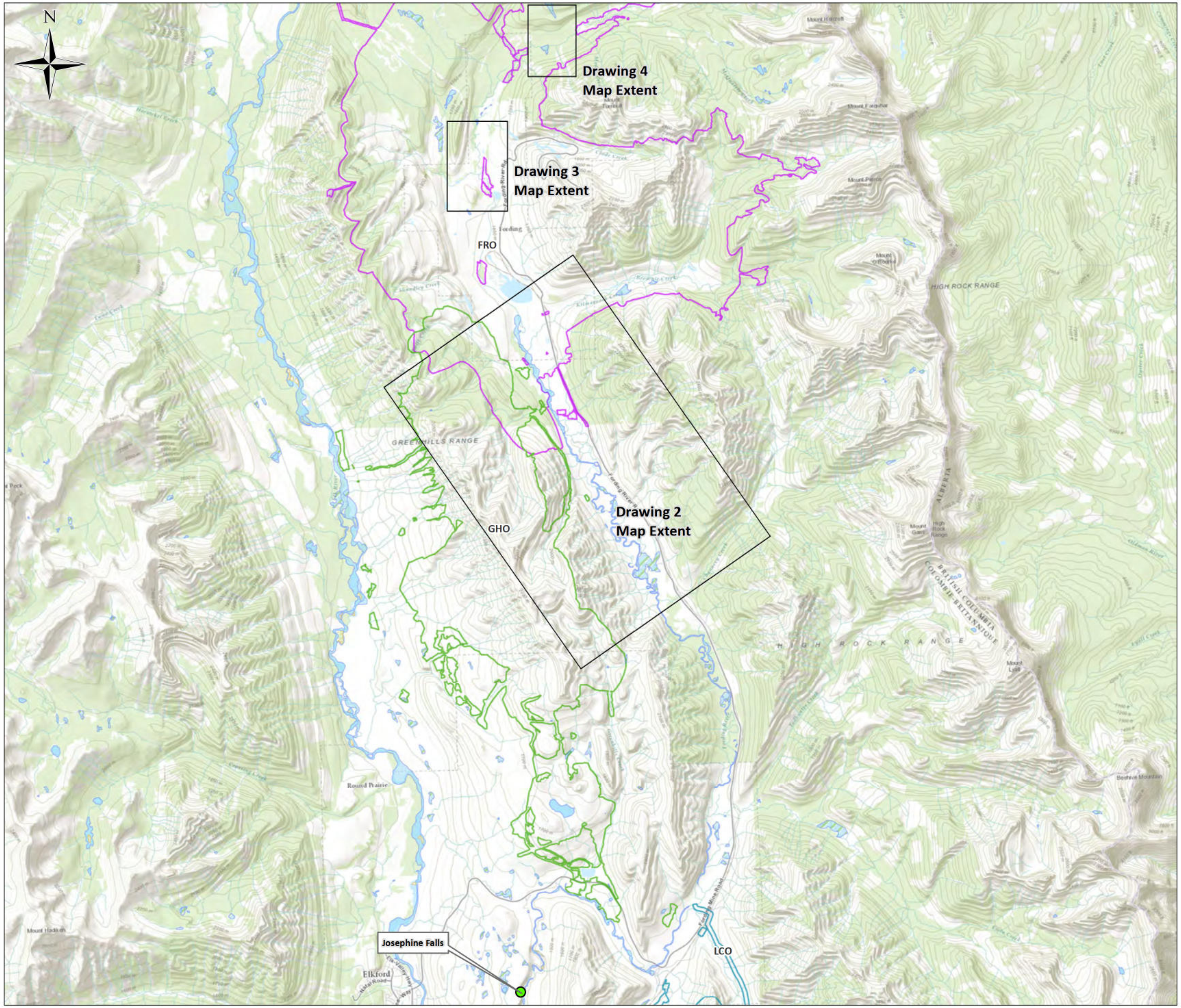
Associated Brooks File: 1904014, 2010047, 2011004.

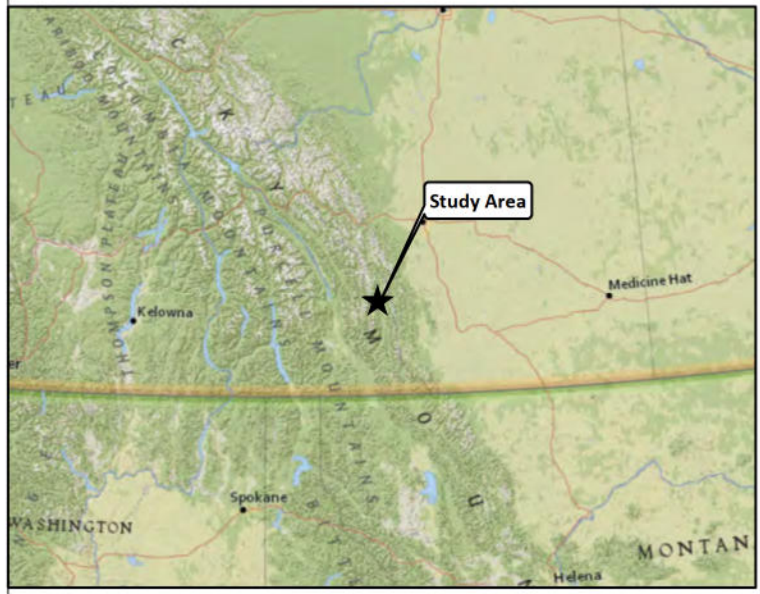
All terms defined within the body of SNC-Lavalin's report.

* all other selenium species which elute from the applied chromatographic column and are not identified through retention time matching with known standards.

Drawings

1. Location Plan
2. S6 Study Area Site Plan
3. S8 Study Area Site Plan
4. S10 Study Area Site Plan
5. Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways – S6 Study Area
6. Block Diagram Showing Dissolved Selenium Concentrations and Mine Influenced Waters – S6
7. Bedrock Geology of the S6 Study Area
8. Surficial Geology of the S6 Study Area
9. Upper Fording River Study Area 6 – Conceptual Geological Cross-Section A-A'
10. Study Area 6 – Groundwater Levels and Inferred Contours, Q1 2019
11. Study Area 6 – Groundwater Levels and Inferred Contours, July 2019
12. Study Area 6 – October 2019 and February 2020 Flow Accretion Results
13. September 2018 Flow Accretion Study Results in the S6 Study Area and Kilmarnock Creek (from Teck Coal, 2019)
14. October 2018 Flow Accretion Study Results in the S6 Study Area and Kilmarnock Creek (from Teck Coal, 2019)
15. February 2019 Flow Accretion Study Results in Kilmarnock Creek (from Teck Coal, 2019)
16. April 2019 Flow Accretion Study Results in Kilmarnock Creek (from Teck Coal, 2019)
17. May 2019 Flow Accretion Study Results in Kilmarnock Creek (from Teck Coal, 2019)
18. Study Area 6 – Inferred Source-Receptor Groundwater Transport Pathways
19. NO3--N/SO42--S ratios in Groundwater and Surface Water in the S6 Study Area
20. Clode Creek Watershed and Settling Ponds (from Golder, 2020b)
21. Current Topography of Clode Creek Watershed (from Golder, 2020b)
22. Mined-Out Topography of Clode Creek Watershed (from Golder, 2019b)
23. Surficial Geology and Conceptual Groundwater Flow of the Clode Creek Watershed (from Golder, 2020b)
24. Geomorphic Overview of the S8 Study Area (from Golder, 2014)
25. Cross-Section through the Clode Creek Settling Ponds Area (from Golder, 2020b)
26. Groundwater Levels and Inferred Contours in the Clode Creek Settling Ponds Area, December 2019 (from Golder, 2020b)
27. Flow Accretion Studies in the S8 Study Area in March, April, July, and September 2019 (from Golder, 2020b)
28. 2019 and Historical Total Selenium Concentrations in Groundwater and Surface Water (from Golder, 2020b)
29. Upper Fording River S10 Study Area – Inferred Geological Cross Section B-B'
30. Study Area 10 – Groundwater Levels and Inferred Contours, March 2019
31. Potable Wells Area
32. Pits and Points of Diversion





Legend

Mine Permitted Areas

- 🟪 Fording River Operations (FRO)
- 🟩 Greenhills Operations (GHO)
- 🟦 Line Creek Operations (LCO)

NOTES:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale; however, scale bar will remain accurate.
3. Intended for illustration purposes. Accuracy has not been verified for construction or navigation

REFERENCES:
1. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN,

REVISIONS:
0 - AO - 2020-07-08- DRAFT - CH
1 - AO - 2021-05-28 - FINAL - CH

0 0.75 1.5 3 4.5 6 7.5
Kilometers

CLIENT:
Teck Coal Ltd.

PROJECT LOCATION:
Fording River Operations, BC

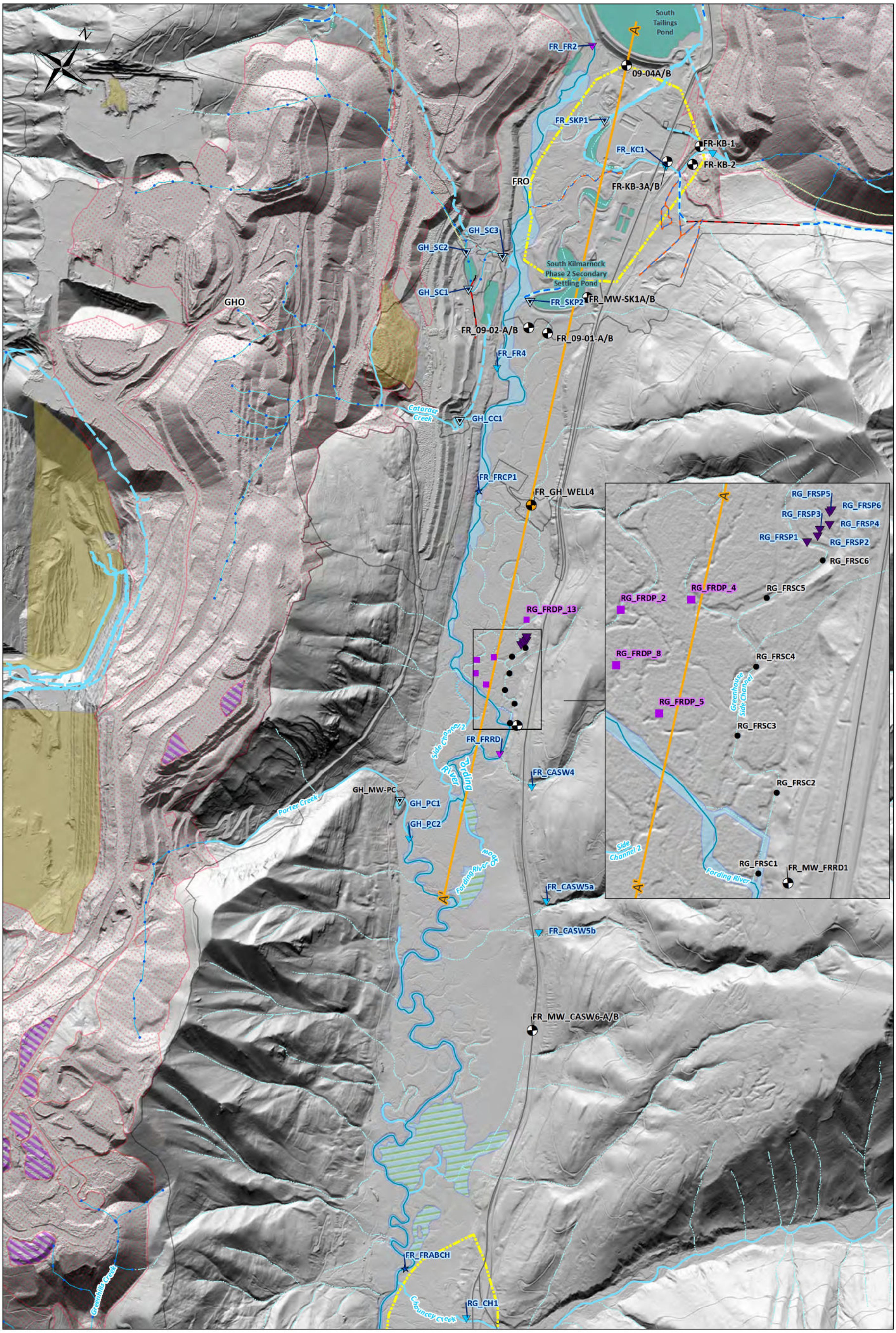
SNC·LAVALIN

Study Area Location Plan

BY: AO
SCALE: 1:24,000
DATE: 2021-05-26
REF No:
REV: 0
CHK'D: CH
Proj Coord Sys: NAD 1983 UTM Zone 11N
DRAWING 1

MXD Path: \\SII2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\1-LocPlan.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\SPO\672386 Confidential



LEGEND

- ● Greenhouse Side Channel flow accretion measurement/sampling locations (February 2020)

Groundwater Stations

- Monitoring Well
- Supply Well

Surface Water Stations

- ▼ Seep
- ★ Compliance Point
- ▼ Receiving Environment
- ▽ Authorized Discharge
- ▼ Monitoring
- ■ Drive Point Sample Locations

Site Features

- Secondary Road
- Geological Cross Sections
- Alluvial Fans
- ☐ Mine Permitted Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Tailings/Settling Pond

Water Features

- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Lake
- River Bed
- Wetland

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Shading reflects LiDAR topographic data

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.
2. Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Revisons:
0 - AO - 2020-07-08- DRAFT - CH
1 - AO - 2021-05-25 - FINAL - CH

0 175 350 700 1,050 1,400 Meters

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Ltd.

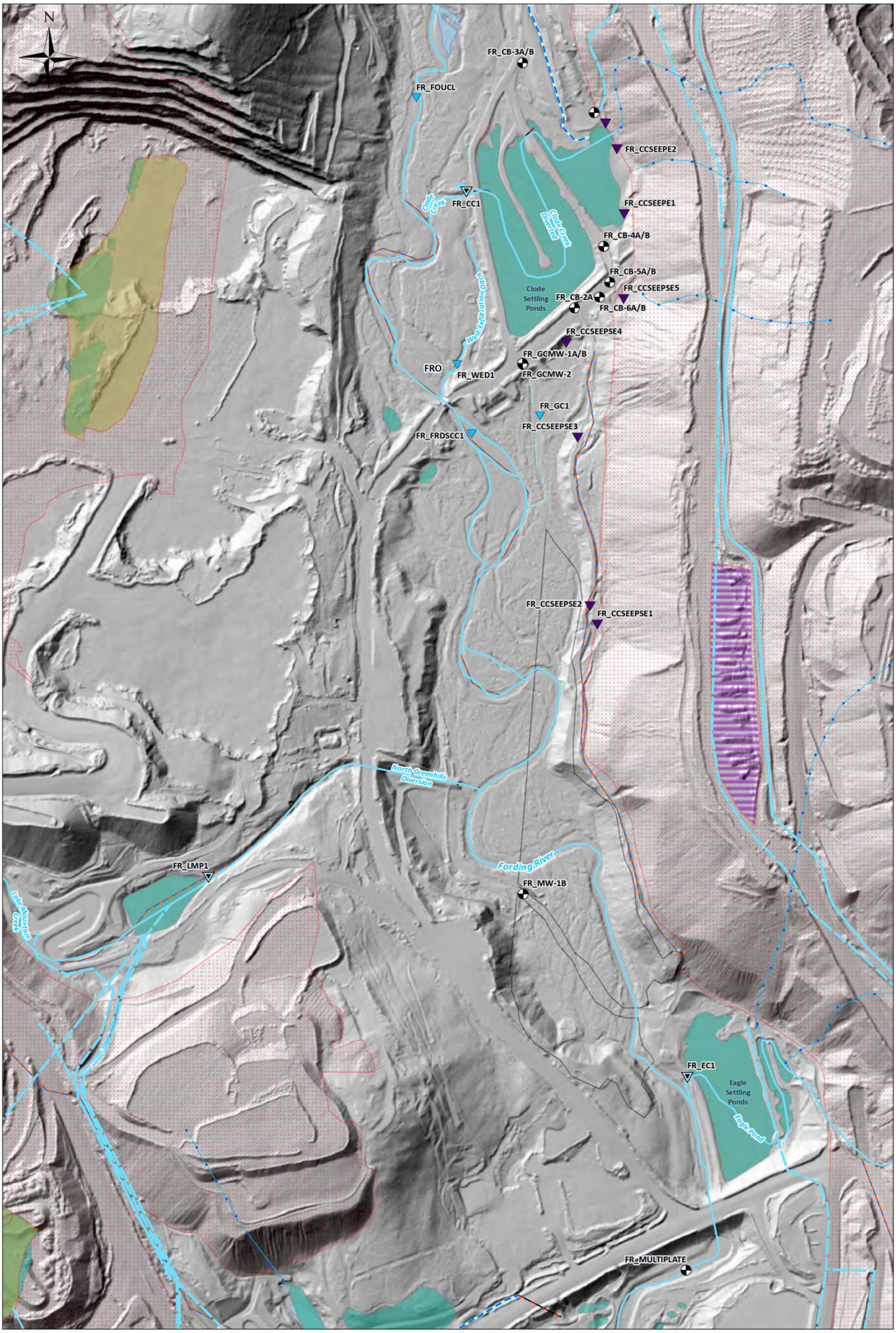
SNC·LAVALIN

S6 Study Area Site Plan

CHK'D: CH	DATE: 2021-06-10 SCALE: 1:24,000	Ref Num: REV: 0
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N	DRAWING 2

Project Path: \\SLI2606\PROJECTS\Current Projects\Teck Coal Ltd\SPO\672386 Confidential

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\2-SitePlanS6.mxd



LEGEND

Surface Water
- ▽ Authorized Discharge
- ▼ Monitoring
- ◐ Monitoring Well
- ▼ Seep
- ☐ Mine Permitted Areas
- ■ Pit
- ▤ Stockpiles
- ⬚ Waste Dump (Spoils)
- ■ Tailings/Settling Pond

Water Features
- ┄ Intermittent Stream
- ╍ Stream Ditch
- ─ Stream
- •─ Subsurface
- ─ Culvert
- ─ Ditch
- ╍ Water Pipeline
- ☐ Lake

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Shading reflects LiDAR topographic data

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.
2.

Revisons:
0 - AO - 2020-07-08- DRAFT - CH
1 - AO - 2021-05-26 - FINAL - CH

0 40 80 160 240 320 Meters

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Ltd.

SNC·LAVALIN

S8 Study Area Site Plan

CHK'D: CH
BY: AO
DATE: 2021-05-26 SCALE: 1:0
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num: REV: 0
DRAWING 3

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\3-SitePlanS8.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\SPO\672386 Confidential

LEGEND

▼ Surface Water Stations selection

Surface Water Stations
- ▽ Authorized Discharge
- ▼ Monitoring
- ▼ Seep

Groundwater Stations
- ◐ Dedicated Monitoring Wells

Water Features
- Intermittent Stream
- Stream Ditch
- Stream
- Subsurface
- Culvert
- Ditch

- Water Pipeline
- Lake

Site Features
- Geological Cross Sections
- Pit
- Waste Dump (Spoils)
- Tailings/Settling Pond
- Mine Permitted Areas

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Shading reflects LiDAR topographic data

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-05-06 - DRAFT - LH
1 - AO - 2021-05-28 - FINAL - CH

0 25 50 100 150 200 250 Meters

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Ltd.

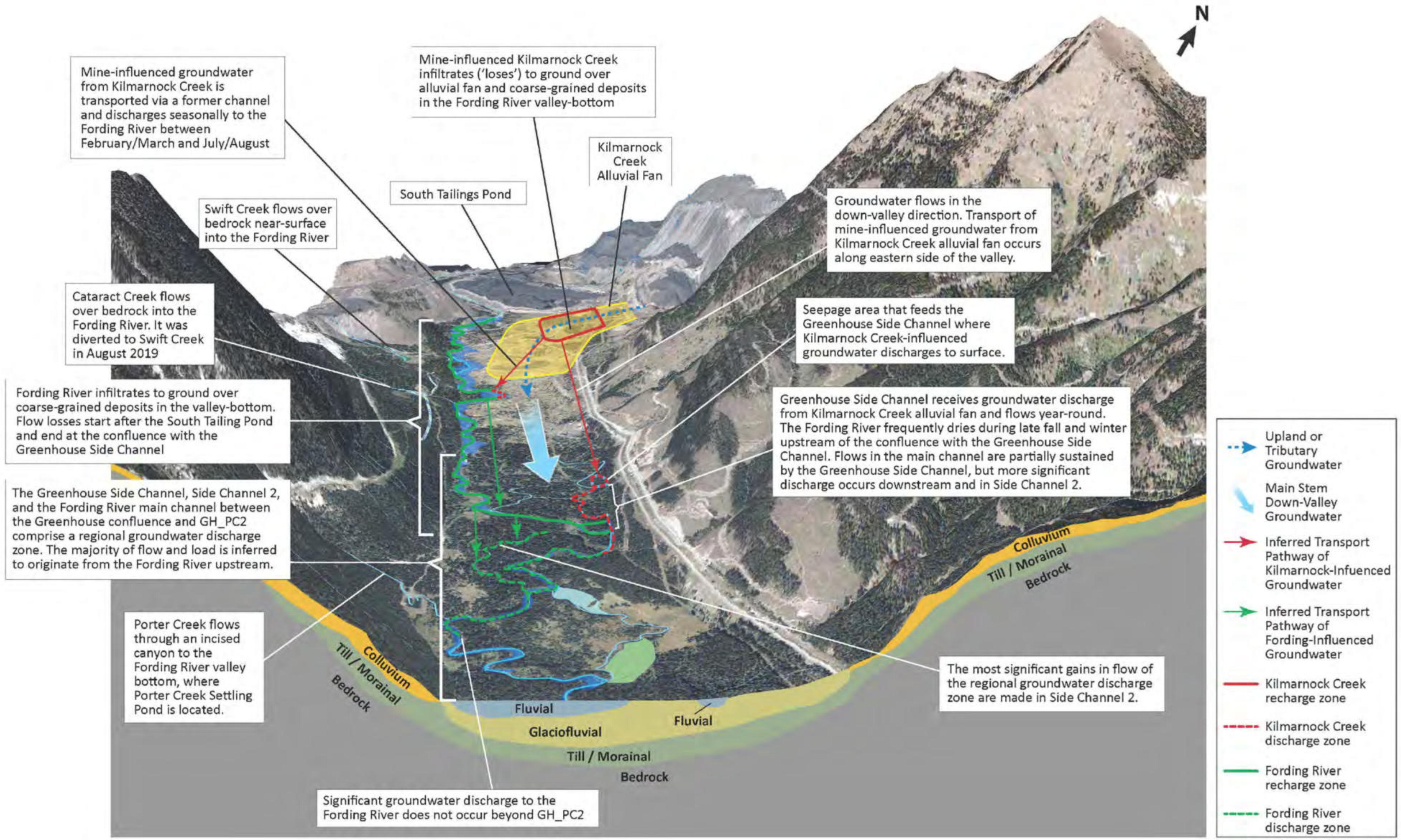
SNC·LAVALIN

S10 Study Area Site Plan

CHK'D: CH	DATE: 2021-05-26	SCALE: 1:6,000	Ref Num: REV: 0
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 4

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\4-SitePlanS10_1.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\SPO\672386 Confidential



Mine-influenced groundwater from Kilmarnock Creek is transported via a former channel and discharges seasonally to the Fording River between February/March and July/August

Mine-influenced Kilmarnock Creek infiltrates ('loses') to ground over alluvial fan and coarse-grained deposits in the Fording River valley-bottom

Swift Creek flows over bedrock near-surface into the Fording River

Cataract Creek flows over bedrock into the Fording River. It was diverted to Swift Creek in August 2019

Fording River infiltrates to ground over coarse-grained deposits in the valley-bottom. Flow losses start after the South Tailing Pond and end at the confluence with the Greenhouse Side Channel

The Greenhouse Side Channel, Side Channel 2, and the Fording River main channel between the Greenhouse confluence and GH_PC2 comprise a regional groundwater discharge zone. The majority of flow and load is inferred to originate from the Fording River upstream.

Porter Creek flows through an incised canyon to the Fording River valley bottom, where Porter Creek Settling Pond is located.

Significant groundwater discharge to the Fording River does not occur beyond GH_PC2

Groundwater flows in the down-valley direction. Transport of mine-influenced groundwater from Kilmarnock Creek alluvial fan occurs along eastern side of the valley.

Seepage area that feeds the Greenhouse Side Channel where Kilmarnock Creek-influenced groundwater discharges to surface.

Greenhouse Side Channel receives groundwater discharge from Kilmarnock Creek alluvial fan and flows year-round. The Fording River frequently dries during late fall and winter upstream of the confluence with the Greenhouse Side Channel. Flows in the main channel are partially sustained by the Greenhouse Side Channel, but more significant discharge occurs downstream and in Side Channel 2.

The most significant gains in flow of the regional groundwater discharge zone are made in Side Channel 2.

- Upland or Tributary Groundwater
- Main Stem Down-Valley Groundwater
- Inferred Transport Pathway of Kilmarnock-Infuenced Groundwater
- Inferred Transport Pathway of Fording-Influenced Groundwater
- Kilmarnock Creek recharge zone
- Kilmarnock Creek discharge zone
- Fording River recharge zone
- Fording River discharge zone

REFERENCES:
1.

NOTES:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale; however, scale bar will remain accurate.
3. Intended for illustration purposes. Accuracy has not been verified for construction or navigation purposes.
4 Subsurface geology is not to scale
5. Vertical exaggeration 2x for topographic profile
6. Groundwater transport pathways are conceptual only

Revisons:
0 - AO - 2020-05-06 - DRAFT - CH
1 - AO - 2021-05-25 - FINAL - CH

CLIENT:
Teck Coal Limited

PROJECT LOCATION:
Fording River Operations, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways – S6 Study Area

BY: AO
SCALE: 1:83,221
DATE: 2021-05-26
REF No:
REV: 0
CHK'D: CH
Proj Coord Sys: NAD 1983 UTM Zone 11N
DRAWING 5

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\5-BlockDiagramS6.mxd

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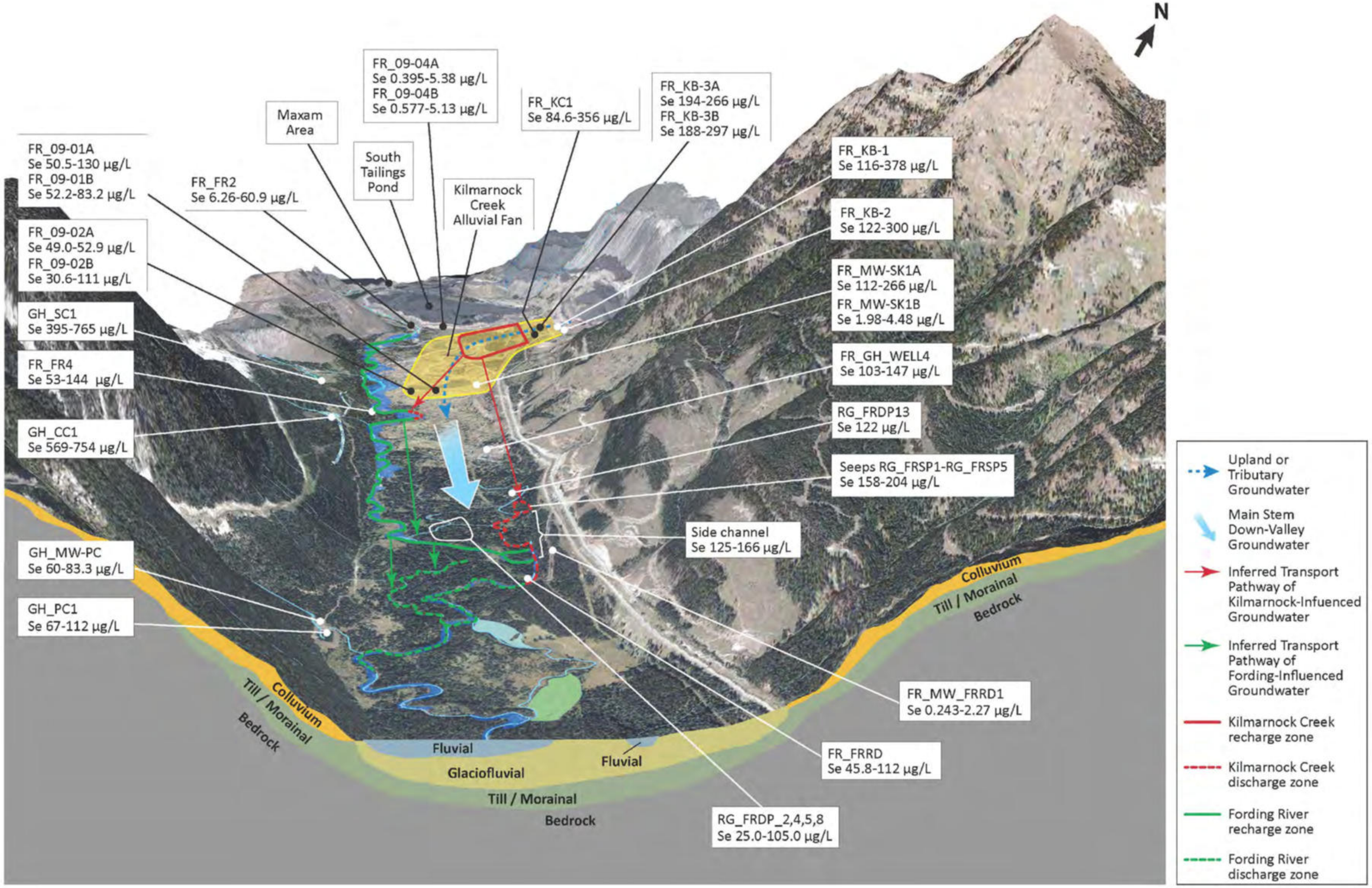


REFERENCES:

NOTES:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale; however, scale bar will remain accurate.
3. Intended for illustration purposes. Accuracy has not been verified for construction or navigation purposes.
4 Subsurface geology is not to scale
5. Vertical exaggeration 2x for topographic profile
6. All concentrations are from samples collected in 2019

Revisons:
0 - AO - 2020-05-06 - DRAFT - CH
1 - AO - 2021-05-25 - FINAL - CH

CLIENT: Teck Coal Limited

PROJECT LOCATION: Fording River Operations, BC

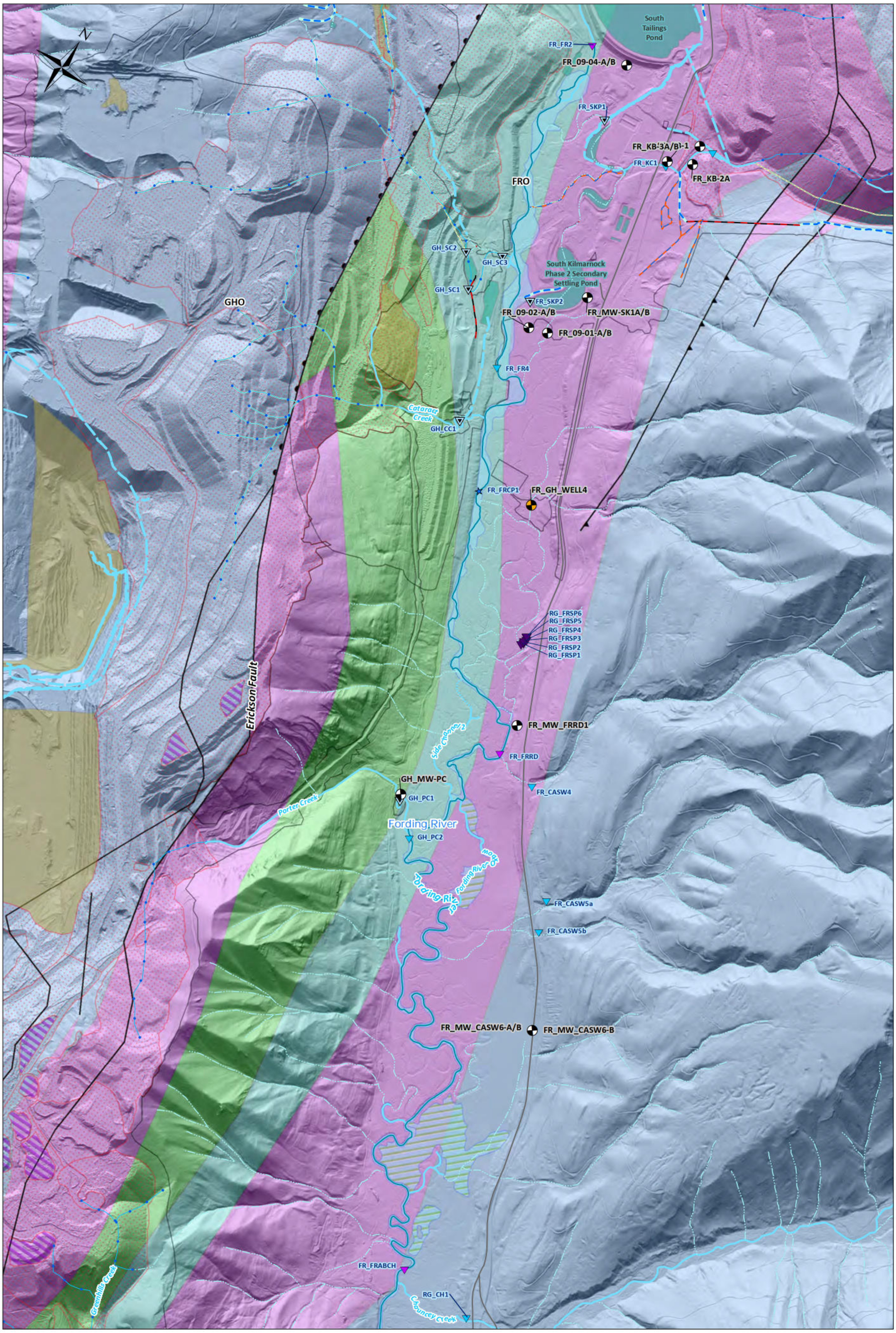
SNC·LAVALIN

Block Diagram Showing Dissolved Selenium Concentrations and Mine Influenced Waters – S6 Study Area

BY: AO
SCALE: 1:83,221
DATE: 2021-05-26
REF No:
REV: 0
CHK'D: KM
Proj Coord Sys: NAD 1983 UTM Zone 11N
DRAWING 6

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\6-BlockDiagramConS6.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\SPO\672386 Confidential



LEGEND

Groundwater Stations
- Monitoring Well
- Supply Well

Surface Water Stations
- ▼ Seep
- ★ Compliance Point
- ▼ Receiving Environment
- ▽ Authorized Discharge
- ▼ Monitoring

Site Features
- Secondary Road

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Mine Permitted Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Tailings/Settling Pond
- Lake
- River Bed
- Wetland
- Normal fault
- Thrust Fault

Bedrock Geology
- Kootenay Group
- Fernie Formation
- Spray River Group
- Rocky Mountain Formation

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Shading reflects LiDAR topographic data

References:
1. 1.George, H., W.A. Gorman, and D.F. VanDine, 1987. Late quaternary geology and geomorphology of the Elk Valley, southeastern British Columbia. Canadian Journal of Earth Science, 24, 741-751
2. Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Revisons:
0 - AO - 2020-07-08- DRAFT - CH

0 175 350 700 1,050 1,400 Meters

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Ltd.

