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Technical Report Overview

Report: 2021 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs

Overview: This report presents the 2021 results of the regional groundwater monitoring program and the site-specific programs at Fording River Operations, Greenhills Operations, Line Creek Operations, Elkview Operations, and Coal Mountain mine required under Sections 8.2 and 9.4 of Permit 107517. This report summarizes the results of groundwater quality and quantity in 2021 and compares them to relevant screening values and historical data. It also compares groundwater chemistry to nearby surface water chemistry to understand groundwater transport pathways and groundwater/surface water interaction.

This report was prepared for Teck by SNC-Lavalin Inc.

For More Information
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Future studies will be made available at **teck.com/elkvalley.**

SNC·LAVALIN

2021 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs

Fording River Operations
Greenhills Operations
Line Creek Operations
Elkview Operations
Coal Mountain mine
Regional Groundwater Monitoring Program

VOLUME III OF IV

Prepared for:

Teck Coal Limited

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Appendix X

Line Creek Operations 2021 SSGMP and RGMP Report

- Figures
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- Drawings
- Attachments
  - I. Borehole Logs
  - II. Block Diagrams
  - III. Mann-Kendall Analyses

1 Line Creek Operations SSGMP and RGMP

1.1 Overview

This report presents the results for the 2021 Line Creek Operation (LCO) Site-specific Groundwater Monitoring Program (SSGMP) and the 2021 Regional Groundwater Monitoring Program (RGMP) Study Areas 2, 5, and 6. The basis for the SSGMP and RGMP is the conceptual site model (CSM) presented in the approved 2018 SSGMP Update (Golder, 2019), the 2020 RGMP Update (SNC-Lavalin, 2020a) and the 2021 SSGMP Update (SNC-Lavalin, 2021a).

The LCO SSGMP and RGMP focuses on monitoring groundwater quality in three areas, which are listed from north to south (Drawing LC-01).

1.1.1 Phase II Upper and Lower LCO Dry Creek (Study Area 2)

LCO Dry Creek drains a formerly glaciated valley that is predominantly blanketed with low permeability till and colluvium near the valley flanks. It flows over the LCO Dry Creek alluvial fan before reaching the Fording River floodplain. Fluvial deposits have been mapped near LCO Dry Creek (main report Drawing 4).

The LCO Dry Creek area consists of monitoring upstream (Upper LCO Dry Creek) and downstream (Lower LCO Dry Creek) of the confluence between LCO Dry Creek East Tributary and LCO Dry Creek. LCO Dry Creek flows from the northern end of Phase II mining area and discharges to the Fording River, southeast of Greenhills Operation (GHO). The drainage area associated with LCO Dry Creek contains waste rock from LCO Phase II. Study Area 2 is in the Fording River valley bottom, and receives drainage from LCO Phase II mining area via LCO Dry Creek.

1.1.2 Phase I Line Creek

Within the Phase I Area, the upland areas consist primarily of thin layers of colluvium up to a few metres thick, with thicker deposits of fluvial and/or glaciofluvial sediments in the valley bottoms. Till is also mapped within the upland areas and along the valley flanks.

Near the confluence of West Line and Center Line creeks, there is 3 m of fill material overlying a coarse sand and gravel unit between 15 m and 20 m thick. Further up the West Line and Line Creeks' valley slopes, at a higher elevation on the eastern extent of the drainage, lower permeability materials (e.g., silt or clay) were predominantly encountered to a maximum depth of 44 m (main report Drawing 4).

Line Creek is a tributary of the Fording River. The watercourse flows from northeast to southwest through the LCO Phase I Area, then to the west through a canyon between the Wisukisak and Salter karst potential blocks of the Rundle Group (SNC-Lavalin 2021a; main report Drawing 6). Line Creek is the key feature that defines the monitoring areas of Phase I. For this SSGMP, Phase I is separated into five subareas: Upper Line Creek; Center Line Creek (both North and South); West Line Creek; and Lower Line Creek. Except for subarea 'West Line Creek' (which is a recognized tributary of Line Creek), all the subareas are directly related to portions of Line Creek proper. The references of 'upper', 'center' and 'lower' were defined by Line Creek's subwatersheds classification, as shown on Drawing LC-02.

1.1.3 Process Plant and Elk Valley (Study Areas 5 and 6)

The Process Plant Area represents a valley bottom hydrogeological setting, consisting of glaciofluvial deposits overlying bedrock of the Fernie Formation and Spray River group. Surficial mapping indicated the LCO Process Plant sits on a till sequence of up to 38 m thick, overlying sands and gravels and bedrock. Significant thicknesses of sand with some gravel and cobbles (up to 55 m) have been noted where the till (silts and clays) is absent. Surficial geology beneath Grave Lake is morainal or till, and Grave Lake may be a kettle feature (main report Drawing 4).

Lower Line Creek flows into the Fording River over an alluvial fan, north of the Process Plant Area. A portion of Line Creek surface flow infiltrates into the alluvial fan near the confluence of Line Creek and Fording River and contributes to the Fording River valley bottom groundwater. The remaining surface water flow enters the Fording River, which then discharges into the Elk River.

Study Area 5 is in the Fording River valley bottom and includes Lower Line Creek and a portion of the Fording River. It is also near the Line Creek alluvial fan. Study Area 5 was selected (SNC-Lavalin, 2015) to assess possible input of order constituents (OC) from Line Creek and from the LCO Process Plant may be occurring in Fording River valley bottom.

Study Area 6 spans the Elk River valley bottom and is downgradient of the LCO Process Plant.

1.1.4 Linkages Between the LCO SSGMP and RGMP Study Areas

Table A presents linkages between the LCO SSGMP and RGMP Study Areas. Results and discussion of the LCO SSGMP and RGMP have been structured by geographical subareas provided in Table A below and are displayed visually on Drawing LC-02.

Table A: SSGMP Tributary Watersheds and Relevant RGMP Study Areas

Areas	Subareas	Study Area
LCO Phase II Dry Creek	› Upper LCO Dry Creek	-
	› Lower LCO Dry Creek	Study Area 2
LCO Phase I Line Creek	› Upper Line Creek (Tornado Creek) › Center Line Creek (North) › Center Line Creek (South) › West Line Creek › Lower Line Creek to LC_LC4	-
Process Plant and Elk Valley	› Northeast of Process Plant	Study Area 5
	› Process Plant	-
	› Southeast of Process Plant	-
	› Southwest of Process Plant	Study Area 6

1.2 Groundwater Monitoring Locations

Tables 1 and 4 in the main report provide a list of monitoring wells associated with each program and a monitoring and/or sampling rationale for each location. Drawing LC-01 shows the location of monitoring wells relative to key surface water and mine site features. Additional well details are provided in Table LC-01. Manually-obtained depths to groundwater (converted to groundwater surface elevations) from 2021 and calculated vertical gradients are provided in Table LC-02. Borehole logs are presented in Attachment I. Block Diagrams are provided in Attachment II and Mann-Kendall trend analyses are provided in Attachment III. A site plan is provided in Drawing LC-01. Fourth quarter groundwater elevations and inferred flow directions are presented on Drawings LC-02 and cross-sections showing well completions, stratigraphy, and groundwater surface elevations are presented on Drawings LC-03 to -10. Drawings LC-11 to -14 provide a spatial summary of 2021 OC concentrations.

In the most recent Update report (submitted in Q4 2021 pending regulatory approval; SNC-Lavalin, 2021a), there were several monitoring locations across LCO that were proposed for SSGMP and RGMP inclusion. Recommendations presented in the 2021 Update indicated the SSGMP and RGMP would be augmented to include data from the proposed monitoring locations beginning in 2022, pending approval. However, to be proactive, Teck is presenting 2021 data, where available, from those proposed locations.

1.3 Program Modifications

For this 2021 LCO SSGMP, data from the approved groundwater well network (based on the 2018 Update Report; SNC-Lavalin 2018) is presented herein. Table B and Table C provide summaries and discussions of modifications to the RGMP and SSGMP, respectively.

Table B: RGMP Study Areas – Summary of Program Modifications

#	Well ID	Q[a]	Modification	Reason
1	RG_MW_DC1A RG_MW_DC1B	3, 4	Well pair installed in Q3.	Monitor and assess surface water-groundwater interactions in Study Area 2.

Notes:
[a] Q denotes Quarter (Q1, Q2, Q3, Q4) in which the modification was implemented.

Table C: SSGMP Study Areas – Summary of Program Modifications

#	Well ID	Q[a]	Modification	Reason
1	LC_MW_LC1-1A LC_MW_LC1-2A LC_MW_LC1-3A	4	Three wells installed in Q4.	Monitor and corroborate surface water-groundwater interactions near the Tornado and Upper Line Creek confluence. Review findings and evaluate new monitoring locations to be incorporated into the SSGMP, as appropriate.
2	WL_MW-15-02-B	1, 2, 3, 4	Added existing well to program.	Monitor groundwater near the former AWTF (Active Water Treatment Facility) residual Landfill.

Table C (Cont'd): SSGMP Study Areas – Summary of Program Modifications

#	Well ID	Q[a]	Modification	Reason
3	LC_MW_CP1A LC_MW_CP1B	3, 4	Well pair installed in Q3.	Monitor and assess groundwater downstream of the AWTF as well as the surface water - groundwater interactions with Line Creek at LC_LCDSSLCC.
4	LC_PIZP1101	4	Well repaired in Q4.	Well found damaged and repair attempted in Q4.

Notes:
[a] Q denotes Quarter (Q1, Q2, Q3, Q4, 2021) in which the modification was implemented.

1.4 LCO Phase II Upper and Lower LCO Dry Creek Watershed (Study Area 2)

A summary of 2021 groundwater monitoring and sampling results for the Upper and Lower LCO Dry Creek subareas, including Study Area 2, is presented in Table D with references to supporting information (Drawings, Figures, Tables, and Attachments).

Table D: Summary of 2021 Groundwater Monitoring and Sampling Results for LCO Phase II Upper and Lower LCO Dry Creek Watershed (Study Area 2)

Hydrogeological Information		Description	Reference
Monitoring Location	Relevant RGMP/SSGMP Wells (Study Area 2)	**Upper LCO Dry Creek:** LC_PIZDC0901, LC_PIZDC1306, LC_PIZDC1307, LC_PIZDC1308, LC_PIZDC1404S, and LC_PIZDC1404D **Lower LCO Dry Creek:** RG_MW_DC1A and RG_MW_DC1B	Table LC-01 Drawings LC-01 and 03
	Other Relevant Monitoring Wells	None	
	Relevant Surface Water Monitoring Stations	LC_DC1, LC_DC2, LC_DC3, LC_DC4, and LC_FRDSDC	
	Relevant Seep Monitoring Locations	LC_SEEP8	
Physical Hydrogeology	Groundwater Elevation Trends	› Rapid responses to seasonal changes in surface water and groundwater, even at deep wells. › **Highest Levels**: late-March to June (freshet). › **Lowest Levels:** mid-March. › **Water Level Change:** 0.89 m to 6.22 m. › Monitoring well LC_PIZDC1306 continues to undergo seasonal artesian conditions. The typical seasonal decline was not observed (levels remained high in November). › Continuous water level data barometrically corrected with the GH_MW-GHC-1A barologger.	Table LC-02 Drawing LC-02 Figures LC-01 and 02
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradients:** – RG_MW_DC1A (deep) and RG_MW_DC1B (shallow): >0.5 m/m upwards (Note: RG_MW_DC1A is artesian, with depths to groundwater above the well's surface elevation. The vertical gradient was estimated using well's ground surface elevation to provide a minimum gradient value); – LC_PIZDC1307 (deep) and LC_PIZDC1308 (shallow): -0.008 to -0.1 m/m downwards, except May 1st to 13th 0.006 m/m upwards (freshet); and – LC_PIZDC1404S (shallow) and LC_PIZDC1404D (deep): -0.03 to -0.05 m/m downwards. › **Flow Direction:** – Shallow groundwater is inferred to be locally influenced by LCO Dry Creek, with a perpendicular component near the LCO Dry Creek alluvial fan (inferred north, parallel to the LCO Dry Creek Valley bottom).	
Chemistry	2021 SSGMP/RGMP OC Results	› All OC concentrations were less than primary and secondary screening criteria.	Table D Tables LC-03 to 05 Drawings LC-11 to 14 Figures LC-03 to 06
	Non-Order Mine-Related and Naturally Occurring Constituents	› **Greater than Primary Screening Criteria:** – Barium: LC_PIZDC1307 (Q1 to Q4) and LC_PIZDC1404D (Q1 to Q4); – Lithium: All wells except LC_PIZDC0901 (Q1 to Q4) and LC_PIZDC1404S (Q1 to Q4); and – Molybdenum: LC_PIZDC1307 (Q1 to Q4) and LC_PIZDC1404D (Q1 to Q4). › Based on the Background Groundwater Assessment (BGA) completed for the 2020 RGMP Update (SNC-Lavalin, 2020a), barium, lithium, and molybdenum were identified as non mine-related. › All other constituents were less than the primary screening criteria.	Tables LC-03 to 05
	Mann-Kendall Trend Analysis	› Insufficient data to complete trend analysis at RG_MW_DC1A and RG_MW_DC1B as the wells were installed in Q3, 2021. › Trend analysis at LC_PIZDC1307 and LC_PIZC1404S for dissolved cadmium and selenium have not been conducted as concentrations have been consistently less than laboratory reported detection limit. › Probably increasing trend: LC_PIZDC1306 (Nitrate-N); however, concentrations have been less the primary screening criteria. › Concentrations of all other OC have been non-trending, stable, or decreasing.	Table E Appendix III

A summary of results for OC compared to primary screening criteria is presented in Table E below.

Table E: Summary of OC Compared to Primary Screening Criteria in LCO Phase II Upper and Lower LCO Dry Creek Watershed (Study Area 2)

Parameter / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Lower LCO Dry Creek (Study Area 2)																
RG_MW_DC1A	NS	NS	-	-	NS	NS	-	-	NS	NS	-	-	NS	NS	-	-
RG_MW_DC1B	NS	NS	-	-	NS	NS	-	-	NS	NS	-	-	NS	NS	-	-
Upper LCO Dry Creek																
LC_PIZDC0901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_PIZDC1306	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_PIZDC1307	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_PIZDC1308	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_PIZDC1404S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_PIZDC1404D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSR AW	400				1,280 – 4,290*				0.5 – 4*				20			
CSR IW	n/s				n/s				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			

Notes:
Primary screening criteria applied are CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)*.
'–' denotes result less than primary screening criteria for given constituents.
Where a duplicate was collected, the higher concentration is provided in table. If more than one sample collected in a quarter, the higher of the two samples is provided in the table.
* Standard varies with hardness.
'NS' denotes no sample. 'n/s' denotes no standard.

According to Technical Guidance Document 15 (BC ENV, 2017), water from a groundwater well may be subject to the British Columbia (Approved and Working) Water Quality Guidelines (BC WQGs) if the groundwater well is within 10 m of the high-water mark of an aquatic receiving environment. An aquatic receiving environment is defined by Procedure 8 (BC ENV, 2021) as any surface water, watercourse, wetland, sediment or porewater containing aquatic life, and the 10 m distance is defined in TG15 as applicable to an area that is not a maintained watercourse. Currently, additional field validation is required to determine if monitoring wells RG_MW_DC1A and RG_MW_DC1B are located within 10 m of an aquatic receiving environment. In 2022, Teck will conduct a hydrologic survey to confirm the location of the high-water mark. If the hydrologic surveys determine that the well locations are within 10 m of the high-water mark, future reporting will be updated to reflect the appropriate guideline.

Mann-Kendall trend analyses were completed for data from wells in the Upper and Lower LCO Dry Creek watershed. A summary of the trend analysis results is provided in Table F and results indicated similar trends as those reported for the 2020 program.

Table F: Summary of Mann-Kendall Trend Analysis for OC in the LCO Dry Creek Watershed

Parameter / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
Upper LCO Dry Creek				
LC_PIZDC0901	Decreasing	Stable	No Trend	No Trend
LC_PIZDC1306	Probably Increasing	Stable	No Trend	No Trend
LC_PIZDC1307	No Trend	Stable	-	-
LC_PIZDC1308	Decreasing	No Trend	Stable	Decreasing
LC_PIZDC1404S	No Trend	Decreasing	-	-
LC_PIZDC1404D	Probably Decreasing	No Trend	No Trend	No Trend

Notes:
'–' denotes Mann-Kendall trend analysis was not completed as concentrations were consistently less than or marginally greater than the detection limit.
Where increasing trends are noted, the cell is shaded yellow.

1.4.1 Discussion

In 2021, groundwater samples from Upper LCO Dry Creek (LC_PIZDC0901, LC_PIZDC1306, LC_PIZDC1307, LC_PIZDC1308, LC_PIZDC1404S, and LC_PIZDC1404D) and Lower LCO Dry Creek (RG_MW_DC1A and RG_MW_DC1B) were less than the primary screening criteria for all OCs (Tables LC-03 and -04, Figures LC-03 to -05 and Drawings LC-11 to -14).

1.4.1.1 Upper LCO Dry Creek

The dissolved selenium to sulphate ratio plot for surface water and groundwater were similar to 2020 (Figure LC-06). Surface water continues to plot along or near the mixing line, suggesting mine influences. Most groundwater and LC_SEEP8 continued to plot in the natural non-contact water range, except for LC_PIZDC1306 (June and September) samples, where results indicated mixing with mine-influenced water. Groundwater from this well in 2020 also was indicative of mixing, but in September and December.

As observed in previous years data, the 2021 OC concentrations in groundwater at all monitored locations were less than those in surface water (at all monitored locations; Figures LC-03 to -05). OC concentrations in groundwater have been relatively low (i.e., near the detection limit) and stable since December 2014, and lower than concentrations measured in LCO Dry Creek surface water. Selenium concentrations in LCO Dry Creek surface waters were 2- to 40-times higher than in groundwater and have increased since 2017 (Figure LC-03). Seasonality was observed both in the groundwater levels and the concentrations of dissolved selenium and nitrate-N, which generally peaked in Q2 and coincided with freshet. As concentrations in groundwater have not been increasing over time, there appears to be sufficient buffering of surface water inputs. Also, given the rapid rise and fall in water levels during spring melt, the period of maximum downward pressure is expected to be limited. Surface water is the primary pathway for OCs to the Fording River valley bottom.

The flow accretion study results suggested portions of the Upper LCO Dry Creek watershed where LCO Dry Creek meets the East Tributary was a net water loser (23 % in November 2018; Drawing LC-02; Golder, 2020; SNC-Lavalin, 2020c). Locally, clustered well pairs (LC_PIZDC1307/LC_PIZDC1308 and LC_PIZDC1404S/LC_PIZDC1404D) indicated weak to strong downward gradients, which supported the accretion study interpretations; however, OC concentrations in groundwater have been less than surface water (Table LC-02).

The furthest upgradient well (LC_PIZDC1306) and the furthest downgradient well (LC_PIZDC0901) both had high Oxygen Reduction Potential (ORP) and Dissolved Oxygen (DO) concentrations year-round, indicating oxygenating conditions. These wells were completed at total depths of 16 and 9 m below ground surface (mBGS), respectively. The magnitude of seasonal change in OC concentrations was less at the deeper well (LC_PIZDC1306).

Inversely, groundwater at both the shallow and deep wells at LC_PIZDC1404 indicated reducing conditions year-round, but with increased oxygenation in Q4 in the shallow well (ORP of -9 mV, DO of 0.73 mg/L). This corresponded with an increase in nitrate-N concentrations; however, there were no corresponding increases in dissolved selenium or sulphate concentrations in Q4. These wells are located upstream of where the LCO Dry Creek East Tributary discharges into LCO Dry Creek.

Groundwater conditions at well pair LC_PIZDC1307 and LC_PIZDC1308 indicated that deeper groundwater had low ORP and DO concentrations year-round (reducing conditions), while the shallow groundwater conditions varied. ORP values at LC_PIZDC1308 were lowest in Q1 with - 107 mV, then rose to 199 mV in Q2 and declined in Q3 and Q4. This well was completed at a total depth of 9 m. Seasonality was observed for dissolved selenium and nitrate-N concentrations, which coincided with the highest ORP value. Seasonality in sulphate concentrations was also observed, but muted, compared to the other two OCs. These wells are located where Dry Creek East Tributary discharges into LCO Dry Creek. This tributary provides a significant portion of water to LCO Dry Creek flows.

As indicated above, most groundwater continued to plot in the natural non-contact water range. Concentrations of molybdenum that exceeded the primary screening criteria at LC_PIZDC1307 and LC_PIZDC1404D were therefore inferred to be natural. Although molybdenum has been identified as a component of the antiscalant uses for calcite prevention (Azimuth, 2021), the elevated concentrations of molybdenum are interpreted to be naturally occurring. The 2020 RGMP BGA concluded that molybdenum can also occur and elevated naturally in the Elk Valley (SNC-Lavalin, 2020a).

The Mann-Kendall analysis indicated a Probably Increasing trend concentration for Nitrate-N at LC_PIZDC1306; however, concentrations were an order of magnitude less than primary screening criteria (Table F, Attachment III).

1.4.1.2 Lower LCO Dry Creek (Study Area 2)

The RGMP network was expanded in 2021 with the drilling and installation of a monitoring well cluster in Study Area 2 (RG_MW_DC1A and RG_MW_DC1B), where LCO Dry Creek discharges to the Fording River (Drawing LC-01). This work was conducted to better understand the groundwater - surface water interactions of mapped permeable fluvial sediments (the LCO Dry Creek alluvial fan). Over the alluvial fan, LCO Dry Creek was expected to lose water by infiltration (Drawing LC-02) (Golder, 2020; SNC-Lavalin, 2020c). Both wells are potentially located within 10 m of the LCO Dry Creek high-water mark.

The deep well (RG_MW_DC1A) was screened across sand and gravel / gravelly silt units with a total depth of 20 m, while the shallow well (RG_MW_DC1B) was screened across a sand and gravel unit at 6 m depth (Drawing LC-03, Attachment I). A silt layer separates the upper and lower sand and gravel units, although its lateral extent is unknown. The vertical hydraulic gradient was strongly upwards and the deeper well exhibited hydrostatic pressures above ground surface (i.e., artesian; Table LC-02).

The selenium to sulphate ratios for groundwater at the new wells plot inside the defined range of natural (non-contact) water (Figure LC-06).

Surface water losses within Lower LCO Dry Creek, at the confluence with the Fording River (as estimated by Golder, 2020; SNC-Lavalin, 2020c), have not been confirmed by the new well data.

1.5 LCO Phase I Line Creek Operations

A summary of 2021 groundwater monitoring and sampling results for the Phase I operations, including subareas Upper Line Creek, Center Line Creek North, Center Line Creek South, West Line Creek, and Lower Line Creek to surface water station LC_LC4, are presented in Table G with references to supporting information (Drawings, Figures, Tables, and Attachments). Lower Line Creek includes the former AWTF residual landfill area. Reporting groundwater quality monitoring of the Phase I Area, as part of the SSGMP for LCO, is new for the 2021 annual report. The inclusion of LCO Phase I Area is based on the 2021 SSGMP Update which identified potential sources and transport pathways of OCs in this area.