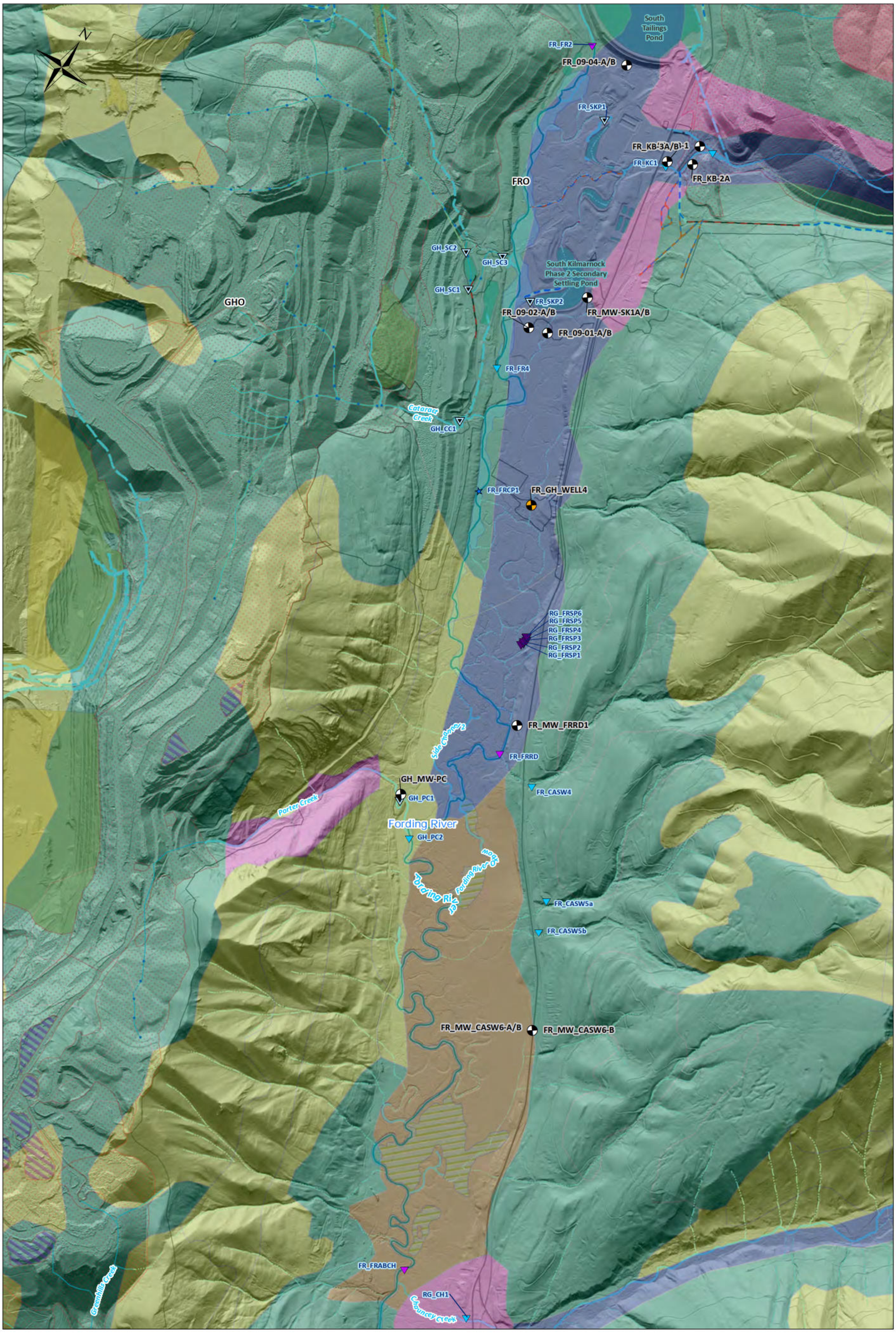
SNC·LAVALIN

Bedrock Geology of the S6 Study Area

CHK'D: CH
BY: AO
DATE: 2021-05-26
SCALE: 1:24,000
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num:
REV: 0
DRAWING 7

MXD Path: \\SI2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\7-BedrockGeologyS6.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\SPO\672386 Confidential



LEGEND

Groundwater Stations
- ◐ Monitoring Well
- ◐ Supply Well

Surface Water Stations
- ▼ Seep
- ★ Compliance Point
- ▼ Receiving Environment
- ▽ Authorized Discharge
- ▼ Monitoring

Surficial Geology
- 🟥 Anthropogenic
- 🟨 Colluvium
- 🟦 Fluvial
- 🟪 Glaciofluvial
- 🟩 Till
- 🟫 Organic Soil

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- ▭ Lake
- ▭ River Bed
- ▨ Wetland

Site Features
- Secondary Road
- ☐ Mine Permitted Areas
- ▭ Pit
- ▭ Stockpiles
- ▨ Waste Dump (Spoils)
- ▭ Tailings/Settling Pond

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Shading reflects LiDAR topographic data

References:
1. 1.George, H., W.A. Gorman, and D.F. VanDine, 1987. Late quaternary geology and geomorphology of the Elk Valley, southeastern British Columbia. Canadian Journal of Earth Science, 24, 741-751
2. Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Revisons:
0 - AO - 2020-07-08- DRAFT - CH
1 - AO - 2021-05-25 - FINAL - CH

0 175 350 700 1,050 1,400 Meters

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Ltd.

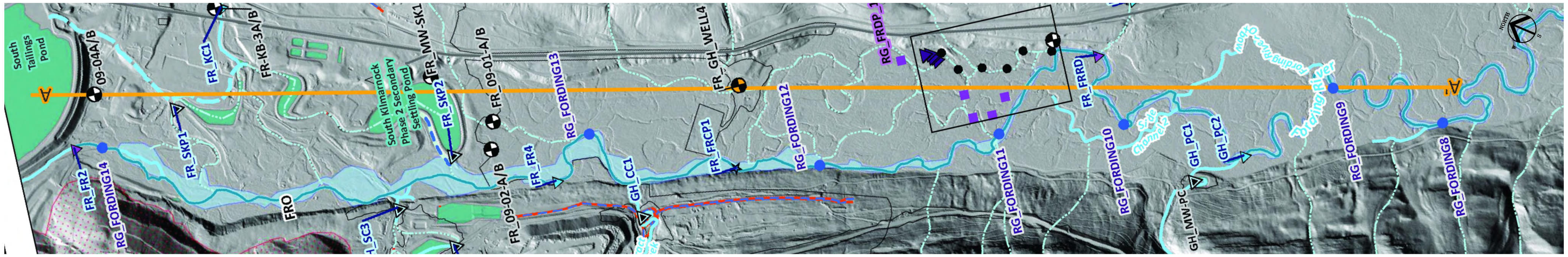
SNC·LAVALIN

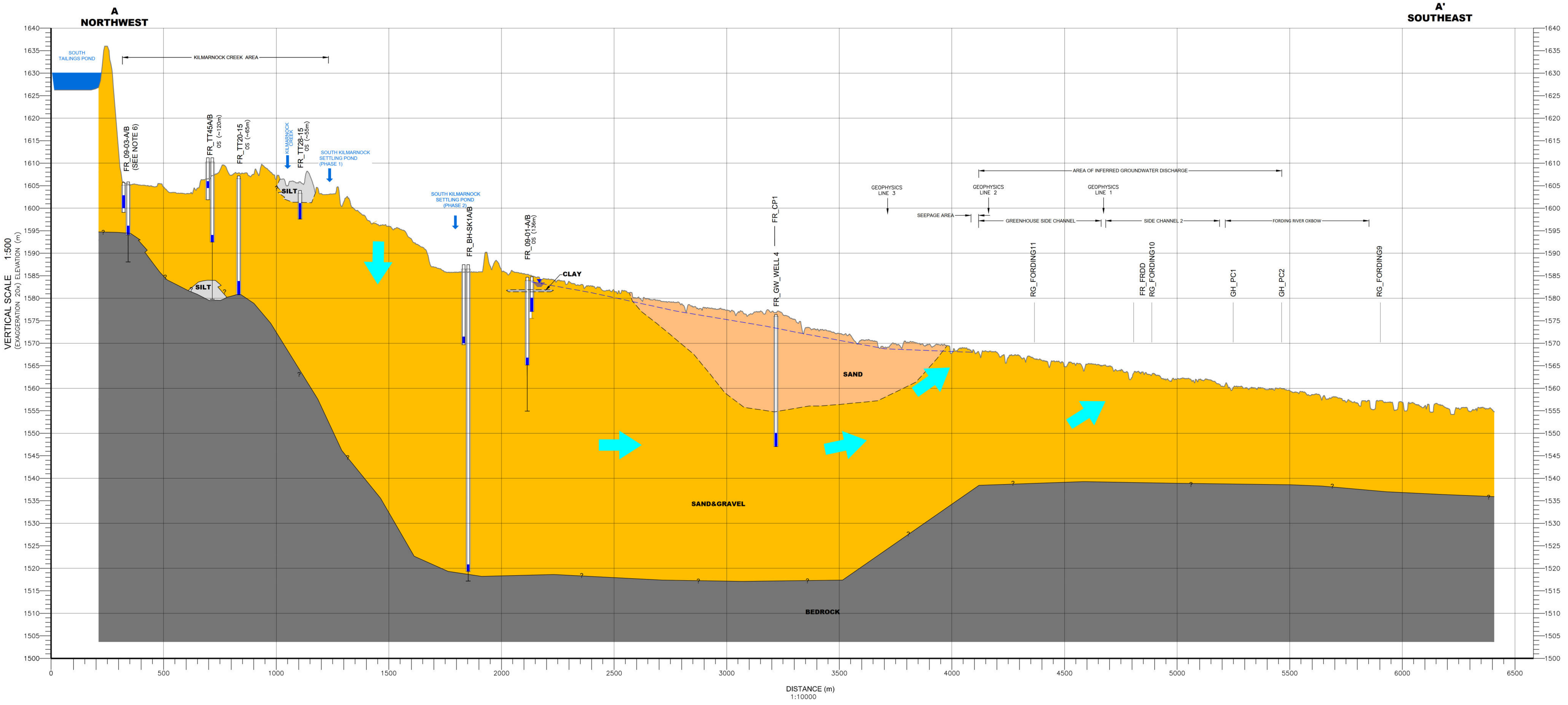
Surficial Geology of the S6 Study Area

CHK'D: CH
BY: AO
DATE: 2021-05-26
SCALE: 1:24,000
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num: DRAWING 8
REV: 0

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\8-SurficialGeologyS6.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\SPO\672386 Confidential



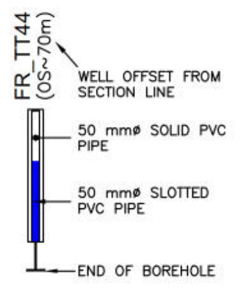


LEGEND

🟨	ORGANIC SOILS
🟧	SAND
🟧	SAND & GRAVEL
⬛	BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

▼ GROUNDWATER ELEVATION (2019 Q4)



NOTES

1. THE CROSS SECTION DEPICTED IS BASED ON INTERPRETATION OF LIMITED GEOLOGICAL DATA. ACTUAL GEOLOGICAL CONDITIONS MAY BE DIFFERENT FROM THOSE INTERPRETED.
2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83).
5. 2019 Q4 GROUNDWATER ELEVATIONS WERE ONLY AVAILABLE FOR SELECT WELLS AS SHOWN ON DRAWING.
6. MONITORING WELLS FR_09-03A/B ARE LOCATED ADJACENT TO FR_09-04A/B. INSTALLATION DETAILS AND BEDROCK CONTACT DEPICTED ON THE CROSS-SECTION REPRESENT FR_09-03A/B.

REFERENCE DRAWINGS

No.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2021-06-08	ISSUED TO CLIENT	AJK	CH

CLIENT NAME:
TECK COAL LIMITED
–

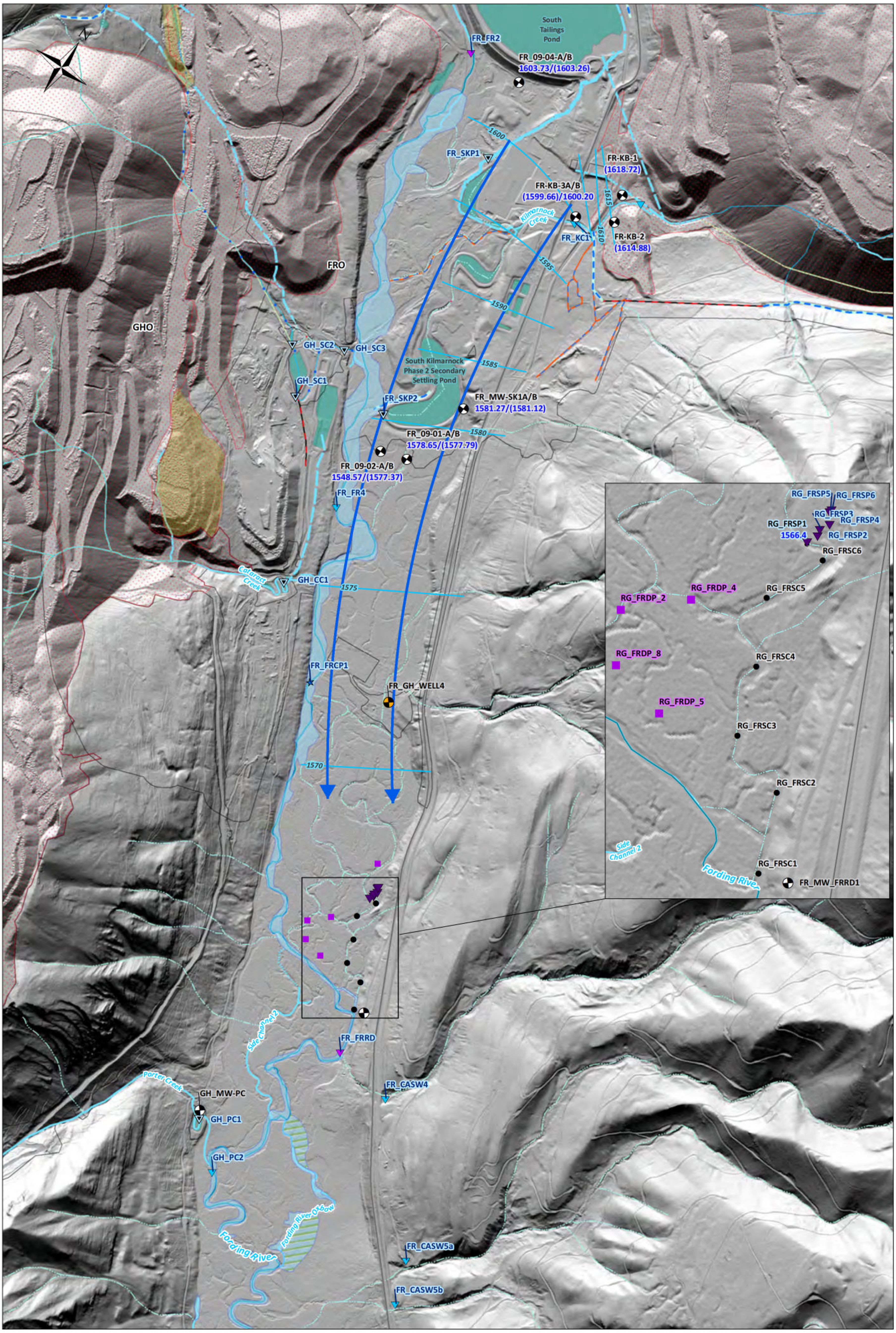
PROJECT LOCATION:
FORDING RIVER OPERATIONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
UPPER FORDING RIVER S6 STUDY AREA - CONCEPTUAL GEOLOGICAL CROSS-SECTION A-A'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–05–14	DWG No: REV.: **0**
CHK'D: CH	PLOT: 20210608.0930	CADFILE:672386–R4	**DRAWING 9**

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\SPO\672386 CONFIDENTIAL\40_EXECUTION\45_GIS_DWGS\CAD\672386–R4.DWG



LEGEND

Legend

- ● Greenhouse Side Channel flow accretion measurement/sampling locations (February 2020)
- ■ Drive Point Sample Locations

Groundwater Stations

- Monitoring Well
- Supply Well

Surface Water Stations

- ▼ Seep
- ★ Compliance Point
- ▼ Receiving Environment
- ▽ Authorized Discharge
- ▼ Monitoring

Site Features

- Secondary Road
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Mine Permitted Areas
- Tailings/Settling Pond

Water Features

- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Island
- Lake
- River Bed
- Wetland
- Inferred Groundwater Contours Q1 2019
- Inferred Flow Direction

1602.26 Groundwater Elevation used for Contouring

(1602.26) Groundwater Elevation not used for Contouring

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Shading reflects LiDAR topographic data

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.
2. Groundwater elevations at RG_FRSP1 is equal to topographic elevation.
3.Elevations at FR_KB1 and FR_KB2 obtained from logger data March 25th.
4. All other measurements observed Feb 13, and March 14, 25 and 28th, 2019

Revisons:
0 - AO - 2020-05-06 - DRAFT - CH
0 - AO - 2021-05-28 - FINAL - CH

0 125 250 500 750 1,000 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

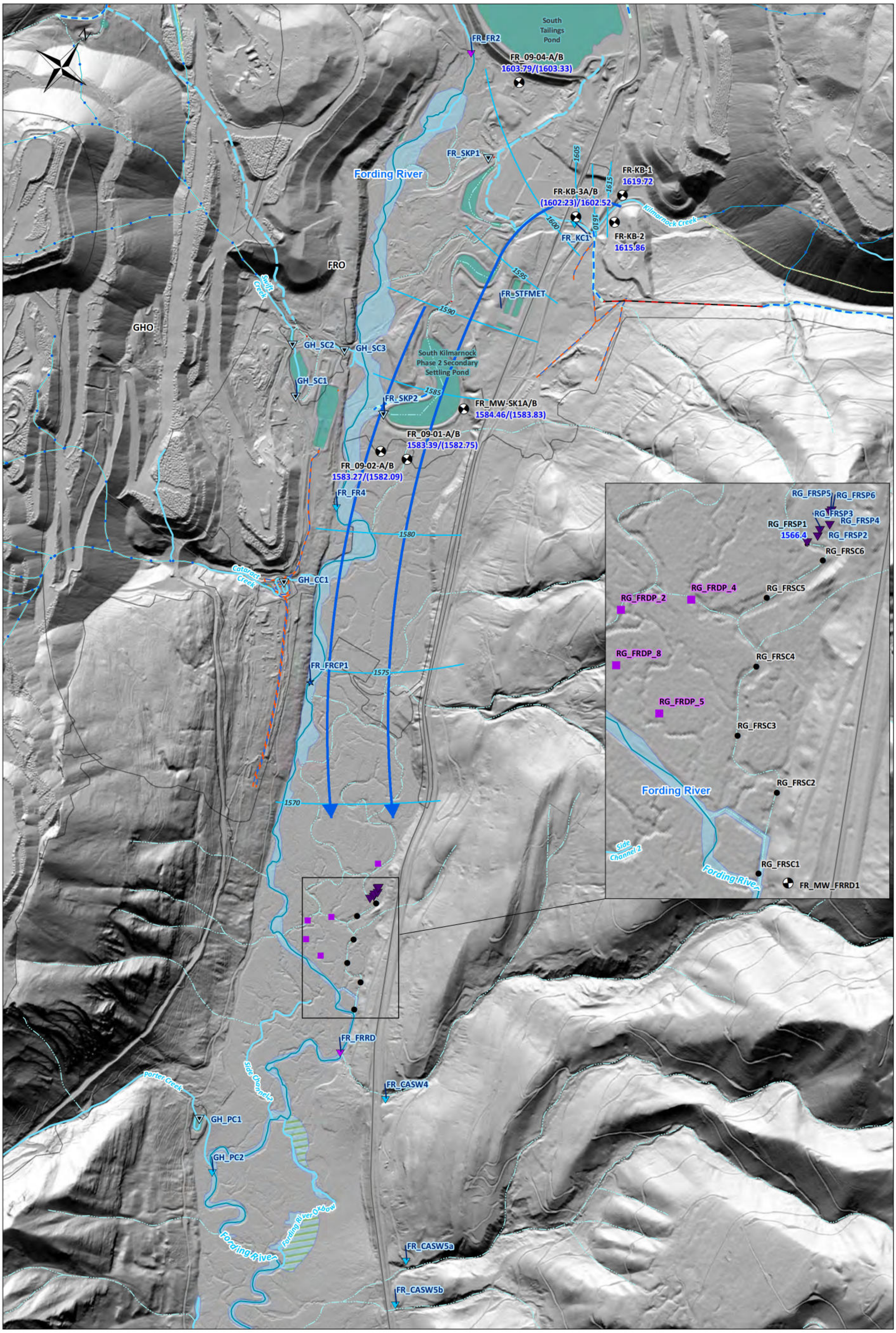
SNC·LAVALIN

Study Area 6 – Groundwater Levels and Inferred Contours, Q1 2019

CHK'D: CH
BY: AO
DATE: 2021-05-26
SCALE: 1:17,000
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num:
REV: 0
DRAWING 10

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\10-LowWaterContour.mxd

Project Path: \\SLI2606\PROJECTS\Current Projects\Teck Coal Ltd\SPO\672386 Confidential



LEGEND

- ● Greenhouse Side Channel flow accretion measurement/sampling locations (February 2020)
- 🟪 Drive Point Sample Locations

Groundwater Stations

- Monitoring Well
- Supply Well

Surface Water Stations

- ▼ Seep
- ★ Compliance Point
- ▼ Receiving Environment
- ▽ Authorized Discharge
- ▼ Monitoring
- ★ Teck Coal Limited Surface Water Stations

Site Features

- — Secondary Road

- ☐ Mine Permitted Areas
- 🟩 Tailings/Settling Pond

Water Features

- Intermittent Stream
- Stream Ditch
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Lake
- River Bed
- Wetland
- Inferred Groundwater Contours Q3 2019
- Inferred Flow Direction

1602.26	Groundwater Elevation used for Contouring
(1602.26)	Groundwater Elevation not used for Contouring

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Shading reflects LiDAR topographic data

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.
2. Groundwater elevations at RG_FRSP1 is equal to topographic elevation.
3. All wells monitored between Jul 26-31, 2019.

Revisons:
0 - AO - 2020-05-06 - DRAFT - CH
1 - AO - 22021-05-26- FINAL- CH

0 125 250 500 750 1,000 Meters

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Ltd.

SNC·LAVALIN

Study Area 6 – Groundwater Levels and Inferred Contours, July 2019

CHK'D: CH
BY: AO
DATE: 2020/11/12 SCALE: 1:17,000
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num: REV: 0
DRAWING 11

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\11-HighWaterContour1.mxd

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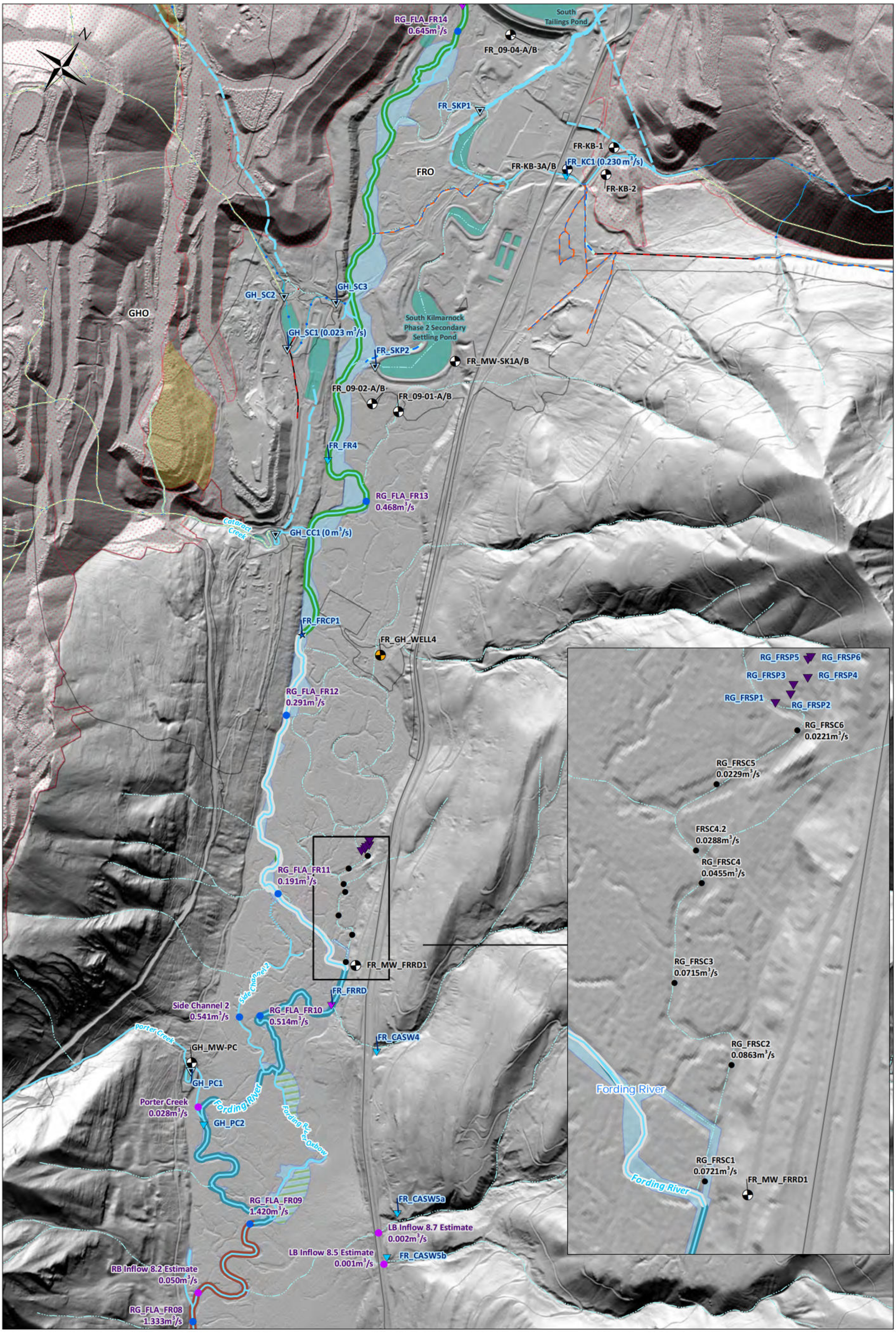


LEGEND

- ■ Drive Point Sample Locations
- ● Greenhouse Side Channel flow accretion measurement/sampling locations (February 2020)

Groundwater Stations

- Monitoring Well
- Supply Well

Surface Water Stations

- ▼ Seep
- ★ Compliance Point
- ▼ Receiving Environment
- ▽ Authorized Discharge
- ▼ Monitoring
- ● Fall 2019 Flow Measurements - Tributary Flow

- ● Fall 2019 Flow Measurements
- Secondary Road
- Drying Stretch (Losing)
- Gaining
- Losing
- No Change
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Mine Permitted Areas
- Tailings/Settling Pond

Water Features

- Intermittent Stream
- Stream Ditch
- Indefinite Stream

- Stream
- Subsurface
- Culvert
- Ditch
- Potable Waterline
- Rock Drain
- Water Pipeline
- Lake
- River Bed
- Wetland

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4.Gaining and losing reaches were defined where a significant change in flow is measured between 2 measurement sites
5. Shading reflects LiDAR topographic data

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-05-06 - DRAFT - CH
0 - AO - 2021-05-28 - FINAL - CH

0 125 250 500 750 1,000 Meters

PROJECT LOCATION:
Elk Valley, BC

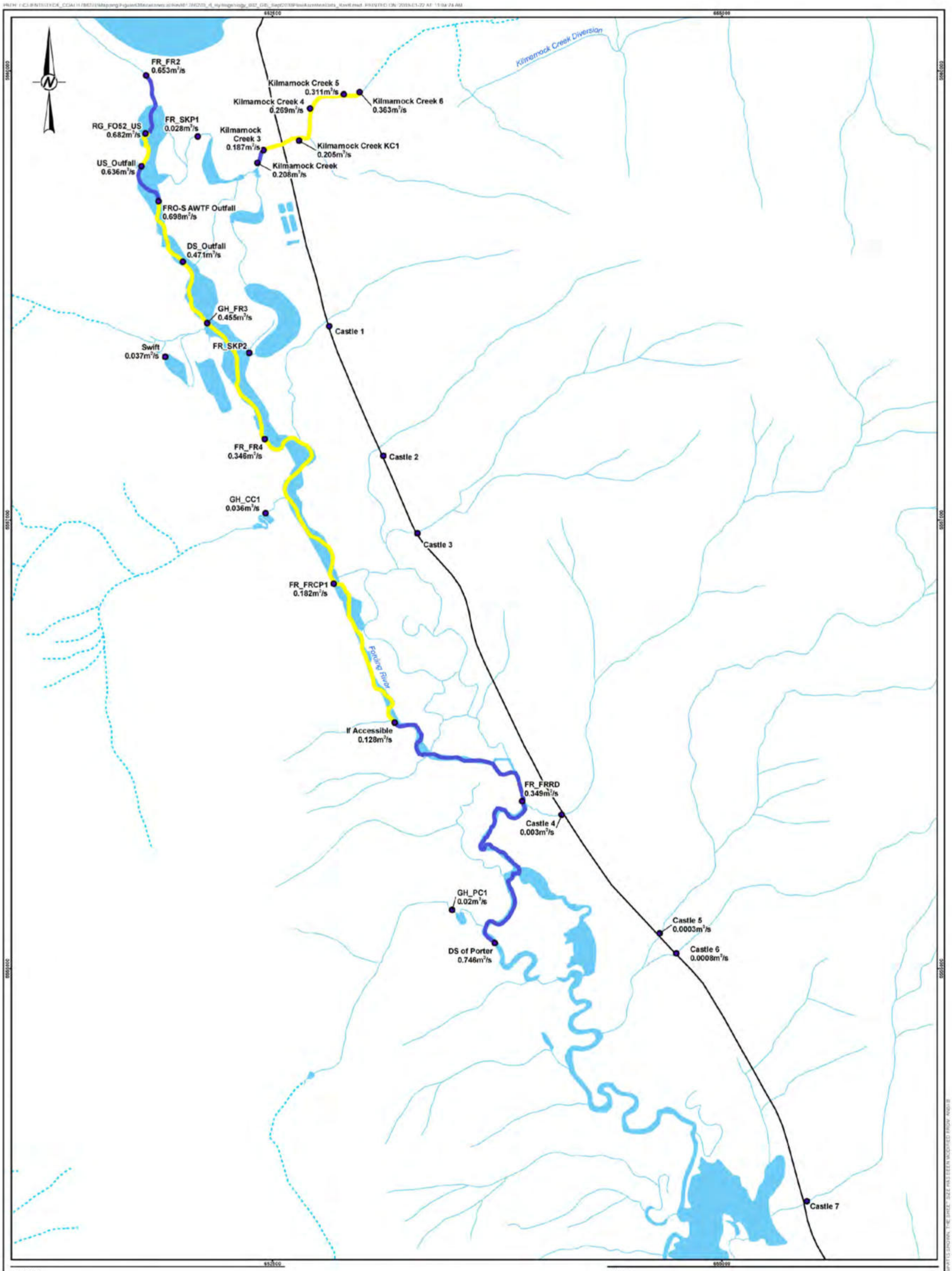
CLIENT NAME:
Teck Coal Ltd.

SNC·LAVALIN

Study Area 6 – October 2019 and February 2020 Flow Accretion Results

CHK'D: CH
BY: AO
DATE: 2021-05-26
SCALE: 1:17,000
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num:
REV: 0
DRAWING 12

MXD Path: \\SlI2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\12- GWSWInteractioins1.mxd



LEGEND

- ● TRANSECT LOCATION
- 🟦 SURFACE WATER FLOW GAIN
- 🟨 SURFACE WATER FLOW LOSS
- — ROAD
- ---- SUBSURFACE FLOW
- — WATERCOURSE

0 500 1,000
1:20,000 METRES

REFERENCE(S)
HYDROGRAPHY AND ROADS OBTAINED FROM TECK COAL LIMITED
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS AWTF-S

TITLE
SEPTEMBER 2018 FLOW ACCRETION STUDY RESULTS

CONSULTANT
GOLDER

YYYY-MM-DD	2019-01-22
DESIGNED	GJ
PREPARED	PS
REVIEWED	JW
APPROVED	JW

PROJECT NO.	CONTROL	REV.	FIGURE
1786270		B	8-1

References:
1. Teck Coal Limited (2019)

Revisons:
0 - AO - 2020-07-08- DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

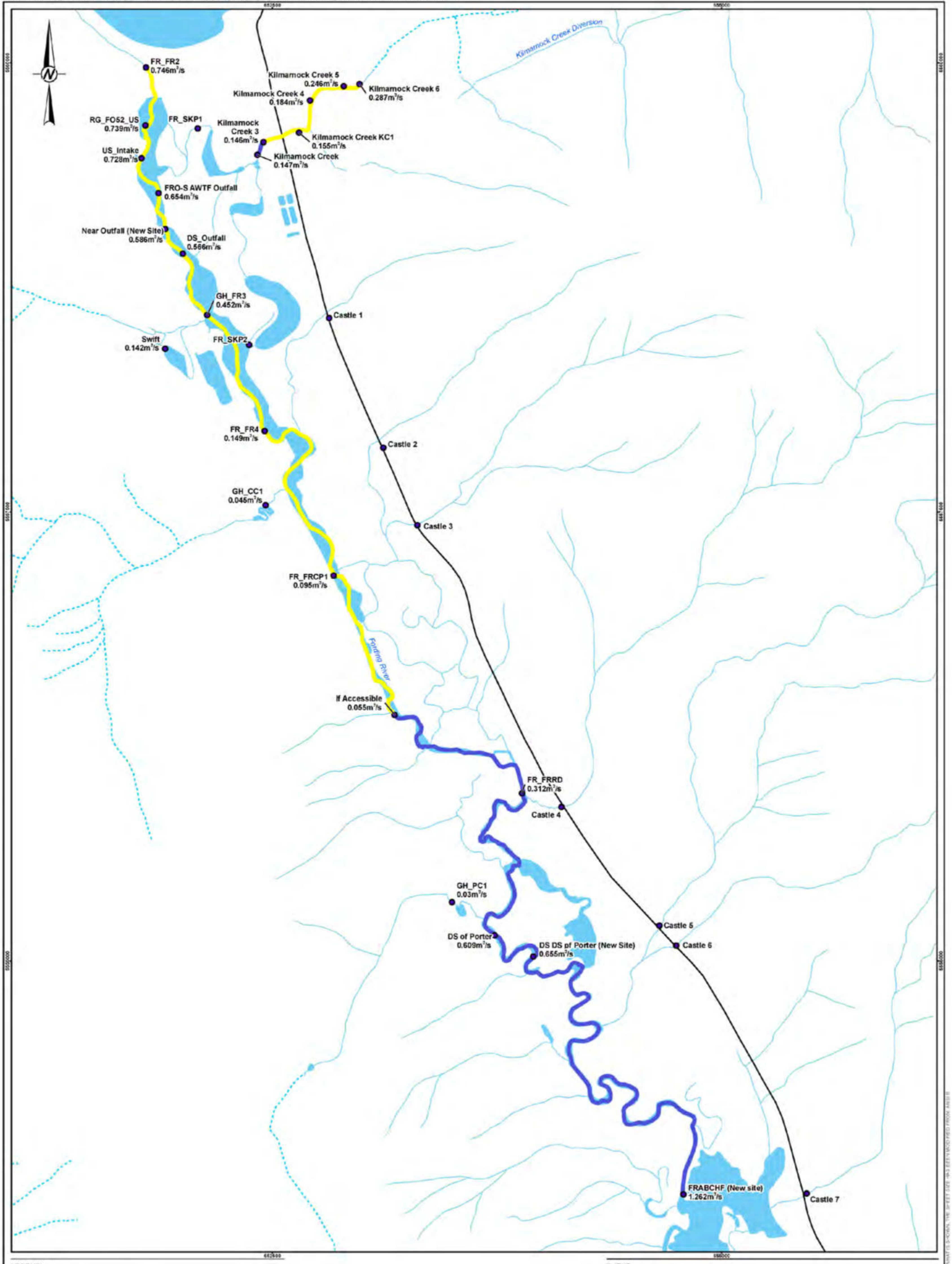
CLIENT NAME:
Teck Coal Limited

SNC·LAVALIN

September 2018 Flow Accretion Study Results in the S6 Study Area and Kilmarnock Creek (from Teck Coal, 2019)

CHK'D: CH	DATE: 2020/11/09	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		**DRAWING 13**

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\13-GroundwaterFlow_Sept.mxd



LEGEND

- ● TRANSECT LOCATION
- SURFACE WATER FLOW GAIN
- SURFACE WATER FLOW LOSS
- ROAD
- SUBSURFACE FLOW
- WATERCOURSE

0 500 1,000
1:20 000 METRES

REFERENCE(S)
HYDROGRAPHY AND ROADS OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS AWTF-S

TITLE
OCTOBER 2018 FLOW ACCRETION STUDY RESULTS

CONSULTANT
GOLDER

YYYY-MM-DD	2019-01-22
DESIGNED	GJ
PREPARED	PS
REVIEWED	JW
APPROVED	JW

PROJECT NO.	CONTROL	REV.	FIGURE
1786270		B	8-2

References:
1. Teck Coal Limited (2019)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

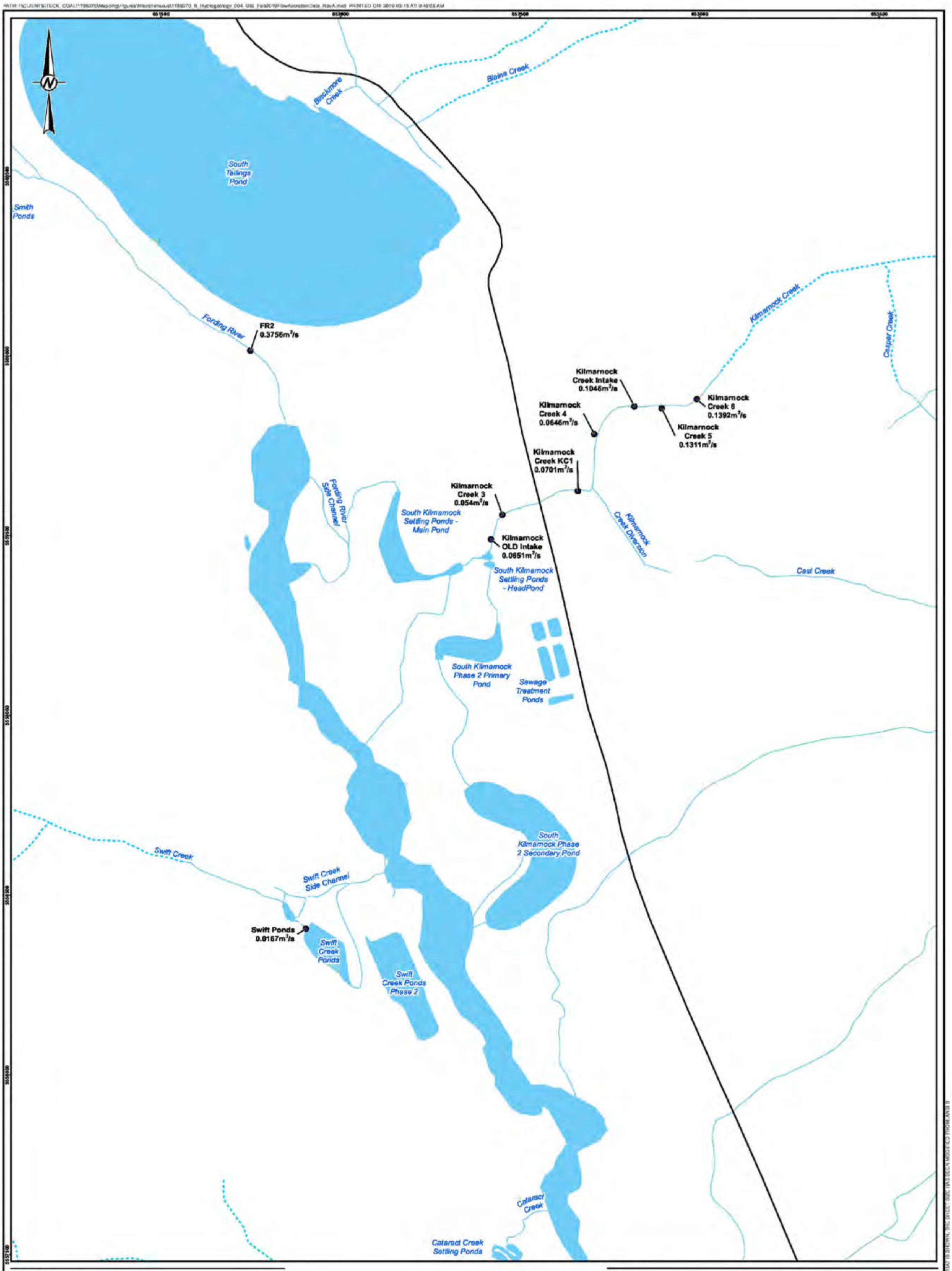
SNC·LAVALIN

October 2018 Flow Accretion Study Results in the S6 Study Area and Kilmarnock Creek (from Teck Coal, 2019)

CHK'D: CH
BY: AO
DATE: 2020/11/09
SCALE: 1:60,000
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num:
DRAWING 14

Project Path: \\SLI2606\PROJECTS\Current Projects\Teck Coal Ltd\SPO\672386 Confidential

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\14-GroundwaterFlow_Oct.mxd



LEGEND

- ● TRANSECT LOCATION
- ROAD
- SUBSURFACE FLOW
- WATERCOURSE
- WATERBODY

0 250 500

1:10,000 METRES

REFERENCE(S)

HYDROGRAPHY AND ROADS OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS AWTF-S

TITLE
FEBRUARY 2019 FLOW ACCRETION STUDY RESULTS

CONSULTANT

GOLDER

YYYY-MM-DD	2019-02-15
DESIGNED	GJ
PREPARED	HR
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
1786270		A	2

References:
1. Teck Coal Limited (2019)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

SNC·LAVALIN

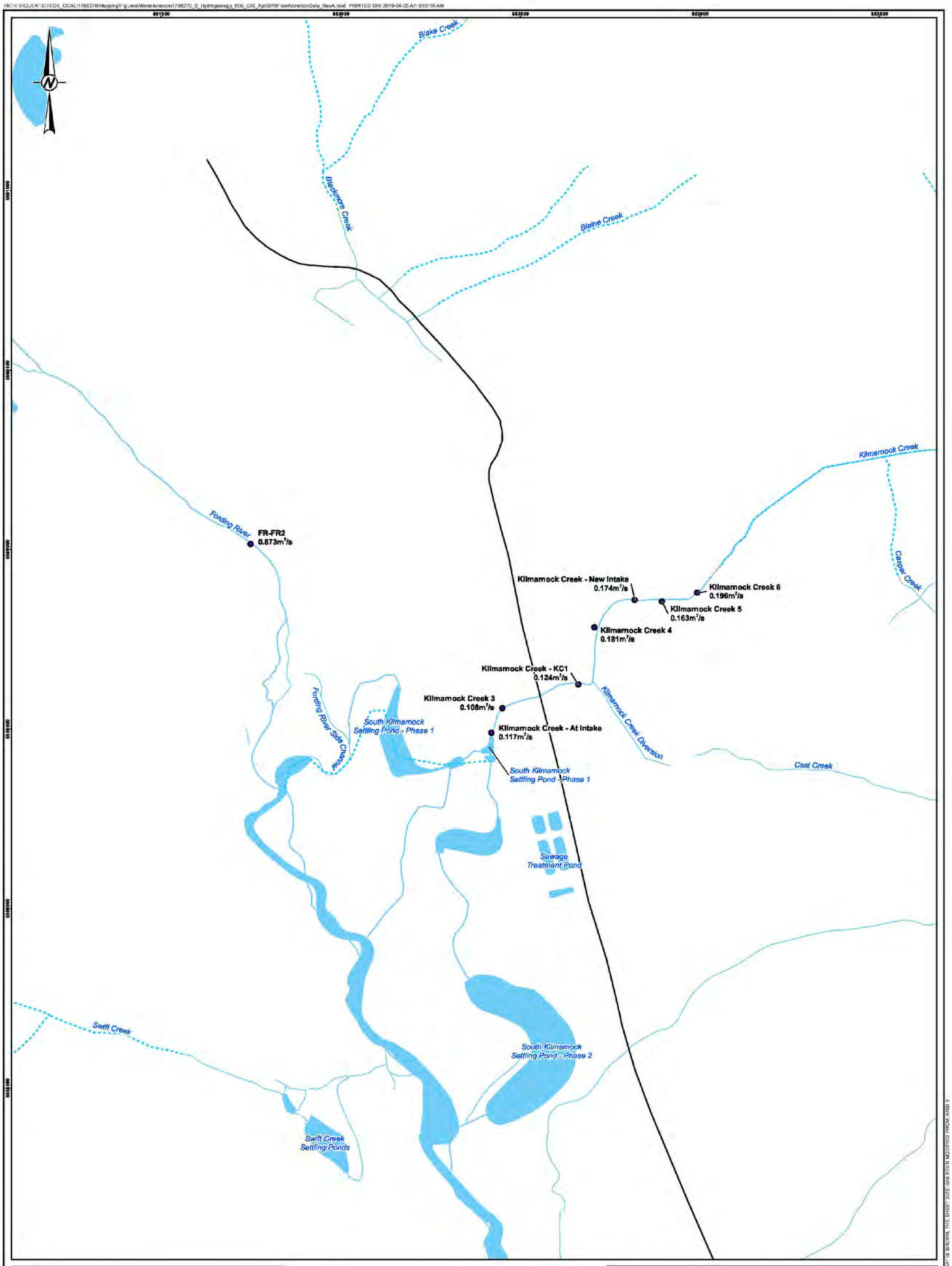
February 2019 Flow Accretion Study Results in Kilmarnock Creek (from Teck Coal, 2019)

CHK'D: CH	DATE: 2020/11/09	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		**DRAWING 15**

Project Path: \\SLI2606\PROJECTS\Current Projects\Teck Coal Ltd\SPO\672386 Confidential

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\15-FebFlow.mxd

PATH: I:\CLIENTS\TECK_COAL\1786270\Mapping\Figures\Miscellaneous\1786270_B_Hydrogeology_006_GIS_Apr2019FlowAccretionData_RevA.mxd PRINTED ON: 2019-04-25 AT: 9:02:16 AM



LEGEND

●	TRANSECT LOCATION
—	ROAD
····	SUBSURFACE FLOW
—	WATERCOURSE
▬	WATERBODY

0 250 500
1:10,000 METRES

REFERENCE(S)
HYDROGRAPHY AND ROADS OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS AWTF-S

TITLE
APRIL 2019 FLOW ACCRETION STUDY RESULTS

CONSULTANT
GOLDER

YYYY-MM-DD	2019-04-25
DESIGNED	GJ
PREPARED	AB
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
1786270		A	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25mm

References:
1. Teck Coal Limited (2019)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

SNC·LAVALIN

April 2019 Flow Accretion Study Results in Kilmarnock Creek (from Teck Coal, 2019)

CHK'D: CH	DATE: 2020/11/09	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		**DRAWING 16**

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\16-April.mxd

Project Path: \\SLI2606\PROJECTS\Current Projects\Teck Coal Ltd\SPO\672386 Confidential

LEGEND

●	TRANSECT LOCATION
—	ROAD
🟩	SURFACE WATER FLOW GAIN
🟥	SURFACE WATER FLOW LOSS
----	SUBSURFACE FLOW
—	WATERCOURSE
▇	WATERBODY

0 75 150
1:3,000 METRES

REFERENCE(S)
HYDROGRAPHY, ROADS AND 2018 IMAGERY OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS AWTF-S

TITLE
MAY 2019 FLOW ACCRETION STUDY RESULTS

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-07
DESIGNED	GJ
PREPARED	PS
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
1786270		A	4

References:
1. Teck Coal Limited (2019)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

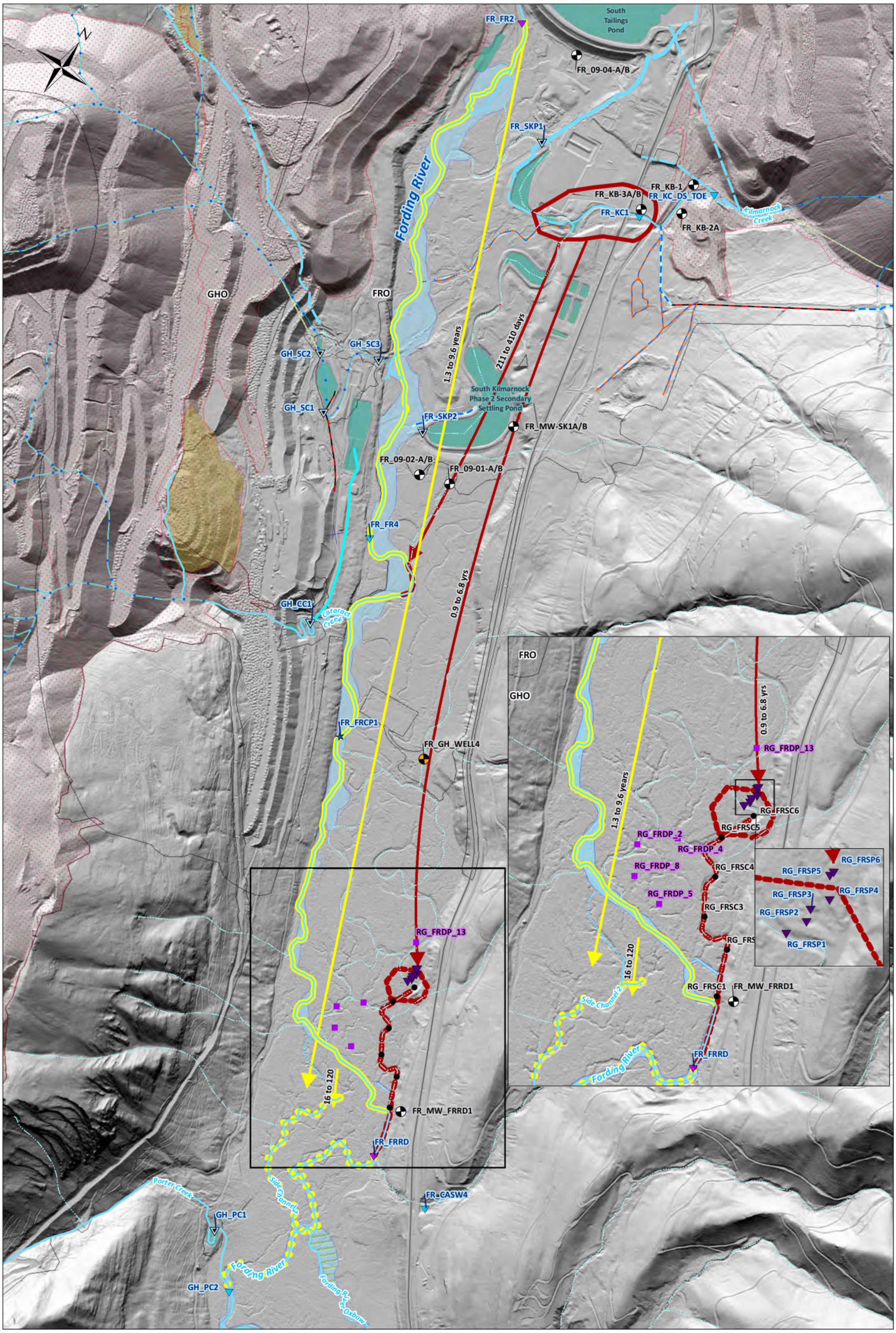
SNC·LAVALIN

May 2019 Flow Accretion Study Results in Kilmarnock Creek (from Teck Coal, 2019)

CHK'D: CH
BY: AO
DATE: 2020/11/09 SCALE: 1:60,000
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num: **DRAWING 17**

Project Path: \\SLI2606\PROJECTS\Current Projects\Teck Coal Ltd\SPO\672386 Confidential

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\17-May.mxd



Legend

- ● Greenhouse Side Channel flow accretion measurement/sampling locations (February 2020)
- ■ Drive Point Sample Locations

Groundwater Stations

- ◐ Monitoring Well
- ◐ Supply Well

Surface Water Stations

- ▼ Seep
- ★ Compliance Point
- ▼ Receiving Environment
- ▼ Authorized Discharge
- ▼ Monitoring

- ● ● Fording River Discharge Zone
- ▬ Fording River Recharge Zone
- ▬ Kilmarnock Creek Discharge Zone
- ▬ Kilmarnock Creek Recharge Zone

Site Features

- — Secondary Road
- ☐ Mine Permitted Areas
- ▨ Pit
- ▨ Waste Dump (Spoils)
- ▨ Tailings/Settling Pond

Water Features

- — Intermittent Stream
- — Stream Ditch
- — Indefinite Stream
- — Stream
- — Subsurface
- ▨ Lake
- ▨ River Bed
- ▨ Wetland
- — Culvert
- — Ditch
- — Rock Drain
- — Water Pipeline

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Shading reflects LiDAR topographic data
5. Groundwater transport pathways are conceptual only

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.
2.

Revisons:
0 - AO - 2020-05-06 - DRAFT - CH
1 - AO - 2021-05-25 - FINAL - CH

0 100 200 400 600 800 Meters

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Ltd.

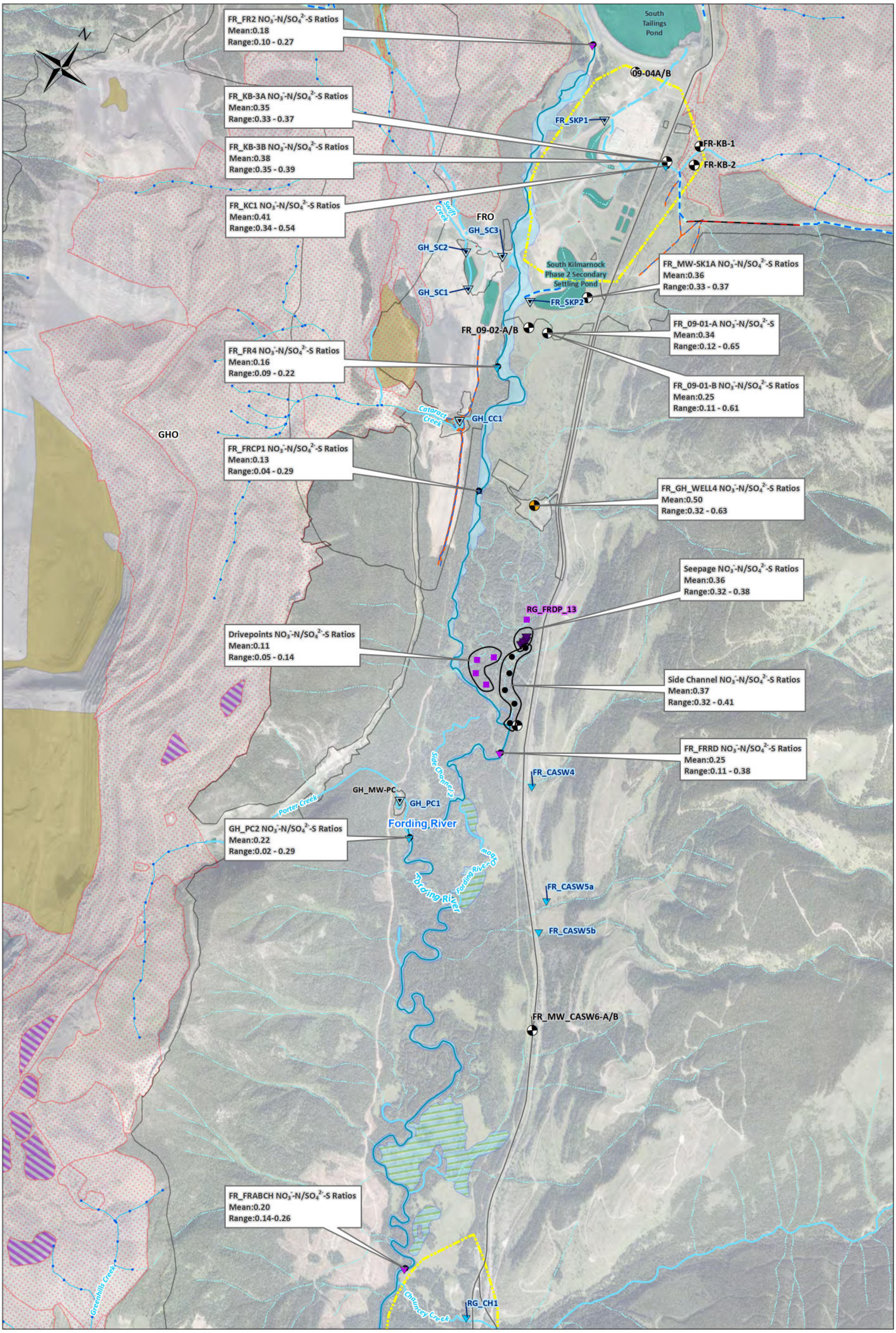
SNC·LAVALIN

Study Area 6 – Inferred Source-Receptor Groundwater Transport Pathways

CHK'D: CH
BY: AO
DATE: 2021-06-02
SCALE: 1:0
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num:
REV: 0
DRAWING 18

MXD Path: \\Sl2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\18-TransportPathways.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386



LEGEND

● Greenhouse Side Channel flow accretion measurement/sampling locations (February 2020)
■ Drive Point Sample Locations

Groundwater Stations
- Monitoring Well
- Supply Well

Surface Water Stations
- ▼ Seep
- ★ Compliance Point
- ▼ Receiving Environment
- ▽ Authorized Discharge
- ▼ Monitoring

Site Features
- Secondary Road

Water Features
- Intermittent Stream
- Stream Ditch
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Alluvial Fans
- Mine Permitted Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Tailings/Settling Pond
- Lake
- River Bed
- Wetland

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.
2.

Revisons:
0 - AO - 2020-07-08- DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

0 175 350 700 1,050 1,400 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Ltd.