Table G: Summary of 2021 Groundwater Monitoring and Sampling Results for LCO Phase I

Hydrogeological Information		Description	Reference
Monitoring Location	Relevant SSGMP Wells	**Upper Line Creek (Tornado Creek):** LC_MW_LC1-1A, LC_MW_LC1-2A, and LC_MW_LC1-3A **Lower Line Creek to LC_LC4:** WL_MW-15-02-B, LC_MW_CP1A, and LC_MW_CP1B	Table LC-01 Drawings LC-01, 04 to 06
	Other Relevant Monitoring Wells[a]	**Center Line Creek (North):** LC_PIZM0903 **Center Line Creek (South):** LC_MW20_01, LC_MW20_02A, LC_MW20_02B, LC_MW20_03, LC_PIZ1211N, and LC_PIZ1212 **West Line Creek:** LC_PIZ1206A, LC_PIZ1206C, LC_PIZ1207A, LC_PIZ1207B, LC_PIZ1210B, LC_PIZ1210C, LC_MW_WLC-1A, LC_MW_WLC-2A, and LC_MW_WLC-3A **Lower Line Creek to LC_LC4:** WL_MW-15-02-A and WL_MW-15-04-B	
	Relevant Surface Water Monitoring Stations	**Center Line Creek (North):** LC_LC2 **Center Line Creek (South):** LC_LCUSWLC, and LC_LC3 **West Line Creek:** LC_WLC **Lower Line Creek to LC_LC4:** LC_LCDSSLCC, LC_BR7, and LC_LC4	
Physical Hydrogeology	Groundwater Elevation Trends	› Groundwater Follows Topography: – **Highest Elevation:** Upper Line Creek at 1639 m above sea level (asl); – **Lowest Elevation:** Lower Line Creek at LC_MW_CP1B at 1397 m asl; and – **Water Level Range:** 0.03 m to 2.84 m; geomean of 0.46 m. › Groundwater levels generally peaked in Q3, but later in Q4 in the shallow aquifer well in West Line Creek (LC_PIZ1206A).	Table LC-02 Drawing LC-02
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradients:** – LC_MW20_02A (deep) and LC_MW20_02B (shallow): -0.004 to -0.01 m/m downwards; – LC_PIZ1206A (shallow) and LC_PIZ1206C (deep): -0.5 to -0.6 m/m downwards; – LC_PIZDC1404S (shallow) and LC_PIZDC1404D (deep): -0.04 to -0.05 m/m downwards; – WL_MW-15-02-A (deep) and WL_MW-15-02B (shallow): -0.3 and -0.4 m/m downwards; and – LC_MW_CP1A (deep) and LC_MW_CP1B (shallow): 0.04 m/m upwards. › **Flow Direction:** – Groundwater flow is interpreted to generally follow topography, flowing towards Line Creek along the valley sides, and parallel to Line Creek along the valley bottom; – Horizontal gradients could not be calculated due to well spatial distribution and completion in different water-bearing zones; and – West Line Creek: groundwater in the basal aquifer flows southeast, towards Line Creek. Groundwater in the perched aquifers is also expected to flow similarly.	
Chemistry	2021 SSGMP/RGMP OC Results	› **Greater than Primary Screening Criteria:** – Nitrate-N: LC_MW20_01 (Q1 to Q4), LC_MW20_02B (Q1 to Q3), LC_PIZ1206A (Q1, Q2), LC_PIZ1211N (Q1 to Q4), and LC_PIZ1212 (Q1 to Q4); – Sulphate: LC_PIZ1206A (Q1 to Q4); and – Dissolved selenium: LC_MW20_01 (Q1 to Q4), LC_MW20_02B (Q1 to Q4), LC_PIZ1206A (Q1 to Q4), LC_PIZ1206C (Q1 to Q4), LC_PIZ1211N (Q1 to Q4), LC_PIZ1212 (Q1 to Q4), WL_MW-15-02B (Q2, Q4), LC_MW_CP1A (Q3, Q4), and LC_MW_CP1B (Q3, Q4). › **Greater than Secondary Screening Criteria (dissolved selenium):** – LC_MW20_01 (Q1, Q2, Q4), LC_PIZ1206A (Q1 to Q4), LC_PIZ1206C (Q1 to Q4), LC_PIZ1211N (Q1 to Q4), LC_PIZ1212 (Q1 to Q4), and LC_MW_CP1A (Q3, Q4).	Table H Tables LC-03 to 05 Drawings LC-11 to 14 Figures LC-07 to 10

Table G (Cont'd): Summary of 2021 Groundwater Monitoring and Sampling Results for LCO Phase I

Hydrogeological Information		Description	Reference
Chemistry (Cont'd)	Non-Order Mine -Related and Naturally Occurring Constituents	› **Greater than Primary Screening Criteria:** – Barium: WL_MW-15-04-B (Q4); – Iron: WL_MW-15-04-B (Q2, Q4); – Lithium: all samples except WL_MW-15-02-A (Q4), WL_MW-15-02-B (Q2), and WL_MW-15-04-B (Q2, Q4); – Manganese: LC_MW20_02A (Q1 to Q4) and WL_MW-15-04-B (Q2, Q4); and – Uranium: LC_PIZ1206A (Q1 to Q4). › Based on the BGA completed for the 2020 RGMP Update, barium, lithium, and manganese were identified as non mine-related. › **WL_MW-15-04-B:** Dissolved iron and manganese concentrations were within historic concentration range. › **LC_MW20_02A:** Manganese concentrations were consistent with 2020 values. › All other constituents were less than the primary screening criteria.	
	Mann-Kendall Trend Analysis	› Insufficient data set to complete Mann-Kendall analysis at LC_MW_LC1-1A, LC_MW_LC1-2A, LC_MW_LC1-3A, LC_PIZM0903, LC_PIZ1206A, LC_PIZ1206C, LC_PIZ1207A, LC_PIZ1207B, LC_PIZ1210B, LC_PIZ1210C, LC_PIZ1211N, LC_PIZ1212, LC_MW20_01, LC_MW20_02A, LC_MW20_02B, LC_MW20_03, LC_MW_WLC-1A, LC_MW_WLC-2A, LC_MW_WLC-3A, LC_MW_CP1A, and LC_MW_CP1B as less than seven samples have been collected and analyzed. › Probably increasing trend: WL_MW-15-02-A (dissolved cadmium); however, concentrations have been less than the primary screening criteria. › Probably increasing trend: WL_MW-15-02-B (dissolved selenium). Concentrations have been greater than the applicable primary criteria since sampling began in 2015. › Increasing trend: WL_MW-15-04-B (sulphate); however, concentrations have been less than the primary screening criteria. › Concentrations of all other OC have been non-trending, stable, or decreasing.	Table I Appendix III

Note
[a] Monitoring wells LC_MW_WLC-1A, LC_MW_WLC-2A, and LC_MW_WLC-3A are under evaluation for potential inclusion in the SSGMP and/or RGMP. All other wells to be included in 2022 SSGMP.

A summary of results for OC compared to primary screening criteria is presented in Table H below.

Table H: Summary of OC Compared to Primary Screening Criteria in LCO Phase I

Parameter / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Center Line Creek (North)																
LC_PIZM0903	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Center Line Creek (South)																
LC_MW20_01	13.4	16.8	13.2	13.0	-	-	-	-	-	-	-	-	***57.1***	***63.9***	***42.3***	***52.5***
LC_MW20_02A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_MW20_02B	12.0	14.6	12.3	-	-	-	-	-	-	-	-	-	***46.9***	***46.4***	***39.5***	***39.5***
LC_MW20_03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_PIZ1211N	20.2	16.7	12.8	14.8	-	-	-	-	-	-	-	-	***127***	***96.3***	***170***	***120***
LC_PIZ1212	18.8	17.6	14.9	15.5	-	-	-	-	-	-	-	-	***139***	***119***	***99.6***	***127***
West Line Creek																
LC_PIZ1206A	12.1	12.6	-	-	1,020	1,070	859	827	-	-	-	-	***425***	***389***	***291***	***315***
LC_PIZ1206C	-	-	-	-	-	-	-	-	-	-	-	-	***68.9***	***72.6***	***73.8***	***89.6***
LC_PIZ1207A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
LC_PIZ1207B	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
LC_PIZ1210B	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
LC_PIZ1210C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lower Line Creek to LC_LC4																
WL_MW-15-02-A	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-
WL_MW-15-02-B	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-	NS	16.0	NS	***33.4***
WL_MW-15-04-B	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-
LC_MW_CP1A	NS	NS	-	-	NS	NS	-	-	NS	NS	-	-	NS	NS	***53.8***	***52.2***
LC_MW_CP1B	NS	NS	-	-	NS	NS	-	-	NS	NS	-	-	NS	NS	***36.3***	***41.2***
CSR AW	400				1,280 – 4,290*				0.5 – 4*				20			
CSR IW	n/s				n/s				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			

Notes:
Primary screening criteria applied are CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)*.
'–' denotes result less than primary screening criteria for given constituents.
Where a duplicate was collected, the higher concentration is provided in table. If more than one sample collected in a quarter, the higher of the two samples is provided in the table.
* Standard varies with hardness.
'NS' denotes no sample. 'n/s' denotes no standard.

Mann-Kendall trend analyses were completed for data from three wells located at the former AWTF residuals landfill, located south of West Line Creek, in the Lower Line Creek watershed. Only these wells were included for trend analysis in the 2021 annual report as there was sufficient data for trend analysis (i.e., the other monitoring wells had less than seven distinct monitoring events). A summary of the trend analysis results is provided in Table I.

Table I: Summary of Mann-Kendall Trend Analysis for OC in LCO Phase I (Lower Line Creek to LC_LC4)

Parameter / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
Lower Line Creek to LC-LC4				
WL-MW-15-02A	No Trend	Decreasing	Prob. Increasing	Stable
WL-MW-15-02B	Prob. Decreasing	Decreasing	Decreasing	***Prob. Increasing***
WL-MW-15-04B	No Trend	Increasing	No Trend	Stable

Notes:
Where OC were greater than the primary screening criteria in 2021, the trend result is ***bold italics***.
Where increasing trends are noted, the cell is shaded yellow.

1.5.1 Discussion

Eight new monitoring wells were installed in the Line Creek watershed in 2021 (Drawing LC-01):

- Three (LC_MW_LC1-1A, LC_MW_LC1-2A, and LC_MW_LC1-3A) in the northern part of Upper Line Creek sub-watershed (near the confluence with Tornado Creek);
- Three (LC_MW_WLC-1A, LC_MW_WLC-2A, and LC_MW_WLC-3A) near West Line Creek; and
- A clustered pair (LC_MW_CP1A and LC_MW_CP1B) in Lower Line Creek, east of the canyon.

Several monitoring wells that were previously installed for other assessments were added to the LCO SSGMP program, with the rationale for inclusion outlined by SNC-Lavalin (2021a).

1.5.1.1 Upper Line Creek

Groundwater samples were not obtained in 2021 for the three new monitoring wells (LC_MW_LC1-1A, LC_MW_LC1-2A, and LC_MW_LC1-3A) drilled and constructed in Upper Line Creek in December 2021. According to the draft borehole logs, the maximum drilled depth was 24 m and the materials consisted mainly of gravel and sand, interbedded with cobbles, silt, and/or clay layers (Attachment I). A hard clay layer (4 m thick) was found at the bottom the deepest borehole (LC_MW_LC1-3A) and bedrock was not encountered in any of the boreholes. This basal clay layer may be a northern extension of a previously mapped glaciolacustrine unit (Block Diagram LC-02); however, additional mapping would be required for confirmation. This glaciolacustrine unit has been previously mapped as interbedded within the coarser-grained glaciofluvial materials, all of which overlies bedrock of the Kootenay Group and Fernie Formation.

All three Upper Line Creek wells were screened at the same depth and across the same sand and gravel hydrostratigraphic unit (Table LC-01). In December 2021, groundwater levels ranged between 5.5 m and 7.8 m below ground surface (mBGS) with elevations ranging between 1637 m and 1639 m above sea level (asl) (Table LC-02). For comparison, the ground surface elevation of nearby Tornado Creek is 1645 m asl. The horizontal groundwater flow direction was anticipated to be southwards, following the Line Creek valley (Drawing LC-02). Flow and load accretion studies of Upper Line Creek were completed by Golder (2021)

with results shown on Drawing LC-02. Downstream of the confluence of Upper Line Creek and Tornado Creek, Upper Line Creek can be seasonally dry. Thus, most flow in the lower reach of Upper Line Creek is interpreted to flow in the subsurface within the valley bottom fluvial/glaciofluvial sediments with a down-valley component (Golder, 2021).

1.5.1.2 Center Line Creek (North)

In 2021, no groundwater samples were collected from LC_PIZM0903 as it will be added to the SSGMP starting in 2022.

Based on selenium-sulphate ratios (Figure LC-10), surface water from northern portion of Center Line Creek subarea (monitored by LC_LC2) is indicative of both mine-influenced mixed water (January to May, August to December) and natural non-contact water (June and July). OC concentrations at this surface water station were an order of magnitude less than those downstream, with dissolved selenium and sulphate concentrations indicating effects of seasonality.

In 2014, dissolved selenium, sulphate, and nitrate-N concentrations at LC_PIZM0903 (SNC-Lavalin, 2021a, 2021b) were less than the primary screening criteria; however, the selenium-sulphate ratios indicated mixing with waste rock, which suggests potential mine influences.

1.5.1.3 Center Line Creek (South)

In 2021, LC_MW20_01, LC_MW20_02B, LC_PIZ1211N, and LC_PIZ1212 had dissolved selenium and nitrate-N concentrations greater than the primary screening criteria (Tables LC-03 and 04, Figures LC-07 and 09, Drawings LC-11 and-14).

Line Creek enters a 3 to 4 km long rock drain through the majority of the LCO disturbed area before daylighting at the southern end of Center Line Creek sub-watershed near station LC_LCUSWLC. Based on selenium-sulphate ratios (Figure LC-10), surface water from Center Line Creek (LC_LCUSWLC and LC_LC3) indicated mixed mine-influenced water. In 2021, surface water concentrations at these stations continued to reflect seasonal trends, where concentrations decline rapidly in late May at the beginning of freshet and reach their lowest in May and June (Figure LC-07 to -09). This has been consistent with expected seasonal fluctuations, where dilution occurs following freshet and more concentrated waters are observed in drier seasons. This was a trend observed at all surface water monitoring stations in Line Creek.

Groundwater surface elevations in the 2012- and 2020-series wells haven't historically been continuously monitored and therefore, seasonal variations have not been assessed. However, as recommended the 2021 SSGMP Update report, these wells will be monitored quarterly for both water level and quality.

Manganese concentrations in groundwater at LC_MW20_02A exceeded the primary screening criteria but were consistent with 2020 values. Strongly reducing conditions were observed with ORP values ranging from -164 mV to -213 mV, low DO concentrations ranging between 0.1 mg/L and 0.55 mg/L, along with measurable concentrations of iron.

Based on 2021 selenium-sulphate ratios (Figure LC-10), groundwater in Center Line Creek subarea (LC_MW20_01, LC_MW20_02A, LC_MW20_02B, LC_MW20_03, LC_PIZ1211N, and LC_PIZ1212) was indicative of mixed mine-influenced water, except at LC_MW20_03, which indicated natural non-contact water ratios. Groundwater at LC_MW20_03 is at a higher elevation and upgradient of the other locations and reflective of deep valley bottom glaciofluvial materials, as it is screened at 39 mBGS (Attachment I). This well was installed in less hydraulically conductive material under a thicker confining layer of silts and clays, which may minimize interaction with mine-impacted surface water at this location. Reported concentrations of all OCs at this location in 2021 were less than the primary screening criteria.

The selenium-sulphate ratios indicated microbial reduction at LC_MW20_02A, supported by low (negative) ORP values, low dissolved oxygen concentrations (< 0.6 mg/L), measurable concentrations of dissolved iron and manganese, and low concentrations of dissolved selenium and nitrate-N (Table LC-03 and -04). Selenium and nitrate-N attenuation in groundwater is possible by reduction caused by the consumption of oxygen (SRK, 2018). Selenium attenuation is expected to initiate as soon as nitrate-N begins to reduce via denitrification (SRK, 2018). This well is screened across a gravel unit at 18 m BGS, that directly overlies shale (Attachment I, Drawing LC-07).

By contrast, the shallower monitoring well LC_MW20_02B (of the clustered pair) reported dissolved selenium and nitrate-N concentrations greater than the primary screening criteria with higher ORP (> 150 mV) and dissolved oxygen (> 5.5 mg/L). This well is screened at 14 mBGS, also across a gravel deposit (Drawing LC-07). Groundwater at LC_MW20_01 also yielded dissolved selenium and nitrate nitrogen concentrations greater than the primary screening criteria. It is screened at a depth of 20 mBGS across the same gravel unit as LC_MW20_02A/B but is closer to Line Creek (Drawing LC-07).

Groundwater at LC_PIZ1211N and LC_PIZ1212 had dissolved selenium and nitrate-N concentrations greater than the primary screening criteria. Although screened at very different depths (7 and 24 mBGS, respectively), groundwater OC concentrations were similar (Drawings LC-04 and -06).

The horizontal groundwater flow direction was anticipated to be westwards from LC_MW20_03 following ground surface and bedrock topographies, and to the southwest from LC_MW20_01 following the Line Creek valley (Drawing LC-02). The calculated vertical gradients were weakly downwards between LC_MW20_02B (shallow) and LC_MW20_02A (deep) (Table LC-02). The nearest Golder (2021) flow accretion data suggests Center Line Creek is a gaining reach; however, the study was conducted 150 m southwest of the wells and may not reflect near-well conditions (Drawing LC-02).

1.5.1.4 West Line Creek

In 2021, monitoring locations LC_PIZ1206A and LC_PIZ1206C yielded dissolved selenium results greater than the primary and secondary screening criteria for (Table LC-04, 05, Figure LC-07, Drawing LC-14). Also, LC_PIZ1206A yielded concentrations greater than the primary screening criteria for nitrate-N and sulphate (Table LC-03, Figure LC-08 and 09, Drawing LC-11 and 12).

At West Line Creek (WLC), water flow is mostly subsurface, within a rock drain and buried culvert. Water within the rock drain interacts with natural subsurface materials and water mixed with mine-influenced water from spoils and backfill pits. Upon outlet of the rock drain, surface water is routed via a culvert to the AWTF intake for treatment, and ultimately discharged to Line Creek (SNC-Lavalin, 2021a).

Based on selenium-sulphate ratios (Figure LC-10), surface water in the WLC subarea (LC_WLC) was indicative of mine- and spoils- influenced water. As observed at the other Line Creek monitoring stations, and in previous years, the surface water chemistry of the OCs at LC_WLC varies seasonally (Figures LC-07 to 09).

The selenium to sulphate ratios for groundwater (LC_PIZ1206A, LC_PIZ1206C, LC_PIZ1211N, and LC_PIZ1212) was consistent with surface water and also indicated mine- and spoils- influenced water. Sulphate and dissolved selenium concentrations of samples collected at LC_PIZ1206A were the highest in the LCO network, which is consistent with a strong hydraulic connection between LC_PIZ1206A and mine-influenced water from the WLC drainage. There is a strong correlation between the OC concentrations at LC_PIZ1206A and LC_WLC, owing to the path of the West Line Creek rock drain passing above the monitoring well screen. Nitrate-N concentrations at LC_PIZ1206A were also greater than the primary screening criteria. This well is screened at 14 mBGS in a perched alluvial aquifer (Golder, 2021; Attachment I, Drawings LC-04 and 05). The calculated vertical gradients were strongly downwards between

LC_PIZ1206A (shallow) and LC_PIZ1206C (deep) which was consistent with 2020 data (Golder, 2021; Table LC-02). Dissolved selenium concentrations were also elevated at the deeper well of the pair (LC_PIZ1206C), which was completed in shallow, weathered bedrock at a depth of 75 m, but were three to four times lower in concentrations.

The dissolved uranium concentrations (12.0 to 15.6 mg/L) at LC_PIZ1206A exceeded the CSR IW standard of 10 ug/L for all four sampling events; however, it was the only location of the LCO monitoring network where uranium concentrations were greater than the primary screening criteria. The uranium concentrations were attributed to the strong hydraulic connection between the well and the mine-influenced water from the WLC drainage as the uranium concentrations at LC_WLC were similar (average of 13.7 mg/L, maximum of 20.7 mg/L).

There were no groundwater samples for the three new monitoring wells (LC_MW_WLC-1A, LC_MW_WLC-2A, and LC_MW_WLC-3A) that were drilled and constructed in November 2021 in West Line Creek (Drawing LC-01). Based on the borehole logs, the geology at the new locations was consistent with the previously mapped stratigraphy (Table LC-01, Attachment I). The stratigraphy consists of an incised bedrock valley, filled with glaciofluvial sands and gravels interbedded with glaciolacustrine clay lenses. Monitoring wells LC_MW_WLC-1A and LC_MW_WLC-3A were both screened across the basal gravel unit at depths of 46 m. There was no groundwater in LC_MW_WLC-1A two weeks after construction (Table LC-02). Groundwater at LC_MW_WLC-3A was measured at a depth of 37 m, with a corresponding elevation of 1474 m asl. Monitoring well LC_MW_WLC-2A was screened across a gravel unit at a depth of 6 m, which directly overlies mudstone. Groundwater in this well was measured at 5 mBGS, at an elevation of 1483 m asl.

The horizontal groundwater flow direction in the basal aquifer was anticipated to be southeast, towards Line Creek (Drawing LC-02). Groundwater in the shallower aquifers is expected to flow in the same general direction.

In 2021, no groundwater samples or water levels were collected from LC_PIZ1207A, LC_PIZ1207B, LC_PIZ1210B, or LC_PIZ1210C. It was recommended to add these wells to the LCO SSGMP starting in 2022 (SNC-Lavalin, 2021a).

1.5.1.5 Lower Line Creek to LC_LC4

Based on selenium-sulphate ratios (Figure LC-10), surface water from Lower Line Creek subarea (LC_LCDSSLCC and LC_BR7) indicated both mixed water and mine-influenced water, respectively. As observed in the northern sections of the watershed and in previous years data, surface water chemistry of the OCs varies seasonally (Figures LC-07 to 09).

Results from station LC_LC4 are discussed in the following Section 1.6.1 Process Plant Area and Elk Valley. However, to allow comparison to monitoring stations in Lower Line Creek, the water chemistry data has also been plotted on LCO Phase I Line Creek Operations Figures LC-07 to 10.

Dissolved iron and manganese concentrations in groundwater at WL_MW-15-04-B exceeded the primary screening criteria but were within historic range. This well is screened in the former AWTF residuals landfill in silty clay material and has reducing conditions as observed with ORP values ranging from -20.7 mV to - 79.4 mV and low DO concentrations (0.2 mg/L and 1.6 mg/L).

Selenium to sulphate ratios for groundwater from the former AWTF residuals landfill showed that one well (WL_MW-15-02-B) indicated mine-influenced water (Figure LC-10), while the other two (WL_MW-15-02-A and WL_MW-15-04-B) were not. WL_MW-15-02-B is screened across a silty sand unit at 8 m BGS, while the deeper screen at this clustered pair (A) straddles a silty clay at 11 m BGS (Attachment I). WL_MW-15-04-B is also screened across silty clay unit, although at a shallower depth of 6 mBGS. Based on field

ORP measurements (> 150 mV), groundwater at WL_MW-15-02-B was consistently more oxidized than at the other locations. Given the difference in ORP readings and the lithology, combined with higher hydraulic conductivity of the silty sand unit, it is likely there are two distinct geochemical hydrostratigraphic units at the former AWTF residuals landfill.

The Mann-Kendall analysis indicated a Probably Increasing trend concentration for dissolved selenium at WL_MW-15-02-B with concentrations greater than the applicable primary criteria since sampling began in 2015 (Table F, Attachment III). Concentrations have been increasing over time and have not appeared to be seasonally driven. This trend analysis was consistent with the presence of mine-influenced water in the silty sand unit as discussed above.

The geology at the new monitoring well cluster LC_MW_CP1A/B was typical of the Line Creek valley, consisting of glaciofluvial sands and gravels overlying shale (Attachment I). Shale bedrock was encountered at 13 mBGS. The deeper monitoring well was screened within the shale at 21 m deep, and the shallow monitoring well was screened across the basal portion of the sand and gravel at 10 m deep (Table LC-01). The vertical gradient was moderately upwards (Table LC-02), which was consistent with the flow accretion data for Lower Line Creek (Golder, 2021). Golder (2021) suggested mine-influenced groundwater has been likely discharging into gaining reaches of Line Creek. December 2021 groundwater levels ranged between 5.5 m and 6.0 mBGS with elevations ranging between 1397.5 m and 1397.9 m asl. For comparison, the ground surface elevation of nearby Line Creek has been measured at 1398 m.

Initial groundwater samples from LC_MW_CP1A and LC_MW_CP1B yielded dissolved selenium concentrations greater than primary screening criteria, with higher concentrations reported at the deeper of the two wells (LC_MW_CP1A; Table LC-03, Figure LC-07, Drawing LC-14). Also, concentrations of dissolved selenium from the shale (bedrock) were also greater than secondary screening criteria (at LC_LCDSSLCC). However, the groundwater dataset was limited to two sampling events and will be confirmed with subsequent sampling programs.

The selenium to sulphate ratios for groundwater from LC_MW_CP1A and LC_MW_CP1B were indicative of mine-influenced water (Figure LC-10).

1.6 Process Plant Area and Elk Valley (Study Areas 5 and 6)

A summary of 2021 groundwater monitoring and sampling results for the Process Plant Area near where Line Creek joins the Fording River (upstream of the Fording/Elk River confluence) is presented in Table J with references to supporting information (Drawings, Figures, Tables, and Attachments).

The Process Plant and Elk Valley (Study Areas 5 and 6) is divided into four subareas: Northeast of Process Plant (Study Area 5), the Process Plant, Southeast of Process Plant and Southwest of Process Plant (Study Area 6).

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Table J: Summary of 2021 Groundwater Monitoring and Sampling Results for the Process Plant and Elk Valley (Study Areas 5 and 6)

Hydrogeological Information		Description	Reference
Monitoring Location	Relevant SSGMP/RGMP Wells (Study Areas 5 and 6)	**Process Plant:** LC_PIZP1001#, LC_PIZP1002#, LC_PIZP1003#, LC_PIZP1101, LC_PIZP1103, LC_PIZP1104, and LC_PIZP1105 **Southwest of Process Plant (Study Area 6):** LC_MW_ER4, and LC_MW_ER4B	Table LC-01 Drawings LC-01, 07 to 10
	Other Relevant Monitoring Wells[a]	**Northeast of Process Plant (Study Area 5):** RG_MW_LC4A and RG_MW_LC4B **Southeast of Process Plant:** LC_MW_ERX1A and LC_MW_ERX1B **Southwest of Process Plant (Study Area 6):** LC_MW_SRD1A, LC_MW_SRD1B, LC_MW_SRD2A, and LC_MW_SRD2B	
	Relevant Surface Water Monitoring Stations	LC_LC4, LC_LC5, LC_ERX, and EV_ER4	
	Relevant Seep Monitoring Locations	LC_SEEP10 and LC_SEEP11	
Physical Hydrogeology	Groundwater Elevation Trends	**Minimal Change:** LC_PIZP1003 and LC_PIZP1104 **Muted Seasonal Change:** LC_PIZP1101, LC_PIZP1103 and LC_PIZP1105 **Distinct Seasonal Change:** LC_PIZP1001, LC_PIZP1002, LC_MW_ER4A and LC_MW_ER4B: – Wells show distinct seasonal changes peak in June, lowest between January and March; and – LC_PIZP1001 peaks later in August. Continuous water level data (barometrically corrected with the LC_MW_ER4 barologger) in the Elk River valley.	Table LC-02 Figures LC-11 to 13
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradients:** – RG_MW_LC4A (deep) and RG_MW_LC4B (shallow): -0.333 and -0.444 m/m downwards; – LC_MW_ERX1A (deep) and LC_MW_ERX1B (shallow): -0.004 m/m downwards; – LC_MW_SRD1A (deep) and LC_MW_SRD1B (shallow): -0.006 m/m downwards; – LC_MW_SRD2A (deep) and LC_MW_SRD2B (shallow): 0.023 m/m upwards; and – LC_MW_ER4A (deep) and LC_MW_ER4B (shallow): 0.001 to 0.062 m/m upwards. › **Flow Direction:** Groundwater flow is interpreted to generally follow topography. Horizontal gradients could not be calculated due to well spatial distribution and completion in different water-bearing zones: – In the northeast, groundwater likely recharged from Line Creek and flowing east and southeast; and – In the southwest, groundwater flows south and southeast, and towards the Elk River.	Table LC-02 Figures LC-11 to 13 Drawing LC-02
Chemistry	2021 SSGMP/RGMP OC Results	› **Greater than Primary Screening Criteria:** – Nitrate-N: LC_MW_SRD1A (Q4), and LC_MW_SRD1B (Q4); and – Dissolved selenium: RG_MW_LC4A (Q4), RG_MW_LC4B (Q3 and Q4), LC_MW_SRD1A (Q3 and Q4), LC_MW_SRD1B (Q3 and Q4), LC_MW_SRD2B (Q4), and LC_MW_ER4B (Q1 and Q4). › **Greater than Secondary Screening Criteria (dissolved selenium):** – LC_MW_SRD1A (Q3 and Q4) and LC_MW_SRD1B (Q3 and Q4).	Table J Tables LC-03 to 05 Figures LC-14 to 17 Drawings LC-11 to 14
	Non-Order Mine -Related and Naturally Occurring Constituents	› **Greater than Primary Screening Criteria:** – Fluoride: PIZP1101 (Q1 to Q4) and LC_MW_SRD2A (Q4); – Antimony: LC_PIZP1105 (Q2); – Lithium: all samples except LC_MW_ER4A (Q1 to Q4) and LC_MW_ER4A (Q1, Q2); – Manganese: LC_PIZP1101 (Q1 to Q4), LC_PIZP1103 (Q1, Q2), LC_PIZP1104 (Q1, Q2, Q4), LC_PIZP1105 (Q1, Q2), and LC_MW_ERX1B (Q4); and – Molybdenum: LC_PIZP1101 (Q1 to Q4), LC_PIZP1103 (Q1, Q2, Q4), LC_MW_ERX1B (Q4), LC_MW_SRD1A (Q3), and LC_MW_SRD2A (Q4). › Antimony at LC_PIZP1105 (Q2 sample and duplicate) is the first occurrence in seven years; most likely field or bottle cross contamination. › Based on the BGA completed for the 2020 RGMP Update, fluoride, lithium, manganese, and molybdenum were identified as non mine-related. › All other constituents were less than the primary screening criteria.	Tables LC-03 and 04

Table J (Cont'd): Summary of 2021 Groundwater Monitoring and Sampling Results for the Process Plant and Elk Valley (Study Areas 5 and 6)

Hydrogeological Information		Description	Reference
Chemistry (Cont'd)	Mann-Kendall Trend Analysis	› Insufficient data to complete analysis at RG_MW_LC4A, RG_MW_LC4B, LC_ERX1A, LC_ERX1B, LC_MW_SRD1A, LC_MW_SRD1B, LC_MW_SRD2A, LC_MW_SRD2B, LC_MW_ER4A, and LC_MW_ER4B as the wells were installed in Q3 and Q4. › Probably increasing trends: LC_PIZP1104 (dissolved selenium); and LC_PIZP1105 (nitrate-N); however, concentrations have been less than the primary screening criteria. › Increasing trend: however, concentrations have been less than the primary screening criteria: – LC_PIZP1104 (nitrate-N); and – LC_PIZP1105 (sulphate and dissolved cadmium). › Concentrations of all other OC have been non-trending, stable, or decreasing.	Table K Appendix III

Note
Only water levels are monitored at these locations.
[a] Relevant monitoring wells from other programs are under evaluation for potential inclusion in the SSGMP and/or RGMP.