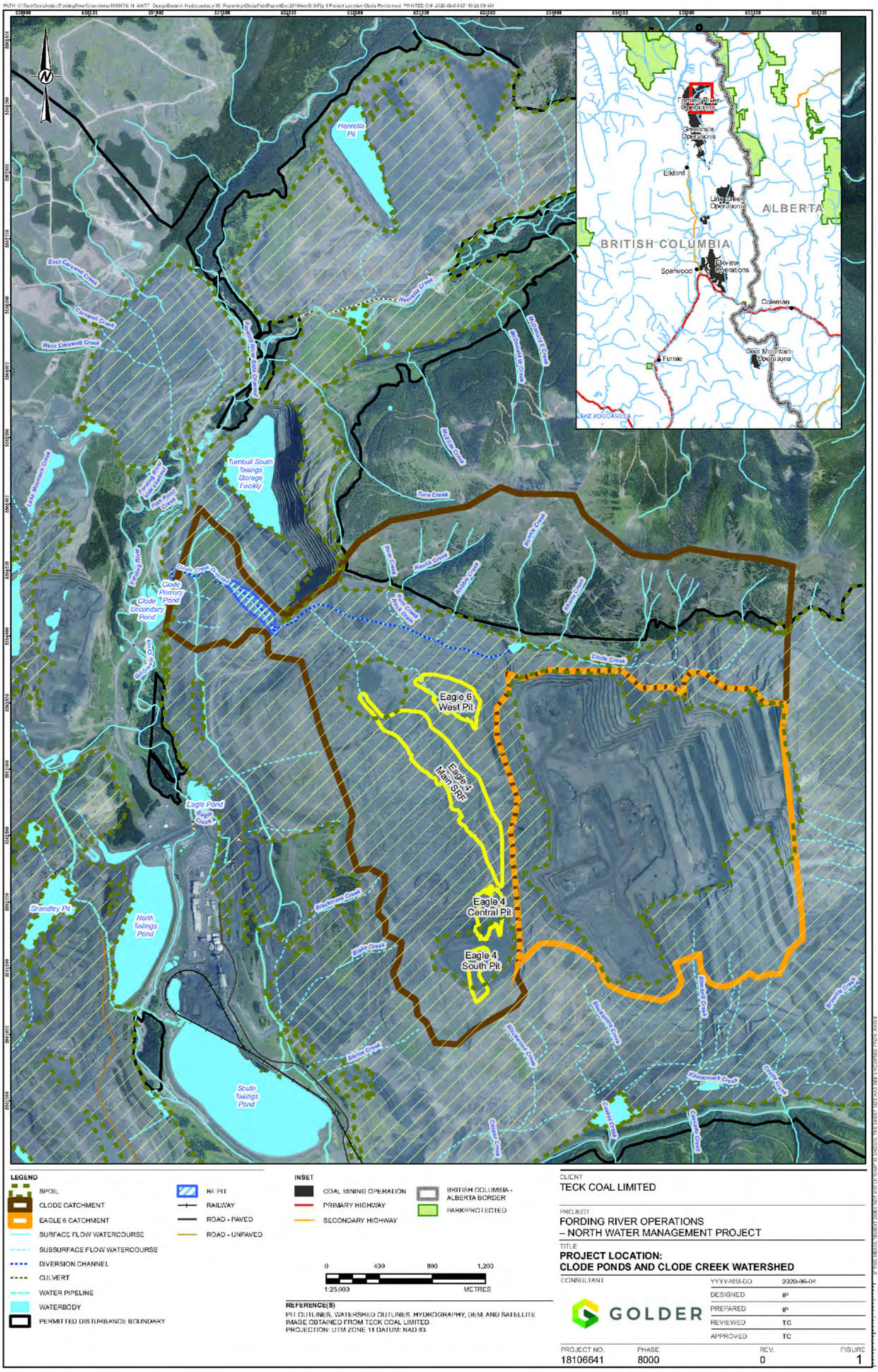
SNC·LAVALIN

NO_3^--N/SO_4^{2-}-S ratios in Groundwater and Surface Water in the S6 Study Area

CHK'D: CH	DATE: 2020/11/12	SCALE: 1:24,000	Ref Num: REV: 0
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 19

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\19-Ratios.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386



REFERENCE(S)

PIT OUTLINES, WATERSHED OUTLINES, HYDROGRAPHY, DEM, AND SATELLITE IMAGE OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS
– NORTH WATER MANAGEMENT PROJECT

TITLE
PROJECT LOCATION:
CLODE PONDS AND CLODE CREEK WATERSHED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-06-04
DESIGNED	IP
PREPARED	IP
REVIEWED	TG
APPROVED	TC

PROJECT NO.	PHASE	REV.	FIGURE
18106641	8000	0	1

References:
1. Golder Limited (2020b)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

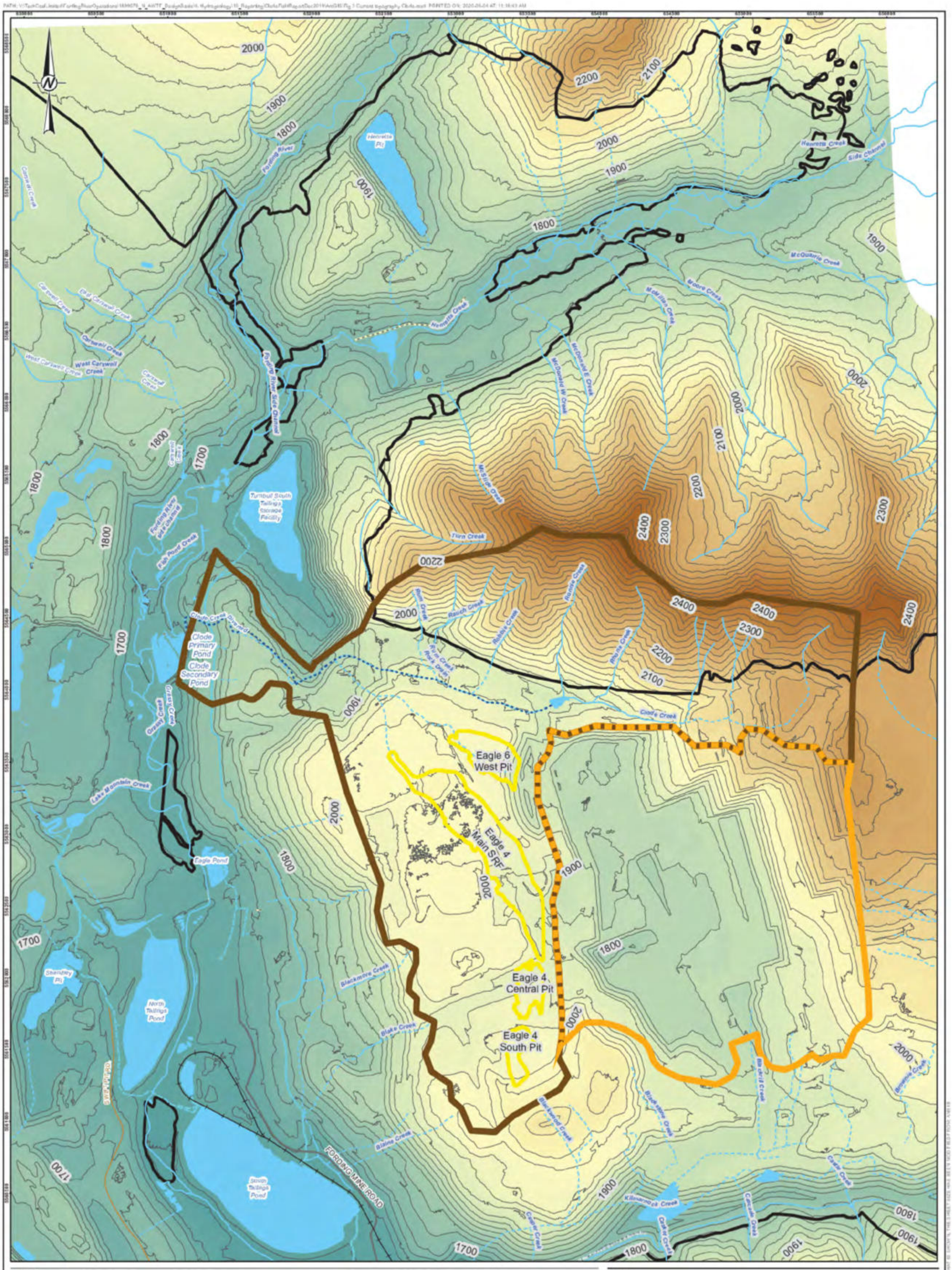
SNC·LAVALIN

Clode Creek Watershed and Settling Ponds (from Golder, 2020b)

CHK'D: CH	DATE: 2020/11/09	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		**DRAWING 20**

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

▬	CLODE CATCHMENT
▬	EAGLE 6 CATCHMENT
····	DIVERSION CHANNEL
—	SURFACE FLOW WATERCOURSE
- - -	SUBSURFACE FLOW WATERCOURSE
- - -	CULVERT
— - —	WATER PIPELINE
■	WATERBODY
☐	PERMITTED DISTURBANCE BOUNDARY
—+—	RAILWAY
—	ROAD - PAVED
—	ROAD - UNPAVED
—	ELEVATION CONTOUR (INTERVAL 25 m)

0 400 800 1,200

1:25,000 METRES

REFERENCE(S)

PIT OUTLINES, WATERSHED OUTLINES, HYDROGRAPHY AND 2018 DEM OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS
– NORTH WATER MANAGEMENT PROJECT

TITLE
CURRENT TOPOGRAPHY

CONSULTANT

GOLDER

YYYY-MM-DD	2020-06-04
DESIGNED	IP
PREPARED	IP
REVIEWED	TG
APPROVED	TC

PROJECT NO.	PHASE	REV.	FIGURE
18106641	8000	1	3

References:
1. Golder Limited (2020b)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

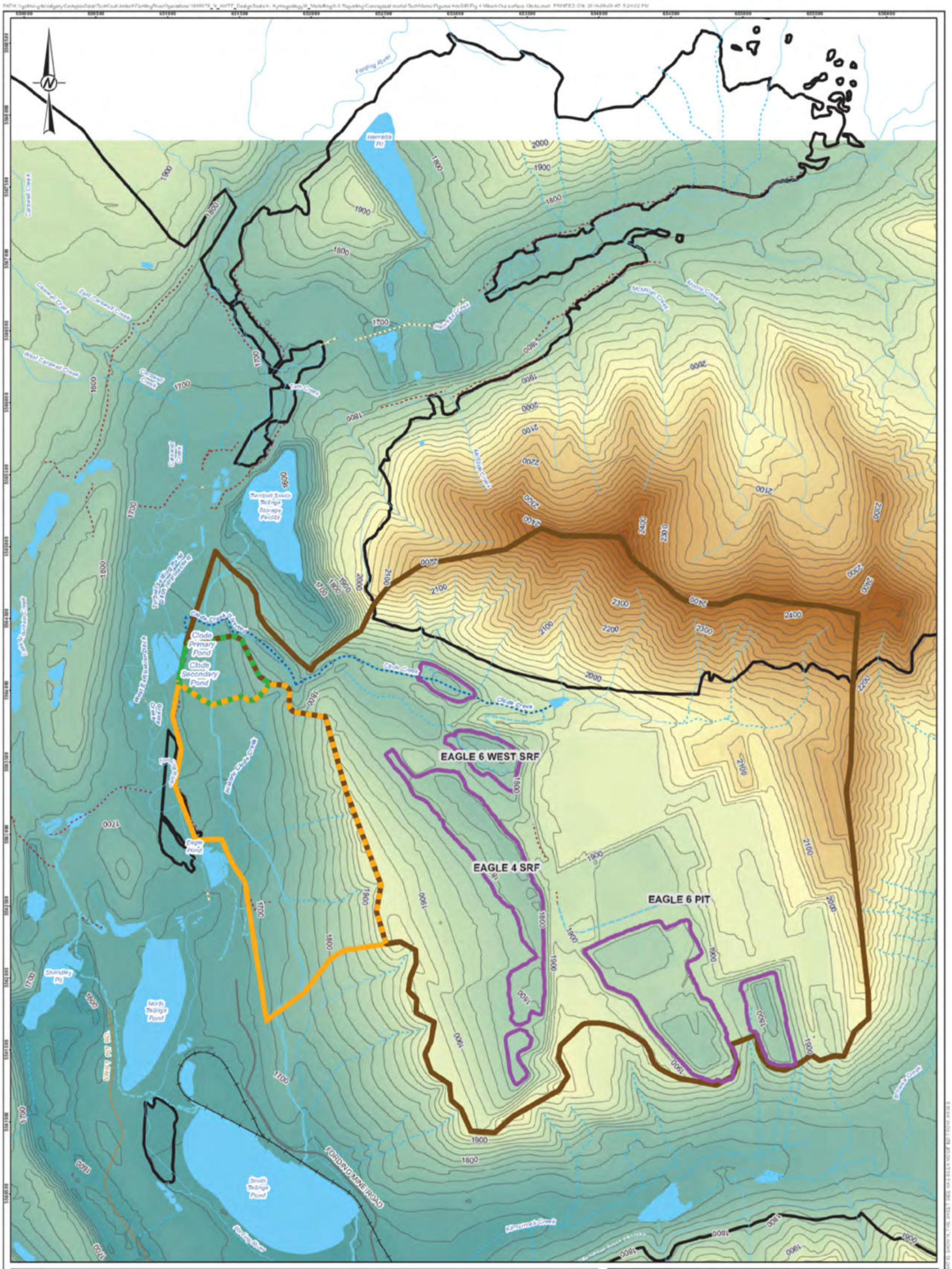
SNC·LAVALIN

Current Topography of Clode Creek Watershed (from Golder, 2020b)

CHK'D: CH	DATE: 2020/11/09	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		**DRAWING 21**

MXD Path: P:\Current Projects\Teck Coal Ltd\GISC

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

🟪	DEPRESSIONS IN MINED-OUT SURFACE	—+—	RAILWAY
🟫	CLODE CREEK WATERSHED	—	ROAD - PAVED
🟩	EC1-CLODESEEPS WATERSHED	—	ROAD - UNPAVED
🟧	EC1-EAGLEPOND WATERSHED	—	MINED-OUT SURFACE CONTOUR (INTERVAL 25 m)
····	DIVERSION CHANNEL		MINED-OUT SURFACE ELEVATION, m ASL
····	CULVERT		HIGH : 2500
····	DITCH		LOW : 1500
— —	WATER PIPELINE		
—	SURFACE FLOW WATERCOURSE		
····	SUBSURFACE FLOW WATERCOURSE		
■	WATERBODY		
☐	PERMITTED DISTURBANCE BOUNDARY		

0 400 800 1,200

1:25,000 METRES

REFERENCE(S)
HYDROGRAPHY AND 2017 MINED-OUT SURFACE OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

DRAFT

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS
– NORTH WATER MANAGEMENT PROJECT

TITLE
MINED-OUT TOPOGRAPHY

CONSULTANT

GOLDER

YYYY-MM-DD	2019-09-09
DESIGNED	IP
PREPARED	IP
REVIEWED	RM
APPROVED	JW

PROJECT NO.	PHASE	REV.	FIGURE
18106641	2000	0	4

References:
1. to Golder Limited (2019b)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

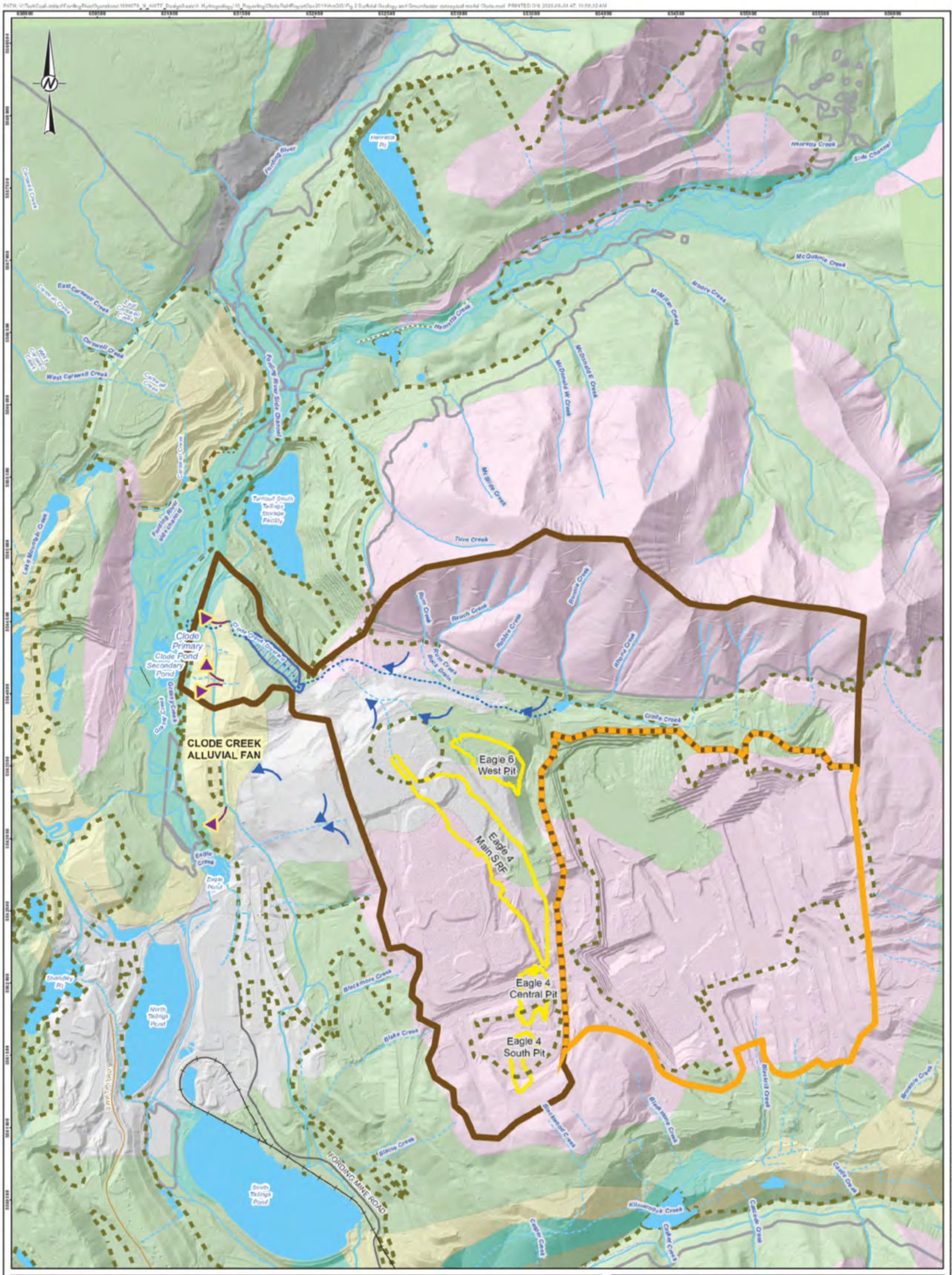
SNC·LAVALIN

Mined-Out Topography of Clode Creek Watershed (from Golder, 2019b)

CHK'D: CH	DATE: 2020/11/09	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		**DRAWING 22**

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GI

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

▬	CLODE CATCHMENT
▬	EAGLE 6 CATCHMENT
▪ ▪ ▪	SPOIL
▨	R4 PIT
·····	DIVERSION CHANNEL
—	SURFACE FLOW WATERCOURSE
- - -	SUBSURFACE FLOW WATERCOURSE
- - -	CULVERT
— —	WATER PIPELINE
🟦	WATERBODY
☐	PERMITTED DISTURBANCE BOUNDARY
—+—	RAILWAY
—	ROAD - PAVED
—	ROAD - UNPAVED
	SURFICIAL UNIT
☐	ANTHROPOGENIC
▨	COLLUVIUM
▨	FLUVIAL
▨	GLACIOFLUVIAL
▨	BEDROCK
🟩	TILL/MORAINAL
→	GROUNDWATER DISCHARGE TO SURFACE WATER
▶	GROUNDWATER RECHARGE BY SURFACE WATER

0 400 800 1,200
1:25,000 METRES

REFERENCE(S)

PIT OUTLINES, WATERSHED OUTLINES, HYDROGRAPHY AND DEM OBTAINED FROM TECK COAL LIMITED.
PROVINCE OF BRITISH COLUMBIA. 2015. BRITISH COLUMBIA SOIL MAPPING SPATIAL DATA (A COMPILATION OF DIGITAL SOIL MAPPING DATASETS).
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS
– NORTH WATER MANAGEMENT PROJECT

TITLE
SURFICIAL GEOLOGY
AND CONCEPTUAL GROUNDWATER FLOW MODEL

CONSULTANT
GOLDER

YYYY-MM-DD	2020-06-04
DESIGNED	IP
PREPARED	IP
REVIEWED	TG
APPROVED	TC

PROJECT NO.	PHASE	REV.	FIGURE
18106641	8000	1	2

References:
1. Golder Limited (2020b)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

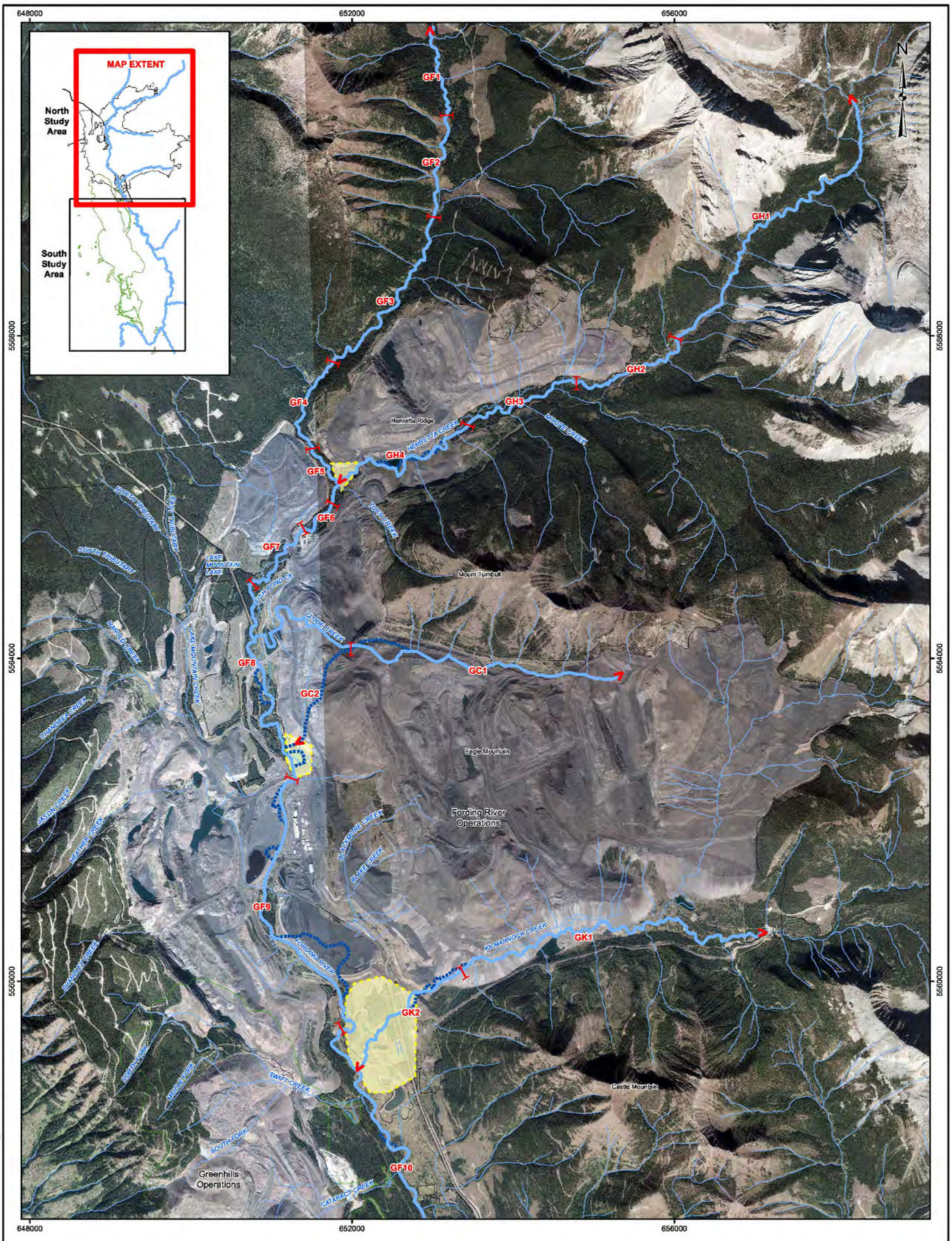
SNC·LAVALIN

Surficial Geology and Conceptual Groundwater Flow of the Clode Creek Watershed (from Golder, 2020b)

CHK'D: CH	DATE: 2020/11/09	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		**DRAWING 23**

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

I	PRELIMINARY GEOMORPHIC REACH BREAK
>	PRELIMINARY GEOMORPHIC REACH BREAK START/END
—	ASSESSED CHANNEL IN 2012
······	1952 CHANNEL LOCATION
—	WATERCOURSE
▨	ALLUVIAL FAN
☐	FRO C-3 PERMIT BOUNDARY
☐	GHO C-137 PERMIT BOUNDARY
GF10	GEOMORPHIC REACH BREAK NUMBER

1 0 1

SCALE 1:45,000 KILOMETRES

REFERENCE

Hydrography obtained from Teck Coal Limited. Imagery obtained from PHB Group.
Projection: UTM Zone 11 Datum: NAD 83

I:\2009\09-1349\09-1349-1007\Mapping\MXD\Geomorph\B-Geomorph-003-GIS-North2012_FishBreaks.mxd

PROJECT

FORDING RIVER OPERATIONS
SWIFT PROJECT

TITLE

GEOMORPHIC OVERVIEW
NORTH STUDY AREA - 2012

Golder Associates

PROJECT No. 09-1349-1007			SCALE AS SHOWN	REV. 0
DESIGN	JS	20 May 2014	FIGURE: 3	
GIS	DR	02 Oct. 2014		
CHECK	MH	06 Nov. 2014		
REVIEW	RA	06 Nov. 2014		

References:
1. Golder Limited (2014)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

SNC·LAVALIN

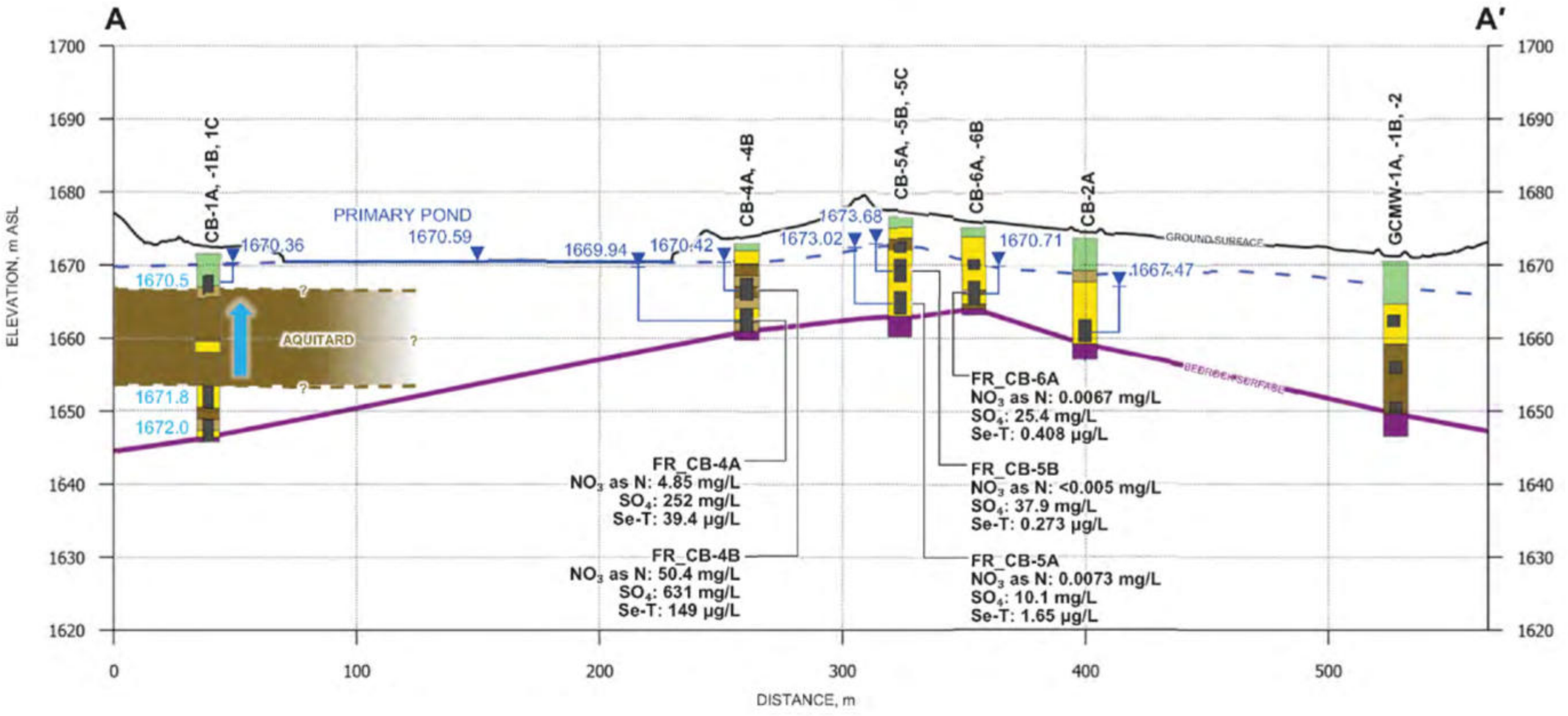
Geomorphic Overview of the S8 Study Area (from Golder, 2014)

CHK'D: CH
BY: AO
DATE: 2020/11/09 SCALE: 1:60,000
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num:
DRAWING 24

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\24-GeomorphicOV_Golder.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042

Legend



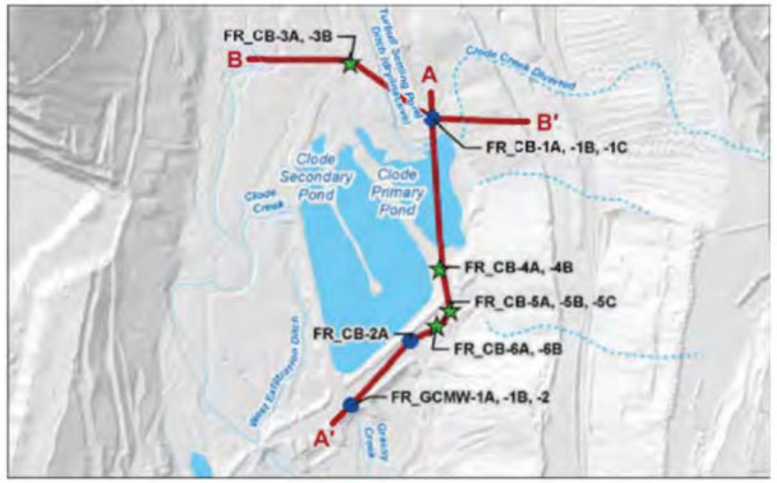
FR_CB-4A
NO$_3$ as N: 4.85 mg/L
SO$_4$: 252 mg/L
Se-T: 39.4 µg/L

FR_CB-4B
NO$_3$ as N: 50.4 mg/L
SO$_4$: 631 mg/L
Se-T: 149 µg/L

FR_CB-6A
NO$_3$ as N: 0.0067 mg/L
SO$_4$: 25.4 mg/L
Se-T: 0.408 µg/L

FR_CB-5B
NO$_3$ as N: <0.005 mg/L
SO$_4$: 37.9 mg/L
Se-T: 0.273 µg/L

FR_CB-5A
NO$_3$ as N: 0.0073 mg/L
SO$_4$: 10.1 mg/L
Se-T: 1.65 µg/L



LEGEND

BOREHOLE LITHOLOGY
- 🟩 FILL
- 🟨 SAND AND GRAVEL (EXCLUDING CLAYEY)
- 🟫 CLAYEY SANDS AND GRAVELS, OR MIXED DESCRIPTIONS
- 🟫 SILTS AND CLAYS
- 🟪 BEDROCK
- ⬜ NO RECOVERY

- BEDROCK SURFACE
- WATER LEVEL, m ASL: 1670.36 DECEMBER 2019; 1670.5 NOVEMBER 2018
- INTERPOLATED WATER TABLE (DECEMBER 2019)
- ▮ SCREENED INTERVAL

UPWARD GROUNDWATER HEAD GRADIENT
- ⬆ NOVEMBER 2018

INSET:
- CROSS-SECTION LOCATION
- WATERCOURSE
- ★ NOVEMBER 2019 GROUNDWATER WELL
- ● PRE-EXISTING GROUNDWATER WELL

NOTE(S)
VERTICAL EXAGGERATION 3:1
GROUNDWATER LEVEL MEASURED IN NOVEMBER 2018 (FR_CB-1C, FR_CB-2A WELLS) AND IN DECEMBER 2019 (ALL OTHER VALUES)
WATER QUALITY SAMPLING PERFORMED BY GOLDER IN DECEMBER 2019
Se-T – TOTAL SELENIUM
GCMW-1A WELL LOG FROM SNC-LAVALIN (2017) 2017 FIELD PROGRAM RESULTS FOR TURNBULL WEST PROJECT HYDROGEOLOGY BASELINE

CLIENT
TECK COAL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-04-29
PREPARED	IP
DESIGN	IP
REVIEW	TG
APPROVED	TC

PROJECT
FORDING RIVER OPERATIONS
– NORTH WATER MANAGEMENT PROJECT

TITLE
SYNTHESIS CROSS-SECTION AA'

PROJECT No.	PHASE	Rev.	FIG.
18106641	8000	0	6

NOTES:
1. Original in colour.
2. Numerical scale reflects full-size print. Print scaling will distort this scale; however, scale bar will remain accurate.
3. Intended for illustration purposes. Accuracy has not been verified for construction or navigation

REFERENCES:
1.
2. BCGOV ILMB Crown Registry and Geographic Base Branch (CRGB) (data accessed through www.GeoBC.gov.bc.ca)
3. GPS Data Collected using an eTrex. Accuracy expected to be approximately +/- 3.5m.