A summary of results for OC compared to primary screening criteria is presented in Table K below.

Table K: Summary of OC Compared to Primary Screening Criteria in the Process Plant and Elk Valley (Study Areas 5 and 6)

Parameter / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Northeast of Process Plant (Study Area 5)																
RG_MW_LC4A	NS	NS	-	-	NS	NS	-	-	NS	NS	-	-	NS	NS	-	12.6
RG_MW_LC4B	NS	NS	-	-	NS	NS	-	-	NS	NS	-	-	NS	NS	***23.6***	***32.5***
Process Plant																
LC_PIZP1101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_PIZP1103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_PIZP1104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_PIZP1105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southeast of Process Plant																
LC_MW_ERX1A	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	-
LC_MW_ERX1B	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	-
Southwest of Process Plant (Study Area 6)																
LC_MW_SRD1A	NS	NS	-	10.1	NS	NS	-	-	NS	NS	-	-	NS	NS	***34.5***	***43.2***
LC_MW_SRD1B	NS	NS	-	10.3	NS	NS	-	-	NS	NS	-	-	NS	NS	***32.3***	***43.2***
LC_MW_SRD2A	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	-
LC_MW_SRD2B	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	***21.2***
LC_MW_ER4A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LC_MW_ER4B	-	-	-	-	-	-	-	-	-	-	-	-	16.4	-	-	15.0
CSR AW	400				1,280 – 4,290*				0.5 – 4*				20			
CSR IW	n/s				n/s				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			

Notes:
Primary screening criteria applied are CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)*.
'–' denotes result less than primary screening criteria for given constituents.
Where a duplicate was collected, the higher concentration is provided in table. If more than one sample collected in a quarter, the higher of the two samples is provided in the table.
* Standard varies with hardness.
'NS' denotes no sample. 'n/s' denotes no standard.

Additional field validation is required to determine if monitoring wells LC_MW_ER4A and LC_MW_ER4B are located within 10 m of an aquatic receiving environment. In 2022, Teck will conduct a hydrologic survey to confirm the location of the high-water mark. If the hydrologic surveys determine that the well locations are within 10 m of the high-water mark, future reporting will be updated to reflect the appropriate guideline.

Mann-Kendall trend analyses were completed for data from wells in the Process Plant Area. A summary of the trend analysis results is provided in Table L. Results of the trend analyses were generally consistent with 2020.

Table L: Summary of Mann-Kendall Trend Analysis for OC in the Process Plant Area

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
Process Plant				
LC_PIZP1101	No Trend	Stable	No Trend	No Trend
LC_PIZP1103	No Trend	Decreasing	No Trend	No Trend
LC_PIZP1104	Increasing	Decreasing	No Trend	Prob. Increasing
LC_PIZP1105	Prob. Increasing	Increasing	Increasing	Decreasing

Note:
Where increasing trends are noted, the cell is shaded yellow.

1.6.1 Discussion

In 2021, groundwater samples from the subarea northeast of the Process Plant (RG_MW_LC4A, RG_MW_LC4B) had dissolved selenium at concentrations greater than the primary screening criteria (Table LC-04, Figure LC-14, Drawing LC-14). Additionally, groundwater from the subarea south of the Process Plant and the Elk Valley (LC_MW_SRD1A, LC_MW_SRD1B, LC_MW_SRD2B, and LC_MW_ER4B) had dissolved selenium and nitrate-N at concentrations greater than the primary screening criteria (Tables LC-03 and -04, Figures LC-14 and -16, Drawings LC-11 and -14).

1.6.1.1 Northeast of Process Plant (Study Area 5)

Previously noted seasonal trends in surface water in Lower Line Creek and the Fording River continued in 2021, with the lowest OC concentrations reported during freshet (May and June; Figures LC-14 to 17). Sulphate concentrations were less than the primary screening criteria, while dissolved selenium and nitrate-N were not. August through May samples were also greater than the secondary screening criteria for dissolved selenium. Based on selenium-sulphate ratios (Figure LC-17), surface water from Line Creek (LC_LC4) and Fording River (LC_LC5) indicated mine-influenced water mixing, consistent with 2020 data.

Northeast of the Process Plant, adjacent to Line Creek (where it exits the canyon), two new monitoring wells (RG_MW_LC4A and RG_MW_LC4B) were installed (Drawings LC-01, -09, and -10). This location was investigated to provide hydrogeologic data for the most upgradient section of the Line Creek alluvial fan. Preliminary water level data from these new wells indicated downwards flow of groundwater from the shallow sand and gravel unit (alluvial fan material) to the deeper shale bedrock, however, this was based on a limited data set over only a few months (Table LC-02). Nonetheless, this preliminary data supports the flow and load accretion study completed in 2020, which identified Lower Line Creek as a losing reach (Drawing LC-02; SNC-Lavalin 2020c, 2020d; Golder, 2021). The horizontal groundwater flow direction was interpreted to be towards the east and southeast, through the sand and gravel material of the alluvial fan (Drawing LC-02).

Preliminary groundwater chemistry analysis in both RG_MW_LC4 wells indicated dissolved selenium was greater than the primary screening criteria (Table LC-04, Figure LC-14, Drawing LC-14). The selenium-sulphate ratios for groundwater at this location were consistent with nearby Line Creek surface water at LC_LC4. At the RG_MW_LC4 wells, the shallower groundwater was more like surface water than the deeper groundwater (Figure LC-17).

1.6.1.2 Process Plant

All OC concentrations for the four sampled wells located at the Process Plant were less than the primary and secondary screening criteria (Tables LC-03 and -04, Figures LC-14 to -16, Drawings LC-11 to -14). Mann-Kendall trend analysis indicated Increasing or Probably Increasing trends at LC_PIZP1104 and LC_PIZP1105; however, OC concentrations remain less than the primary screening criteria (Table K, Attachment III).

The selenium-sulphate ratios indicated groundwater quality in deep aquifers in the Process Plant Area does not appear to have been mine-influenced (Figure LC-17). Natural and near natural non-contact water ratios were calculated for groundwater at LC_PIZP1101, LC_PIZP1103, LC_PIZP1104, and LC_PIZP1105. In 2021, only water levels were monitored from the three easterly monitoring wells LC_PIZP1001, LC_PIZP1002, and LC_PIZP1003 as requested by the BC MOE (Teck, 2015).

As indicated in the previous paragraph, deep groundwater plots in the natural non-contact water range. Concentrations of molybdenum that exceeded the primary screening criteria at LC_PIZDC1101 and LC_PIZDC1103 are inferred to be of natural origin. Although molybdenum is a component of antiscalant (Azimuth, 2021), these wells are likely too far away from the WLC treatment facility to be influenced by this activity. The BGA also concluded molybdenum was also naturally elevated in the Elk Valley (SNC-Lavalin, 2020a).

Selenium-sulphate ratios suggested seep water from LC_SEEP10 (located east of the plant) and LC_SEEP11 (located southwest of the plant) has been near natural non-contact water, while seep water from LC_ERX (located on the East Refuse Expansion [ERX]) has been mine-influenced (Figure LC-17). Seep water in 2020 at LC_ERX reported less influence in June and more influence in November, likely owing to seasonality.

1.6.1.3 Southeast of Process Plant

Two new monitoring wells (LC_MW_ERX1A and LC_MW_ERX1B; Drawing LC-01) were constructed southeast of the Process Plant, between the ERX and Grave Lake (Drawing LC-01). The material at this location consisted chiefly of 16 metres of silty gravel (interpreted as till) overlying shale bedrock (Attachment I). The observed lithology was different than other materials mapped beneath and around the Process Plant (which was identified as sand with gravel, sand and gravel, and silt). Therefore, this silty gravel at LC_MW_ERX1A and LC_MW_ERX1B likely represents a distinct hydrostratigraphic unit. The initial vertical gradient was weakly downward but was based on only one monitoring event and therefore, more data is required to conclude gradients (Table LC-02). The horizonal groundwater flow direction was assumed to follow topography, which is overall to the west (Drawing LC-02).

All OC concentrations were less than primary and secondary screening criteria (Tables LC-03 and -04, Figures LC-14 to -16, Drawings LC-11 to -14). The selenium-sulphate ratios suggest groundwater from the deeper bedrock well (LC_MW_ERX1A) may reflect natural non-contact water, while the shallow overburden well (LC_MW_ERX1B) could be mine-influenced (Figure LC-17).

The source of molybdenum at LC_MW_ERX1B is inconclusive due to the limited number of samples (one sample); however, it is likely non mine-related as antiscalant dosing does not occur upgradient of this location.

1.6.1.4 Southwest and West of the East Refuse Expansion

Surface water quality at EV_ER4 exhibits seasonal trends, similar to those observed at the upstream locations in the Fording River and Line Creek (Figures LC-14 to -16). Sulphate concentrations were consistently less than the primary screening criteria. The selenium-sulphate ratios from the Elk River (EV_ER4) indicated mixing with mine-influenced water (Figure LC-17).

Four new monitoring wells (LC_MW_SRD1A, LC_MW_SRD1B, LC_MW_SRD2A, LC_MW_SRD2B) were installed southeast and east of the ERX, and each consisted of a deep and a shallow well screened in the overburden (Drawing LC-01). Drilling indicated 16 m of surficial sands and gravels overlying 10 m of silt/clay, overlying shale (Attachment I). Depths to bedrock depths ranged between 21 m and 32 m, being deeper to the east. The sands and gravels encountered in these boreholes were interpreted as the south- and westwards extension of the Line Creek alluvial fan that underlies the Process Plant Area (Drawing LC-09).

Initial groundwater surface elevations (based on one monitoring event) indicated a downward gradient at LC_MW_SRD1 and upward gradient at LC_MW_SRD2 (Table LC-02). An upwards gradient was also present at the 2020 constructed well LC_MW_ER4, consistent with 2020 data. During freshet, the gradient was the weakest likely owing to the increased surficial pressures from spring melt water volumes as this well pair may be located within 10 m of the high-water mark of the Elk River, but will be confirmed in 2022 with a hydrology field survey.

All OC concentrations were less than the primary screening criteria, except for dissolved selenium and nitrate at LC_MW_SRD1A, LC_MW_SRD1B, LC_MW_SRD2B, and LC_MW_ER4B (Tables LC-03 and -04, Figures LC-14 to -16, Drawings LC-11 to -14). Groundwater samples at LC_MW_SRD1A and LC_MW_SRD1B were also greater than the secondary screening criteria (Table LC-05). Three out of these four wells are screened across shallow sands and gravels (Table LC-01, Attachment I). The two well pairs with upward vertical gradients reported low level OC concentrations in the deeper wells, while the pair with a downward vertical gradient reported higher OC concentrations in the deeper well (Table LC-02).

The selenium-sulphate ratios from the six wells in this area suggest there is mine influence in the shallow groundwater although the data from the newly constructed wells should be considered preliminary (Figure LC-17). Groundwater at a deeper well (LC_MW_SRD1A) appears to also indicate mine influence.

The source of molybdenum at LC_MW_SRD1A and LC_MW_SRD2A is inconclusive due to the limited number of samples (two and one samples, respectively); however, it is likely non mine-related as antiscalant dosing does not occur upgradient of these locations.

Consistent with 2020, results indicated groundwater mixing with mine-influenced water at Elk River valley bottom shallow well LC_MW_ER4B, as the selenium-sulphate ratios are similar to Elk River surface water at EV_ER4 (Figure LC-17).

2 Recommendations

New recommendations identified in the LCO SSGMP and the RGMP are presented in Table M below, and existing recommendations are presented in Table N. Appendix II of the main report provides recommendations related to LCO from the 2020 RGMP Update (SNC-Lavalin, 2020a) and the 2020 Annual Report (SNC-Lavalin, 2021b).

Table M: Summary of New Recommendations for LCO SSGMP and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs	
LCO Phase II Lower LCO Dry Creek	In 2022, Teck will conduct hydrologic survey to confirm the location of the high-water mark of LCO Dry Creek near RG_MW_DC1A/B. If the hydrologic survey determine that the well locations are within 10 m of the high-water mark, future reporting will be updated to reflect the appropriate guideline.
LCO Phase I Upper Line Creek	Assess available data from LC_MW_LC1-1A, LC_MW_LC1-2A, and LC_MW_LC1-3A for potential continuous groundwater level monitoring and install a transducer in a minimum of one well. Continuous groundwater level measurements would facilitate a more detailed assessment of groundwater in this area.
Process Plant	Develop the repaired well LC_PIZP1101, prior to next round of sampling and assess whether water quality is representative of the aquifer. Conduct new geodetic survey of ground surface and top of casing. Deploy protection measures to mitigate future damage.
	Utilize a bladder pump at LC_PIZP1105.
	In 2022, Teck will conduct hydrologic survey to confirm the location of the high-water mark of Elk River near LC_MW_ER4A/B. If the hydrologic survey determine that the well locations are within 10 m of the high-water mark, future reporting will be updated to reflect the appropriate guideline.
Regional Groundwater Monitoring Program	
Study Area 2	Evaluate the feasibility of installing transducers in RG_MW_DC1A and RG_MW_DC1B for continuous groundwater level monitoring. Continuous groundwater level measurements would facilitate a more detailed assessment of groundwater at this location.

Table N: Summary of Existing Recommendations for LCO SSGMP and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs	
LCO Phase II Upper and Lower LCO Dry Creek	Install pressure transducers for continuous groundwater level monitoring at LC_PIZDC1404S, LC_MW_CP1A, and LC_MW_CP1B. Assess whether a pressure transducer can be installed at LC_PIZDC1306. Continuous groundwater level measurements would facilitate more detailed assessments of groundwater at these locations.
LCO Phase I Lower Line Creek	
Process Plant	Reduce sampling frequency to twice per year for the following wells (LC_PIZDC1307, LC_PIZDC1308, LC_PIZP 1101 and LC_PIZP1103) because OCs are less than primary screening levels, baseline data has been established with a long period of data and trends are stable or decreasing according to Mann-Kendall statistical analysis.

Table N (Cont'd): Summary of Existing Recommendations for LCO SSGMP and RGMP

Program	Recommendation
Process Plant (Cont'd)	Reduce manual water level measurement frequency to twice per year for the following wells; LC_PIZP1001, LC_PIZP1002 and LC_PIZP1003 because groundwater levels for these wells are only needed to augment interpreted groundwater flow direction at the Process Plant. Recommend continuous groundwater level monitoring of all three wells.
	Investigate the reason for the anomalously high groundwater elevations at LC_PIZP1002 and LC_PIZP1003 (17 m and 9 m, respectively). Depths to bottom and depths to water information should be validated. A new geodetic survey of the ground surfaces and tops of casings may be warranted.
Regional Groundwater Monitoring Program	
Study Areas 5/6	Install transducers in newly drilled clustered monitoring wells RG_MW_LC4A and RG_MW_LC4B. Continuous groundwater level measurements would facilitate a more detailed assessment of groundwater at this location.
	Teck has existing water supply wells near the top of the Line Creek alluvial fan. It may be possible that one or some of the existing water supply wells near LC_LC4 can provide supplemental information to facilitate characterization of groundwater - surface water interactions in the alluvial fan. Assess available relevant data for inclusion into the SSGMP and potentially validate through monitoring.
	Confirm the December 2021 repairs were successful and the well integrity of PIZP1101 has been maintained. If the well was successfully repaired, remove PIZP1101 as part of the Study Areas 5/6 assessment but retain sampling as part of the BGA. If subsequent analytical results do not align with historical ranges (i.e., within 2 sampling events), this well should be decommissioned.
	Add LC_MW_ER4A and LC_MW_ER4B to the RGMP. Continue quarterly sampling and continuous groundwater level measurements.

3 References

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SNC-Lavalin Inc. (SNC-Lavalin). 2020c. Elk River and Fording River Flow Accretion Studies, October 2019. Prepared for Teck Coal Limited. Memorandum. August 27, 2020.

SNC-Lavalin Inc. (SNC-Lavalin). 2020d. Line Creek Operations Flow Accretion Studies, November 2019. Technical Memorandum prepared for Teck Coal Ltd. February 5th, 2020.

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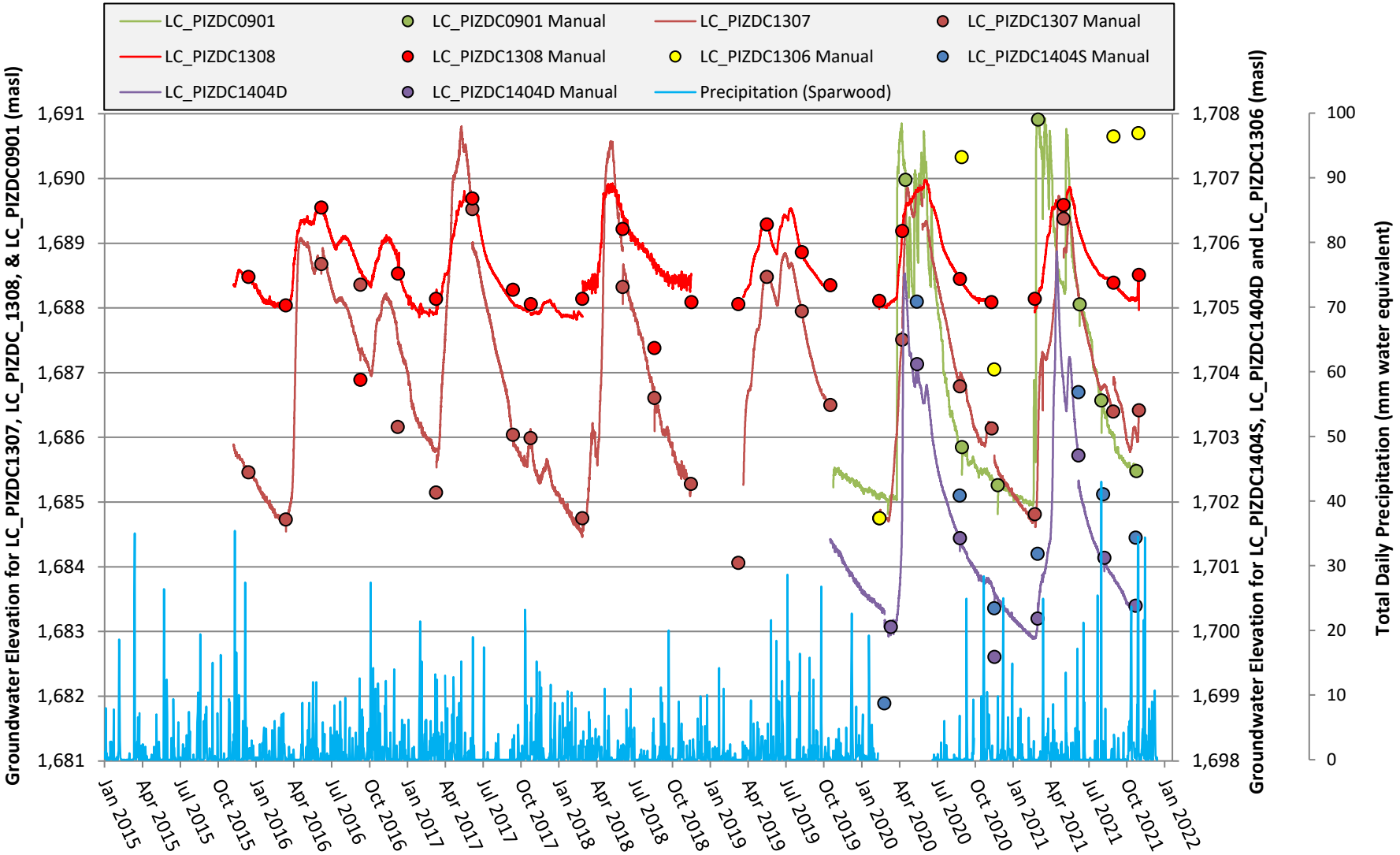
SNC-Lavalin Inc. (SNC-Lavalin). 2021c. Estimated Groundwater Transport Pathways and Bypass Lines of Evidence – West Line Creek. Prepared for Teck Coal Ltd., dated March 16, 2021.

SRK Consulting (Canada) Inc. (SRK). 2018. Work Plan for the Evaluation of Main Stem Nitrate and Selenium Mass Reduction Mechanisms in the Fording and Elk Rivers. Memorandum prepared for Teck Coal Limited. May 14, 2018.

Teck Coal Limited (Teck). 2015. LCO Groundwater Monitoring Program. Letter outlining status of GWMP. February 16, 2015.

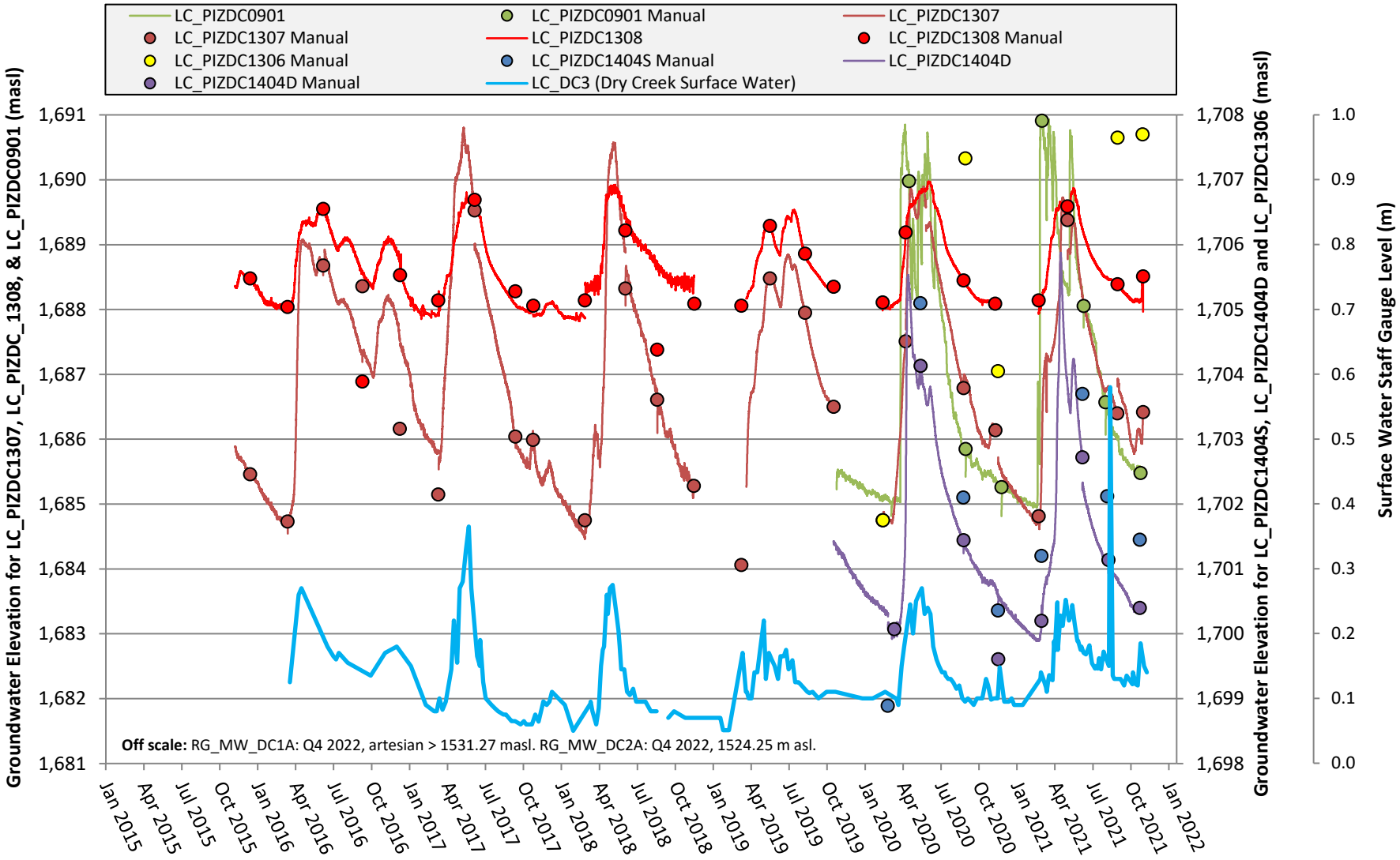
Figures:

Figure LC-01: LCO Phase II Upper and Lower Dry Creek - Hydrograph with Precipitation



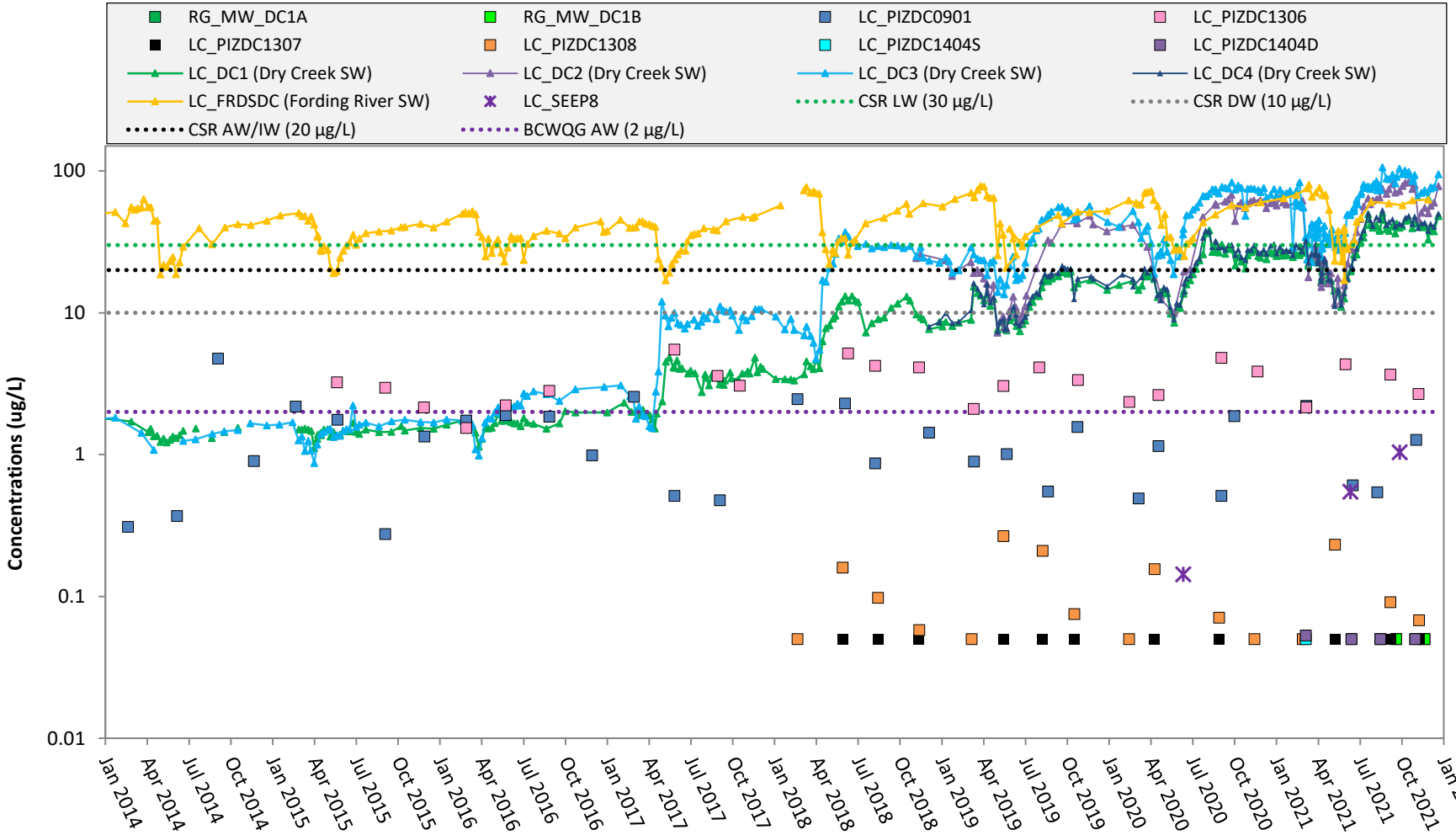
Notes: Pressure transducer data removed where data logger removal occured. Precipitation data presented for Environment Canada Sparwood station. Precipitation missing from February 23 to July 3, 2020.
Continuous water level data was compensated using barologger installed at GH_MW-GHC-1A.
Off scale: RG_MW_DC1A: Q4 2022, artesian > 1531.27 masl. RG_MW_DC2A: Q4 2022, 1524.25 m asl.

Figure LC-02: LCO Phase II Upper and Lower Dry Creek - Hydrograph with Surface Water



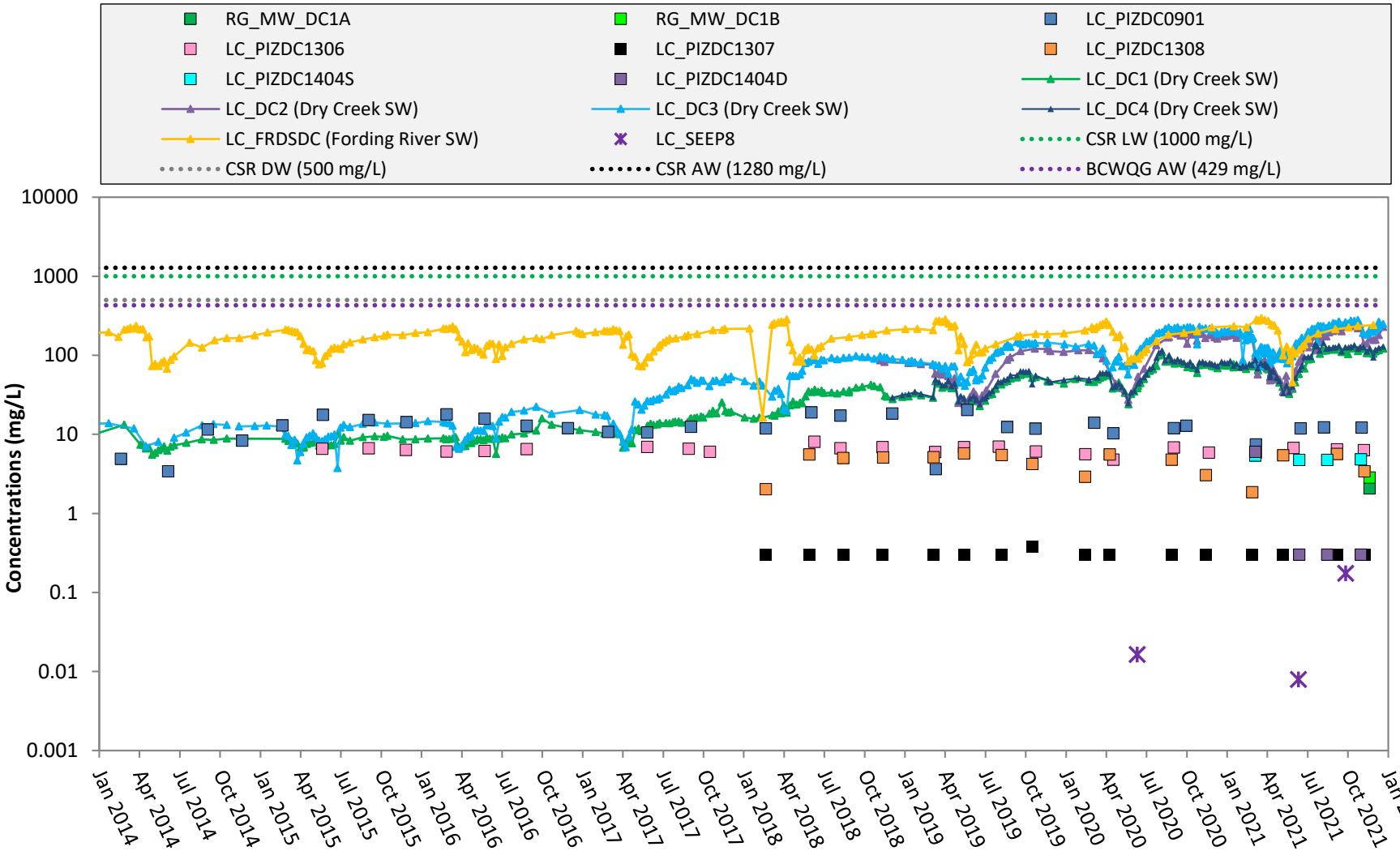
Notes: Pressure transducer data removed where data logger removal occured. Precipitation data presented for Environment Canada Sparwood station.
Precipitation missing from February 23 to July 3, 2020.
Continuous water level data was compensated using barologger installed at GH_MW-GHC-1A.
LC_DC3 staff gauge height in open channel on September 2, 2021 of 0.58 m possibly erronous. Field data sheets not checked.

Figure LC-03: LCO Phase II Upper and Lower Dry Creek - Dissolved Selenium



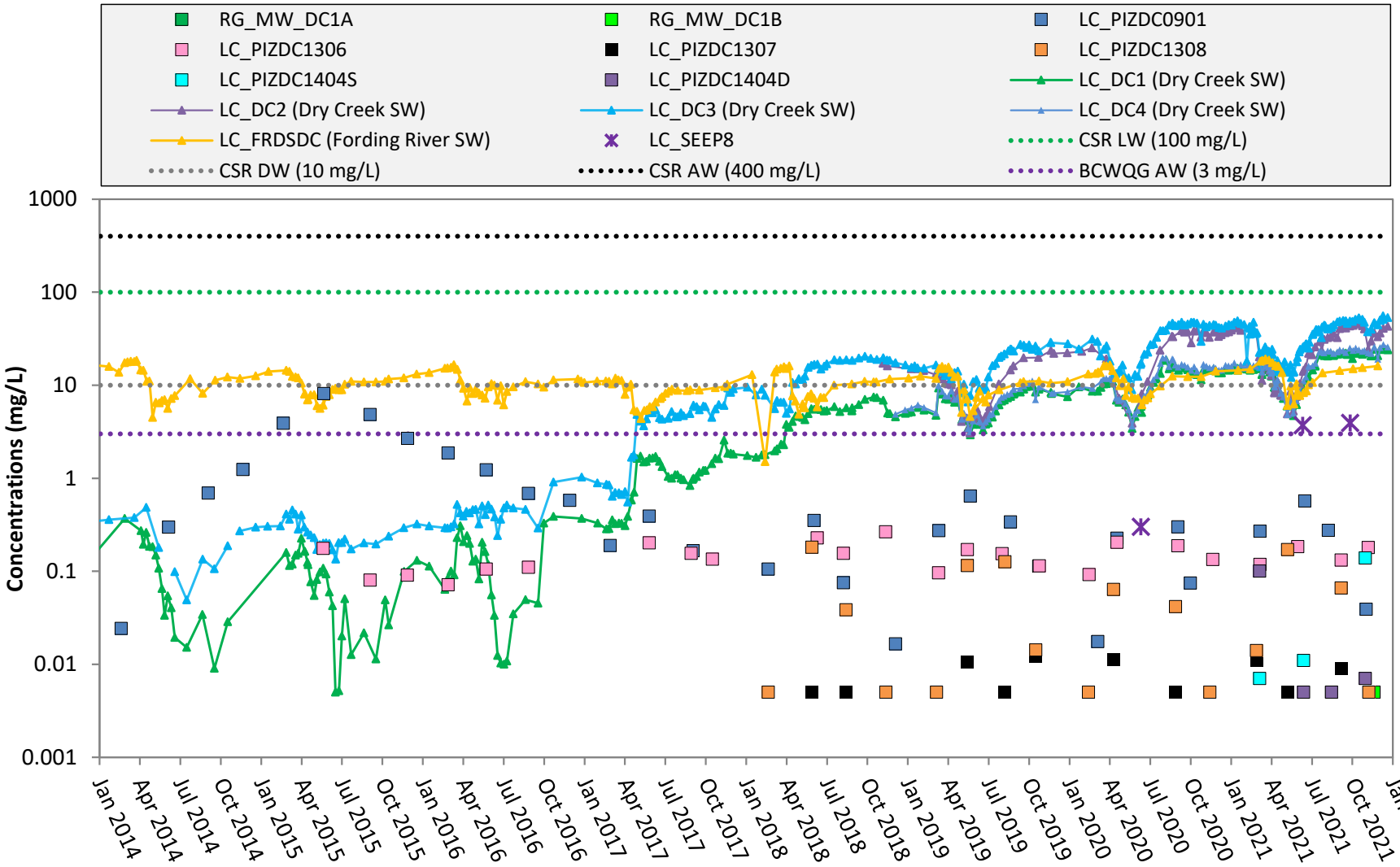
Note: For concentrations measured below the method detection limit, the method detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure LC-04: LCO Phase II Upper and Lower Dry Creek - Sulphate



Note: For concentrations measured below the method detection limit, the method detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure LC-05: LCO Phase II Upper and Lower Dry Creek - Nitrate-N



Note: For concentrations measured below the method detection limit, the method detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure LC-06: LCO Phase II Upper and Lower Dry Creek Watershed - Se:SO_4 (S)

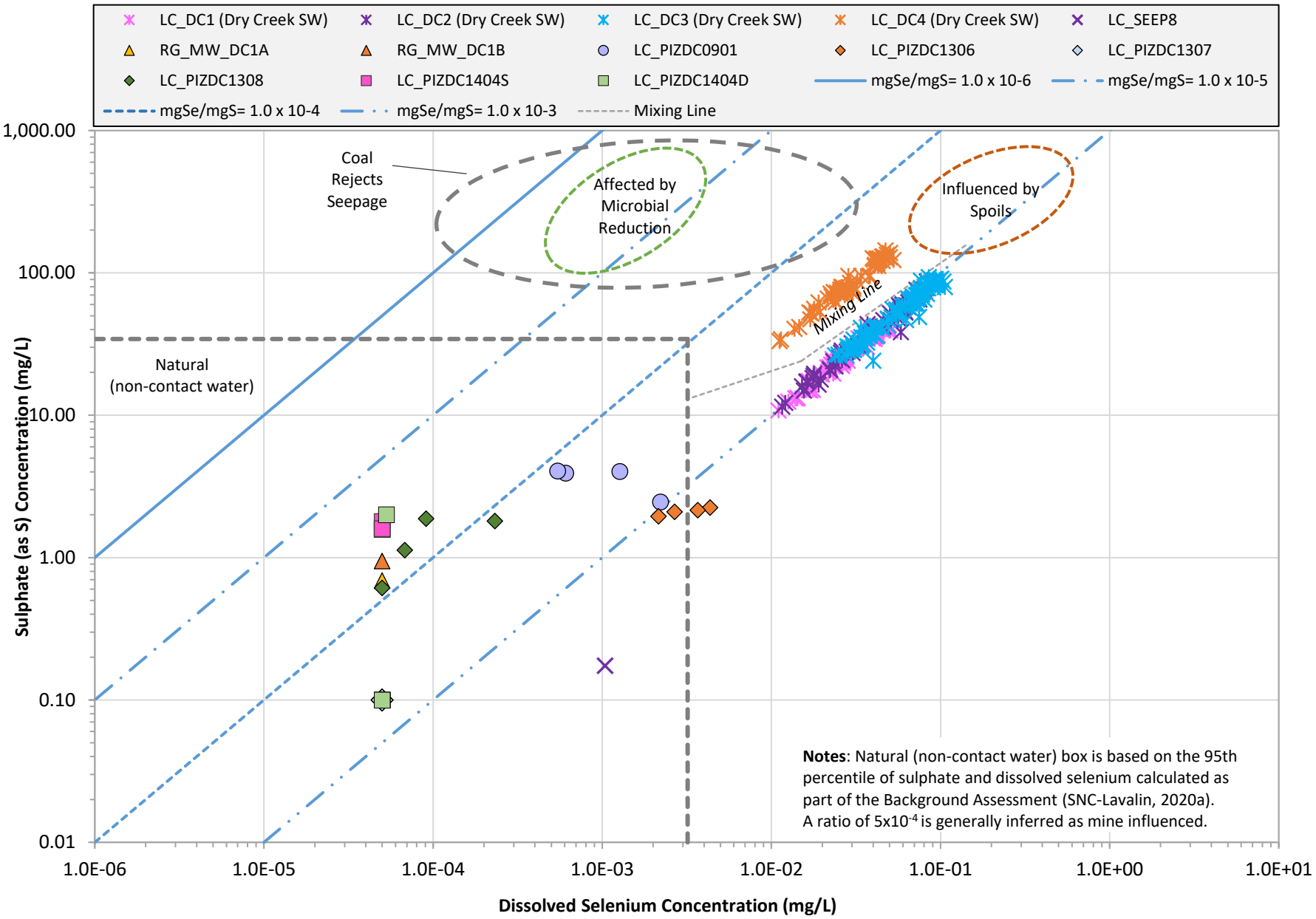
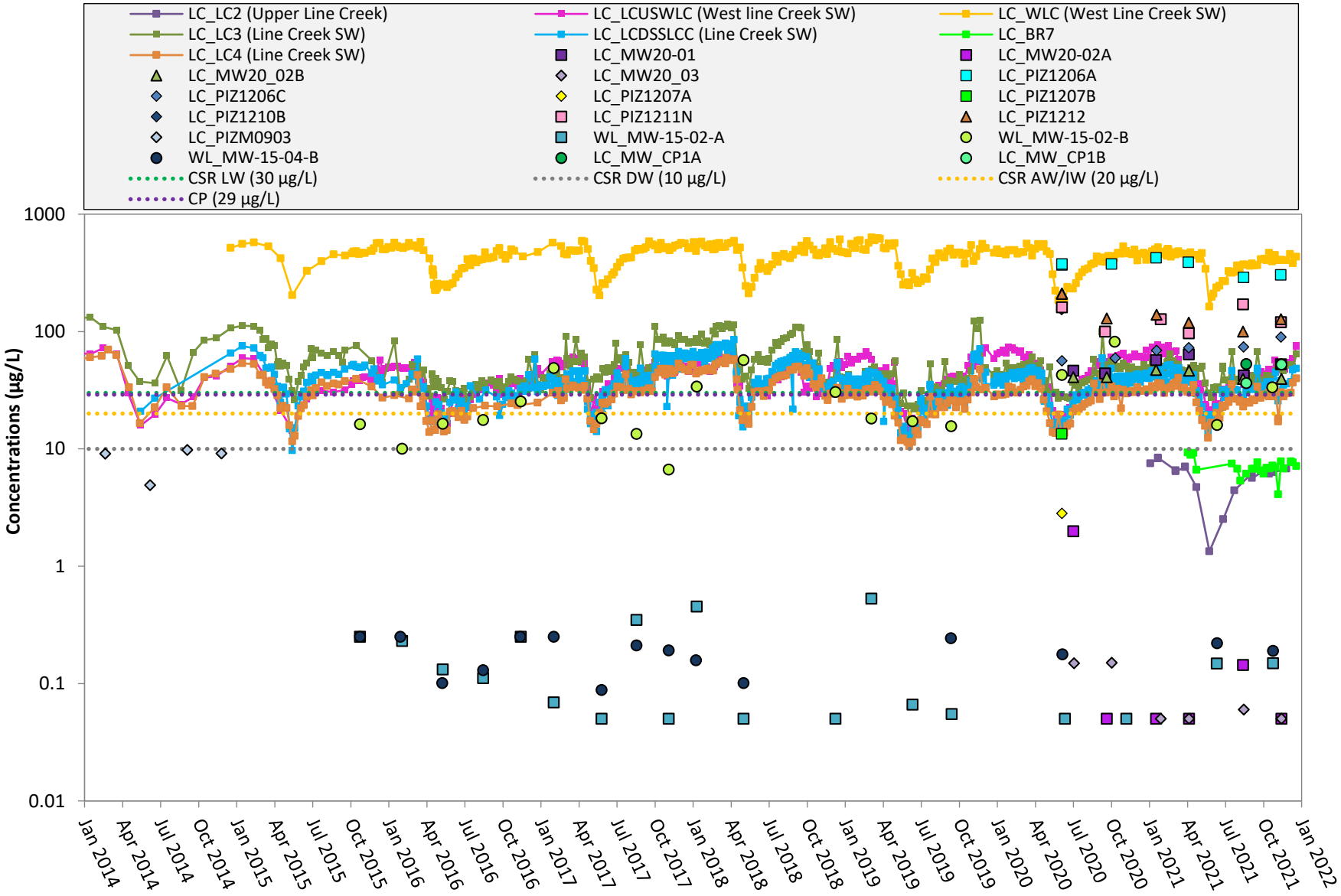
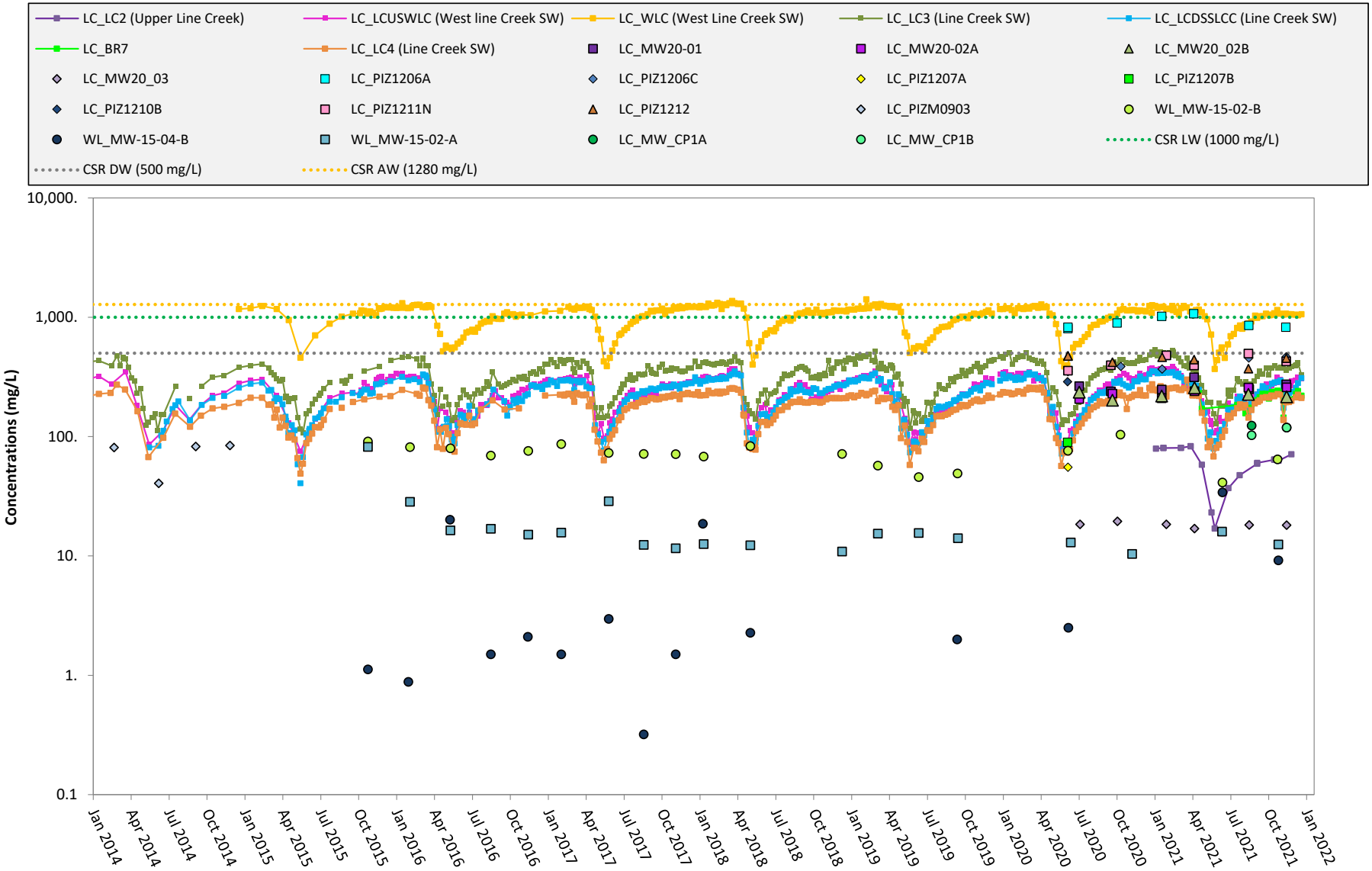


Figure LC-07: LCO Phase I Centre Line Creek, West Line Creek, and Lower Line Creek to LC_LC4 - Dissolved Selenium