REVISIONS:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

CLIENT:
Teck Coal Limited

PROJECT LOCATION:
Fording River Operations, BC

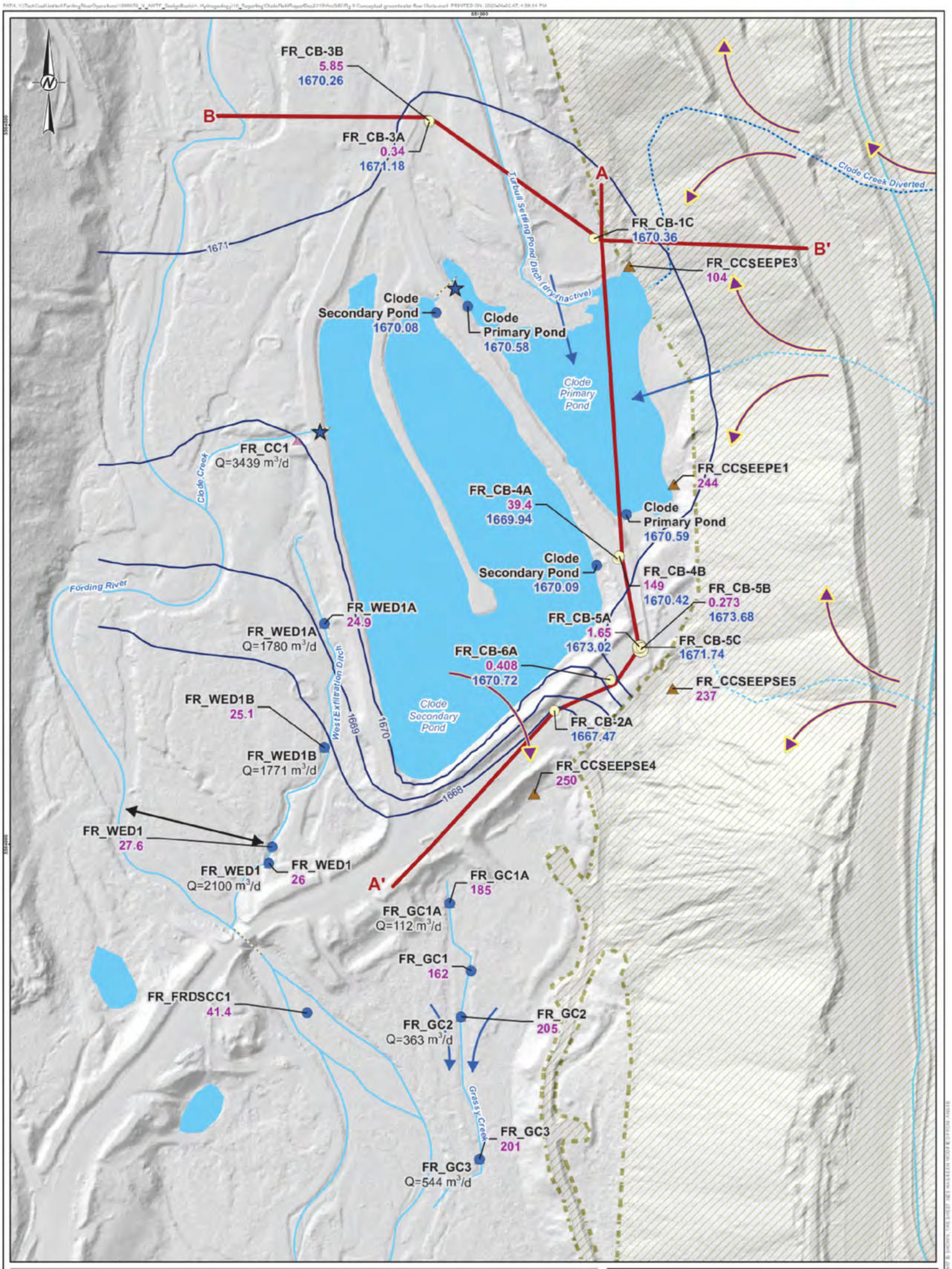
SNC·LAVALIN

Cross-Section through the Clode Creek Settling Ponds Area (Golder, 2020b)

BY: AO	SCALE: 1:112,205	DATE: 2020/07/08	REF No: REV: 0
CHK'D: KM	Proj Coord Sys: NAD 1983 UTM Zone 11N		DRAWING 25

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386n.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

- ▲ SURFACE STREAM DISCHARGE MEASUREMENT POINT (DEC 2019)

WATER QUALITY SAMPLING POINT (DEC 2019)

- ○ GROUNDWATER WELL
- ▲ GROUNDWATER SEEP
- ● SURFACE WATER
- 5.85 - TOTAL SELENIUM, µg/L
- 1670 - WATER LEVEL, m ASL
- — GROUNDWATER TABLE ELEVATION CONTOUR
- ★ POND DECANT POINT
- ▨ SPOIL
- ···· DIVERSION CHANNEL
- ···· CULVERT
- - - WATER PIPELINE
- — SURFACE FLOW WATERCOURSE
- - - SUBSURFACE FLOW WATERCOURSE
- → GROUNDWATER DISCHARGE TO SURFACE WATER
- → GROUNDWATER RECHARGE BY SURFACE WATER
- ↔ SURFACE WATER - GROUNDWATER INTERACTION

0 50 100

1:2,500 METRES

REFERENCE(S)

HYDROGRAPHY AND DEM OBTAINED FROM TECK COAL LIMITED.

PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT

TECK COAL LIMITED

PROJECT

FORDING RIVER OPERATIONS
– NORTH WATER MANAGEMENT PROJECT

TITLE

GROUNDWATER TABLE
CLODE CREEK PONDS (DECEMBER 2019)

CONSULTANT

GOLDER

YYYY-MM-DD	2020-06-02
DESIGNED	IP
PREPARED	IP
REVIEWED	TG
APPROVED	TC

PROJECT NO.	PHASE	REV.	FIGURE
18106641	8000	1	8

References:
1. Golder Limited (2020b)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

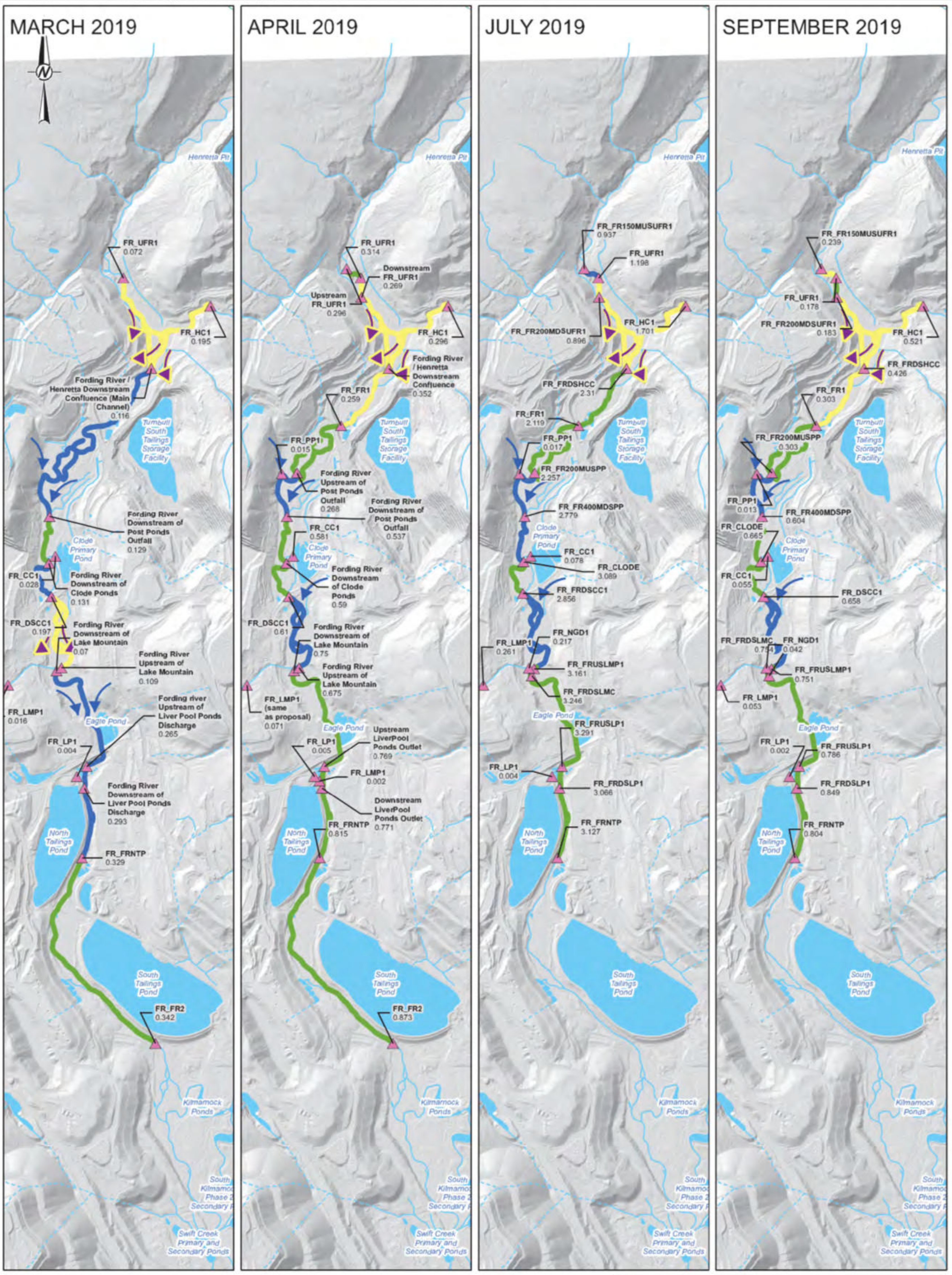
SNC·LAVALIN

Groundwater Levels and Inferred Contours in the Clode Creek Settling Ponds Area, December 2019 (from Golder, 2020b)

CHK'D: CH	DATE: 2020/11/09 SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N	DRAWING 26

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

- ▲ SURFACE STREAM DISCHARGE MEASUREMENT POINT
  0.804 – DISCHARGE, m³/s

FLOW ACCRETION RESULTS

- 🟦 GAINING REACH (INFLOW >10% OF UPSTREAM DISCHARGE)
- 🟩 NEUTRAL REACH (CHANGE < 10% OF UPSTREAM DISCHARGE)
- 🟨 LOSING REACH (OUTFLOW >10% OF UPSTREAM DISCHARGE)
- → GROUNDWATER DISCHARGE TO SURFACE WATER
- ▶ GROUNDWATER RECHARGE BY SURFACE WATER

0 400 800 1,200
1:32,000 METRES

NOTE(S) AND REFERENCE(S)

FOR POINTS WITH MORE THAN ONE DISCHARGE MEASUREMENT LABELS IDICATE MEAN MEASURED VALUE

HYDROGRAPHY AND DEM OBTAINED FROM TECK COAL LIMITED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS
– NORTH WATER MANAGEMENT PROJECT

TITLE
FLOW ACCRETION STUDIES AT FORDING RIVER NORTH
MARCH, APRIL, JULY, SEPTEMBER 2019

CONSULTANT
GOLDER

YYYY-MM-DD	2020-05-26
DESIGNED	IP
PREPARED	IP
REVIEWED	TG
APPROVED	TC

PROJECT NO.	PHASE	REV.	FIGURE
18106641	8000	1	9

References:
1.Golder Limited (2020b)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

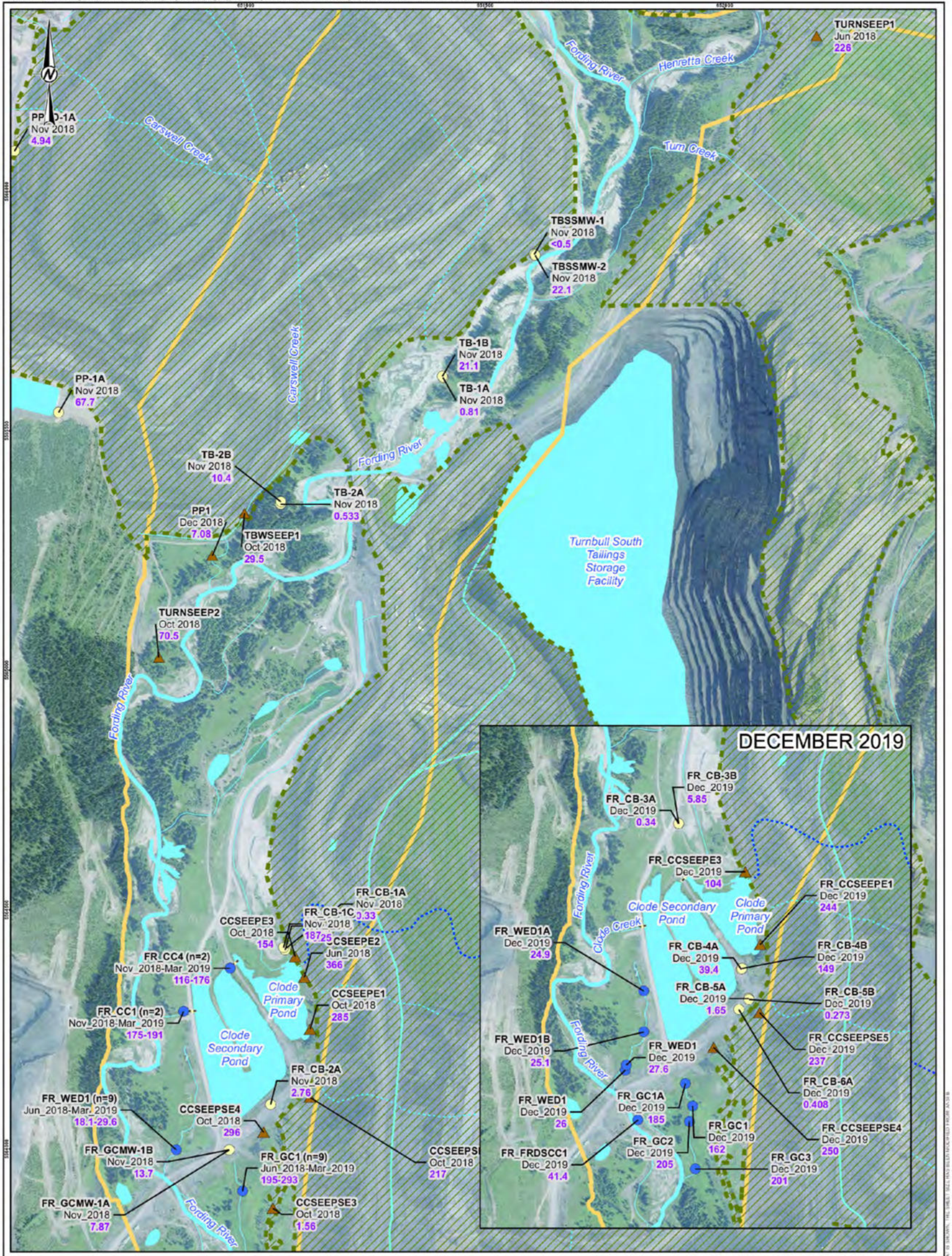
SNC · LAVALIN

Flow Accretion Studies in the S8 Study Area in March, April, July, and September 2019 (from Golder, 2020b)

CHK'D: CH	DATE: 2020/11/09	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		**DRAWING 27**

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\27- FAS_S8.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

○ GROUNDWATER WELL
▲ GROUNDWATER SEEP
● SURFACE WATER
Dec_2019 – SAMPLING DATE
205 - TOTAL SELENIUM, µg/L
- - - - DIVERSION CHANNEL
- - - - CULVERT
— WATER PIPELINE
▭ VALLEY-BOTTOM AQUIFER BOUNDARY
▨ SPOIL
— SURFACE FLOW WATERCOURSE
- - - - SUBSURFACE FLOW WATERCOURSE
🟦 WATERBODY

REFERENCE(S)

HYDROGRAPHY AND DEM OBTAINED FROM TECK COAL LIMITED.
WATER LEVEL MEASURED BY GOLDER IN NOVEMBER 2018, AND BY KWL IN AUGUST 2019
GROUNDWATER CONTOUR INTERVAL 5 m
PROVINCE OF BRITISH COLUMBIA, 2015, BRITISH COLUMBIA SOIL MAPPING SPATIAL DATA (A COMPILATION OF DIGITAL SOIL MAPPING DATASETS)
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS
– NORTH WATER MANAGEMENT PROJECT

TITLE
TOTAL SELENIUM CONCENTRATIONS IN GROUNDWATER AND SURFACE WATER – HISTORICAL AND 2019

CONSULTANT
GOLDER

YYYY-MM-DD	2020-06-04
DESIGNED	IP
PREPARED	IP
REVIEWED	TG
APPROVED	TC

PROJECT NO.	PHASE	REV.	FIGURE
18106641	8000	0	10

References:
1. Golder Limited (2020b)

Revisons:
0 - AO - 2020-07-08 - DRAFT - CH
1 - AO - 2021-05-26 - FINAL- CH

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

SNC · LAVALIN

2019 and Historical Total Selenium Concentrations in Groundwater and Surface Water (from Golder, 2020b)

CHK'D: CH	DATE: 2020/11/09	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 28

MXD Path: P:\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\28- HistSel.mxd

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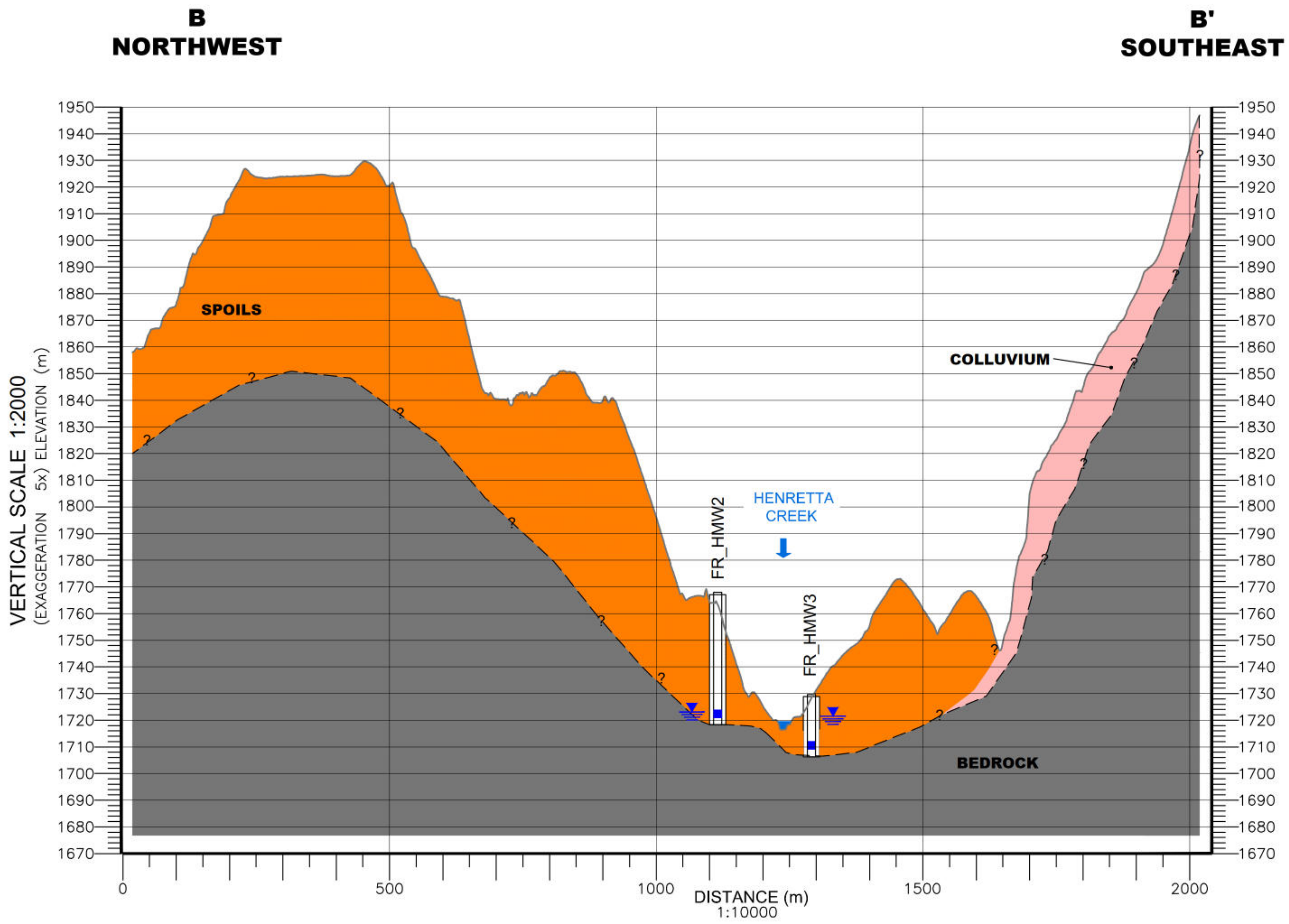


LEGEND

🟧 **GRAVEL (SPOILS)**

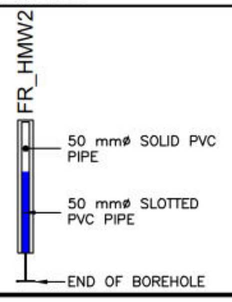
🟥 **GRAVEL (COLLUVIUM)**

⬛ **BEDROCK**

— — — — INFERRED STRATIGRAPHIC BOUNDARY

▼ GROUNDWATER ELEVATION (2019 Q4)

BOREHOLE LEGEND



NOTES

1. THE CROSS SECTION DEPICTED IS BASED ON INTERPRETATION OF LIMITED GEOLOGICAL DATA. ACTUAL GEOLOGICAL CONDITIONS MAY BE DIFFERENT FROM THOSE INTERPRETED.
2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)
5. 2019 Q4 GROUNDWATER ELEVATIONS WERE ONLY AVAILABLE FOR SELECT WELLS AS SHOWN ON DRAWING.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2021–06–08	ISSUED TO CLIENT	AJK	CH

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
FORDING RIVER OPERATIONS
ELK VALLEY, BC

SNC•LAVALIN

TITLE:
UPPER FORDING RIVER S10 STUDY AREA
- INFERRED GEOLOGICAL CROSS SECTION B-B'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: **0**
CHK'D: KM	PLOT: 20210608.0930	CADFILE: 672386–R4	**DRAWING 29**

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\SPO\672386 CONFIDENTIAL\40_EXECUTION\45_GIS_DWGS\CAD\672386–R4.DWG

LEGEND

Groundwater Stations
- Monitoring Well
- Supply Well

Surface Water Stations
- Authorized Discharge
- Monitoring
- Seep

Site Features
- Geological Cross Sections
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Mine Permitted Areas
- Tailings/Settling Pond

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Culvert
- Ditch
- Potable Waterline
- Rock Drain
- Water Pipeline
- Island
- Lake
- River Bed
- Wetland
- Inferred Potentiometric Contours (masl)

1723.20 Potentiometric Elevations from March 11 to 13, 2019

1717.82 Potentiometric Elevation not used for contouring

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Shading reflects LiDAR topographic data

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.
2.

Revisons:
0 - AO - 2020-05-06 - DRAFT - LH
1 - AO - 2021-05-28 - FINAL - CH

0 30 60 120 180 240 300 Meters

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Ltd.

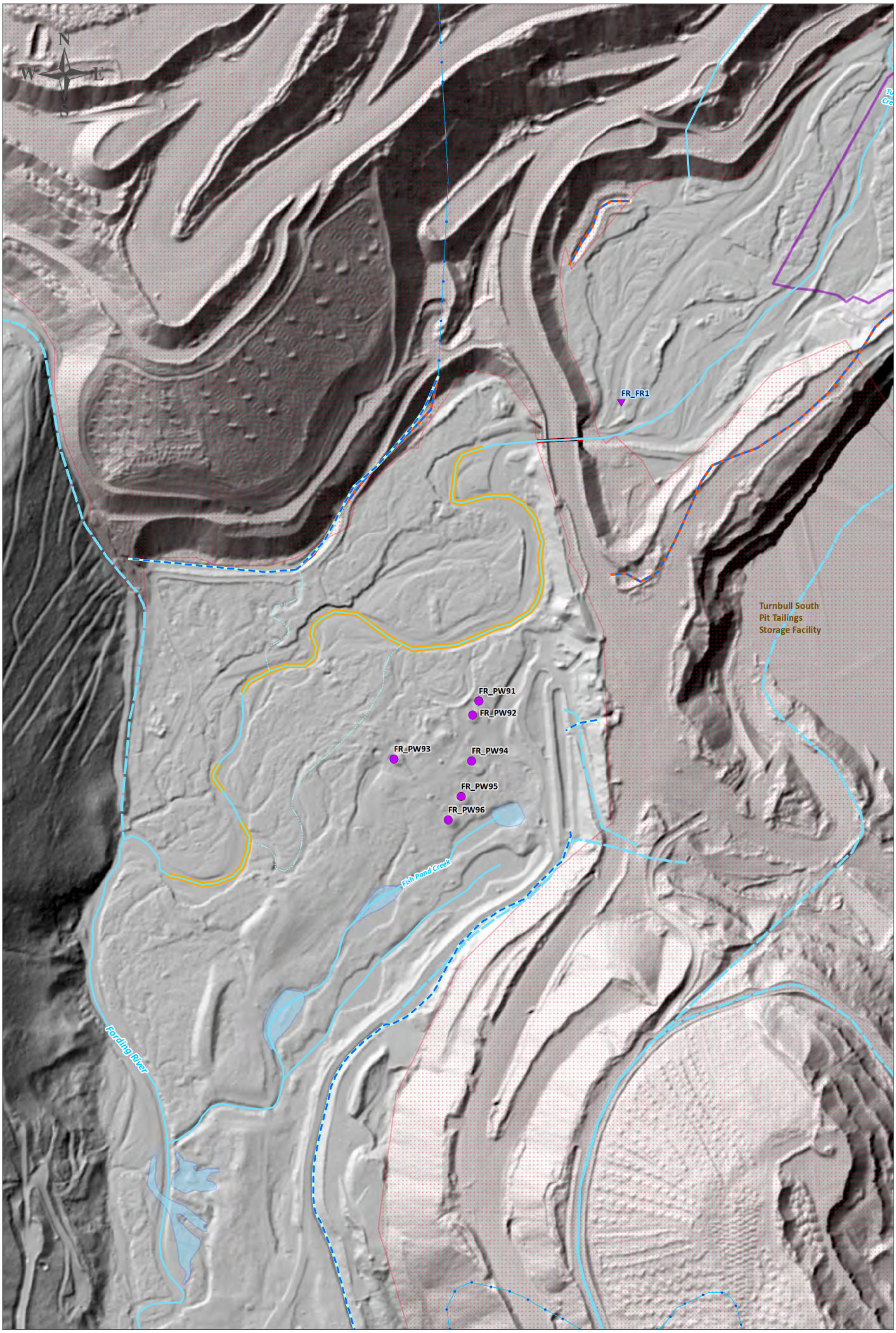
SNC·LAVALIN

Study Area 10 – Groundwater Levels and Inferred Contours, March 2019

CHK'D: CH
BY: AO
DATE: 2021-05-26 SCALE: 1:0
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num: REV: 0
DRAWING 30

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\30-StudyArea10.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\666653



Legend

- ● Potable Well

Water Features

- Intermittent Stream
- Stream Ditch
- Stream
- Subsurface
- Dry Reach (March 6, 2020)
- Culvert
- Ditch
- Water Pipeline
- Waste Dump (Spoils)
- Lake
- River Bed
- FRO Mine Permitted Area

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.

Revisons:
0 - AO - 2021-05-28 - FINAL - CH

0 25 50 100 150 200
Metres

Client:
Teck Coal Ltd.

Project Location:
Fording River Operations, BC

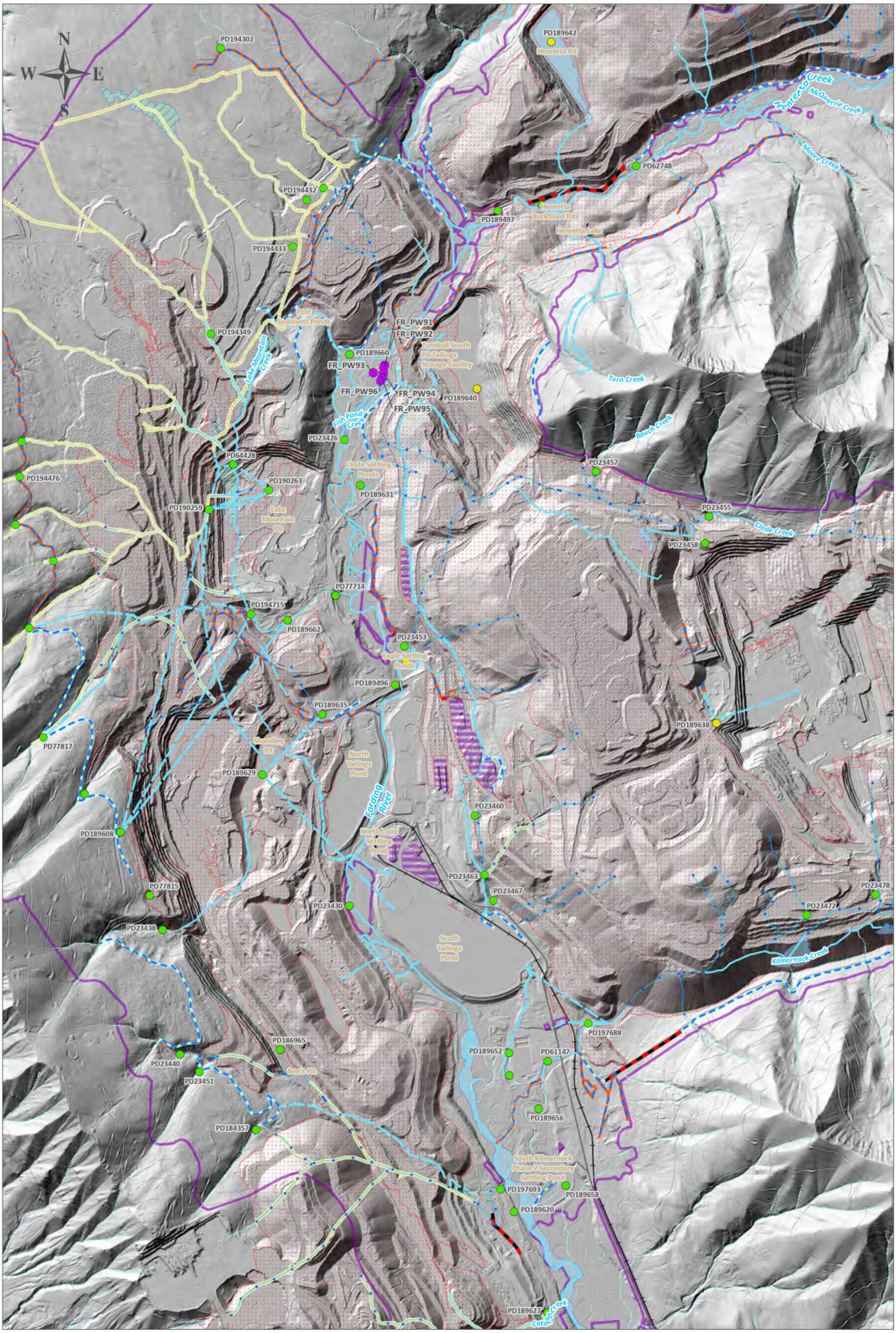
SNC·LAVALIN

Potable Wells Area

CHK'D: CH
BY: AO
DATE: 2021-06-07 SCALE: 1:4,000
COORD SYS: NAD 1983 UTM Zone 11N
REF No: **DRAWING 31**

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\31-Potable Wells Area.mxd

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\SPO\672386 Confidential\40_Execution\45_GIS_Dwgs\Exports



Legend

- ● Water Rights Licences - Active
- ● Water Rights Licences - No Minimum IFR
- ● Potable Well
- — Secondary Road

Water Features

- Intermittent Stream
- Stream Ditch
- Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Stockpiles
- Waste Dump (Spoils)
- Lake
- River Bed
- Wetland
- Rails
- Secondary Road
- FRO Mine Permitted Area

Notes:

1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:

1. Surface water station locations, Site Features, Water Features and LIDAR were provided by Teck Coal Limited.

Revisons:

0 - AO - 2021-05-28 - FINAL - CH

0 190 380 760 1,140 1,520 Metres

Client:
Teck Coal Ltd.