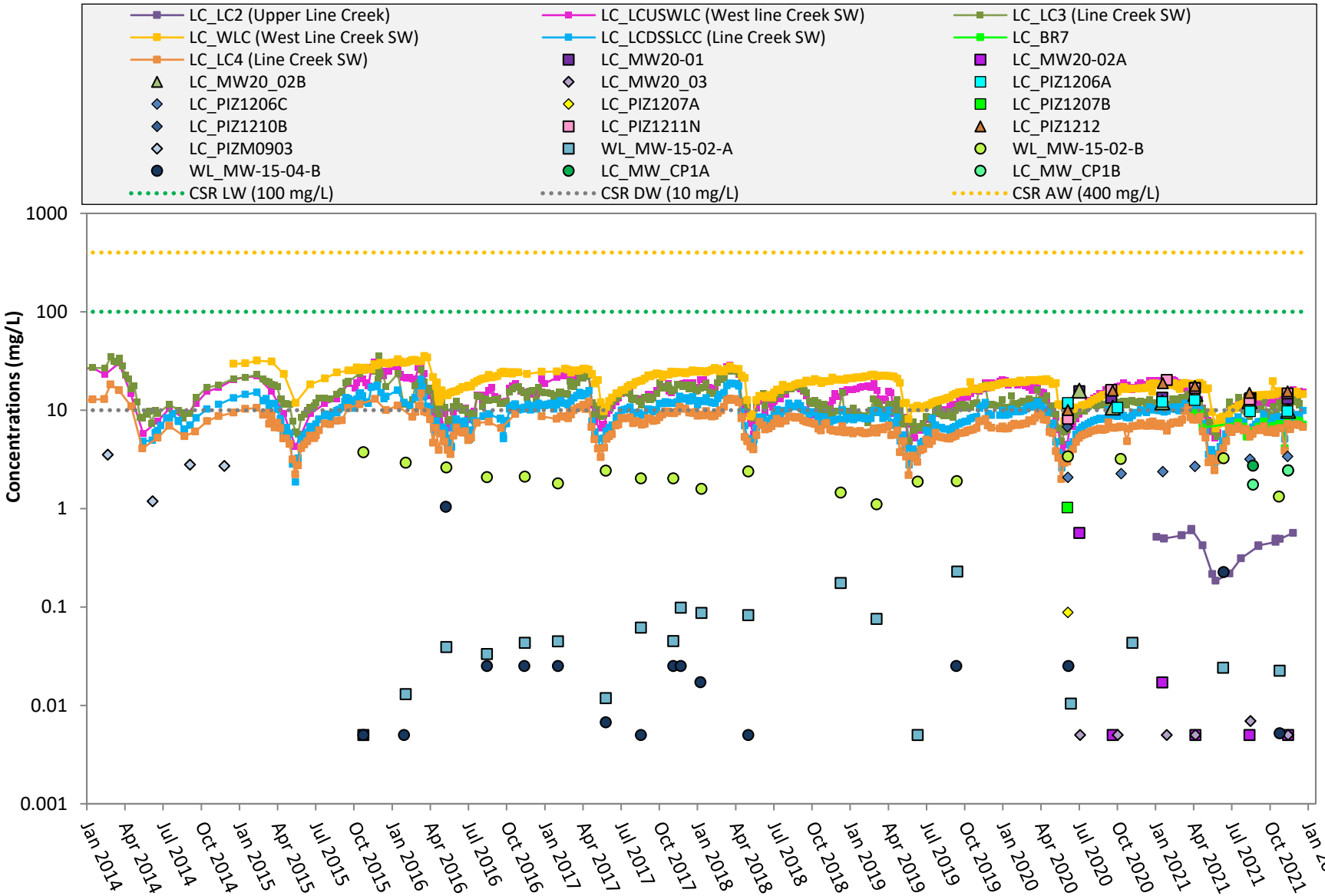
Note: For concentrations measured below the method detection limit, the method detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure LC-08: LCO Phase I Centre Line Creek, West Line Creek, and Lower Line Creek to LC_LC4 - Sulphate



Note: For concentrations measured below the method detection limit, the method detection limit (0.3 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure LC-09: LCO Phase I Centre Line Creek, West Line Creek, and Lower Line Creek to LC4 - Nitrate-N



Note: For concentrations measured below the method detection limit, the method detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure LC-10: LCO Phase I Centre Line Creek, West Line Creek, and Lower Line Creek to LC_LC4 - Se:SO_4 (S)

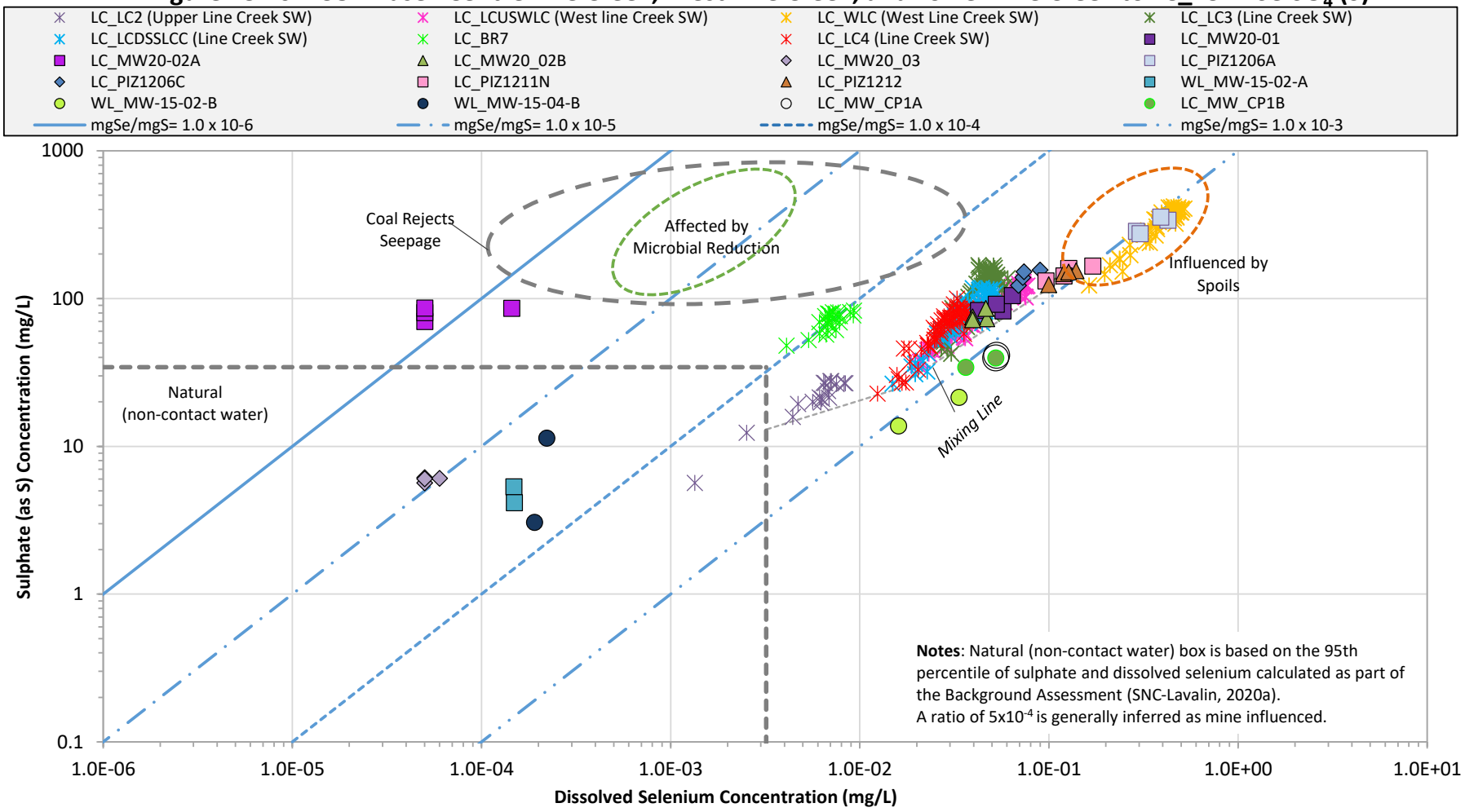
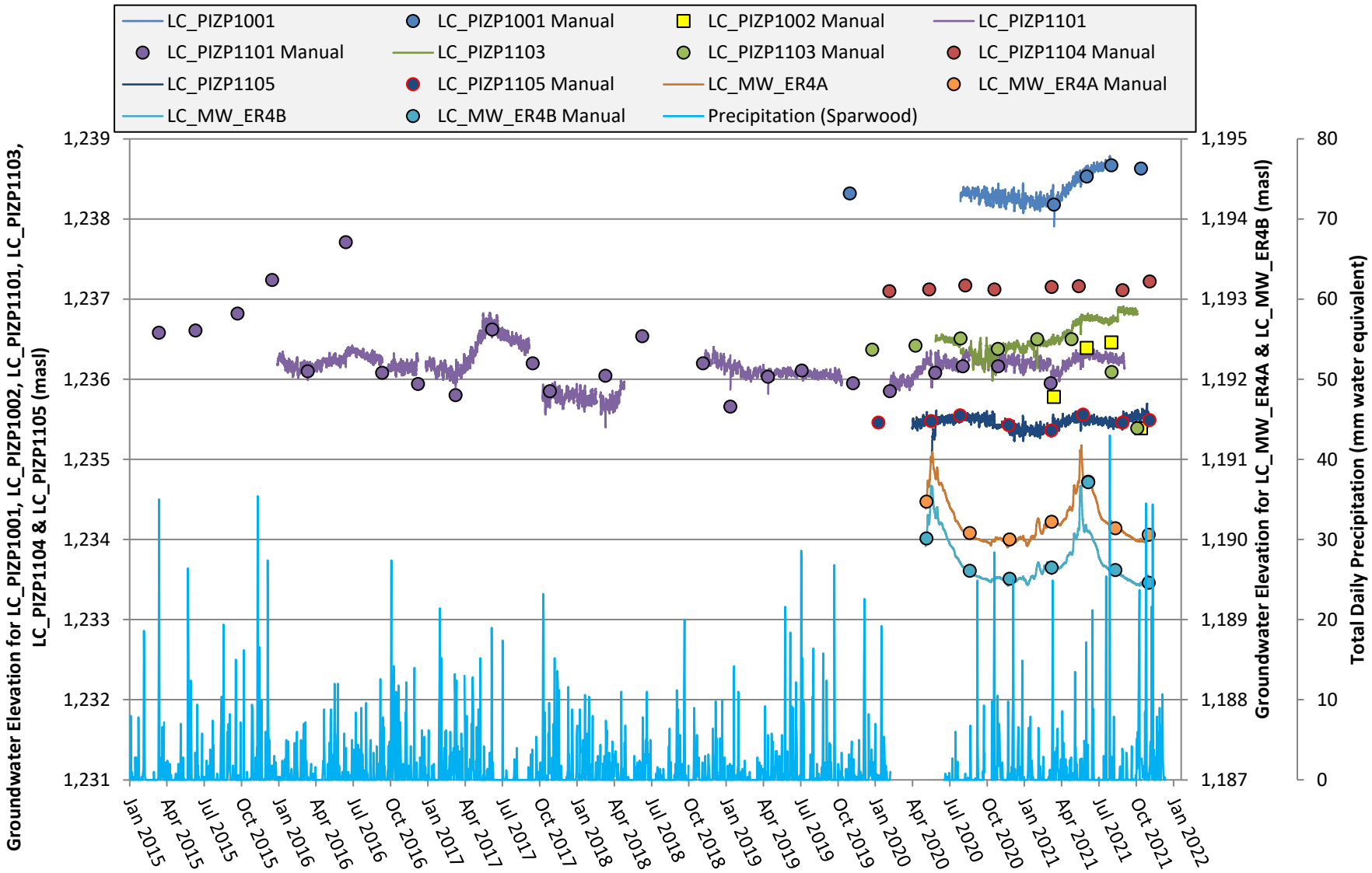
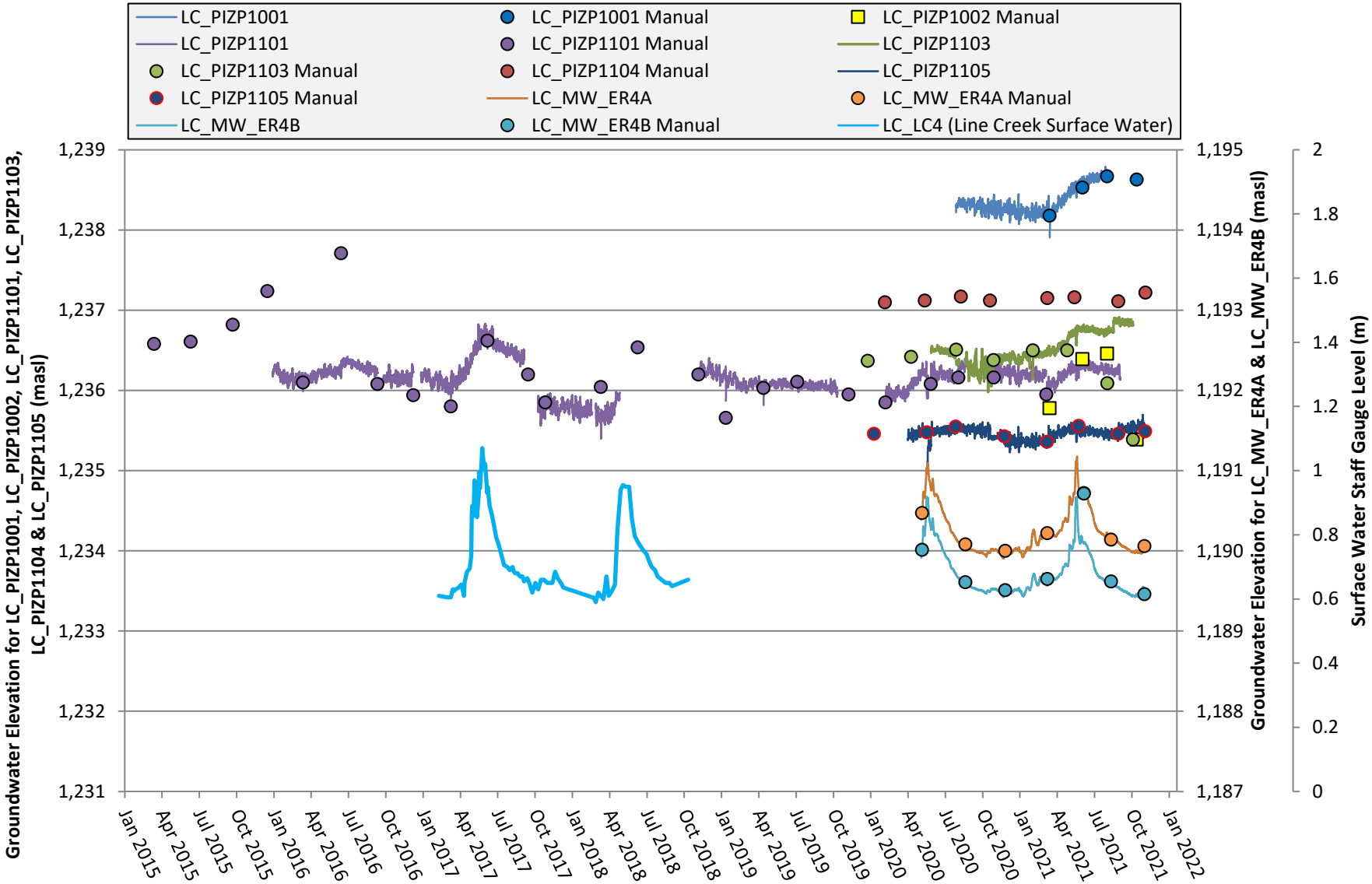


Figure LC-11: Process Plant and Elk Valley (North) - Hydrograph with Precipitation



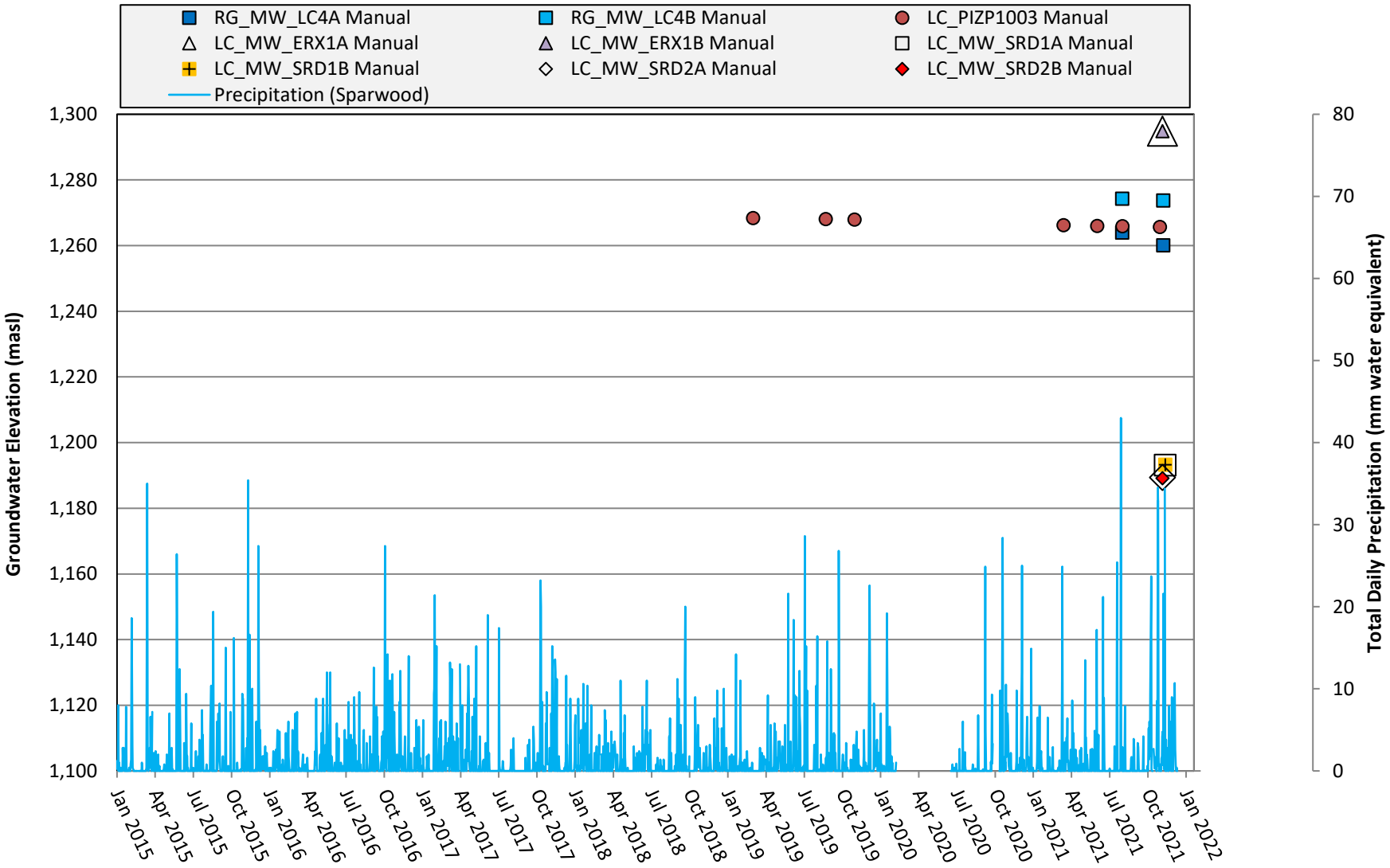
Notes: Pressure transducer data removed where data logger removal occured. Precipitation data presented for Environment Canada Sparwood station. Precipitation missing from February 23 to July 3, 2020. Continuous water level data was compensated using barologger installed at LC_MW_ER4B Baro.

Figure LC-12: Process Plant and Elk Valley - Hydrograph with Surface Water



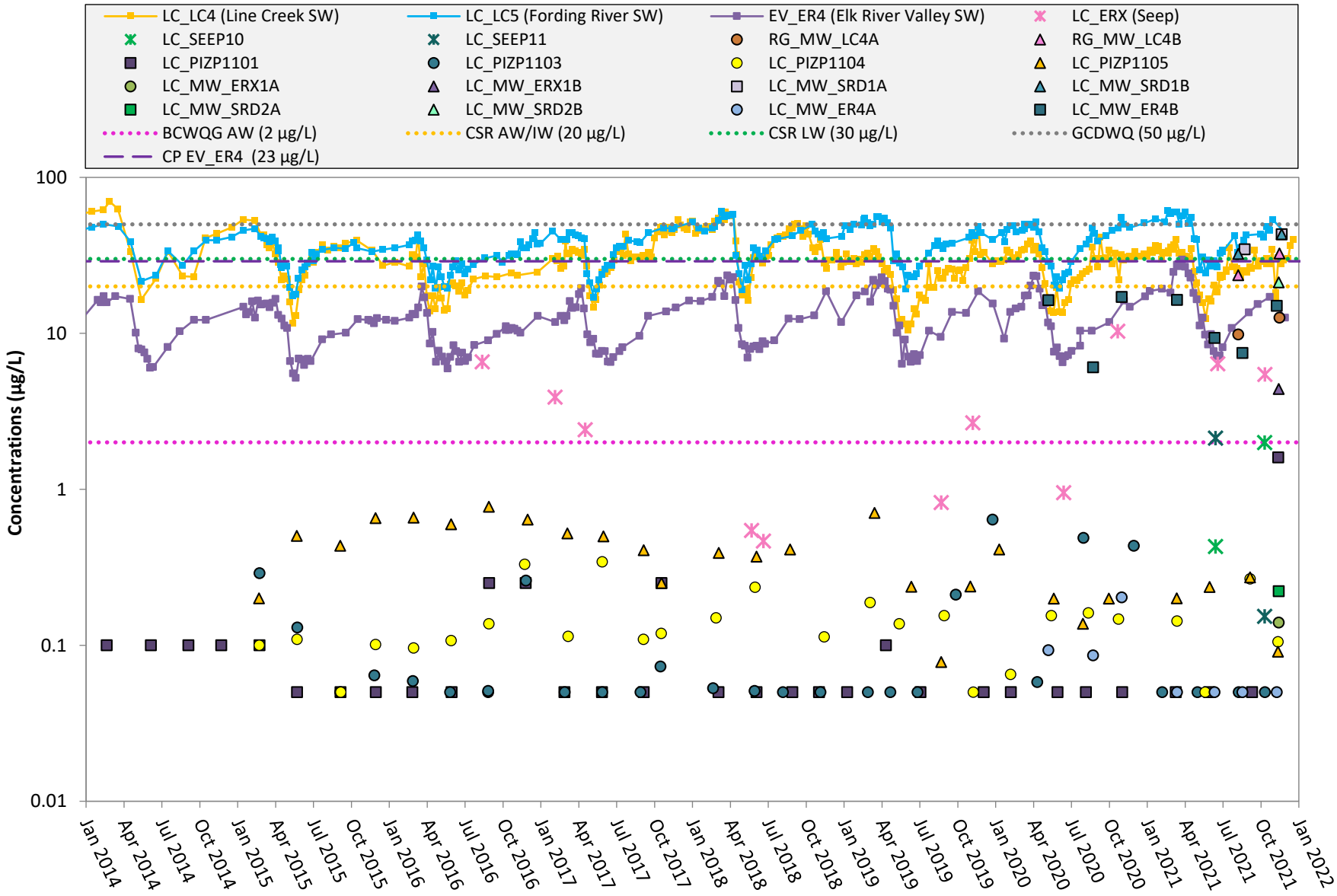
Notes: Pressure transducer data removed where data logger removal occured.
Continuous water level data was compensated using barologger installed at LC_MW_ER4B Baro.

Figure LC-13: Process Plant and Elk Valley (South) - Hydrograph with Precipitation



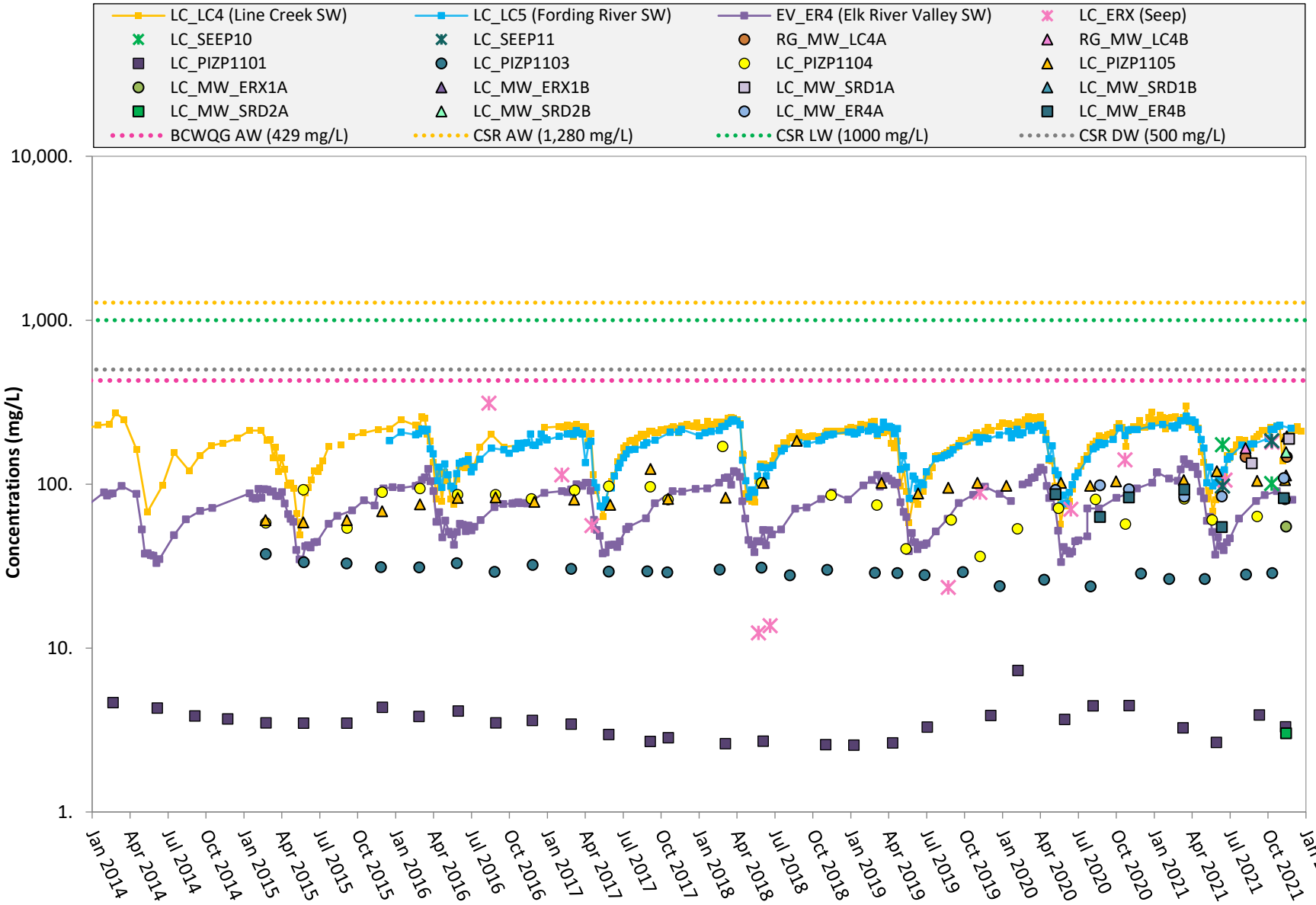
Notes: Pressure transducer data removed where data logger removal occured. Precipitation data presented for Environment Canada Sparwood station. Precipitation missing from February 23 to July 3, 2020. Continuous water level data was compensated using barologger installed at LC_MW_ER4B Baro.