Project Location:
Fording River Operations, BC

SNC·LAVALIN

Pits and Points of Diversion

CHK'D: CH
BY: AO
DATE: 2021-06-07 SCALE: 1:30,000
COORD SYS: NAD 1983 UTM Zone 11N
REF No: DRAWING 32

MXD Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\672386\32-PODs.mxd

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\SPO\672386 Confidential\40_Execution\45_GIS_Dwgs\Exports

Appendix I

Mann-Kendall Trend Analyses

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 07-Jan-00
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS
Job ID: 672386 - Privileged and Confidential
Location FR_09-01-A Q1

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	Sampling Date	FR_09-01-A Q1 CONCENTRATION						
1	13-Mar-14	14.6	320	35.6	7.83			
2	22-Jan-15	20.2	337	49.3	7.49			
3	25-Jan-16	27.6	374	66.3	8.69			
4	8-Mar-17	47.2	481	120	7.73			
5	14-Mar-19	21.3	302	50.5	7.51			
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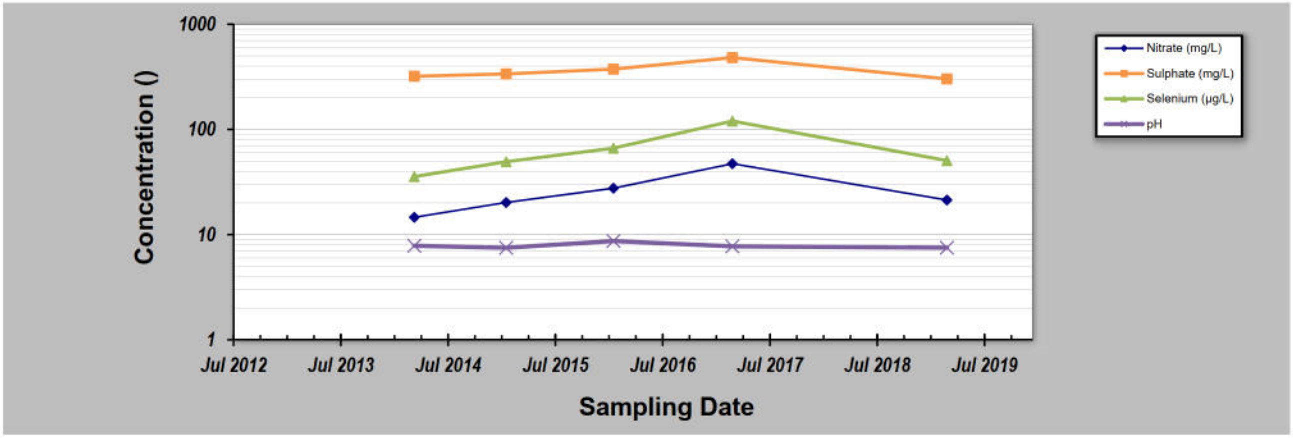
20								
Coefficient of Variation:		0.48	0.20	0.51	0.06			
Mann-Kendall Statistic (S):		6	2	6	-2			
Confidence Factor:		88.3%	59.2%	88.3%	59.2%			
Concentration Trend:		No Trend	No Trend	No Trend	Stable			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS

Job ID: 672386 - Privileged and Confidential
Location FR_09-01-A Q2

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	Sampling Date	FR_09-01-A Q2 CONCENTRATION						
1	30-May-13	38.9	178	85.5	7.78			
2	14-May-14	34.7	389	75	7.63			
3	14-Apr-15	25.1	374	64.5	7.8			
4	14-Jun-16	32.4	226	77.5				
5	1-Jun-17	35.1	208	112	7.65			
6	13-Jun-18	31.6	239	106	7.55			
7	30-May-19	36.5	343	130	7.51			
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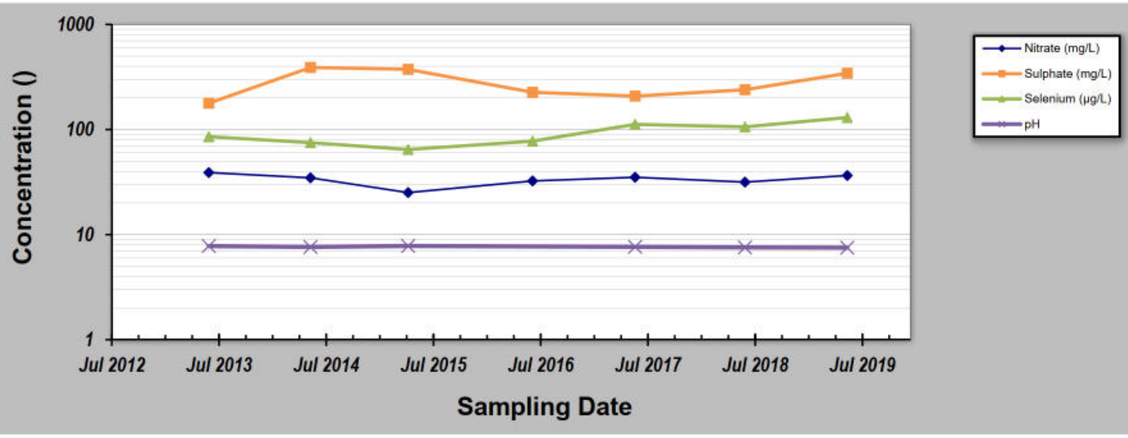
Coefficient of Variation:		0.13	0.31	0.25	0.02			
Mann-Kendall Statistic (S):		-1	1	11	-9			
Confidence Factor:		50.0%	50.0%	93.2%	93.2%			
Concentration Trend:		Stable	No Trend	Prob. Increasing	Prob. Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS
Job ID: 672386 - Privileged and Confidential
Location FR_09-01-A Q3

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	Sampling Date	FR_09-01-A Q3 CONCENTRATION						
1	29-Aug-13	50.8	290	107	7.95			
2	25-Aug-14	24	287	62.7	6.95			
3	2-Jul-15	33.1	219	82.2	7.62			
4	17-Aug-16	32.2	242	85.7	7.41			
5	12-Sep-17	21.2	347	68.1	7.34			
6	31-Jul-18	24	226	81.2	7.36			
7	29-Jul-19	23.5	215	102	7.51			
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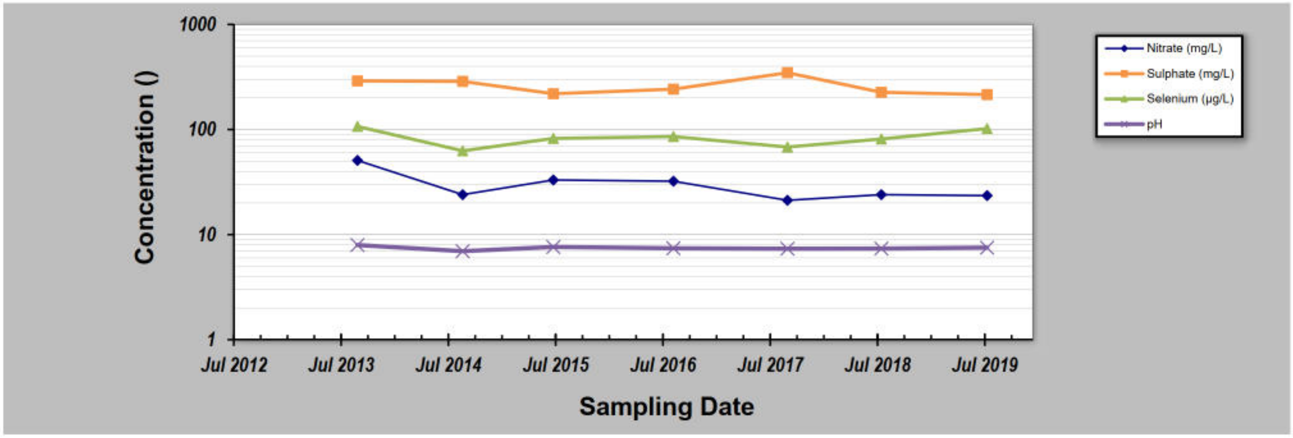
	Coefficient of Variation:	0.35	0.19	0.19	0.04			
	Mann-Kendall Statistic (S):	-12	-9	1	-3			
	Confidence Factor:	94.9%	88.1%	50.0%	61.4%			
	Concentration Trend:	Prob. Decreasing	Stable	No Trend	Stable			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS
Job ID: 672386 - Privileged and Confidential
Location FR_09-01-A Q4

Sampling Event	Sampling Date	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
		FR_09-01-A Q4 CONCENTRATION						
1	14-Nov-12	60.6	395	116				
2	31-Oct-13	68.6	403	146	7.46			
3	6-Nov-14	28.6	327	68	7.83			
4	8-Oct-15	27.8	351	66.6	7.42			
5	24-Nov-16	51.7	347	159	7.61			
6	22-Nov-17	54.3	486	166	7.3			
7	13-Dec-18	11.5	297	38.1	7.31			
8	1-Nov-19	38.7	371	126	7.31			
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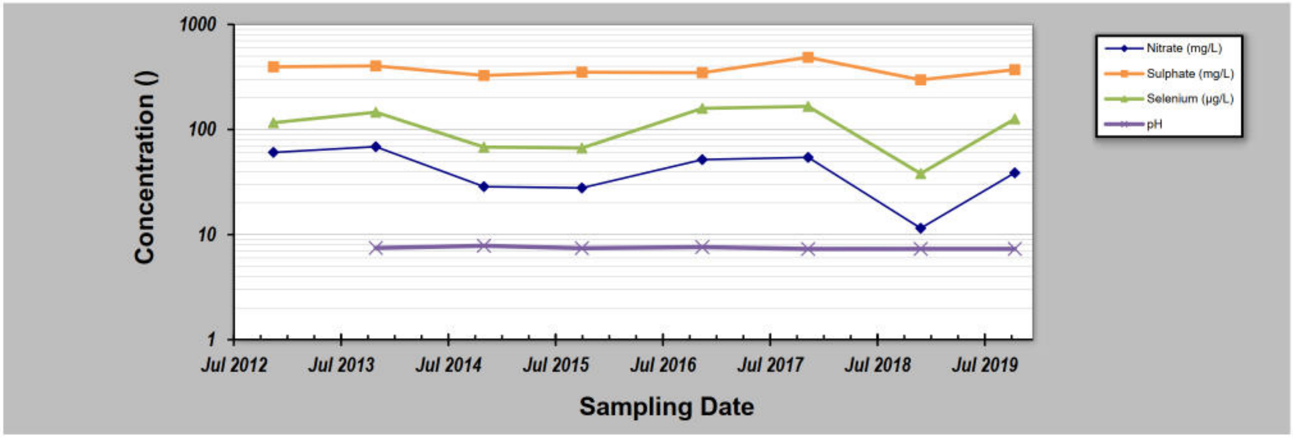
Coefficient of Variation:		0.45	0.15	0.43	0.03			
Mann-Kendall Statistic (S):		-10	-4	0	-10			
Confidence Factor:		86.2%	64.0%	45.2%	90.7%			
Concentration Trend:		Stable	Stable	Stable	Prob. Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS
Job ID: 672386 - Privileged and Confidential
Location FR_09-01-B Q1

Parameter (units)		Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	**Sampling Date**	**FR_09-01-B Q1 CONCENTRATION**						
1	26-Mar-13	16	354	31.1	7.63			
2	13-Mar-14	14.3	288	38.7	7.64			
3	22-Jan-15	11.4	261	31.1	7.6			
4	25-Jan-16	17.6	291	42.6	7.59			
5	8-Mar-17	25.9	409	71.8	7.45			
6	22-Feb-18	17	378	54.1	7.2			
7	14-Mar-19	21.1	300	52.2	7.52			
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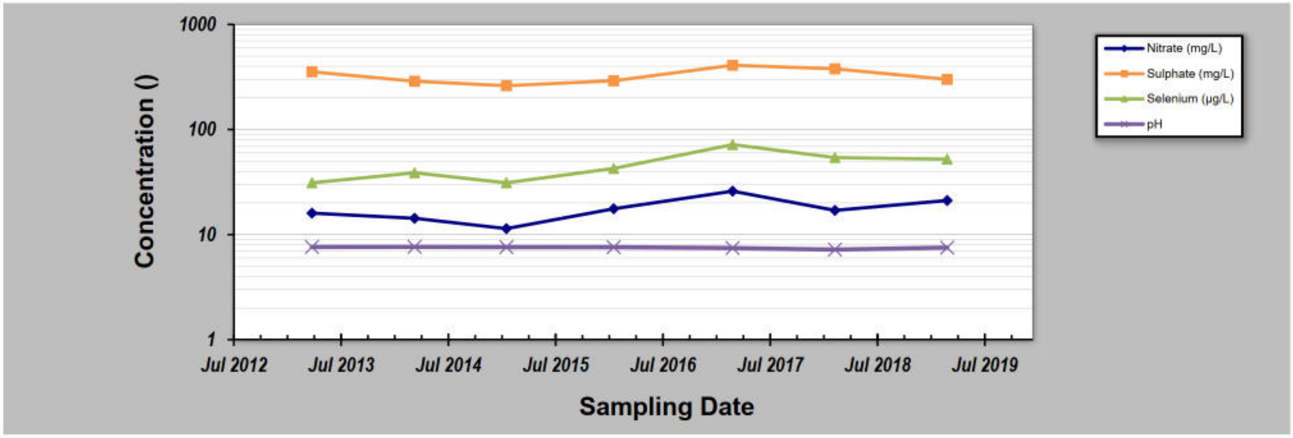
20								
Coefficient of Variation:		0.27	0.17	0.32	0.02			
Mann-Kendall Statistic (S):		9	5	12	-15			
Confidence Factor:		88.1%	71.9%	94.9%	98.5%			
Concentration Trend:		No Trend	No Trend	Prob. Increasing	Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS
Job ID: 672386 - Privileged and Confidential
Location FR_09-01-B Q2

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	Sampling Date	FR_09-01-B Q2 CONCENTRATION						
1	30-May-13	43.5	212	90.2	7.82			
2	14-May-14	13.5	302	39.5	7.64			
3	14-Apr-15	11.3	300	34.2				
4	14-Jun-16	34.8	252	79.9	7.66			
5	1-Jun-17	43.9	267	126	7.32			
6	13-Jun-18	29.3	222	97.1	7.29			
7	30-May-19	20.5	230	76	7.51			
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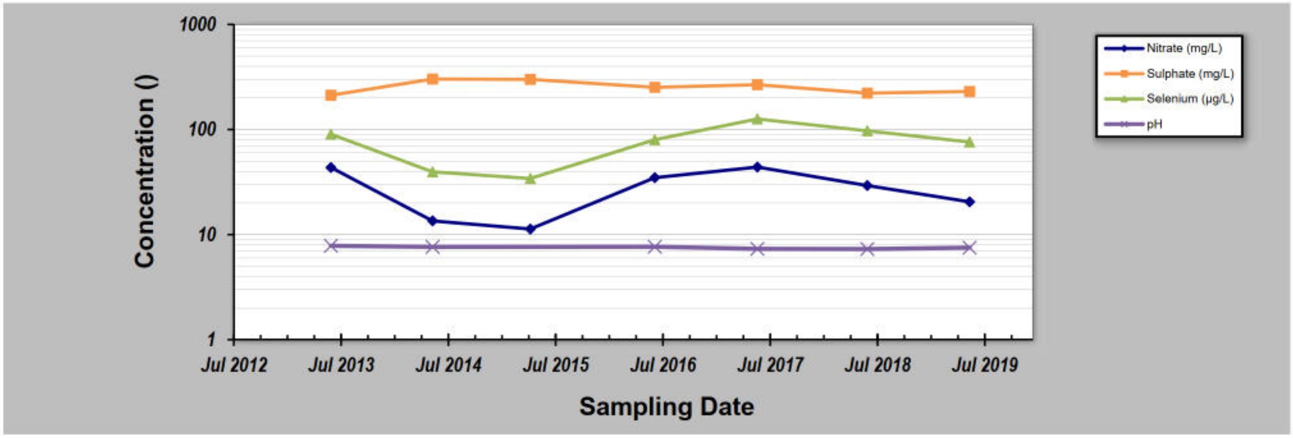
17								
18								
19								
20								
Coefficient of Variation:		0.48	0.14	0.42	0.03			
Mann-Kendall Statistic (S):		-1	-5	3	-9			
Confidence Factor:		50.0%	71.9%	61.4%	93.2%			
Concentration Trend:		Stable	Stable	No Trend	Prob. Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS
Job ID: 672386 - Privileged and Confidential
Location FR_09-01-B Q3

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	Sampling Date	FR_09-01-B Q3 CONCENTRATION						
1	29-Aug-13	41.3	271	89	7.63			
2	25-Aug-14	14	267	44	7.58			
3	2-Jul-15	30.8	227	76.8	7.48			
4	17-Aug-16	22	297	58.9	7.2			
5	12-Sep-17	12.7	296	44.2	7.23			
6	31-Jul-18	28.4	311	79.4	7.39			
7	29-Jul-19	19.3	201	83.2	7.15			
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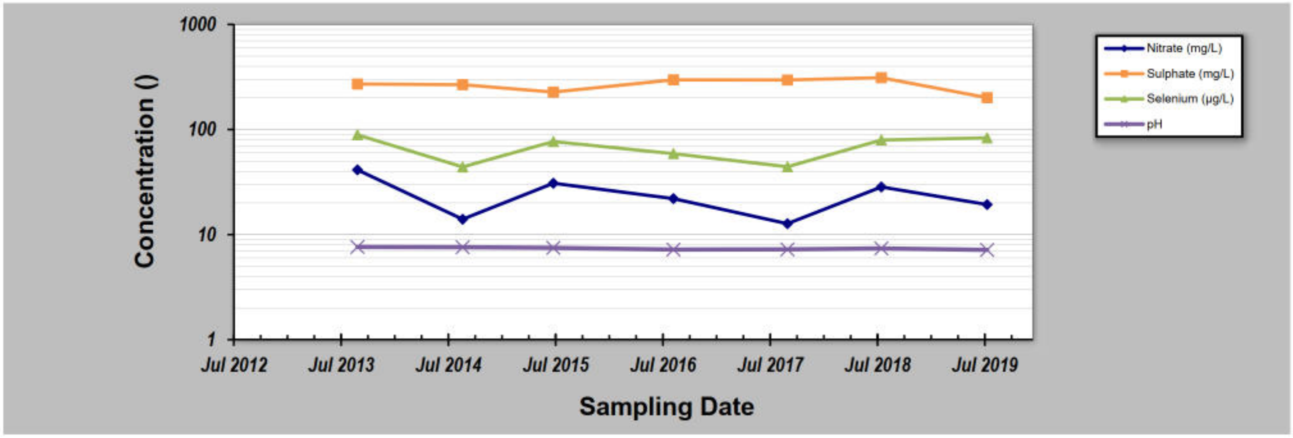
	Coefficient of Variation:	0.42	0.15	0.28	0.03			
	Mann-Kendall Statistic (S):	-7	1	3	-15			
	Confidence Factor:	80.9%	50.0%	61.4%	98.5%			
	Concentration Trend:	Stable	No Trend	No Trend	Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS
Job ID: 672386 - Privileged and Confidential
Location FR_09-01-B Q4

Sampling Event	Sampling Date	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
		FR_09-01-B Q4 CONCENTRATION						
1	14-Nov-12	37.6	350	61.5	7.28			
2	31-Oct-13	41.8	364	79.9	8.38			
3	6-Nov-14	10.2	256	29.7	7.46			
4	8-Oct-15	11.1	288	30.2				
5	24-Nov-16	39.4	351	117	7.54			
6	22-Nov-17	29.6	407	91.5	7.29			
7	13-Dec-18	12.8	262	41.8	7.09			
8	1-Nov-19	20.4	317	70.7	7.42			
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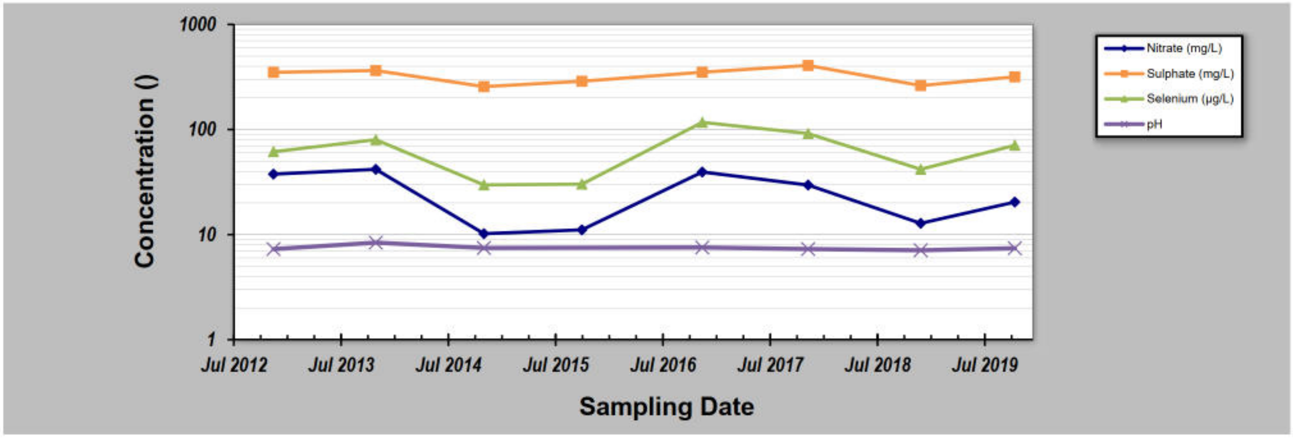
18								
19								
20								
Coefficient of Variation:		0.53	0.16	0.47	0.06			
Mann-Kendall Statistic (S):		-4	0	4	-5			
Confidence Factor:		64.0%	45.2%	64.0%	71.9%			
Concentration Trend:		Stable	Stable	No Trend	Stable			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS

Job ID: 672386 - Privileged and Confidential
Location FR_09-02-A Q1

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	**Sampling Date**	**FR_09-02-A Q1 CONCENTRATION**						
1	26-Mar-13	13.1	291	44.5	7.93			
2	25-Jan-16	20.7	255	47.1	7.87			
3	20-Mar-17	19.8	264	50.8	7.75			
4	22-Feb-18	15.7	287	52.8	7.56			
5	14-Mar-19	21.9	296	50.4	7.83			
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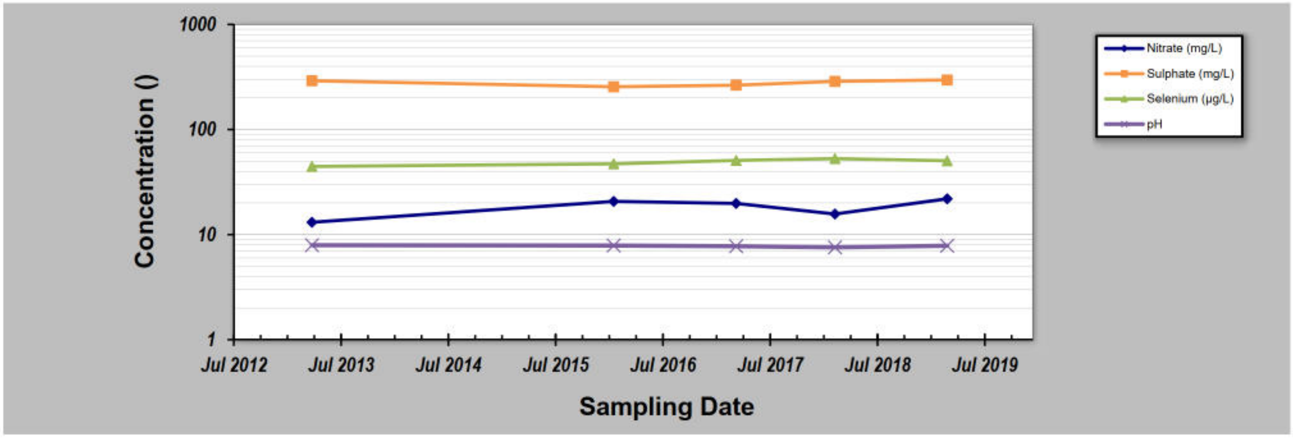
Coefficient of Variation:		0.20	0.06	0.07	0.02			
Mann-Kendall Statistic (S):		4	4	6	-6			
Confidence Factor:		75.8%	75.8%	88.3%	88.3%			
Concentration Trend:		No Trend	No Trend	No Trend	Stable			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	05-Feb-20	Job ID:	672386 - Privileged and Confidential
Facility Name:	Teck Coal Regional Groundwater - FRO	Location	FR_09-02-A Q2
Conducted By:	NDS		

Parameter (units)		Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	Sampling Date	FR_09-02-A Q2 CONCENTRATION						
1	30-May-13	39.3	179	85.9	8.03			
2	15-Jun-16	26.1	218	61.5	7.72			
3	1-Jun-17	39.4	236	117	7.56			
4	13-Jun-18	31	250	96.3	7.61			
5	30-May-19	13.3	200	52.9	7.81			
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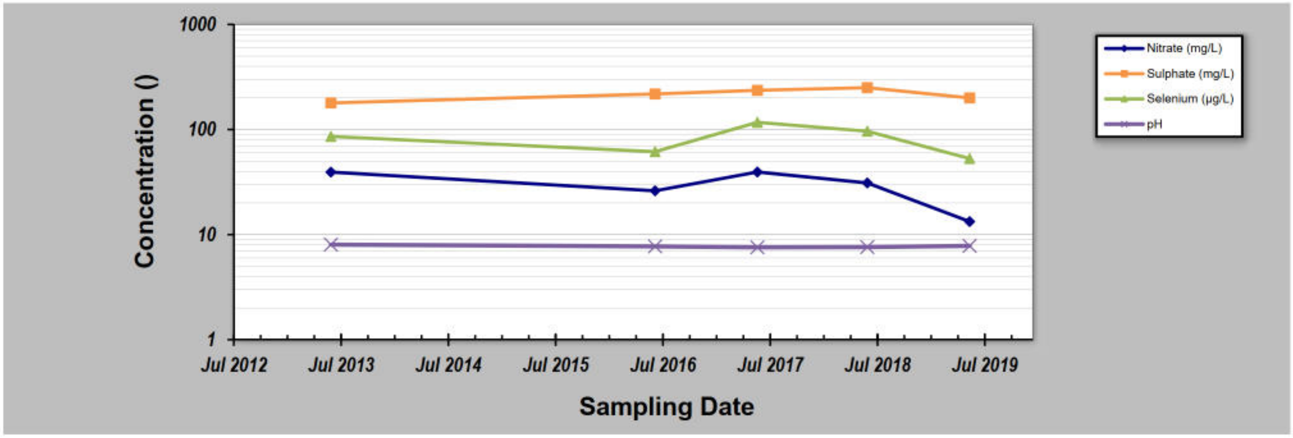
Coefficient of Variation:		0.36	0.13	0.31	0.02			
Mann-Kendall Statistic (S):		-4	4	-2	-2			
Confidence Factor:		75.8%	75.8%	59.2%	59.2%			
Concentration Trend:		Stable	No Trend	Stable	Stable			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS
Job ID: 672386 - Privileged and Confidential
Location FR_09-02-A Q3

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	**Sampling Date**	**FR_09-02-A Q3 CONCENTRATION**						
1	22-Aug-16	7.74	165	20	8.09			
2	13-Sep-17	11.3	200	38.2	7.53			
3	31-Jul-18	9.87	169	33	7.75			
4	26-Jul-19	12.7	158	49.5	7.79			
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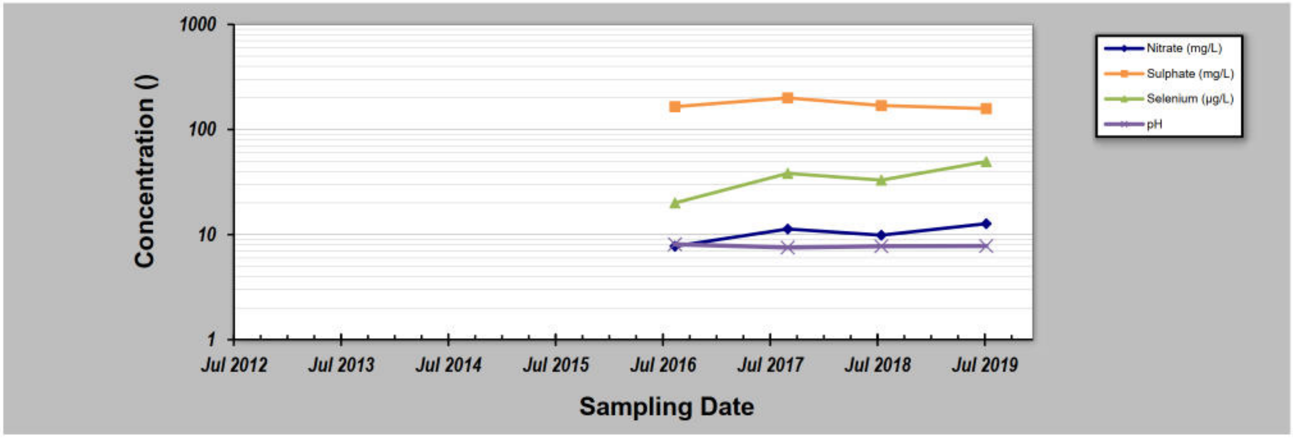
	Coefficient of Variation:	0.20	0.11	0.35	0.03			
	Mann-Kendall Statistic (S):	4	-2	4	0			
	Confidence Factor:	83.3%	62.5%	83.3%	37.5%			
	Concentration Trend:	No Trend	Stable	No Trend	Stable			



Notes:

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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: NDS
Job ID: 672386 - Privileged and Confidential
Location FR_09-02-A Q4

Sampling Event	Sampling Date	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
		FR_09-02-A Q4 CONCENTRATION						
1	22-Aug-16	7.74	165	20	7.66			
2	13-Sep-17	11.3	200	38.2	7.55			
3	31-Jul-18	9.87	169	33	7.23			
4	26-Jul-19	12.7	158	49.5	7.69			
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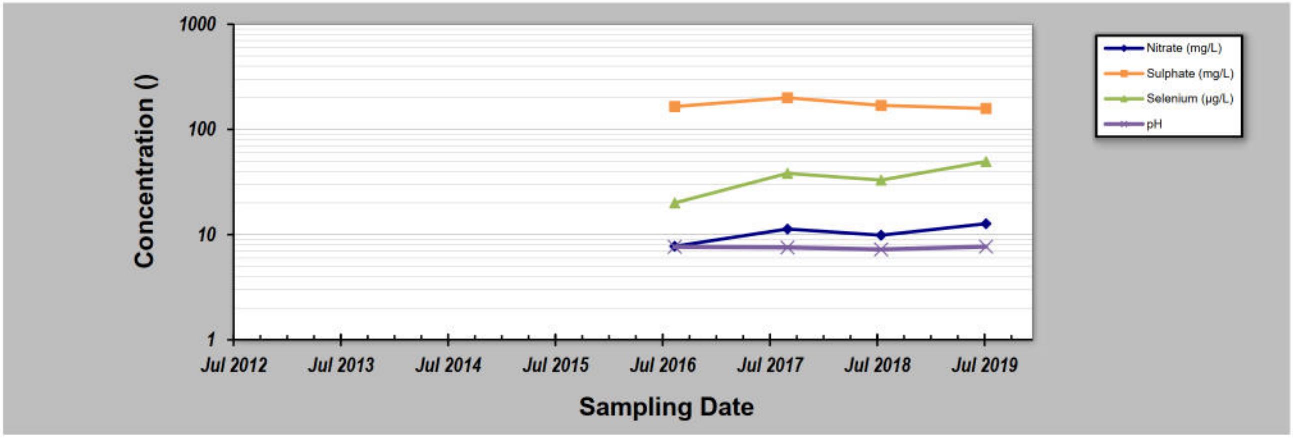
Coefficient of Variation:		0.20	0.11	0.35	0.03			
Mann-Kendall Statistic (S):		4	-2	4	0			
Confidence Factor:		83.3%	62.5%	83.3%	37.5%			
Concentration Trend:		No Trend	Stable	No Trend	Stable			



Notes:

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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: CMH

Job ID: 672386 - Privileged and Confidential
Location FR_09-02-B Q1

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	**Sampling Date**	**FR_09-02-B Q1 CONCENTRATION**						
1	26-Mar-13	11.8	288	40.4	8.04			
2	25-Jan-16	20.8	265	44.1	7.94			
3	20-Mar-17	18.9	267	43.8	7.58			
4	8-Feb-18	12.7	270	49.9	7.42			
5	14-Mar-19	21.8	296	51.8	7.61			
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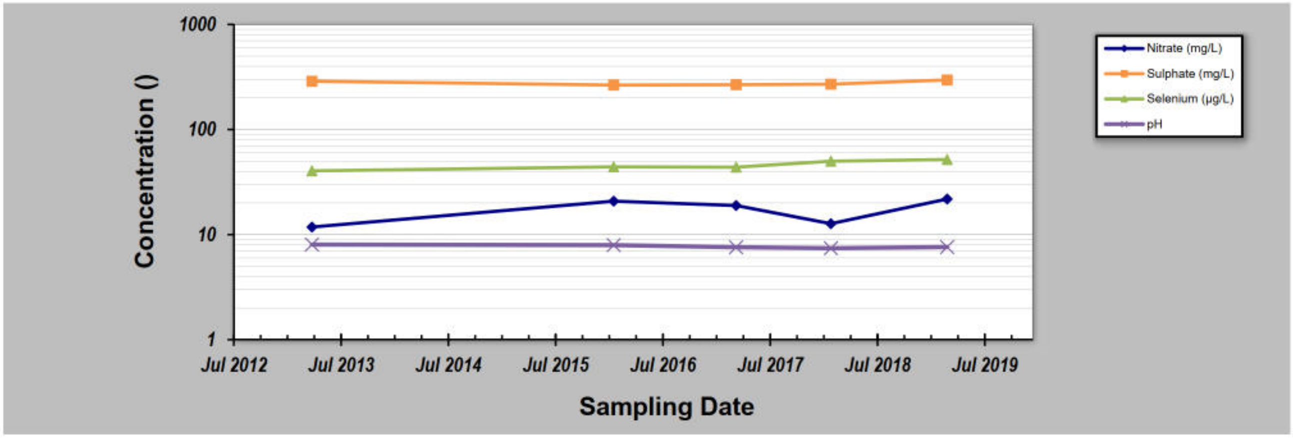
	Coefficient of Variation:	0.27	0.05	0.10	0.03			
	Mann-Kendall Statistic (S):	4	4	8	-6			
	Confidence Factor:	75.8%	75.8%	95.8%	88.3%			
	Concentration Trend:	No Trend	No Trend	Increasing	Stable			