Figure LC-14: Process Plant and Elk Valley - Dissolved Selenium



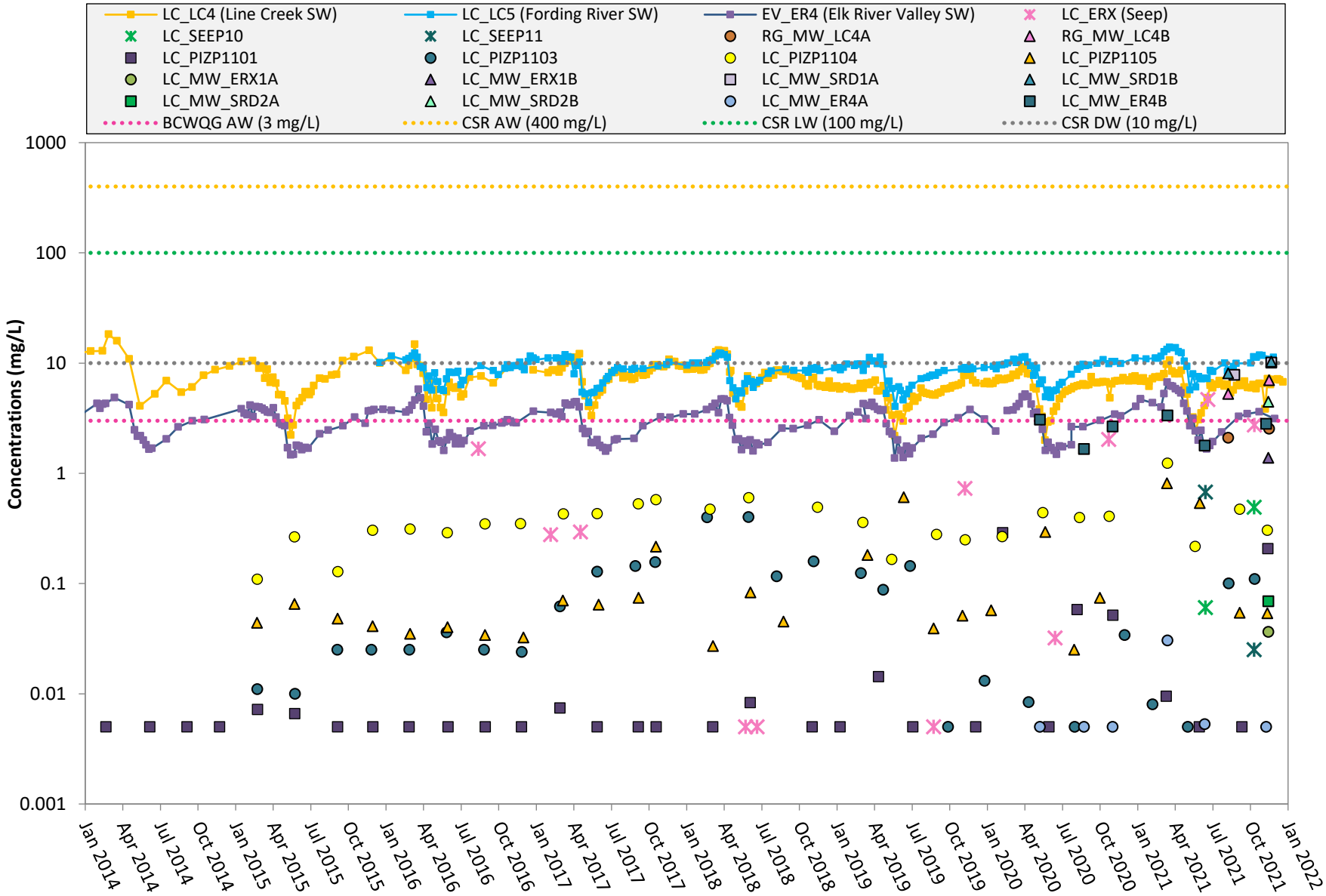
Note: For concentrations measured below the method detection limit, the method detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure LC-15: Process Plant and Elk Valley - Sulphate



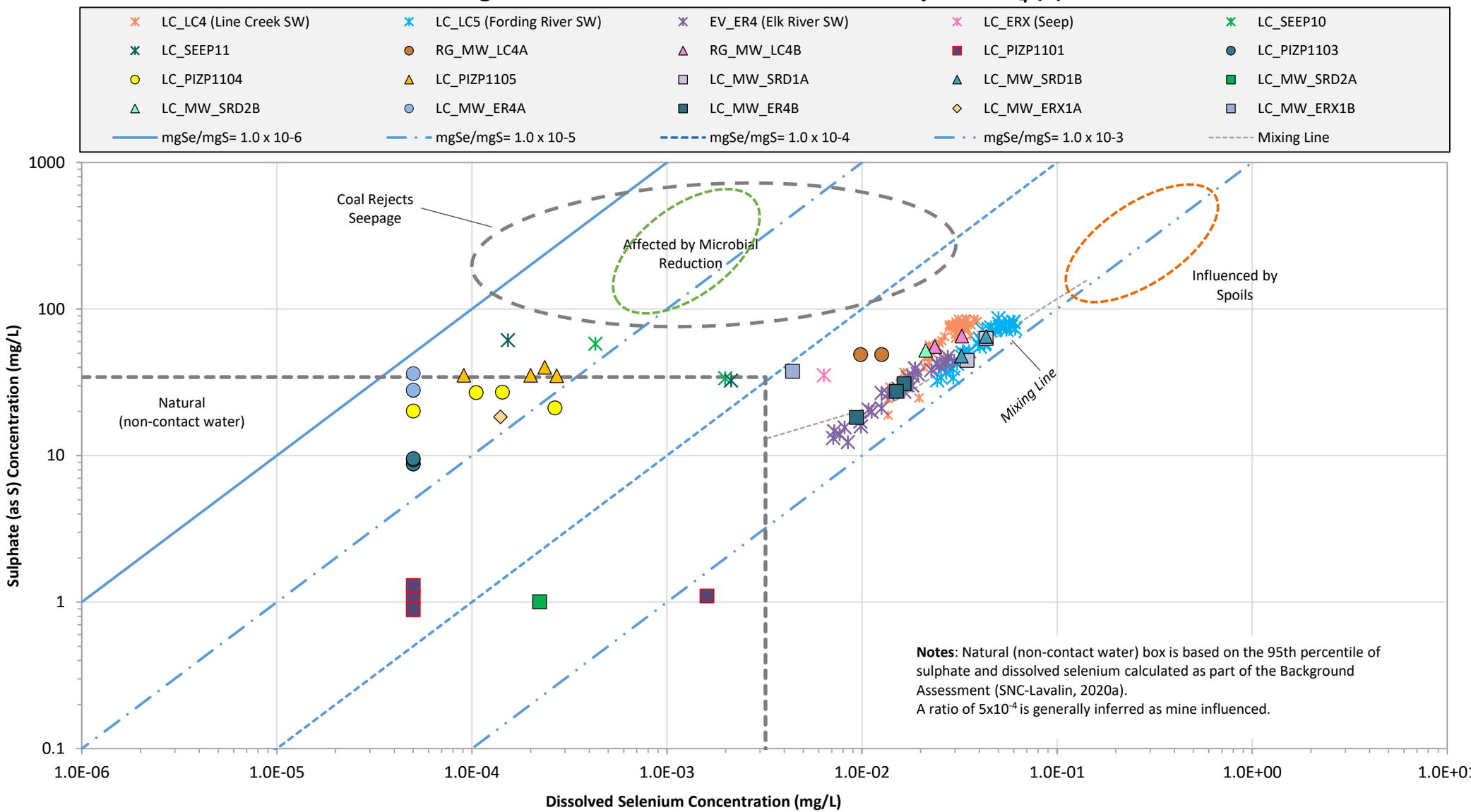
Note: For concentrations measured below the method detection limit, the method detection limit (0.3 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure LC-16: Process Plant and Elk Valley - Nitrate-N



Note: For concentrations measured below the method detection limit, the method detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure LC-17: Process Plant and Elk Valley - Se:SO_4 (S)



Tables:

TABLE LC-01: Summary of Well Installation Details and Hydrogeological Information (LCO)

Area	Well ID	Monitoring Program[a]	Well Type	Logs (Y/N)	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation	Stick Up Height	Drilled Depth	Well Diameter	Top of Screen Depth	Bottom of Screen Depth	Screened Formation	Depth to Bedrock	Hydraulic Conductivity
					Easting	Northing	masl	masl	m	mbgs	mm	mbgs	mbgs		mbgs	m/s
LCO Phase II Upper and Lower Dry Creek (Study Area 2)	RG_MW_DC1A[b]	RGMP	Monitoring	Y	656510	5544637	1530.39	1531.27	0.88	21.3	50	19.5	21.0	Sand and Gravel, Gravelly Silt	-	-
	RG_MW_DC1B[b]	RGMP	Monitoring	Y	656510	5544636	1530.38	1531.24	0.86	7.5	50	5.5	7.0	Sand and Gravel	-	7.5E-05
	LC_PIZDC0901	SSGMP	Monitoring	Y	658048	5541500	1692.00	1693.00	1.00	9.4	50	3.3	9.4	Till and Clay	-	2.0E-07
	LC_PIZDC1306	SSGMP	Monitoring	Y	658278	5541059	1708.15	1709.05	0.90	16.8	50	14.6	16.6	Sandy Gravel	-	3.0E-05
	LC_PIZDC1307[b]	SSGMP, RGMP	Monitoring	Y	658111	5541267	1690.51	1691.22	0.71	34.6	49	32.8	34.8	Silt	-	1.0E-07
	LC_PIZDC1308[b]	SSGMP, RGMP	Monitoring	Y	658111	5541267	1690.42	1691.37	0.95	9.0	49	6.1	9.1	Gravel and Silt	-	7.0E-07
	LC_PIZDC1404S	SSGMP	Monitoring	Y	658192	5541069	1705.36	1706.5	1.14	12.8	-	9.5	12.6	Clayey Silt and Gravel	-	5.0E-08
	LC_PIZDC1404D	SSGMP	Monitoring	Y	658192	5541069	1705.36	1706.93	1.57	35.4	-	32.3	35.3	Sandy Gravel	-	4.0E-08
LCO Phase I Upper Line Creek 1 (Tornado Creek)	LC_MW_LC1-1A[b]	Under Evaluation	Monitoring	Y	661955	5538176	1642.52	-	-	15.2	55	10.9	14.0	Gravel,	-	-
	LC_MW_LC1-2A[b]	Under Evaluation	Monitoring	Y	662008	5538214	1645.10	-	-	18.3	55	11.6	14.7	Gravel, Sand, Cobbles and Sand	-	-
	LC_MW_LC1-3A[b]	Under Evaluation	Monitoring	Y	661990	5538247	1645.10	-	-	24.4	55	10.5	13.6	Gravel, Sand	-	-
LCO Phase I Centre Line Creek (North)	LC_PIZM0903[c]	SSGMP	Monitoring	Y	661410	5536285	1587.00	1587.90	0.90	6.2	50	1.7	6.2	Gravel	-	-
LCO Phase I Centre Line Creek (South)	LC_MW20_01[c]	SSGMP	Monitoring	Y	660104	5532280	1451.72	1452.50	0.78	25.9	51	17.6	20.6	Silty Sandy Gravel	24.4	>1.0E-04[e]
	LC_MW20_02A[c]	SSGMP	Monitoring	Y	660266	5532231	1451.65	1452.52	0.87	23.2	51	17.0	18.5	Gravel	19.2	1.0E-04
	LC_MW20_02B[c]	SSGMP	Monitoring	Y	660262	5532226	1451.45	1452.19	0.74	14.9	51	11.1	14.1	Gravel	-	>1.0E-04[e]
	LC_MW20_03[c]	SSGMP	Monitoring	Y	660483	5532203	1510.37	1511.13	0.76	44.2	51	36.0	39.0	Sand	44.2	1.0E-05
LCO Phase I West Line Creek	LC_MW_WLC-1A[b]	SSGMP	Monitoring	Y	659753	5532228	1503.18	-	-	48.8	55	44.2	47.2	Gravel	47.5	-
	LC_MW_WLC-2A[b]	SSGMP	Monitoring	Y	659869	5532370	1488.33	-	-	9.1	55	4.4	5.9	Gravel	6.0	-
	LC_MW_WLC-3A[b]	SSGMP	Monitoring	Y	659583	5532281	1511.42	-	-	47.9	55	42.7	45.7	Gravel	-	-
	LC_PIZ1206A[c]	SSGMP	Monitoring	Y	659672	5532409	1509.92	1510.90	0.98	44.2	51	10.7	13.7	Sand	-	1.0E-04
	LC_PIZ1206C[c]	SSGMP	Monitoring	Y	659679	5532410	1509.80	1510.89	1.09	76.2	51	72.7	75.7	Bedrock - siltstone	48.2	2.0E-08
	LC_PIZ1207A[c]	SSGMP	Monitoring	Y	659855	5532380	1489.11	1490.20	1.09	12.8	51	10.3	11.3	Bedrock	9.2	-
	LC_PIZ1207B[c]	SSGMP	Monitoring	Y	659863	5532375	1488.67	1489.78	1.10	16.8	51	11.4	14.4	Bedrock - siltstone	10.1	-
	LC_PIZ1210B[c]	SSGMP	Monitoring	Y	659817	5532283	1498.25	1499.09	0.83	56.4	51	44.2	47.2	Gravel	53.3	3.0E-04

Notes:

a: SSGMP denotes LCO Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.

b: Monitoring well installed in 2021 to support the RGMP and/or SSGMP.

c: Monitoring well added to the SSGMP Program as per the 2021 SSGMP Update.

d: Monitored for water levels only.

e: Near instantaneous recovery, hydraulic conductivity results considered a lower-bound value. Actual values may be greater.

Hydraulic conductivity testing at these wells considered to be preliminary/draft.

masl denotes metres above sea level.

mbgs denotes metres below ground surface.

TOC denotes top of pipe casing.

"-" denotes data not available.

TABLE LC-01: Summary of Well Installation Details and Hydrogeological Information (LCO)

Area	Well ID	Monitoring Program[a]	Well Type	Logs (Y/N)	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation	Stick Up Height	Drilled Depth	Well Diameter	Top of Screen Depth	Bottom of Screen Depth	Screened Formation	Depth to Bedrock	Hydraulic Conductivity
					Easting	Northing	masl	masl	m	mbgs	mm	mbgs	mbgs		mbgs	m/s
LCO Phase I West Line Creek	LC_PIZ1210C[c]	SSGMP	Monitoring	Y	659825	5532277	1497.59	1498.32	0.74	65.8	51	60.7	63.7	Bedrock	54.7	8.0E-08
	LC_PIZ1211N[c]	SSGMP	Monitoring	Y	659964	5532041	1442.40	1443.25	0.85	7.6	51	3.7	6.7	Gravel	-	1.0E-04
	LC_PIZ1212[c]	SSGMP	Monitoring	Y	660004	5532172	1447.48	1448.26	0.78	32.0	51	21.1	24.1	Gravel	28.0	1.0E-06
LCO Phase I Lower Line Creek to LC_LC4	WL_MW-15-02-A[c]	SSGMP	Monitoring	Y	659624	5531823	1493.72	1494.60	0.88	12.3	51	10.7	12.2	Silty Clay	-	-
	WL_MW-15-02-B[c]	SSGMP	Monitoring	Y	659624	5531823	1493.72	1494.55	0.83	12.3	51	7.5	9.0	Silty Sand	-	5.0E-06
	WL_MW-15-04-B[c]	SSGMP	Monitoring	Y	659651	5531802	1488.14	1488.91	0.77	10.5	51	5.1	6.8	Silty Clay	-	9.0E-06
	LC_MW_CP1A[b,c]	SSGMP	Monitoring	Y	659278	5530776	1402.76	1403.43	0.67	23.2	51	19.5	21.0	Bedrock - shale	13.1	3.3E-05
	LC_MW_CP1B[b,c]	SSGMP	Monitoring	Y	659277	5530775	1402.79	1403.50	0.71	11.1	51	9.1	10.7	Sand and Gravel	-	1.9E-04
Process Plant	RG_MW_LC4A[b]	Under Evaluation	Monitoring	Y	655533	5528823	1279.46	1280.29	0.84	38.9	51	37.3	38.9	Bedrock - shale	11.3	2.4E-04
	RG_MW_LC4B[b]	Under Evaluation	Monitoring	Y	655535	5528823	1279.50	1280.33	0.83	8.4	51	6.6	8.1	Sand and Gravel	-	1.4E-04
	LC_PIZP1001[d]	SSGMP	Monitoring	Y	654575	5528151	1287.03	1288.03	1.00	56.4	-	53.4	56.4	Coarse Sand	-	-
	LC_PIZP1002[d]	SSGMP	Monitoring	Y	654191	5527889	1272.13	1273.13	1.00	43.6	-	41.0	43.5	Coarse Sand and Gravel	-	-
	LC_PIZP1003[d]	SSGMP	Monitoring	Y	654546	5528194	1283.39	1284.39	1.00	57.8	-	52.8	57.8	Sand and Gravel	-	-
	LC_PIZP1101	SSGMP, RGMP	Monitoring	Y	653956	5528265	1266.00	1267.06	1.06	41.2	-	38.2	41.2	Sand and Gravel	-	7.4E-04
	LC_PIZP1103	SSGMP, RGMP	Monitoring	Y	654250	5528634	1263.49	1264.49	1.00	41.2	-	35.1	38.1	Clayey Silt	38.8	7.5E-08
	LC_PIZP1104	SSGMP	Monitoring	Y	653940	5528165	1271.15	1272.15	1.00	38.1	-	33.8	36.8	Sand and Gravel / Silt	-	3.4E-04
	LC_PIZP1105	SSGMP	Monitoring	Y	653984	5528075	1272.94	1273.94	1.00	40.5	-	35.1	38.1	Silt / Sand and Gravel	38.5	-
	LC_MW_ERX1A[b]	Under Evaluation	Monitoring	Y	655036	5526827	1300.87	1301.52	0.65	21.2	51	19.5	21.0	Bedrock - shale	16.2	1.6E-07
	LC_MW_ERX1B[b]	Under Evaluation	Monitoring	Y	655035	5526832	1300.86	1301.56	0.70	14.6	51	11.9	13.4	Silty Gravel	-	4.1E-07
	LC_MW_SRD1A[b]	Under Evaluation	Monitoring	Y	653604	5526818	1202.46	1203.25	0.79	37.5	51	30.2	31.7	Silty Clay	32.0	7.3E-05
	LC_MW_SRD1B[b]	Under Evaluation	Monitoring	Y	653601	5526820	1202.47	1203.16	0.69	11.0	51	9.6	10.8	Sand and Gravel	-	2.1E-03
	LC_MW_SRD2A[b]	Under Evaluation	Monitoring	Y	653885	5525984	1197.22	1198.03	0.81	22.8	51	18.9	20.7	Sandy Clay	20.7	7.5E-07
	LC_MW_SRD2B[b]	Under Evaluation	Monitoring	Y	653885	5525983	1197.22	1198.01	0.79	9.1	51	7.2	8.7	Gravel	-	4.8E-04
Elk River Valley	LC_MW_ER4A	RGMP	Monitoring	Y	653205	5525919	1192.96	1193.92	0.96	21.3	50	13.4	14.9	Sand and Gravel	17.7	8.5E-05
	LC_MW_ER4B	RGMP	Monitoring	Y	653206	5525917	1192.89	1193.85	0.96	6.1	50	3.7	5.2	Sand and Gravel	-	8.2E-05

Notes:

a: SSGMP denotes LCO Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.

b: Monitoring well installed in 2021 to support the RGMP and/or SSGMP.

c: Monitoring well added to the SSGMP Program as per the 2021 SSGMP Update.

d: Monitored for water levels only.

e: Near instantaneous recovery, hydraulic conductivity results considered a lower-bound value. Actual values may be greater.

Hydraulic conductivity testing at these wells considered to be preliminary/draft.

masl denotes metres above sea level.

mbgs denotes metres below ground surface.

TOC denotes top of pipe casing.

"-" denotes data not available.

TABLE LC-02: Summary of Groundwater Level and Sampling Information (LCO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		yyyy-mm-dd	m/m	Direction	Quarter	
LCO Phase II Upper and Lower Dry Creek (Study Area 2)	RG_MW_DC1A	1530.39	1531.27	0.88	2021-09-29	Artesian	>1531.27	RG_MW_DC1A (deep) and RG_MW_DC1B (shallow)	2021-09-29	0.520	Upward	Q4	Tap/Grab
					2021-11-30	Artesian	>1531.27		2021-11-30	0.513	Upward		
	RG_MW_DC1B	1530.38	1531.24	0.86	2021-09-29	7.065	1524.18		-	-	-	Q4	Peristaltic
					2021-11-30	6.99	1524.25						
	LC_PIZDC0901	1692.00	1693.00	1.00	2021-03-18	2.09	1690.91	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-06-27	4.95	1688.06						Peristaltic
					2021-08-19	6.43	1686.57						
					2021-11-12	7.52	1685.48						
	LC_PIZDC1306	1708.15	1709.05	0.90	2021-03-18	0.51	1708.54	-	-	-	-	-	Bladder
					2021-06-11	Artesian	>1709.05						Grab
					2021-09-17	1.40	1707.65						Peristaltic
					2021-11-17	1.35	1707.70						
	LC_PIZDC1307	1690.51	1691.22	0.71	2021-03-10	6.40	1684.83	LC_PIZDC1307 (deep) and LC_PIZDC1308 (shallow)	2021-03-10	-0.127	Downward	Q1, Q2, Q3, Q4	Bladder
					2021-05-19	1.83	1689.39		2021-05-19	-0.008	Downward		Peristaltic
					2021-09-17	4.81	1686.41		2021-09-17	-0.076	Downward		
					2021-11-18	4.79	1686.43		2021-11-18	-0.080	Downward		
	LC_PIZDC1308	1690.42	1691.37	0.95	2021-03-10	3.23	1688.14		-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-05-19	1.78	1689.59						Peristaltic
					2021-09-17	2.98	1688.39						
					2021-11-18	2.86	1688.51						
	LC_PIZDC1404S	1705.36	1706.50	1.14	2021-03-17	5.30	1701.20	LC_PIZDC1404S (shallow) and LC_PIZDC1404D (deep)	2021-03-17	-0.044	Downward	-	Bladder
					2021-06-24	2.80	1703.70		2021-06-24	-0.043	Downward		Peristaltic
					2021-08-23	4.38	1702.12		2021-08-23	-0.043	Downward		
					2021-11-10	5.05	1701.45		2021-08-23	-0.046	Downward		
	LC_PIZDC1404D	1705.36	1706.93	1.57	2021-03-17	6.73	1700.20		-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-06-24	4.21	1702.72						Peristaltic
					2021-08-26	5.79	1701.14						
					2021-11-10	6.53	1700.40						
LCO Phase I Upper Line Creek 1 (Tornado Creek)	LC_MW_LC1-1A	1642.52	-	-	2021-12-05	5.49	1637.03	-	-	-	-	-	-
	LC_MW_LC1-2A	1645.10	-	-	2021-12-05	6.73	1638.37	-	-	-	-	-	-
	LC_MW_LC1-3A	1647.03	-	-	2021-11-10	7.77	1639.26	-	-	-	-	-	-
LCO Phase I Centre Line Creek (North)	LC_PIZM0903	1587.00	1587.90	0.90	No 2021 WLs	-	-	-	-	-	-	-	-
LCO Phase I Centre Line Creek (South)	LC_MW20_01	1451.72	1452.50	0.78	2021-01-28	6.49	1446.01	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-04-16	6.22	1446.28						Low Flow
					2021-08-24	5.99	1446.51						
					2021-11-24	6.15	1446.35						
	LC_MW20_02A	1451.65	1452.52	0.87	2021-01-28	4.77	1447.75	LC_MW20_02A (deep) and LC_MW_02B (shallow)	2021-01-28	-0.006	Downward	Q1, Q2, Q3, Q4	Bladder
					2021-04-17	4.54	1447.98		2021-04-17	-0.010	Downward		Low Flow
					2021-08-24	4.25	1448.27		2021-08-24	-0.009	Downward		
					2021-11-24	4.41	1448.11		2021-11-24	-0.004	Downward		
	LC_MW20_02B	1451.45	1452.19	0.74	2021-01-28	4.41	1447.78		-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-04-17	4.16	1448.03						Low Flow
					2021-08-24	3.88	1448.32						
					2021-11-24	4.06	1448.13						
	LC_MW20_03	1510.37	1511.13	0.76	2021-02-08	35.68	1475.45	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-04-17	35.56	1475.57						Low Flow
					2021-08-26	35.54	1475.59						
					2021-11-24	35.56	1475.57						

Notes:
masl denotes metres above sea level.
mbtoc denotes meters below top of casing.
TOC denotes top of pipe casing.
"-" denotes data not available.
Quarter is represented as Q1, Q2, Q3, Q4.
Water levels are metre below ground surface at LC_MW_LC1-1A, LC_MW_LC1-2A, LC_MW_LC1-3A, LC_MW_WLC-1A, LC_MW_WLC-2A, and LC_MW_WLC-3A.