Notes:

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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: CMH

Job ID: 672386 - Privileged and Confidential
Location FR_09-02-B Q2

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	Sampling Date	FR_09-02-B Q2 CONCENTRATION						
1	30-May-13	38.9	204	80.2	8.4			
2	15-Jun-16	17	202	42.4	7.56			
3	1-Jun-17	40.5	253	117	7.52			
4	13-Jun-18	31	252	87.8	7.52			
5	30-May-19	31.9	319	111	7.7			
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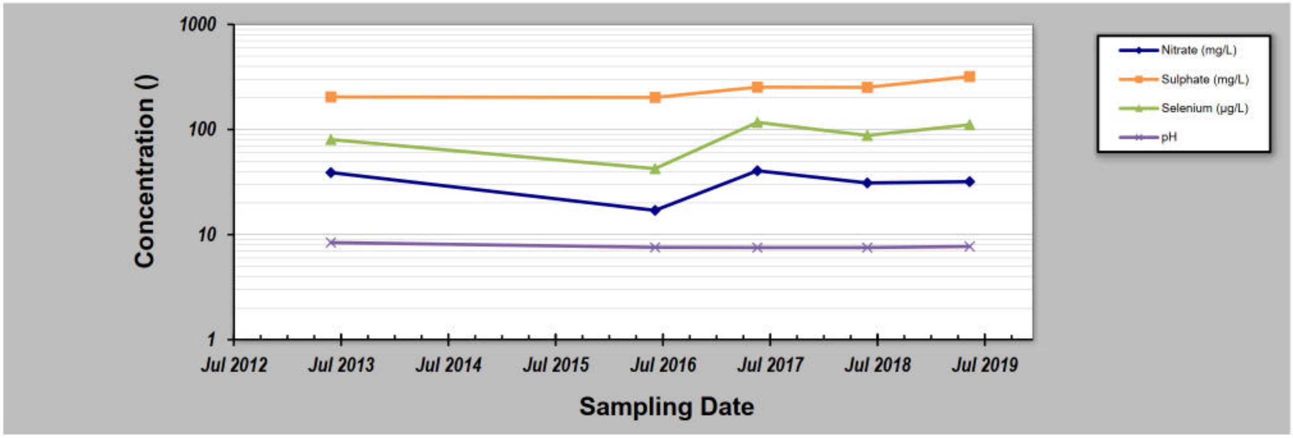
Coefficient of Variation:		0.29	0.19	0.34	0.05			
Mann-Kendall Statistic (S):		0	6	4	-3			
Confidence Factor:		40.8%	88.3%	75.8%	67.5%			
Concentration Trend:		Stable	No Trend	No Trend	Stable			



Notes:

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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: CMH

Job ID: 672386 - Privileged and Confidential
Location FR_09-02-B Q3

Parameter (units)		Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	Sampling Date	FR_09-02-B Q3 CONCENTRATION						
1	22-Aug-16	8.15	171	21	7.6			
2	13-Sep-17	10	186	34.4	7.53			
3	31-Jul-18	15.9	223	49	7.61			
4	26-Jul-19	8.56	130	30.6	7.7			
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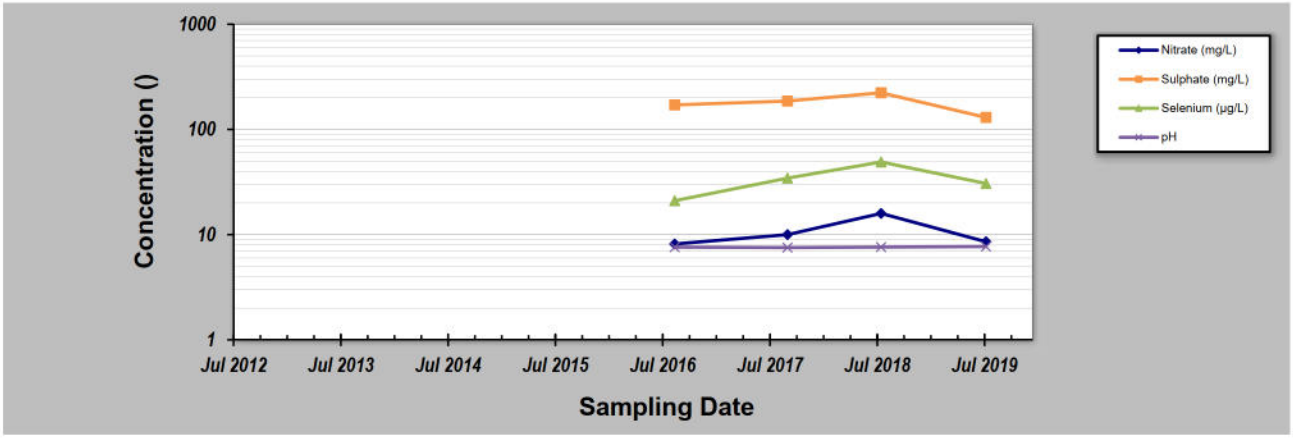
Coefficient of Variation:		0.34	0.22	0.34	0.01			
Mann-Kendall Statistic (S):		2	0	2	4			
Confidence Factor:		62.5%	37.5%	62.5%	83.3%			
Concentration Trend:		No Trend	Stable	No Trend	No Trend			



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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: CMH

Job ID: 672386 - Privileged and Confidential
Location FR_09-02-B Q4

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	**Sampling Date**	**FR_09-02-B Q4 CONCENTRATION**						
1	14-Nov-12	11.8	242	32.1				
2	28-Nov-16	9.87	271	26.4	7.46			
3	22-Nov-17	11.5	254	43.1	7.44			
4	13-Dec-18	13.8	274	45	7.2			
5	24-Oct-19	9.24	180	36.3	7.61			
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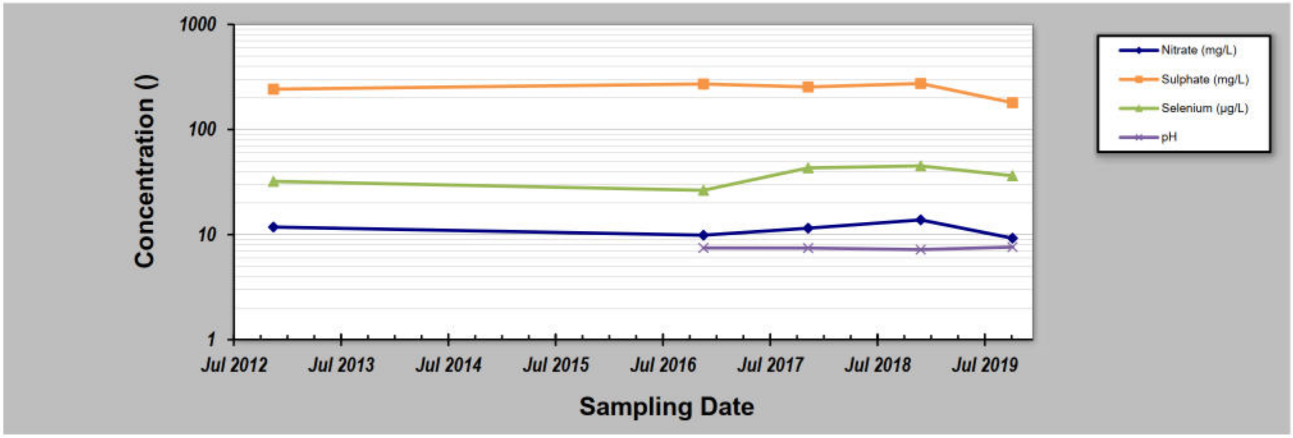
Coefficient of Variation:		0.16	0.16	0.21	0.02			
Mann-Kendall Statistic (S):		-2	0	4	0			
Confidence Factor:		59.2%	40.8%	75.8%	37.5%			
Concentration Trend:		Stable	Stable	No Trend	Stable			



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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	05-Feb-20	Job ID:	672386 - Privileged and Confidential
Facility Name:	Teck Coal Regional Groundwater - FRO	Location	FR_GH_WELL4 Q1
Conducted By:	CMH		

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	Sampling Date	FR_GH_WELL4 Q1 CONCENTRATION						
1	4-Feb-13	72.2	373	138				
2	5-Mar-13	75.6	419	152				
3	6-Jan-14	56.2	282	113				
4	3-Feb-14	61.2	308	121				
5	4-Mar-14	64	328	126	7.28			
6	13-Mar-14	63.6	322	127				
7	21-Jan-15	46.7	276	102				
8	14-Apr-15	56.2	336	127				
9	25-Jan-16	53.9	360	137	7.52			
10	27-Feb-17	46.6	287	123	7.57			
11	31-Jan-18	40.4	269	109	7.34			
12	21-Mar-19	37.7	342	147	7.34			
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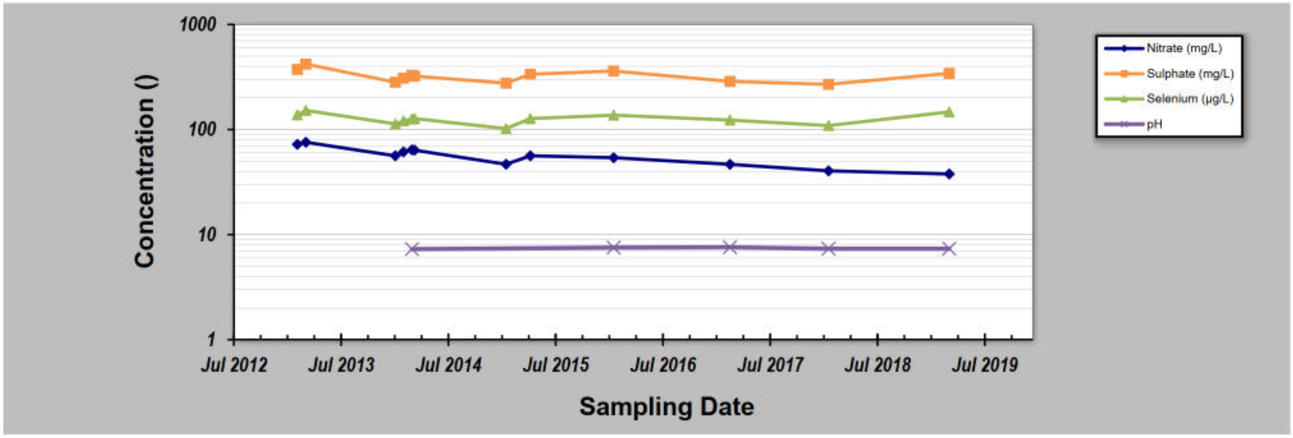
Coefficient of Variation:		0.21	0.14	0.12	0.02			
Mann-Kendall Statistic (S):		-49	-12	-3	1			
Confidence Factor:		>99.9%	77.0%	55.4%	50.0%			
Concentration Trend:		Decreasing	Stable	Stable	No Trend			



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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: CMH

Job ID: 672386 - Privileged and Confidential
Location FR_GH_WELL4 Q2

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
Sampling Event	**Sampling Date**	**FR_GH_WELL4 Q2 CONCENTRATION**						
1	1-Apr-13	55.2	262	94.9				
2	7-May-13	51.7	265	103				
3	3-Jun-13	29.8	181	67.9				
4	7-Apr-14	68.3	356	150				
5	14-May-14	61.4	349	140	7.69			
6	14-Apr-15	56.2	336	127				
7	18-May-16	68.4	438	160	7.51			
8	1-Jun-17	33.4	248	93.5	7.34			
9	14-Jun-18	22.4	207	77	7.14			
10	13-Jun-19	43.1	400	140	7.32			
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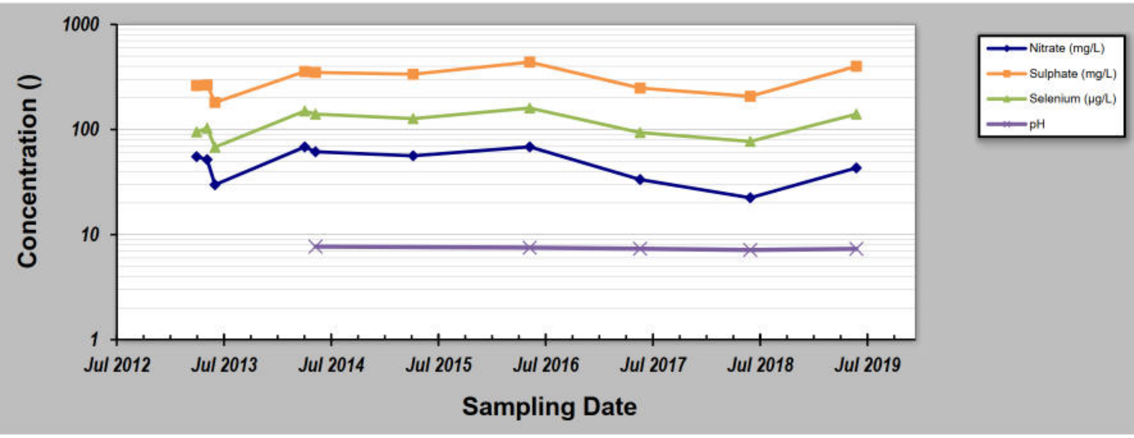
20								
	Coefficient of Variation:	0.33	0.28	0.28	0.03			
	Mann-Kendall Statistic (S):	-7	7	4	-8			
	Confidence Factor:	70.0%	70.0%	60.3%	95.8%			
	Concentration Trend:	Stable	No Trend	No Trend	Decreasing			



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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: CMH
Job ID: 672386 - Privileged and Confidential
Location FR_GH_WELL4 Q3

Sampling Event	Sampling Date	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
		FR_GH_WELL4 Q3 CONCENTRATION						
1	2-Jul-13	17.8	116	39.8				
2	3-Sep-13	28.1	139	58.1	7.57			
3	25-Aug-14	34.4	204	78.3	7.41			
4	2-Jul-15	45.5	286	108	7.78			
5	17-Aug-16	36.3	252	91	7.71			
6	13-Sep-17	27.3	195	82.2	7.33			
7	31-Jul-18	30.9	207	76.9	7.387			
8	30-Jul-19	36.7	342	118	7.33			
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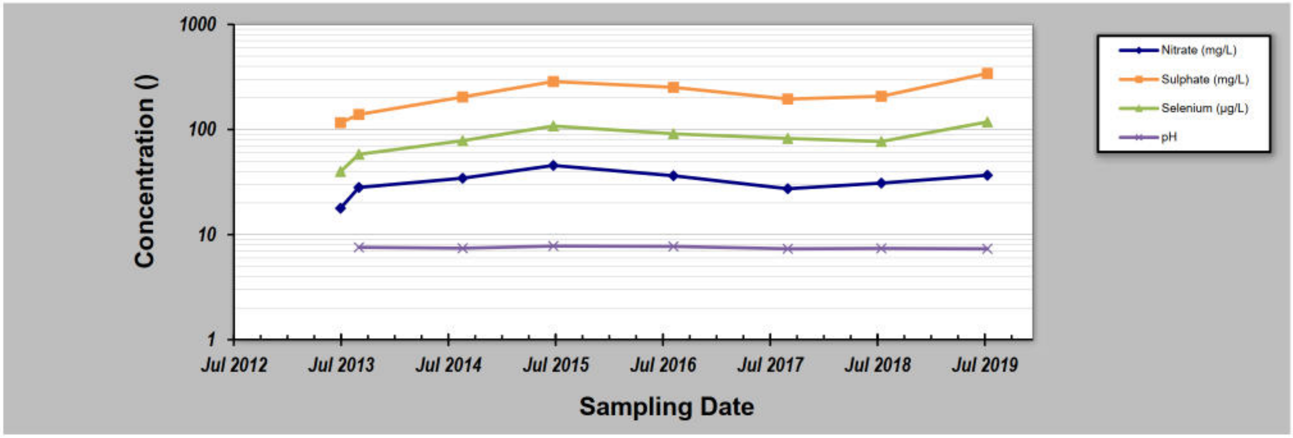
20								
Coefficient of Variation:		0.25	0.34	0.31	0.02			
Mann-Kendall Statistic (S):		10	16	14	-10			
Confidence Factor:		86.2%	96.9%	94.6%	90.7%			
Concentration Trend:		No Trend	Increasing	Prob. Increasing	Prob. Decreasing			



Notes:

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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 05-Feb-20
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: CMH

Job ID: 672386 - Privileged and Confidential
Location FR_GH_WELL4 Q4

Sampling Event	Sampling Date	FR_GH_WELL4 Q4 CONCENTRATION						
Parameter (units)		Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	pH			
1	5-Nov-12	45.7	235	81.3				
2	3-Dec-12	54.4	278	103				
3	7-Oct-13	35.9	174	75.5				
4	31-Oct-13	42.8	209	84.5	7.28			
5	2-Dec-13	50.4	245	103				
6	23-Oct-14	40.3	234	87	7.69			
7	5-Nov-15	37.8	280	97.5				
8	15-Nov-17	34.9	243	92.8	7.48			
9	13-Dec-18	31.6	271	99.2	7.34			
10	1-Nov-19	31.9	278	103	7.4			
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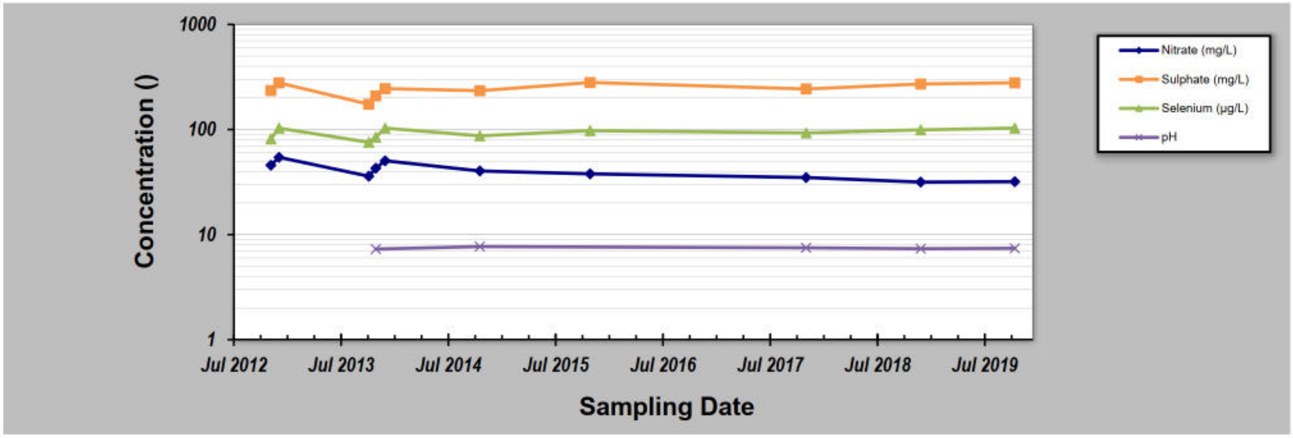
20								
Coefficient of Variation:		0.19	0.14	0.11	0.02			
Mann-Kendall Statistic (S):		-29	16	18	0			
Confidence Factor:		99.5%	90.7%	93.4%	40.8%			
Concentration Trend:		Decreasing	Prob. Increasing	Prob. Increasing	Stable			



Notes:

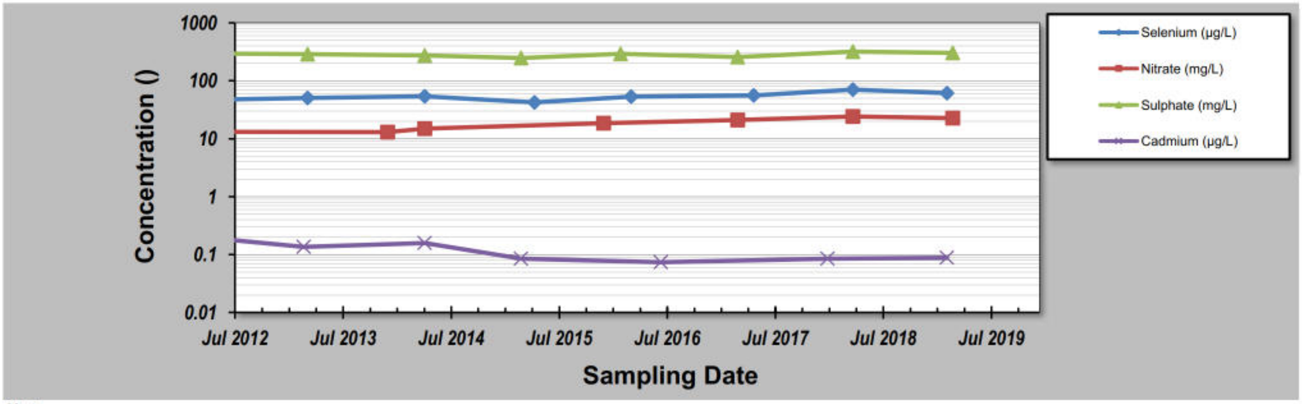
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 18-Nov-21
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: CMH

Job ID: 672386 - Privileged and Confidential
Location FR_FR2 Annual Maximum Concentrations

Parameter (units)		Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	FR_FR2 ANNUAL MAXIMUM CONCENTRATIONS CONCENTRATION						
	26-Mar-12	13.2	296	0.195	46.80			
	19-Feb-13			0.135				
	4-Mar-13		287		50.20			
	2-Dec-13	13						
	7-Apr-14	14.9	272	0.158	54.00			
	2-Mar-15		248	0.085				
	16-Apr-15				42.20			
	8-Dec-15	18.5						
	3-Feb-16		290					
	10-Mar-16				53.40			
	14-Mar-16							
	20-Jun-16			0.0734				
	9-Mar-17	20.9	256					
	2-May-17				55.70			
	9-Jan-18			0.085				
	5-Apr-18	24.2	317		70.30			
	19-Feb-19			0.0885	60.90			
	11-Mar-19	22.8	303					
Coefficient of Variation:		0.25	0.08	0.40	0.16			
Mann-Kendall Statistic (S):		17	4	-10	18			
Confidence Factor:		99.5%	64.0%	90.7%	98.4%			
Concentration Trend:		Increasing	No Trend	Prob. Decreasing	Increasing			



Notes:

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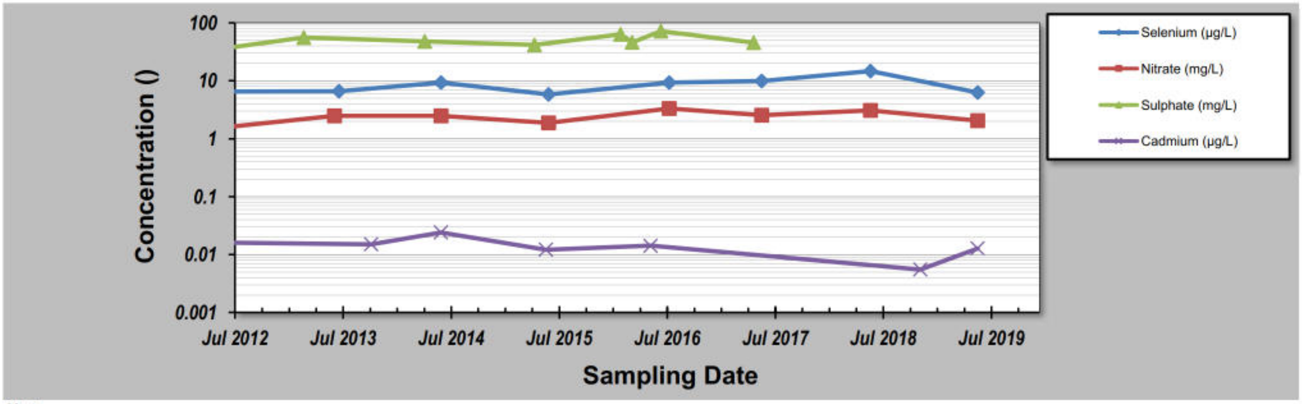
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 18-Nov-21
Facility Name: Teck Coal Regional Groundwater - FRO
Conducted By: CMH

Job ID: 672386 - Privileged and Confidential
Location FR_FR2 Annual Minimum Concentrations

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	**Sampling Date**	**FR_FR2 ANNUAL MINIMUM CONCENTRATIONS CONCENTRATION**						
	25-Jun-12	1.62	32.9	0.016	6.52			
	4-Jun-13	2.47	55.5					
	19-Jun-13				6.63			
	7-Oct-13			0.015				
	2-Jun-14	2.48	47.7	0.024	9.31			
	26-May-15			0.0121				
	3-Jun-15	1.88	41.7		5.78			
	16-May-16			0.0142				
	6-Jun-16		63.5					
	18-Jul-16	3.32			9.25			
	30-May-17	2.53	46.1		9.84			
	4-Jun-18	3.08	72		14.60			
	21-Nov-18			0.0055				
	4-Jun-19	2.05	45.4	0.0128	6.26			
	Coefficient of Variation:	0.24	0.25	0.39	0.34			
	Mann-Kendall Statistic (S):	10	6	-11	8			
	Confidence Factor:	86.2%	72.6%	93.2%	80.1%			
	Concentration Trend:	No Trend	No Trend	Prob. Decreasing	No Trend			



Notes:

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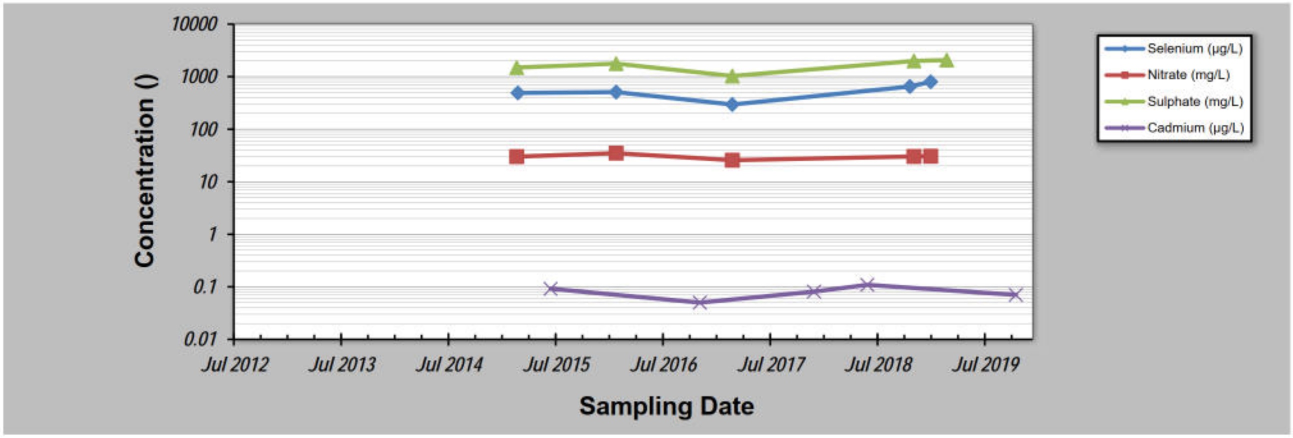
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: **13-Apr-20**
Facility Name: **Teck Coal Regional Groundwater - FRO**
Conducted By: **CMH**

Job ID: **672386 - Privileged and Confidential**
Location **FR_FRCP1 Annual Maximum Concentrations**

	Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	FR_FRCP1 ANNUAL MAXIMUM CONCENTRATIONS CONCENTRATION						
102	26-Feb-15	30.1	1490					
103	2-Mar-15				490.00			
104	22-Jun-15			0.0919				
115	2-Feb-16	35	1770		508.00			
116	15-Nov-16			0.0501				
128	7-Mar-17	25.7	1030		295.00			
129	12-Dec-17			0.0809				
141	13-Jun-18			0.109				
142	6-Nov-18				649.00			
	20-Nov-18	30.3	1990					
	16-Jan-19	30.6			798.00			
	12-Mar-19		2070					
152	4-Nov-19			0.0701				
	Coefficient of Variation:	0.11	0.25	0.28	0.34			
	Mann-Kendall Statistic (S):	2	6	0	6			
	Confidence Factor:	59.2%	88.3%	40.8%	88.3%			
	Concentration Trend:	No Trend	No Trend	Stable	No Trend			



Notes:

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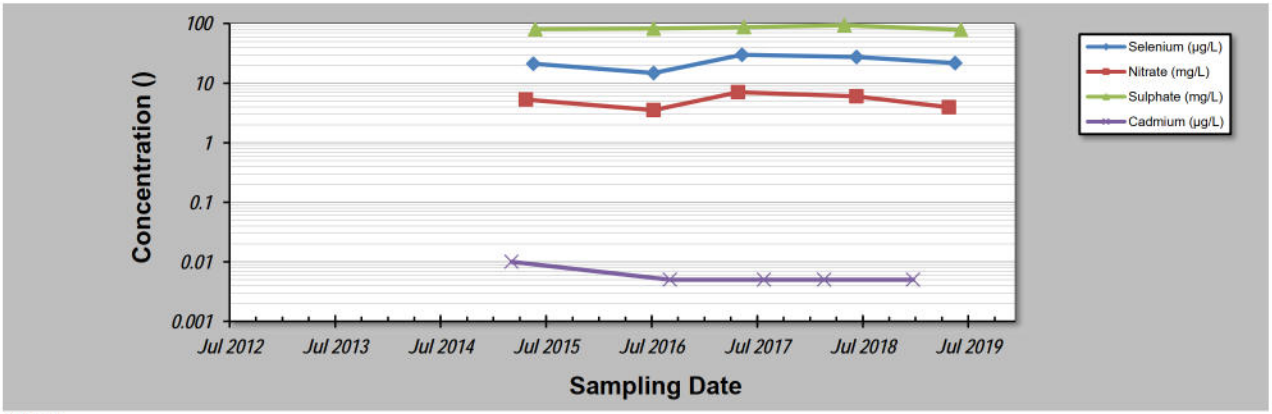
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: **13-Apr-20**
Facility Name: **Teck Coal Regional Groundwater - FRO**
Conducted By: **CMH**

Job ID: **672386 - Privileged and Confidential**
Location **FR_FRCP1 Annual Minimum Concentrations**

Sampling Event	Sampling Date	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
		FR_FRCP1 ANNUAL MINIMUM CONCENTRATIONS CONCENTRATION						
102	11-Mar-15			0.01				
103	30-Apr-15	5.27						
104	26-May-15				21.20			
	2-Jun-15		80.1					
115	18-Jul-16	3.54	82.3		14.80			
116	13-Sep-16			0.005				
128	9-May-17	7.07						
129	23-May-17				30.00			
	30-May-17		87.3					
	8-Aug-17			0.005				
141	6-Mar-18			0.005				
142	15-May-18		93.1					
	26-Jun-18	5.97			27.60			
	9-Jan-19			0.005				
	14-May-19	3.95						
	4-Jun-19				21.60			
152	25-Jun-19		78.8					
Coefficient of Variation:		0.28	0.07	0.37	0.26			
Mann-Kendall Statistic (S):		0	2	-4	2			
Confidence Factor:		40.8%	59.2%	75.8%	59.2%			
Concentration Trend:		Stable	No Trend	Stable	No Trend			



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Appendix II

Potable Well As-Built Drawings

Bill of Material

Item No.	No. Req'd	Material	Description	Pattern or Drawing Number	Supplied or Made by	Date Ordered	Requisition No.

AS-BUILT NOTE

14"¢ WATERMAIN IN FRONT OF WELLS 7A & 8A CHANGED TO 12' OFFSET FROM ℄ OF WELL ENCLOSURES

NOTE

THE OWNER SHALL PROVIDE REFERENCE SURVEY HUBS AND CUT SHEETS IN ORDER FOR THE CONTRACTOR TO CONSTRUCT THE 14"¢ WATERMAIN TO LINE AND GRADE. ALL OTHER LAYOUT REQUIRED SHALL BE COMPLETED BY THE CONTRACTOR.

NOTES

[1] The Owner will supply all ductile iron pipe and cast iron fittings complete with nuts, bolts and gaskets required for the extension of the 14-inch diameter watermain and the connection to each production well and stand pipe.

[2] The submersible pumping units will be supplied by the Owner complete with discharge riser pipe, couplings, support flange assembly and 50 feet of factory spliced power cable. All riser pipe will be supplied pre-cut and threaded to maintain the specified settings for the pumping units. Each section of the riser pipe will be supplied coded by well number.