TABLE LC-02: Summary of Groundwater Level and Sampling Information (LCO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		yyyy-mm-dd	m/m	Direction	Quarter	
LCO Phase I West Line Creek	LC_MW_WLC-1A	1503.18	-	-	2021-12-14	dry	-	-	-	-	-	-	-
	LC_MW_WLC-2A	1488.33	-	-	2021-12-14	4.80	1483.53	-	-	-	-	-	-
	LC_MW_WLC-3A	1511.42	-	-	2021-12-14	37.43	1473.99	-	-	-	-	-	-
	LC_PIZ1206A	1509.92	1510.90	0.98	2021-01-28	11.01	1499.89	LC_PIZ1206A (shallow) and LC_PIZ1206C (deep)	2021-01-28	-0.524	Downward	-	Bladder
					2021-04-15	9.35	1501.55		2021-04-15	-0.561	Downward		
					2021-08-25	9.45	1501.45		2021-08-25	-0.542	Downward		Low Flow
					2021-11-22	8.21	1502.69		2021-11-22	-0.568	Downward		
	LC_PIZ1206C	1509.80	1510.89	1.09	2021-01-29	43.56	1467.33		-	-	-	-	Low Flow / Bladder
					2021-04-16	44.18	1466.71						Bladder
					2021-08-25	43.11	1467.78						Low Flow
					2021-11-22	43.47	1467.42						
	LC_PIZ1207A	1489.11	1490.20	1.09	No 2021 WLs	-	-	LC_PIZ1207A (shallow) and LC_PIZ1207B (deep)	-	-	-	-	-
	LC_PIZ1207B	1488.67	1489.78	1.10	No 2021 WLs	-	-		-	-	-	-	-
	LC_PIZ1210B	1498.25	1499.09	0.83	No 2021 WLs	-	-	LC_1210B (shallow) and LC_PIZ1210C (deep)	-	-	-	-	-
	LC_PIZ1210C	1497.59	1498.32	0.74	No 2021 WLs	-	-		-	-	-	-	-
	LC_PIZ1211N	1442.40	1443.25	0.85	2021-02-08	4.26	1438.99	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-16	4.08	1439.17						
					2021-08-24	3.74	1439.51						
					2021-11-23	3.96	1439.29						
	LC_PIZ1212	1447.48	1448.26	0.78	2021-01-29	6.68	1441.59	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-04-16	6.55	1441.71						Peristaltic
					2021-08-24	5.16	1443.10						Low Flow
					2021-11-23	6.44	1441.82						
LCO Phase I Lower Line Creek to LC_LC4	WL_MW-15-02-A	1493.72	1494.60	0.88	2021-06-21	9.21	1485.39	WL_MW-15-02-A (deep) and WL_MW-15-02B (shallow)	2021-06-21	-0.310	Downward	-	Bladder
					2021-11-02	9.92	1484.68		2021-11-02	-0.370	Downward		
	WL_MW-15-02-B	1493.72	1494.55	0.83	2021-06-21	8.17	1486.38		-	-	-	-	Bladder
					2021-11-02	8.77	1485.78						
	WL_MW-15-04-B	1488.14	1488.91	0.77	2021-06-21	9.98	1478.94	-	-	-	-	Q2, Q4	Bladder
					2021-11-02	7.13	1481.78						
	LC_MW_CP1A	1402.76	1403.43	0.67	2021-09-01	5.53	1397.91	LC_MW_CP1A (deep) and LC_MW_CP1B (shallow)	2021-09-01	0.041	Upward	-	Peristaltic
					2021-11-24	5.50	1397.93		2021-11-24	0.041	Upward		
	LC_MW_CP1B	1402.79	1403.50	0.71	2021-09-01	6.02	1397.48		-	-	-	-	Peristaltic
					2021-11-24	5.99	1397.51						
Process Plant (Study Areas 5 & 6)	RG_MW_LC4A	1279.46	1280.29	0.84	2021-08-19	16.30	1263.99	RG_MW_LC4A (deep) and RG_MW_LC4B (shallow)	2021-08-19	-0.333	Downward	-	Geosub
					2021-11-26	20.23	1260.06		2021-11-26	-0.444	Downward		Bladder
	RG_MW_LC4B	1279.50	1280.33	0.83	2021-08-19	6.08	1274.25		-	-	-	-	Peristaltic
					2021-11-26	6.57	1273.76						
	LC_PIZP1001	1287.03	1287.83	1.05	2021-03-31	49.85	1237.98	-	-	-	-	-	Not Sampled
					2021-06-20	49.50	1238.33						
					2021-08-20	49.36	1238.47						
					2021-11-01	49.40	1238.43						
	LC_PIZP1002	1272.13	1273.13	1.00	Damaged	-	-	-	-	-	-	-	Not Sampled
					2021-03-31	18.15	1254.98						
					2021-06-20	18.41	1254.72						
					2021-08-20	18.53	1254.61						
					2021-11-01	18.70	1254.43						

Notes:
masl denotes metres above sea level.
mbtoc denotes meters below top of casing.
TOC denotes top of pipe casing.
"-" denotes data not available.
Quarter is represented as Q1, Q2, Q3, Q4.
Water levels are metre below ground surface at LC_MW_LC1-1A, LC_MW_LC1-2A, LC_MW_LC1-3A, LC_MW_WLC-1A, LC_MW_WLC-2A, and LC_MW_WLC-3A.

TABLE LC-02: Summary of Groundwater Level and Sampling Information (LCO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		yyyy-mm-dd	m/m	Direction	Quarter	
Process Plant (Study Areas 5 & 6)	LC_PIZP1003	1283.39	1284.39	1.00	2021-03-31	37.35	1247.04	-	-	-	-	-	Not Sampled
					2021-06-20	36.74	1247.65						
					2021-08-20	36.67	1247.72						
					2021-11-18	37.74	1246.65						
	LC_PIZP1101	1266.00	1267.06	1.06	2021-03-22	31.11	1235.95	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-06-10	Damaged	-						
					2021-09-21	Damaged	-						
					2021-11-23	Damaged	-						
	LC_PIZP1103	1263.49	1264.54	1.05	2021-02-17	28.04	1236.50	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-05-13	28.04	1236.50						
					2021-08-20	28.45	1236.09						
					2021-10-22	29.15	1235.39						
	LC_PIZP1104	1271.15	1272.10	1.05	2021-03-25	34.95	1237.15	-	-	-	-	-	Bladder
					2021-05-31	34.94	1237.16						
					2021-09-16	34.99	1237.11						
					2021-11-22	34.88	1237.22						
	LC_PIZP1105	1272.94	1273.86	1.05	2021-03-24	38.50	1235.36	-	-	-	-	Q1, Q2, Q3, Q4	Bailer
					2021-06-10	38.30	1235.56						
					2021-09-16	38.40	1235.46						
					2021-11-22	38.37	1235.49						
	LC_MW_ERX1A	1300.87	1301.52	0.65	2021-11-24	6.67	1294.85	LC_MW_ERX1A (deep) and LC_MW_ERX1B (shallow)	2021-11-24	-0.004	Downward	Q4	Bailer
	LC_MW_ERX1B	1300.86	1301.56	0.70	2021-11-24	6.68	1294.88					Q4	Peristaltic
	LC_MW_SRD1A	1202.46	1203.25	0.79	2021-12-01	10.11	1193.14	LC_MW_SRD1A (deep) and LC_MW_SRD1B (shallow)	2021-12-01	-0.006	Downward	-	Bladder
	LC_MW_SRD1B	1202.47	1203.16	0.69	2021-12-01	9.90	1193.26					-	Bladder
	LC_MW_SRD2A	1197.22	1198.03	0.81	2021-11-24	8.63	1189.40	LC_MW_SRD2A (deep) and LC_MW_SRD2B (shallow)	2021-11-24	0.023	Upward	Q4	Geosub
	LC_MW_SRD2B	1197.22	1198.01	0.79	2021-11-24	8.88	1189.13					Q4	Bailer
Elk River Valley (Study Area 6)	LC_MW_ER4A	1192.96	1193.92	0.96	2021-03-25	3.70	1190.22	LC_MW_ER4A (deep) and LC_MW_ER4B (shallow)	2021-03-25	0.059	Upward	Q4	Peristaltic
					2021-06-23	3.20	1190.72		2021-06-23	0.001	Upward		
					2021-08-29	3.78	1190.14		2021-08-29	0.054	Upward		
					2021-11-19	3.86	1190.06		2021-11-19	0.062	Upward		
	LC_MW_ER4B	1192.89	1193.85	0.96	2021-03-25	4.20	1189.65		-	-	-	Q4	Peristaltic
					2021-06-23	3.14	1190.72						
					2021-08-29	4.23	1189.62						
					2021-11-19	4.39	1189.46						

Notes:
masl denotes metres above sea level.
mbtoc denotes meters below top of casing.
TOC denotes top of pipe casing.
"-" denotes data not available.
Quarter is represented as Q1, Q2, Q3, Q4.
Water levels are metre below ground surface at LC_MW_LC1-1A, LC_MW_LC1-2A, LC_MW_LC1-3A, LC_MW_WLC-1A, LC_MW_WLC-2A, and LC_MW_WLC-3A.

TABLE LC-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (LCO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample (yyyy mm dd)	Field Temperature C	pH (field) pH	Dissolved Oxygen mg/L	Field Conductivity µS/cm	Field ORP mV	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity ntu	Total Alkalinity mg/L	Bicarbonate mg/L	Carbonate mg/L	Hydroxide mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulphate mg/L	Ammonia Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Phosphorus, Total mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Standard																													
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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.5[c]	400	0.2-2[d]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Dry Creek (+ denotes part of Study Area 2)																													
RG_MW_DC1A+	RG_MW_DC1A_WG_2021_09_29_NP	2021 09 29	4.8	7.28	0.23	444.6	-121	-	246	-	-	-	-	-	-	-	-	-	-	-	-	0.0847	-	-	0.128	-	0.0412	1.48	1.59
	RG_MW_MC10A_WG_2021_09_29_NP	Duplicate	-	-	-	-	-	-	244	-	-	-	-	-	-	-	-	-	-	-	-	0.0862	-	-	0.124	-	0.0228	1.41	1.23
	QA/QC RPD%		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	*	-	57	*	*
	RG_MW_DC1A_WG_Q4-2021_NP	2021 11 30	4.0	7.63	4.3	435	52	7.97	238	435	4.4	247	14.7	265	265	< 1.0	< 1.0	< 0.050	0.19	0.323	2.07	0.103	< 0.0050	< 0.0010	0.137	< 0.0010	0.0075	1.68	0.84
RG_MW_DC1B+	RG_MW_DC1B_WG_2021_09_29_NP	2021 09 29	4.8	7.07	0.31	266.2	-118.7	-	235	-	-	-	-	-	-	-	-	-	-	-	-	0.0921	-	-	0.134	-	0.0026	1.18	1.27
	RG_MW_DC1B_WG_Q4-2021_NP	2021 11 30	3.9	7.59	0.04	431	-151	7.87	225	423	1.5	236	28.8	265	265	< 1.0	< 1.0	< 0.050	0.18	0.341	2.84	0.107	< 0.0050	< 0.0010	0.136	< 0.0010	< 0.0020	1.12	1.36
LC_PIZDC0901	LC_PIZDC0901_WG_Q1-2021_NP	2021 03 18	3.2	7.06	9.55	442	265	7.41	210	420	2.4	263	1.85	252	308	< 1.0	< 1.0	< 0.050	< 0.10	0.084	7.40	0.0183	0.269	0.0012	0.308	0.0157	0.0176	5.04	3.94
	LC_PIZDC0901_WG_Q2-2021_NP	2021 06 27	9.0	6.89	4.38	647	136	8.36	342	600	< 1.0	384	0.42	356	420	6.8	< 1.0	< 0.050	0.35	0.078	11.8	0.124	0.570	< 0.0010	0.336	0.0154	0.0152	3.15	3.13
	LC_PIZDC0901_WG_Q3-2021_NP	2021 08 19	6.3	7	7.04	649	169	7.95	361	600	6.6	405	27.0	366	447	< 1.0	< 1.0	< 0.050	0.74	0.062	12.2	< 0.0050	0.275	< 0.0010	0.123	0.0116	0.0287	3.07	2.55
	LC_PIZDC0901_WG_Q4-2021_NP	2021 11 12	4.3	7.03	1.7	650	183	7.64	346	632	4.6	377	12.7	367	448	< 1.0	< 1.0	< 0.050	0.53	0.072	12.1	0.0188	0.0389	< 0.0010	0.099	0.0167	0.0218	2.33	2.78
LC_PIZDC1306	LC_PIZDC1306_WG_Q1-2021_NP	2021 03 18	4.0	7.1	1.67	491	269	7.47	236	464	199	339	172	288	352	< 1.0	< 1.0	< 0.050	< 0.10	0.119	5.86	0.0379	0.118	< 0.0010	0.787	0.0024	0.220	20.9	1.06
	LC_PIZDC1306_WG_Q2-2021_NP	2021 06 11	5.3	7.52	4.81	473	131	8.22	259	442	100	311	43.2	262	320	< 1.0	< 1.0	< 0.050	0.13	0.130	6.75	0.0592	0.183	< 0.0010	0.327	0.0011	0.233	4.62	2.02
	LC_PIZDC1306_WG_Q3-2021_NP	2021 09 17	7.3	7.18	2.14	460	243	8.23	267	461	4.6	278	3.96	268	327	< 1.0	< 1.0	< 0.050	0.12	0.137	6.46	< 0.0050	0.132	< 0.0010	0.063	< 0.0010	0.0031	2.19	2.36
	LC_PIZDC1306_WG_Q4-2021_NP	2021 11 17	2.9	7.28	1.68	480	140	7.87	241	484	1.8	257	2.49	291	354	< 1.0	< 1.0	< 0.050	0.12	0.169	6.28	< 0.0050	0.180	< 0.0010	0.057	0.0043	0.0049	1.91	1.97
LC_PIZDC1307	LC_PIZDC1307_WG_Q1-2021_NP	2021 03 10	2.48	7.93	0.1	398.4	-184.8	8.28	185	375	2.5	191	6.45	224	274	< 5.0	< 5.0	< 0.050	0.23	0.406	< 0.30	0.104	0.0113	< 0.0010	0.233	< 0.0010	0.0116	1.81	1.55
	LC_PIZDC1307_WG_Q2-2021_NP	2021 05 19	4.7	7.84	-0.6	397	-207.3	8.42	198	381	< 1.0	205	6.84	221	258	5.5	< 1.0	< 0.050	0.17	0.559	< 0.30	0.119	< 0.0050	< 0.0010	0.164	< 0.0010	0.0127	1.15	1.26
	LC_PIZDC1307_WG_Q3-2021_NP	2021 09 17	4.1	7.93	0.08	381	-179	8.32	180	383	3.5	222	12.0	239	284	3.6	< 1.0	< 0.050	0.16	0.500	< 0.30	0.103	0.0090	< 0.0010	0.179	< 0.0010	0.0136	2.04	2.01
	LC_PIZDC1307S_WG_Q4-2021_NP	2021 11 18	1.9	8.15	0.15	388	-197	8.30	168	388	2.8	211	8.03	245	294	2.2	< 1.0	< 0.050	0.20	0.570	< 0.30	0.212	< 0.0050	< 0.0010	0.168	< 0.0010	0.0131	1.73	2.05
LC_PIZDC1308	LC_PIZDC1308_WG_Q1-2021_NP	2021 03 10	3.2	7.44	0.02	479	-107	8.12	245	448	< 1.0	242	4.21	267	325	< 5.0	< 5.0	< 0.050	0.31	0.183	1.84	0.0583	0.0143	< 0.0010	0.163	< 0.0010	< 0.0020	2.09	2.27
	LC_PIZDC1308_WG_Q2-2021_NP	2021 05 19	4.02	6.9	0.04	720	198.5	8.28	430	671	< 1.0	396	< 0.10	412	502	< 1.0	< 1.0	< 0.050	2.30	0.136	5.41	< 0.0050	0.171	< 0.0010	0.096	< 0.0010	< 0.0020	3.36	3.38
	LC_PIZDC1308_WG_Q3-2021_NP	2021 09 17	5.5	6.98	0.04	639	67	7.99	366	660	< 1.0	396	0.58	399	487	< 1.0	< 1.0	< 0.050	1.46	0.137	5.64	0.0071	0.0656	0.0028	0.089	< 0.0010	< 0.0020	2.90	3.17
	LC_PIZDC1308D_WG_Q4-2021_NP	2021 11 18	2.6	7.16	0.14	587	-2	7.87	315	608	< 1.0	328	1.99	380	464	< 1.0	< 1.0	< 0.050	0.89	0.227	3.39	0.116	< 0.0050	0.0010	0.078	< 0.0010	< 0.0020	2.24	3.60
LC_PIZDC1404S	LC_PIZDC1404S_WG_Q1-2021_NP	2021 03 17	4.61	7.43	0.04	369.5	-122.2	8.14	198	335	< 1.0	208	4.62	203	248	< 5.0	< 5.0	< 0.050	0.19	0.069	5.37	0.0063	0.0072	0.0010	0.159	< 0.0010	0.0039	1.98	2.14
	LC_PIZDC1404S_WG_Q2-2021_NP	2021 06 24	9.7	7.54	0.14	364.8	-112	8.04	197	352	2.0	204	6.46	203	248	< 1.0	< 1.0	< 0.050	0.20	0.143	4.75	0.0063	0.0107	< 0.0010	< 0.050	< 0.0010	0.0076	2.40	3.33
	EXT_GW_TANYA	2021 08 26	8.6	7.5	0.3	376.8	-129.2	8.22	191	336	5.0	205	13.7	179	218	< 1.0	< 1.0	< 0.050	0.12	0.118	4.74	0.0111	< 0.0050	< 0.0010	0.068	< 0.0010	0.0163	4.42	5.02
	LC_PIZDC1404S_WG_Q4-2021_NP	2021 11 10	4.1	7.53	0.73	373	-9	7.87	178	364	6.0	209	9.91	227	227	< 1.0	< 1.0	< 0.050	0.11	0.119	4.79	0.0173	0.139	0.0038	0.104	< 0.0010	0.0225	2.32	2.56
LC_PIZDC1404D	LC_PIZDC1404D_WG_Q1-2021_NP	2021 03 17	5.8	7.67	0.03	734	-164	8.29	307	670	< 1.0	390	10.1	411	498	< 5.0	< 5.0	< 1.0	2.6	< 0.40	< 6.0	2.26	< 0.10	< 0.020	2.09	< 0.0010	< 0.0020	3.25	3.79
	LC_PIZDC1404D_WG_Q2-2021_NP	2021 06 24	8.6	7.87	0.05	729	-206	8.23	293	687	7.4	350	16.2	407	497	< 1.0	< 1.0	< 0.050	0.59	0.192	< 0.30	2.79	< 0.0050	< 0.0010	2.69	< 0.0010	0.0114	3.35	3.33
	LC_PIZDC1404D_WG_Q3-2021-NP	2021 08 26	8.3	7.8	0.1	726.0	-231.2	8.30	280	643	5.3	392	13.4	362	432	4.4	< 1.0	< 0.050	0.48	0.163	< 0.30	2.46	< 0.0050	< 0.0010	2.82	< 0.0010	0.0093	4.44	5.14
	LC_PIZDC1404D_WG_Q4-2021_NP	2021 11 10	4.0	7.91	0.07	723	-182	8.13	280	706	4.1	385	11.1	442	442	< 1.0	< 1.0	< 0.050	0.40	0.172	< 0.30	2.34	0.0070	< 0.0010	2.51	< 0.0010	0.0125	2.87	2.83

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[c] Standard varies with Hardness.

[f] Standard varies with pH and Temperature. Temperature assumed 10C.

[g] Standard varies with Chloride.

TABLE LC-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (LCO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample (yyyy mm dd)	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																													
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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.5[c]	400	0.2-2[d]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
LCO Phase I Centre Line Creek, West Line Creek, and Lower Line Creek																													
LC_MW20_01	LC_MW20_01_WG_2021-01-25_NP	2021 01 28	4.12	7.24	5.4	987.89	117.5	7.83	577	930	3.9	691	4.20	212	-	-	-	< 0.050	7.36	0.093	248	< 0.0050	13.4	0.0028	0.117	0.0024	0.0116	0.82	0.87
	LC_MW20_01_WG_2021-04-09_NP	2021 04 16	7.68	7.06	5.17	689.7	50.5	8.12	562	1,040	< 1.0	710	0.46	220	-	-	-	< 0.250	9.78	< 0.100	315	0.0300	16.8	< 0.0050	0.730	0.0014	< 0.0020	< 0.50	< 0.50
	LC_MW20_01_WG_2021-Q3_NP	2021 08 26	7.57	7.33	5.98	890.68	71.8	8.11	470	870	< 1.0	640	0.59	185	226	< 1.0	< 1.0	< 0.050	7.97	0.107	250	< 0.0050	13.2	0.0033	< 0.050	0.0025	0.0058	1.75	1.47
	LC_MW20_01_WG_2021-Q4_NP	2021 11 23	4.59	7.55	5.42	927.63	165.28	7.79	505	929	3.7	666	5.42	225	275	< 1.0	< 1.0	< 0.250	7.49	0.113	275	< 0.0050	13.0	< 0.0050	< 0.050	0.0034	0.0070	< 0.50	< 0.50
LC_MW20_02A	LC_MW20_02A_WG_2021-01-25_NP	2021 01 28	4.36	7.84	0.1	763.87	-212.7	7.99	452	743	4.3	523	39.9	196	-	-	-	< 0.050	8.21	0.136	210	0.0459	0.0171	< 0.0010	< 0.050	< 0.0010	0.0061	0.81	0.79
	LC_MW20_02A_WG_2021-04-09_NP	2021 04 17	4.32	8.18	0.13	461.54	-172.6	8.29	435	527	5.1	548	39.0	163	-	-	-	< 0.050	9.36	0.090	241	0.0507	< 0.0050	< 0.0010	2.69	< 0.0010	0.0032	< 0.50	< 0.50
	LC_MW20_02A_WG_2021-Q3_NP	2021 08 24	5.85	7.69	0.28	824.99	-164	7.95	428	759	7.5	590	43.8	180	221	< 1.0	< 1.0	< 0.050	9.77	0.153	258	0.0477	< 0.0050	< 0.0010	0.073	< 0.0010	0.0108	1.62	1.88
	LC_MW20_02A_WG_2021-Q4_NP	2021 11 24	4.12	7.93	0.55	847.24	-172.1	7.88	454	811	6.3	615	40.8	212	259	< 1.0	< 1.0	< 0.050	9.31	0.129	259	0.0613	< 0.0050	< 0.0010	0.074	< 0.0010	0.0096	< 0.50	< 0.50
LC_MW20_02B	LC_MW20_02B_WG_2021-01-25_NP	2021 01 28	4.41	6.92	7.37	916.38	150.2	7.86	545	870	< 1.0	649	< 0.10	212	-	-	-	< 0.050	8.12	0.099	219	0.0082	12.0	0.0012	< 0.25	0.0023	< 0.0020	0.76	0.72
	LC_MW20_02B_WG_2021-04-09_NP	2021 04 17	3.6	7.45	6.07	566.15	324.3	8.16	515	961	< 1.0	636	0.72	219	-	-	-	< 0.050	11.0	0.058	257	0.0288	14.6	< 0.0010	0.113	0.0019	< 0.0020	< 0.50	< 0.50
	LC_MW20_02B_WG_2021-Q3_NP	2021 08 24	5.53	7.26	5.88	853.42	236.2	7.78	449	816	< 1.0	620	0.52	199	244	< 1.0	< 1.0	0.051	8.82	0.146	226	< 0.0050	12.3	< 0.0010	< 0.050	0.0028	0.0041	1.31	1.73
	LC_MW20_02B_WG_2021-Q4_NP	2021 11 24	4.07	7.44	6.08	834.13	182.3	7.77	458	823	< 1.0	604	0.15	221	270	< 1.0	< 1.0	< 0.050	7.76	0.108	216	< 0.0050	9.80	< 0.0010	< 0.050	0.0030	0.0033	< 0.50	< 0.50
LC_MW20_03	LC_MW20_03_WG_2021-01-25_NP	2021 02 08	5.32	7.3	6.7	566.57	-28.7	7.81	328	545	53.7	328	39.0	302	-	-	-	< 0.050	7.16	0.205	18.4	0.0170	< 0.0050	0.0010	0.052	< 0.0010	0.0496	1.75	0.94
	LC_CC3_WG_2021-01-25_NP	Duplicate	-	-	-	-	-	7.75	326	549	59.2	317	38.4	318	-	-	-	< 0.050	7.05	0.189	17.7	0.0168	< 0.0050	< 0.0010	0.082	< 0.0010	0.0725	1.84	1.06
	QA/QC RPD%		-	-	-	-	-	1	1	1	10	3	2	5	-	-	-	*	2	8	4	*	*	*	*	*	38	*	*
	LC_MW20_03_WG_2021-04-09_NP	2021 04 17	7.04	7.51	0.39	342.74	-44	8.00	311	534	89.4	290	31.1	294	-	-	-	< 0.050	6.52	0.094	17.0	0.0118	< 0.0050	< 0.0010	0.107	< 0.0010	0.0951	1.18	0.77
	LC_MW20_03_WG_2021-Q3_NP	2021 08 26	6.64	7.09	0.26	531.79	-31	8.10	307	517	6.3	325	10.3	261	319	< 1.0	< 1.0	< 0.050	6.73	0.149	18.2	0.0314	0.0069	< 0.0010	< 0.050	< 0.0010	0.0112	1.62	0.76
	LC_MW20_03_WG_2021-Q4_NP	2021 11 24	5.45	7.32	0.34	367.34	-26	7.82	315	561	12.0	341	10.1	315	384	< 1.0	< 1.0	< 0.050	6.54	0.159	18.1	0.0080	< 0.0050	< 0.0010	0.053	0.0016	0.0121	< 0.50	< 0.50
LC_PIZ1206A	LC_PIZ1206A_WG_2021-01-25_NP	2021 01 28	4.1	6.91	6.36	2303.1	115.6	7.59	1,660	2,130	8.3	2,060	13.7	350	-	-	-	< 0.25	3.07	< 0.10	1,020	< 0.0050	12.1	< 0.0050	< 0.25	0.0039	0.0190	1.45	1.09
	LC_PIZ1206A_WG_2021-04-09_NP	2021 04 15	5.37	6.98	5.46	1302.6	167.9	7.95	1,570	2,080	5.2	1,650	2.56	288	-	-	-	0.514	2.98	< 0.100	1,070	0.0118	12.6	< 0.0050	< 0.050	0.0035	0.0058	1.00	0.52
	LC_PIZ1206A_WG_2021-Q3_NP	2021 08 25	6.74	7.06	5.12	1743.7	183.2	7.91	1,180	1,600	3.8	1,540	4.27	336	410	< 1.0	< 1.0	< 0.250	2.36	< 0.100	857	< 0.0050	9.68	< 0.0050	0.140	0.0039	0.0051	2.62	2.16
	LC_CC3_WG_2021-Q3_NP	Duplicate	-	-	-	-	-	7.98	1,080	1,680	1.7	1,400	3.75	344	420	< 1.0	< 1.0	< 0.250	2.34	< 0.100	859	< 0.0050	9.66	< 0.0050	< 0.050	0.0040	0.0065	2.21	2.34
	QA/QC RPD%		-	-	-	-	-	1	9	5	*	10	13	2	2	*	*	*	1	*	0	*	0	*	*	*	*	*	*
	LC_PIZ1206A_WG_2021-Q4_NP	2021 11 22	4.6	7.25	6.15	1766	179.7	7.47	1,210	1,800	6.4	1,570	9.27	369	450	< 1.0	< 1.0	< 0.250	3.65	0.188	827	< 0.0050	9.76	< 0.0050	0.314	0.0034	0.0093	1.24	0.94
	LC_CC3_WG_2021-Q4_NP	Duplicate	-	-	-	-	-	7.48	1,130	1,780	5.9	1,570	8.07	376	458	< 1.0	< 1.0	< 0.250	2.87	0.162	825	< 0.0050	9.78	< 0.0050	0.193	0.0033	0.0093	1.00	1.12
	QA/QC RPD%		-	-	-	-	-	0	7	1	8	0	14	2	2	*	*	*	24	15	0	*	0	*	*	*	*	*	*
LC_PIZ1206C	LC_PIZ1206C_WG_2021-01-25_NP	2021 01 29	4.92	7.5	13.09	1054.3	146.6	8.04	623	988	< 1.0	799	1.40	195	-	-	-	< 0.25	3.90	0.15	368	0.0050	2.37	< 0.0050	< 0.050	0.0025	0.0059	1.26	0.95
	LC_PIZ1206C_WG_2021-04-09_NP	2021 04 16	12.13	7.67	12.22	611.28	187.6	8.24	610	1,080	14.0	790	8.89	194	-	-	-	< 0.250	4.37	0.100	417	0.0132	2.67	< 0.0050	0.505	< 0.0010	0.0135	1.89	1.40
	LC_PIZ1206C_WG_2021-Q3_NP	2021 08 25	10.63	7.5	11.04	1027.1	172	8.11	579	983	7.3	812	11.2	213	260	< 1.0	< 1.0	< 0.250	4.07	0.157	456	0.0231	3.17	< 0.0050	0.240	< 0.0010	0.0117	2.80	2.20
	LC_PIZ1206C_WG_2021-Q4_NP	2021 11 23	3.79	7.6	11.02	1060.6	182.7	7.90	607	1,120	2.2	837	2.35	215	262	< 1.0	< 1.0	< 0.250	3.71	0.198	468	< 0.0050	3.37	< 0.0050	0.276	0.0014	0.0079	< 0.50	< 0.50
LC_PIZ1211N	LC_PIZ1211N_WG_2021-01-25_NP	2021 02 08	3.64	7.54	9.15	1389	129.9	7.84	825	1,280	< 1.0	978	< 0.10	219	-	-	-	< 0.25	10.6	0.18	480	< 0.0050	20.2	< 0.0050	< 0.050	0.0028	0.0024	0.80	0.61
	LC_PIZ1211N_WG_2021-04-09_NP	2021 04 16	3.99	7.4	9.23	700.58	263.4	8.20	649	1,200	< 1.0	834	0.21	235	-	-	-	< 0.250	10.0	0.102	396	< 0.0050	16.7	< 0.0050	1.09	0.0026	< 0.0020	0.78	0.62
	LC_PIZ1211N_WG_2021-Q3_NP	2021 08 24	8.42	7.21	7.43	1336.2	216.6	7.72	778	1,220	< 1.0	1,100	0.24	254	311	< 1.0	< 1.0	< 0.250	6.13	0.133	498	< 0.0050	12.8	0.0150	< 0.050	0.0025	0.0028	2.28	2.16
	LC_PIZ1211N_WG_2021-Q4_NP	2021 11 23	5	7.48	8.42	1206.5	200.5	7.75	685	1,190	< 1.0	920	0.21	255	311	< 1.0	< 1.0	< 0.250	8.62	0.163	427	< 0.0050	14.8	< 0.0050	< 0.050	0.0048	0.0033	< 0.50	< 0.50

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[e] Standard varies with Hardness.