J. A. WOOD

KERR WOOD LEIDAL ASSOCIATES LTD.
CONSULTING ENGINEERS

K.W.L. DWG. NO. 8.76.40 SHEET 2 OF 12

Project No.
Drawing No.
Revision
Reference

Revisions No.	Made by	Date	Approved	Description
	RK	12/4/77	JAW	AS CONSTRUCTED
Δ	RK	25/4/77	JAW	DRAWING NUMBER REVISED

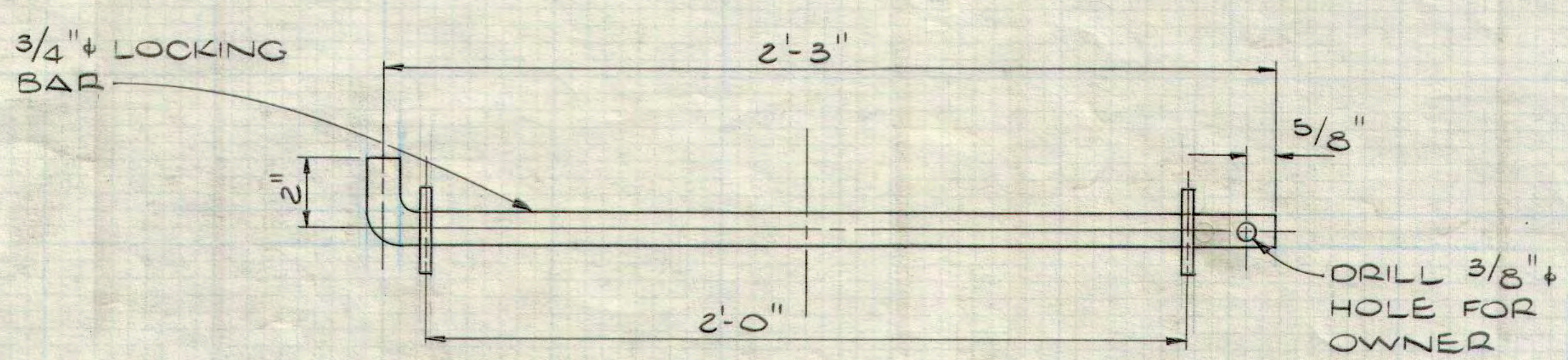
Drawn by RK
Checked by K.A.S.
Design Eng.
Proj. Eng. J.A.W.
Approved JAWood Jan 28/77

fording
COAL LIMITED

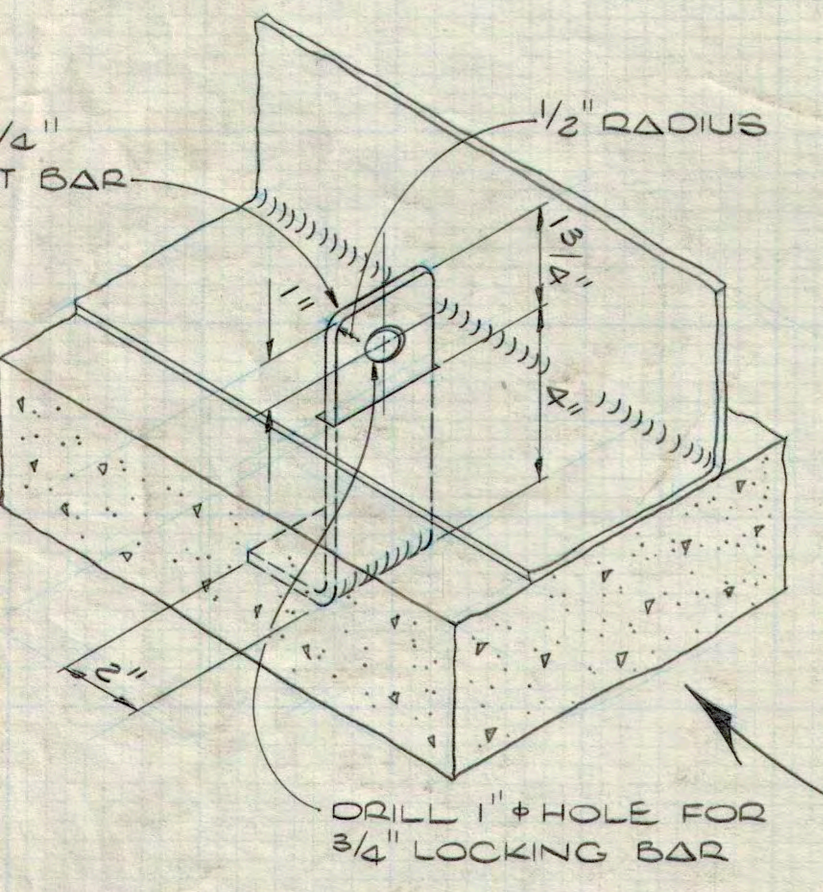
Function FORDING COAL
Activity YARDS AND SERVICES
Section PRIMARY WATER SUPPLY
Job 14"¢ WATERMAIN & WELL DET'S
Scale AS SHOWN
Drawing No. FC1 Δ 1523
Revision A

BCIL 61060-F.C.L.

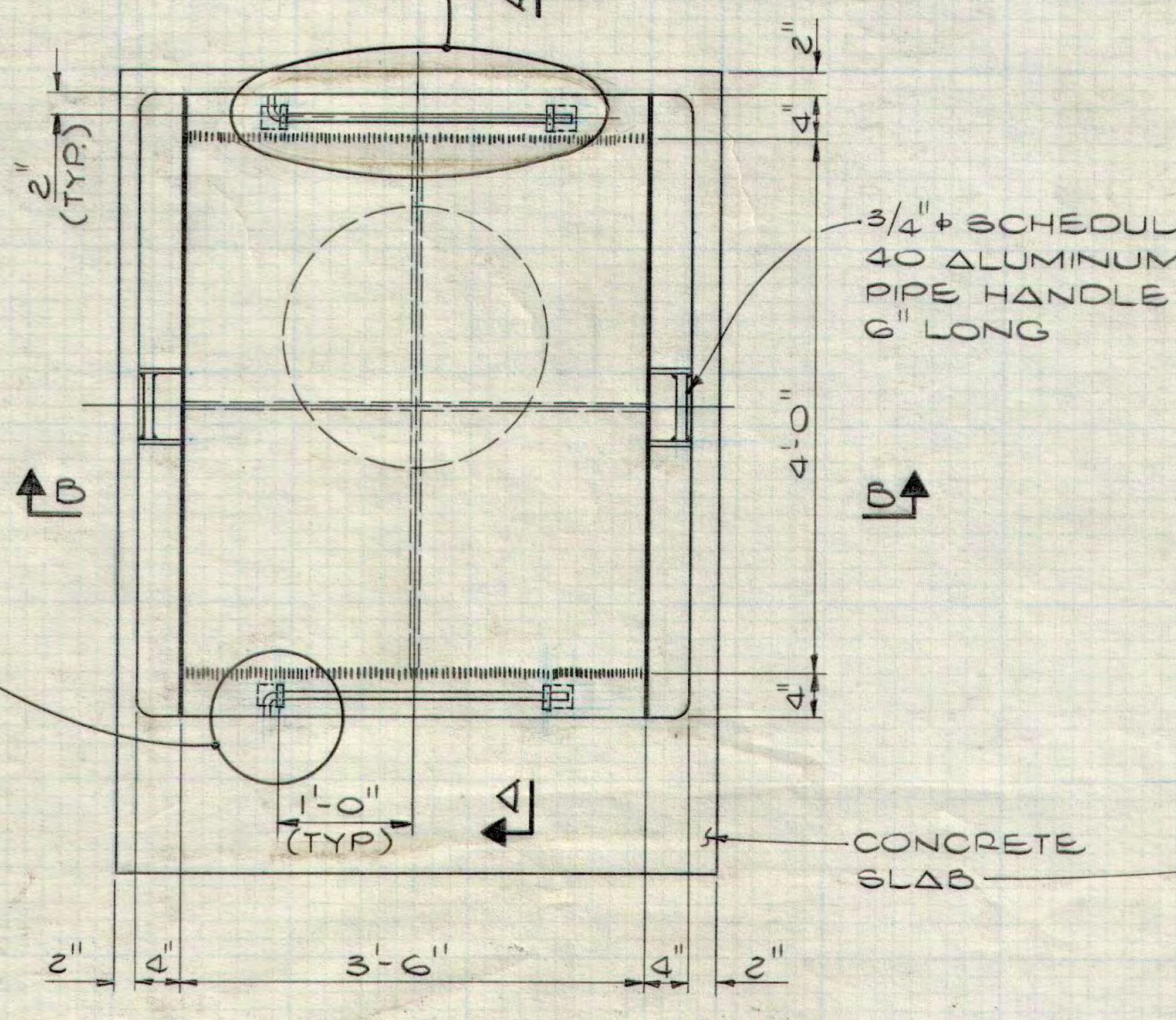
Item No.	No. Req'd	Material	Description	Pattern or Drawing Number	Supplied or Made by	Date Ordered	Requisition No.



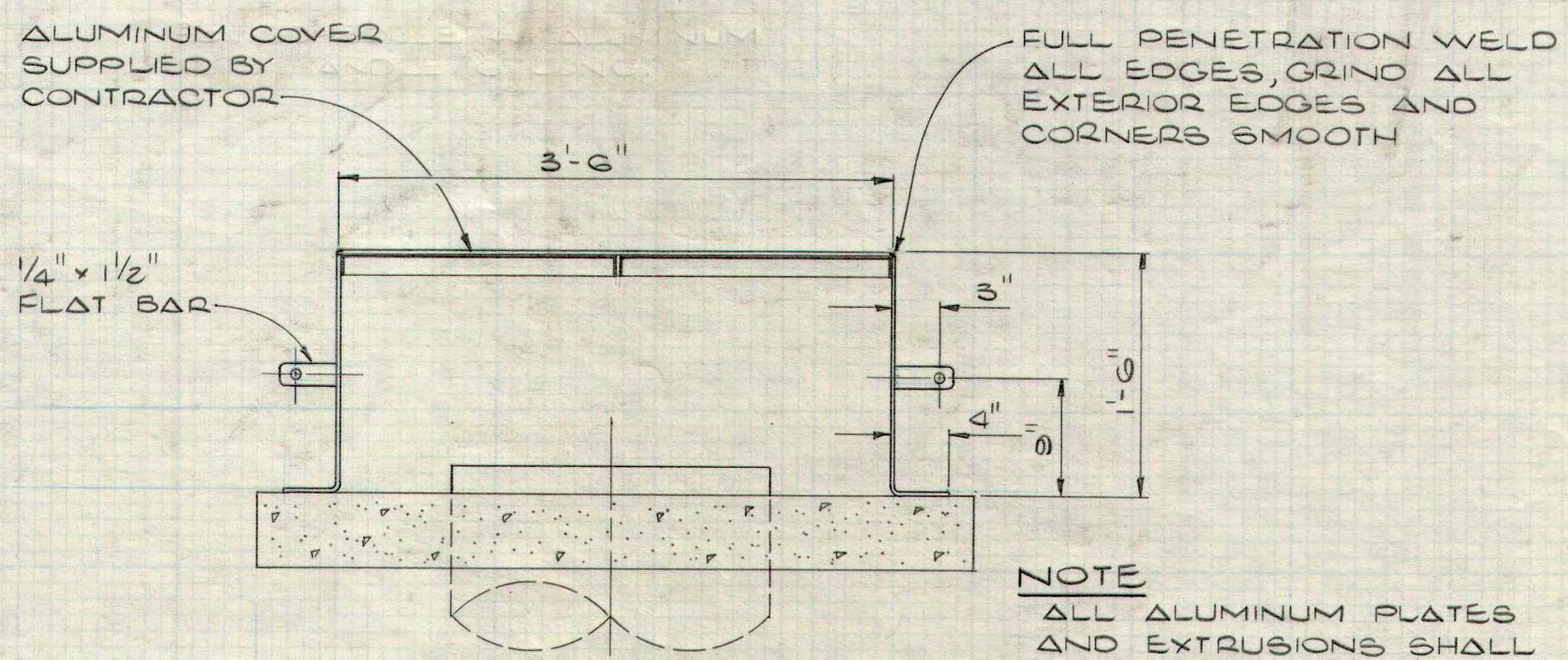
LOCKING BAR DETAIL
N.T.S.



HASP DETAIL
N.T.S.

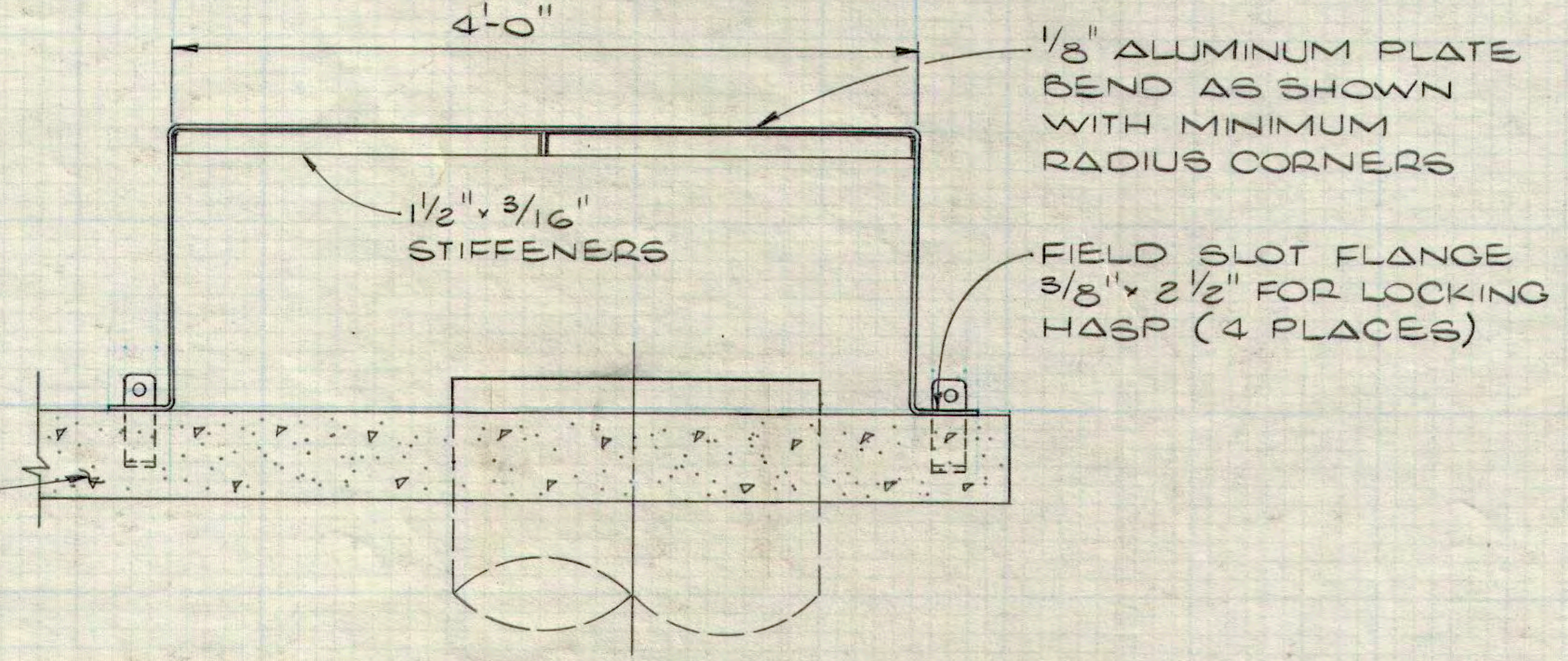


PLAN
SCALE: 3/4"=1'-0"



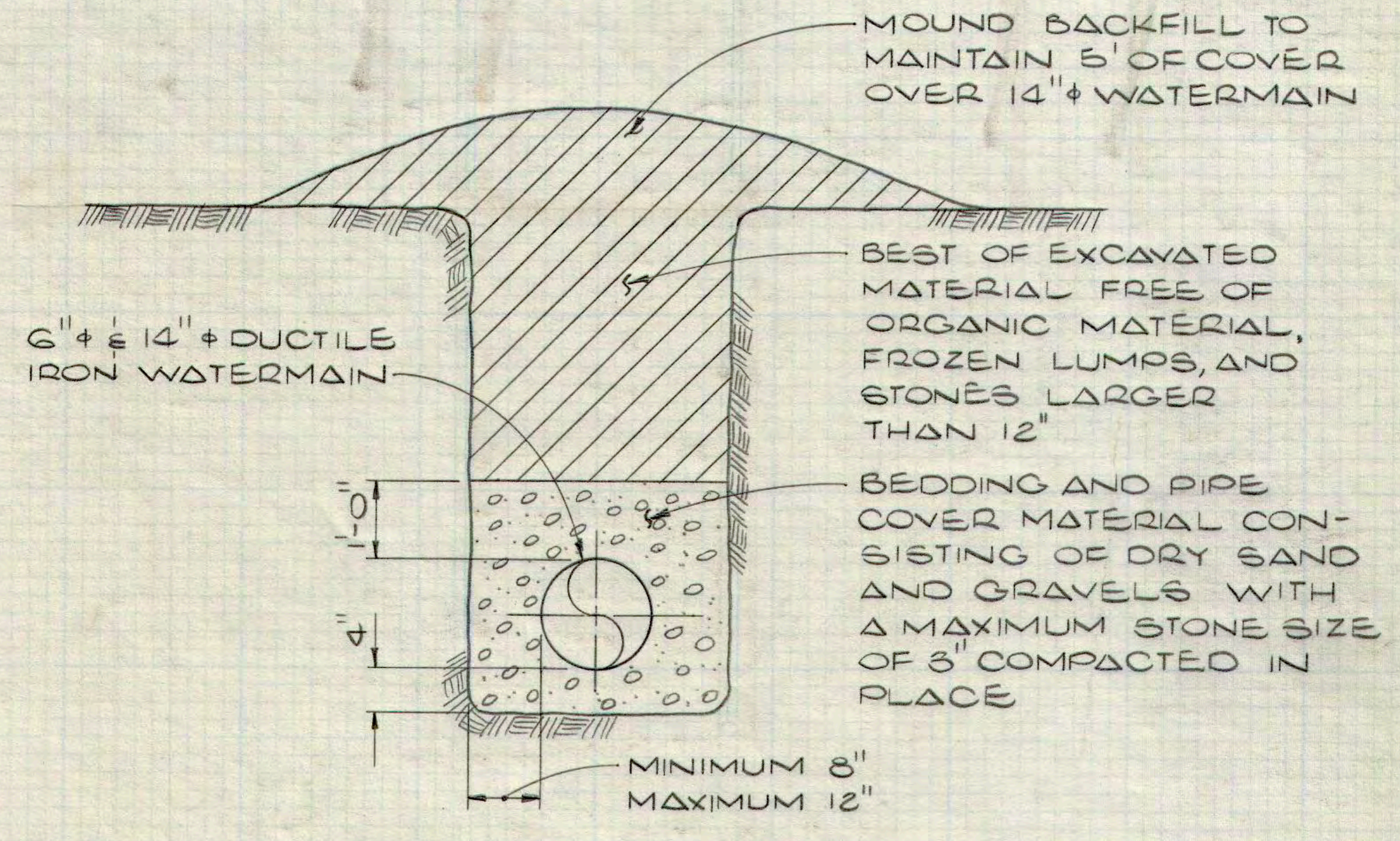
SECTION B-B
SCALE: 1"=1'-0"

NOTE
ALL ALUMINUM PLATES AND EXTRUSIONS SHALL BE MANUFACTURED FROM 65S-T6 ALUMINUM



SECTION A-A
SCALE: 1"=1'-0"

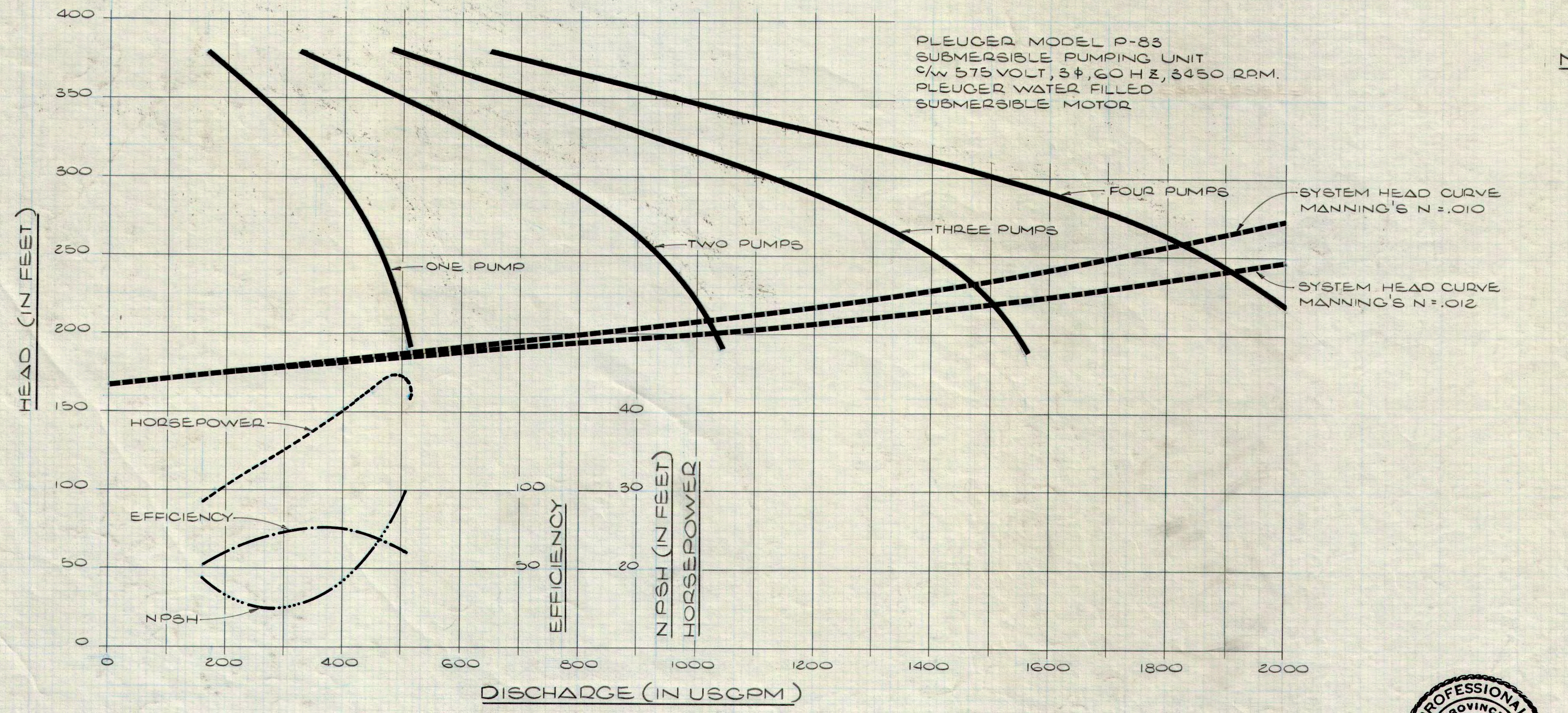
*STANDPIPE COVER DETAIL ⑤/③



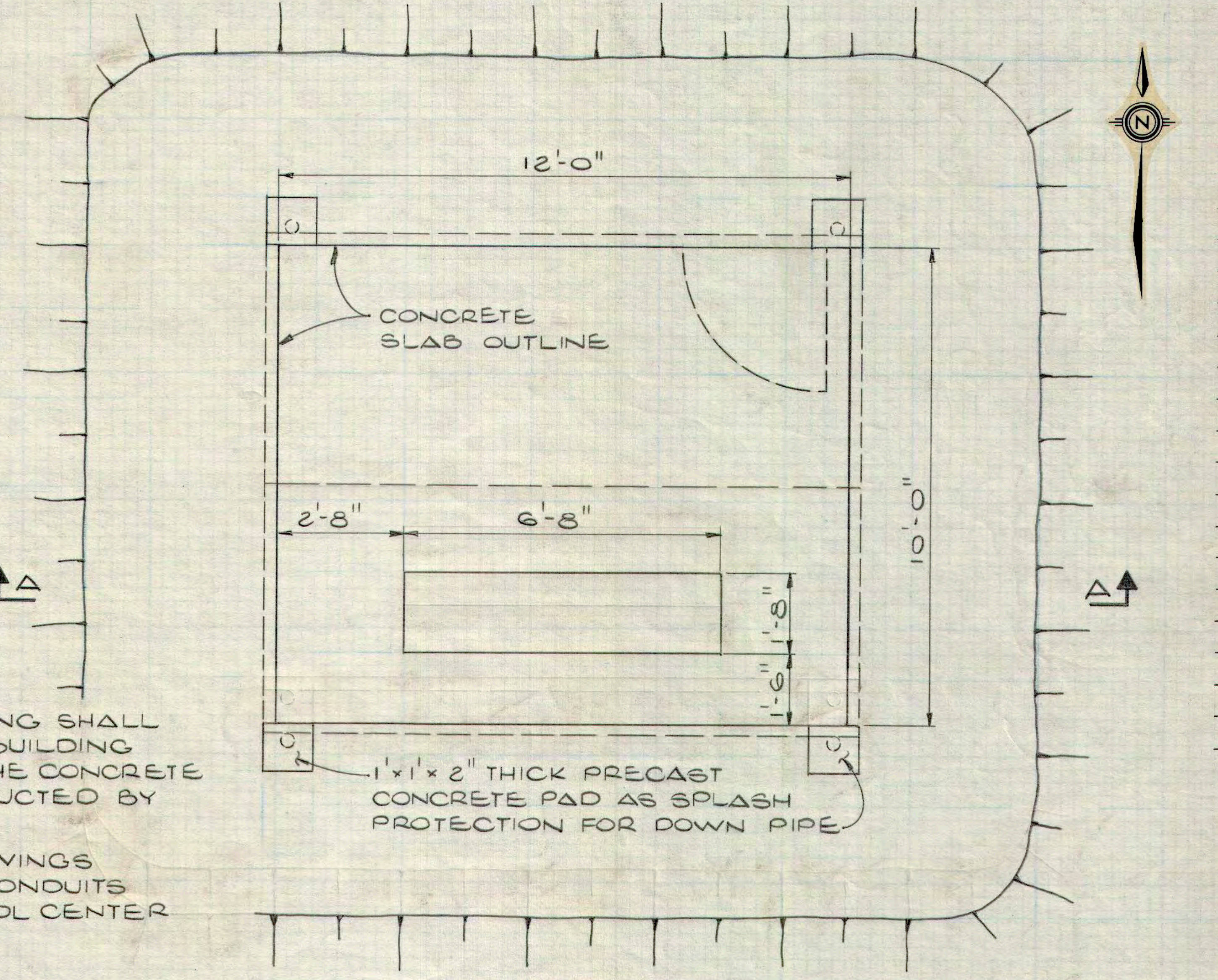
TYPICAL TRENCH CROSS-SECTION
N.T.S.

WELL CAPACITIES (USGPM)
(ALL FOUR PUMPING STATIONS OPERATING IN PARALLEL)

	7A	8A	11A	12A	TOTAL
LOW WATER TABLE (WINTER AND EARLY SPRING)	350	350	500	400	1600
HIGH WATER TABLE (SUMMER AND EARLY FALL)	400	400	500	450	1750

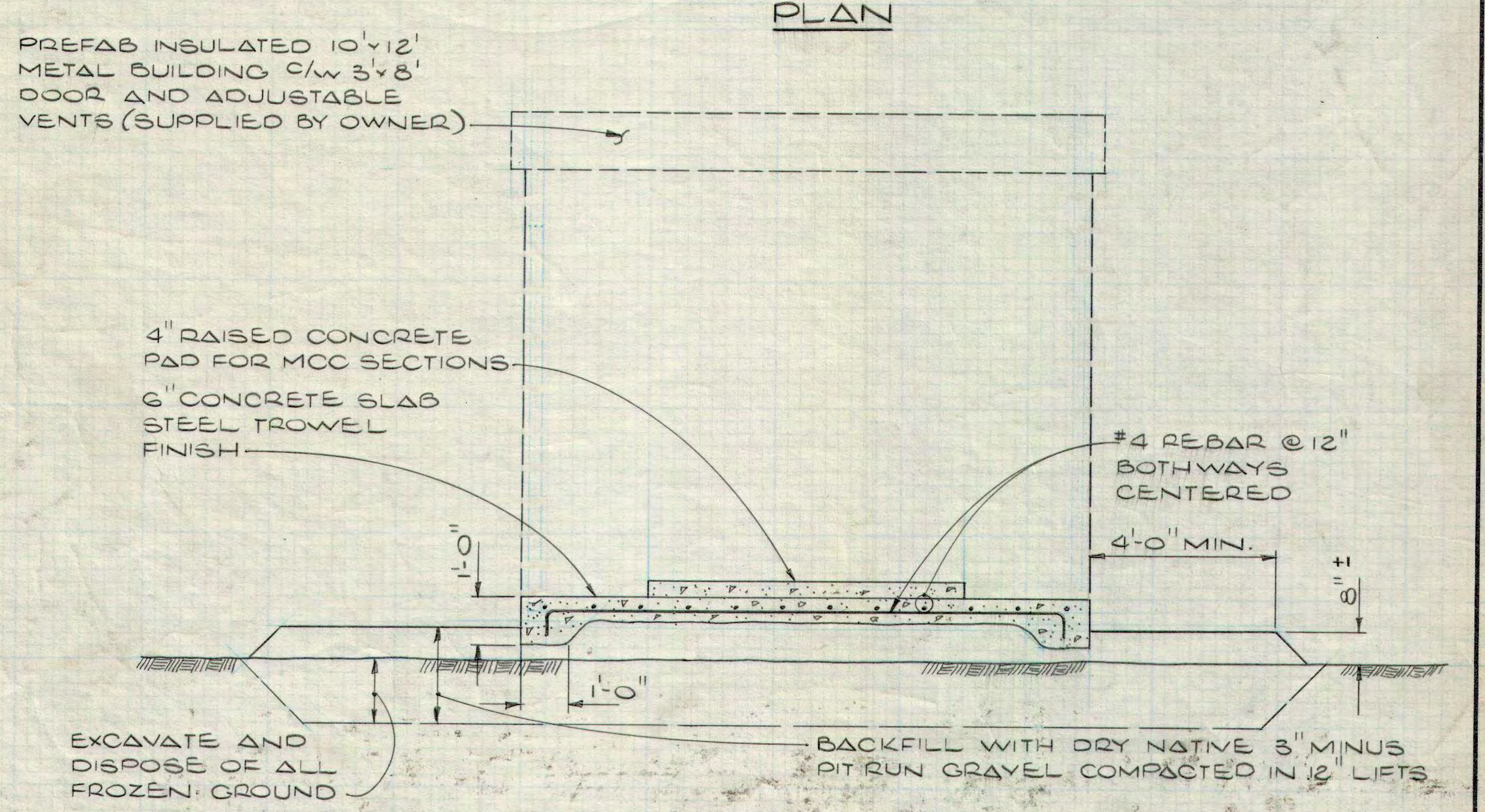


PLEUGER MODEL P-83 SUBMERSIBLE PUMPING UNIT C/W 575 VOLT, 3ϕ, 60 HZ, 3450 RPM. PLEUGER WATER FILLED SUBMERSIBLE MOTOR



NOTE
(1) PREFAB METAL BUILDING SHALL BE ERECTED BY THE BUILDING MANUFACTURER ON THE CONCRETE FOUNDATION CONSTRUCTED BY THE CONTRACTOR.
(2) SEE ELECTRICAL DRAWINGS FOR POSITIONING OF CONDUITS UNDER MOTOR CONTROL CENTER

PLAN



SECTION A-A
ELECTRICAL BUILDING DETAILS
SCALE: 3/8"=1'-0"

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. A. WOOD

KERR WOOD LEIDAL ASSOCIATES LTD.
CONSULTING ENGINEERS

K.W.L. DWG. NO. 8.76.40 SHEET 5 OF 12

Revisions No.	Made by	Date	Approved	Description
	RK	12/4/77	JAW	AS CONSTRUCTED

Drawn by RK
Checked by K.A.S.
Design Eng.
Proj. Eng. J.A.W.
Approved J.A. Wood Jan. 28/77

fording
COAL LIMITED

Function FORDING COAL
Activity YARDS AND SERVICES
Section PRIMARY WATER SUPPLY
Job PUMP DATA & ELEC BLDG. SLAB

Scale AS SHOWN
Drawing No. FC1 A 1524
Revision

SNC·LAVALIN

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