[f] Standard varies with pH and Temperature. Temperature assumed 10C.

[g] Standard varies with Chloride.

TABLE LC-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (LCO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample (yyyy mm dd)	Field Temperature C	pH (field) pH	Dissolved Oxygen mg/L	Field Conductivity µS/cm	Field ORP mV	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity ntu	Total Alkalinity mg/L	Bicarbonate mg/L	Carbonate mg/L	Hydroxide mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulphate mg/L	Ammonia Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Phosphorus, Total mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Standard																													
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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.5[c]	400	0.2-2[d]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
LCO Phase I Centre Line Creek, West Line Creek, and Lower Line Creek																													
LC_PIZ1212	LC_PIZ1212_WG_2021-01-25_NP	2021 01 29	3.59	7.35	10.8	1397.4	159.4	8.01	869	1,300	4.4	1,080	4.24	223	-	-	-	< 0.25	8.46	0.14	463	< 0.0050	18.8	< 0.0050	< 0.25	0.0029	0.0112	1.24	1.30
	LC_PIZ1212_WG_2021-04-09_NP	2021 04 16	6.22	7.56	8.15	802.57	248.5	8.18	702	1,270	< 1.0	954	0.26	242	-	-	-	< 0.250	10.1	< 0.100	442	< 0.0050	17.6	< 0.0050	1.14	0.0031	0.0041	< 0.50	< 0.50
	LC_PIZ1212_WG_2021-Q3_NP	2021 08 24	7.67	7.3	8.06	1110.1	185.3	7.85	620	1,020	1.2	864	0.81	220	269	< 1.0	< 1.0	< 0.250	8.08	0.102	372	< 0.0050	14.9	< 0.0050	< 0.050	0.0036	0.0055	2.01	2.24
	LC_PIZ1212_WG_2021-Q4_NP	2021 11 23	4.39	7.5	8.81	1253.6	188.3	7.75	714	1,230	3.0	964	2.97	254	310	< 1.0	< 1.0	< 0.250	8.55	0.155	455	< 0.0050	15.5	< 0.0050	< 0.050	0.0040	0.0080	0.60	0.65
WL_MW-15-02-A	WL_MW-15-02-A_WG_2021-SA-01_N	2021 06 22	13.7	7.21	1.67	471	39.4	7.67	302	568	8.7	379	10.7	329	-	-	-	< 0.050	1.51	0.287	16.0	0.0083	0.0240	< 0.0010	0.274	0.0030	0.0153	1.59	1.73
	WL_MW-15-02-A_WG_2021-SA-02_N	2021 11 04	5.7	7.32	2.56	456.7	-26.9	8.01	234	400	11.4	283	13.8	222	270	< 1.0	< 1.0	< 0.050	1.31	0.108	12.5	0.0600	0.0225	0.0014	0.094	0.0030	0.0170	2.25	2.68
WL_MW-15-02-B	WL_MW-15-02-B_WG_2021-SA-01_N	2021 06 23	16.1	6.64	1.87	1,035	144.5	7.82	576	673	4.3	586	2.44	347	-	-	-	< 0.250	6.70	< 0.100	41.3	< 0.0050	3.25	< 0.0050	0.278	0.0014	0.0027	1.41	0.60
	WL_MW-15-02-B_WG_2021-SA-02_N	2021 11 02	6.73	6.81	2.02	968	15.0	7.19	607	1,050	1.3	670	8.16	543	662	< 1.0	< 1.0	< 0.250	9.18	< 0.100	64.5	< 0.0050	1.32	< 0.0050	0.226	0.0024	0.0027	1.61	1.91
WL_MW-15-04-B	WL_MW-15-04-B_WG_2021-SA-01_N	2021 06 23	11.1	6.58	1.64	1,220	-20.7	7.84	660	903	56.4	673	212	544	-	-	-	< 0.250	2.23	0.102	34.2	0.364	0.226	< 0.0050	1.39	< 0.0010	0.106	9.38	7.33
	WL_MW-15-04-B_WG_2021-SA-02_N	2021 11 04	6.9	6.67	0.21	1,262	-79.4	7.75	625	908	19,200	740	100,000	620	756	< 1.0	< 1.0	0.079	1.75	0.110	9.20	3.32	0.0052	0.0081	3.74	< 0.0010	2.91	83.3	11.6
LC_MW_CP1A	LC_MW_CP1A_WG_2021_09_01_NP	2021 09 01	6.1	7.36	5.16	953	101.9	8.18	280	600	10.4	421	6.11	200	244	< 5.0	< 5.0	< 0.050	3.65	0.287	125	0.0401	2.74	< 0.0010	0.234	0.0037	0.0115	1.59	1.35
	LC_MW_MC10A_WG_2021_09_01_NP	Duplicate	-	-	-	-	-	8.21	278	608	10.6	414	5.94	201	246	< 5.0	< 5.0	< 0.050	3.49	0.315	124	0.0153	2.72	< 0.0010	0.210	0.0037	0.0113	2.63	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	1	2	2	3	0	1	*	*	*	4	9	1	*	1	*	*	*	2	*	*
	LC_MW_CP1A_Q4-2021_NP	2021 11 24	4.6	7.53	1.75	6	52	7.79	272	559	2.0	392	2.31	200	244	< 1.0	< 1.0	< 0.050	1.13	0.294	119	< 0.0050	2.44	0.141	0.310	0.0028	0.0058	< 0.50	< 0.50
LC_MW_CP1B	LC_MW_CP1B_WG_2021_09_01_NP	2021 09 01	6.7	6.76	6.65	943	209.7	-	335	-	< 1.0	391	1.48	-	-	-	-	< 0.050	10.8	0.254	103	< 0.0050	1.75	< 0.0010	0.204	0.0027	0.0025	2.44	1.34
	LC_MW_CP1B_Q4-2021_NP	2021 11 24	4.6	7.37	5.9	669	52	7.73	324	646	< 1.0	438	< 0.10	222	271	< 1.0	< 1.0	0.299	24.0	0.245	114	< 0.0050	1.95	< 0.0010	0.201	0.0029	< 0.0020	< 0.50	1.12
Process Plant (^ denotes part of Study Area 5/6)																													
RG_MW_LC4A^	RG_MW_LC4A_WG_2021_08_19_NP	2021 08 19	6.09	6.32	6.76	580	56.6	7.67	302	577	4.4	406	4.93	169	206	< 5.0	< 5.0	0.051	6.66	0.358	147	0.0058	2.10	0.0020	0.282	< 0.0010	0.0093	0.93	0.79
	RG_MW_LC4A_WG_Q4-2021_NP	2021 11 26	4.3	7.4	5.62	627	43	7.64	282	605	2.3	527	3.12	180	180	< 1.0	< 1.0	< 0.050	7.86	0.471	147	< 0.0050	2.53	0.0044	0.406	0.0011	0.0075	1.48	1.23
RG_MW_LC4B^	RG_MW_LC4B_WG_2021_08_19_NP	2021 08 19	8.5	7.51	6.43	349.4	185.1	7.77	357	671	7.8	493	12.2	204	249	< 5.0	< 5.0	< 0.050	7.69	0.200	166	< 0.0050	5.23	< 0.0010	0.334	< 0.0010	0.0228	0.67	0.91
	RG_MW_LC4B_WG_Q4-2021_NP	2021 11 26	4.7	7.66	9.33	761	52	7.84	364	731	< 1.0	409	< 0.10	188	188	< 1.0	< 1.0	< 0.050	10.8	0.291	196	0.0120	6.97	< 0.0010	0.353	< 0.0010	< 0.0020	0.75	0.86
LC_PIZP1101	LC_PIZP1101_WG_Q1-2021_N	2021 03 22	8.0	7.96	0.13	363	-85	7.92	133	291	300	376	472	197	240	< 5.0	< 5.0	< 0.050	0.65	*1.81*	3.26	0.0287	0.0095	< 0.0010	0.647	0.0107	0.551	< 5.0	< 0.50
	WG_Q1-2021_010	Duplicate	-	-	-	-	-	8.04	130	289	292	380	450	187	229	< 5.0	< 5.0	< 0.050	0.63	*1.80*	3.23	0.0216	0.0079	< 0.0010	0.506	0.0063	0.568	6.5	< 0.50
	QA/QC RPD%		-	-	-	-	-	2	2	1	3	1	5	5	5	*	*	*	3	1	1	*	*	*	24	52	3	*	*
	LC_PIZP1101_WG_Q2-2021_N	2021 06 10	9.1	7.56	0.09	307.6	-123.3	8.29	121	303	69.9	192	102	187	228	< 1.0	< 1.0	< 0.050	0.76	*1.88*	2.66	0.0268	< 0.0050	< 0.0010	0.242	0.0091	0.213	2.08	1.21
	WG_Q2-2021_005	Duplicate	-	-	-	-	-	8.28	120	303	77.9	192	113	179	219	< 1.0	< 1.0	< 0.050	0.76	*1.88*	2.63	0.0705	< 0.0050	< 0.0010	0.239	0.0091	0.223	1.72	1.49
	QA/QC RPD%		-	-	-	-	-	1	0	0	11	0	10	4	4	*	*	*	0	0	1	90	*	*	*	0	5	*	*
	LC_PIZP1101_WG_Q3-2021_N	2021 09 21	17.2	7.8	0	295.5	-189.2	8.15	125	306	2,010	397	4,000	175	214	< 1.0	< 1.0	< 0.050	0.90	*1.89*	3.91	0.0471	< 0.0050	< 0.0010	0.116	0.0045	2.04	32.3	0.82
	LC_CC2_PIZP1101_N	Duplicate	-	-	-	-	-	8.03	122	304	2,080	424	4,000	178	217	< 1.0	< 1.0	< 0.050	0.90	*1.87*	3.87	0.0415	< 0.0050	0.0010	0.111	0.0041	2.03	27.7	1.18
	QA/QC RPD%		-	-	-	-	-	1	2	1	3	7	0	2	1	*	*	*	0	1	1	13	*	*	*	*	0	15	*
	LC_PIZP1101_WG_Q4-2021_N	2021 11 23	4.1	8.02	0.05	306	-152	8.14	120	295	2,160	533	3,110	175	214	< 1.0	< 1.0	< 0.050	0.87	*1.79*	3.31	0.0848	0.207	0.0013	0.114	0.0118	1.89	9.88	< 0.50
	WG_Q4-2021_010_CC3	Duplicate	-	-	-	-	-	8.16	120	297	2,180	415	83.2	178	217	< 1.0	< 1.0	< 0.050	0.86	*1.80*	3.27	0.0874	0.206	0.0012	0.158	0.0112	1.86	< 10.0	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	0	1	1	25	190	2	1	*	*	*	1	1	1	3	0	*	*	5	2	*	*

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

< Denotes concentration less than indicated detection limit.

- 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.

[a] Standard to protect freshwater aquatic life.

[e] Standard varies with Hardness.

[f] Standard varies with pH and Temperature. Temperature assumed 10C.

[g] Standard varies with Chloride.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE LC-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (LCO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample (yyyy mm dd)	Field Temperature C	pH (field) pH	Dissolved Oxygen mg/L	Field Conductivity µS/cm	Field ORP mV	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity ntu	Total Alkalinity mg/L	Bicarbonate mg/L	Carbonate mg/L	Hydroxide mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulphate mg/L	Ammonia Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Phosphorus, Total mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Standard																													
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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.5[c]	400	0.2-2[d]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Process Plant (^ denotes part of Study Area 5/6)																													
LC_PIZP1103	LC_PIZP1103_WG_Q1-2021_NP	2021 02 17	4.2	7.5	0.38	785	-29	7.80	137	743	36.8	528	60.9	408	498	< 5.0	< 5.0	< 0.050	4.00	0.254	26.4	0.149	0.0080	0.0029	0.331	0.0493	0.154	1.64	1.44
	LC_PIZP1103_WG_Q2-2021_NP	2021 05 13	8.5	7.44	0.48	740	-50.3	8.62	139	741	16.5	438	16.0	407	444	25.9	< 1.0	< 0.050	2.56	0.347	26.4	0.126	< 0.0050	< 0.0010	0.278	0.0376	0.0502	1.85	1.66
	LC_PIZP1103_WG_Q3-2021_NP	2021 08 20	9.3	7.65	1.09	790	-58	8.05	137	741	16.4	444	17.5	433	528	< 1.0	< 1.0	< 0.050	2.99	0.347	28.1	0.0491	0.0999	0.0109	0.086	0.0483	0.0786	1.70	2.56
	LC_PIZP1103_WG_Q4-2021_N	2021 10 22	7.3	7.4	1.7	742.0	188.6	8.55	136	756	13.6	453	9.62	429	501	10.9	< 1.0	< 0.050	4.10	0.426	28.7	0.0367	0.110	0.0048	0.265	0.0589	0.0485	1.88	1.68
LC_PIZP1104	LC_PIZP1104_WG_Q1-2021_N	2021 03 25	5.969	7.01	1.99	1,204	-15.1	7.81	595	1,190	24.3	803	24.2	251	306	< 1.0	< 1.0	2.71	*226*	0.270	81.4	0.0193	1.23	0.0071	0.243	< 0.0010	0.0448	0.67	0.69
	LC_PIZP1104_WG_Q2-2021_NP	2021 05 31	18.7	7.13	0.67	1,131	-104.3	7.74	575	1,180	62.8	824	57.0	262	320	< 1.0	< 1.0	2.74	*221*	0.295	60.6	0.0176	0.217	0.0030	0.063	< 0.0010	0.153	3.49	3.69
	LC_PIZP1104_WG_Q3-2021_NP	2021 09 16	7.5	6.5	10.3	38.3	231.4	7.68	558	1,170	1,740	939	884	265	323	< 1.0	< 1.0	2.92	*224*	0.304	63.6	< 0.0050	0.472	< 0.0050	0.073	< 0.0010	1.76	27.9	10.4
	LC_PIZP1104_WG_Q4-2021_NP	2021 11 22	5.6	6.85	2.06	1,274	-98	7.44	572	1,270	21.8	857	25.2	255	311	< 1.0	< 1.0	3.18	*245*	0.332	80.8	0.0055	0.303	< 0.0050	0.054	< 0.0010	0.0352	1.35	0.88
LC_PIZP1105	LC_PIZP1105_WG_Q1-2021_N	2021 03 24	6.5	6.92	3.06	1,630	182	7.48	740	1,300	2,590	830	2,450	459	560	< 1.0	< 1.0	2.19	*175*	0.207	106	0.0173	0.812	< 0.0050	< 0.050	0.0060	0.911	74.5	0.57
	WG_Q1-2021_013	Duplicate	-	-	-	-	-	7.40	735	1,310	4,770	859	3,730	413	504	< 1.0	< 1.0	2.11	*174*	0.215	101	0.0223	0.0346	< 0.0050	2.98	0.0064	2.48	348	276
	QA/QC RPD%		-	-	-	-	-	1	1	1	59	3	41	11	11	*	*	4	1	4	5	*	184	*	*	6	93	129	*
	LC_PIZP1105_WG_Q2-2021_N	2021 06 11	8.9	6.94	3.01	1,451	1,513	7.46	782	1,330	242	854	143	427	520	< 1.0	< 1.0	2.41	*186*	0.189	120	0.0147	0.535	0.0102	0.227	0.0092	0.558	2.44	35.5
	WG_Q2-2021_005B	Duplicate	-	-	-	-	-	7.47	712	1,340	390	850	246	437	533	< 1.0	< 1.0	2.32	*186*	0.168	107	0.0552	0.0928	< 0.0050	0.236	0.0089	0.560	2.48	38.9
	QA/QC RPD%		-	-	-	-	-	0	9	1	47	0	53	2	2	*	*	4	0	12	11	*	141	*	*	3	0	*	9
	LC_PIZP1105_WG_Q3-2021_NP	2021 09 16	7.1	7.1	4.6	1,356.0	205.9	7.37	687	1,340	1,740	989	1,240	416	507	< 1.0	< 1.0	2.36	*192*	0.249	105	0.0151	0.0543	< 0.0050	0.122	0.0063	2.06	36.7	1.92
	WG_Q3-2021_007_CC3	Duplicate	-	-	-	-	-	7.36	684	1,340	1,050	957	808	402	491	< 1.0	< 1.0	2.44	*192*	0.248	105	0.0376	0.0410	< 0.0050	0.162	0.0075	3.58	63.9	1.96
	QA/QC RPD%		-	-	-	-	-	0	0	0	49	3	42	3	3	*	*	3	0	0	0	*	28	*	*	17	54	54	*
	LC_PIZP1105_WG_Q4-2021_N	2021 11 22	5.6	6.89	4.6	1,418	87	7.22	720	1,390	424	906	290	437	533	< 1.0	< 1.0	2.62	*199*	0.268	106	0.0882	0.0536	< 0.0050	0.084	0.0031	0.384	9.55	0.84
	WG_Q4-2021_010_CC2	Duplicate	-	-	-	-	-	7.24	713	1,420	476	900	290	417	508	< 1.0	< 1.0	2.70	*200*	0.271	105	0.0717	0.0329	< 0.0050	0.075	0.0029	0.403	8.09	0.81
	QA/QC RPD%		-	-	-	-	-	0	1	2	12	1	0	5	5	*	*	3	1	1	1	21	48	*	*	*	5	17	*
LC_MW_ERX1A^	LC_MW_ERX1A_WG_2021_11_24_NP	2021 11 24	6.8	7.87	6.47	684	-134	8.04	126	675	22.0	450	23.0	346	422	< 2.0	< 2.0	0.077	0.65	0.189	55.1	0.406	0.0363	< 0.0010	0.346	0.0036	0.0161	6.11	3.88
LC_MW_ERX1B^	LC_MW_ERX1B_WG_2021_11_24_NP	2021 11 24	5.1	7.68	5.07	680	-196	7.96	255	667	134	520	168	280	342	< 2.0	< 2.0	< 0.050	6.94	0.499	113	0.107	1.38	0.0118	0.621	0.0041	0.158	145	9.22
LC_MW_SRD1A^	RG_MW_ERXA_WG_2021_09_03_NP	2021 09 03	4.2	6.28	0.16	655.9	228.3	-	345	-	130	439	78.9	-	-	-	-	< 0.050	5.59	0.249	134	0.0566	7.82	0.0040	0.833	0.0136	0.154	7.8	1.55
	LC_MW_SRD1A_WG_Q4-2021_NP	2021 12 01	7.6	7.13	6.05	775	96	7.88	399	773	4.1	501	3.65	222	271	< 1.0	< 1.0	< 0.050	4.24	0.200	189	0.0269	10.1	0.0023	0.140	0.0014	0.0098	1.06	0.69
LC_MW_SRD1B^	LC_MW_SRD1B_WG_2021_08_19_NP	2021 08 19	5.2	7.5	8.17	330.1	102.7	7.78	322	628	60.9	447	29.3	198	241	< 5.0	< 5.0	< 0.050	2.35	0.145	143	< 0.0050	8.04	< 0.0010	0.372	< 0.0010	0.0313	0.63	0.67
	RG_MW_MC11A_WG_2021_08_19_NP	Duplicate	-	-	-	-	-	7.78	330	628	62.2	457	29.3	199	242	< 5.0	< 5.0	< 0.050	2.35	0.141	142	< 0.0050	8.00	< 0.0010	0.336	< 0.0010	0.0298	0.67	0.55
	QA/QC RPD%		-	-	-	-	-	0	2	0	2	2	0	1	0	*	*	*	0	3	1	*	0	*	10	*	5	*	*
	LC_MW_SRD1B_WG_Q4-2021_NP	2021 12 01	8.0	7	6.35	811	110	7.87	407	805	19.5	528	28.0	238	290	< 1.0	< 1.0	< 0.050	4.56	0.196	195	< 0.0050	10.3	< 0.0010	0.311	0.0021	0.0161	0.53	< 0.50
LC_MW_SRD2A^	LC_MW_SRD2A_WG_2021_11_24_NP	2021 11 24	4.9	8.49	2.94	784	-203	8.45	43.8	779	111	690	376	334	391	8.0	< 2.0	0.396	*101*	***2.77***	3.02	0.325	0.0690	< 0.0010	0.647	0.0047	0.414	10.1	1.44
LC_MW_SRD2B^	LC_MW_SRD2B_WG_2021_11_24_NP	2021 11 24	6.3	7.03	7.45	1,030	-17.9	7.67	558	1,020	5.2	702	2.12	281	342	< 2.0	< 2.0	0.860	*103*	0.157	157	0.0084	4.44	< 0.0050	< 0.050	0.0038	0.0124	1.35	0.97
	LC_MW_MC10A_WG_2021_11_24_NP	Duplicate	-	-	-	-	-	7.69	555	1,020	4.4	716	2.15	282	344	< 2.0	< 2.0	0.958	*104*	0.157	156	0.0057	4.43	< 0.0050	0.125	0.0035	0.0114	1.05	0.70
	QA/QC RPD%		-	-	-	-	-	0	1	0	*	2	1	0	1	*	*	11	1	0	1	*	0	*	*	*	8	*	*

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[e] Standard varies with Hardness.

[f] Standard varies with pH and Temperature. Temperature assumed 10C.

[g] Standard varies with Chloride.

TABLE LC-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (LCO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample (yyyy mm dd)	Field Temperature C	pH (field) pH	Dissolved Oxygen mg/L	Field Conductivity µS/cm	Field ORP mV	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity ntu	Total Alkalinity mg/L	Bicarbonate mg/L	Carbonate mg/L	Hydroxide mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulphate mg/L	Ammonia Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Phosphorus, Total mg/L	Total Organic Carbon mg/L	Dissolved Organic Carbon mg/L
BC Standard																													
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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.5[c]	400	0.2-2[d]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Elk River Valley (^ denotes part of Study Area 6)																													
LC_MW_ER4A^	LC_MW_ER4A_WG_Q1-2021_N	2021 03 25	4.5	7.03	0.21	484	-58	7.83	262	444	< 1.0	266	0.95	182	223	< 1.0	< 1.0	< 0.050	1.76	0.098	83.9	0.0169	0.0304	< 0.0010	0.095	0.0012	< 0.0020	< 0.50	< 0.50
	LC_MW_ER4A_WG_Q2-2021-N	2021 06 23	9	7.58	0.008	486.9	-102	8.06	244	466	1.6	311	< 0.10	178	218	< 1.0	< 1.0	< 0.050	1.90	0.166	84.1	0.0329	0.0053	< 0.0010	0.059	< 0.0010	< 0.0020	0.70	1.57
	LC_MW_ER4A_WG_Q3-2021_N	2021 08 29	10.6	7.52	0.25	496	-141	8.02	278	459	< 1.0	314	1.34	156	190	< 1.0	< 1.0	< 0.050	2.27	0.134	96.8	0.0185	0.0084	< 0.0010	< 0.050	< 0.0010	0.0025	< 0.50	0.90
	LC_MW_ER4A	2021 11 19	7.0	7.64	0.07	509	-57	8.07	246	511	< 1.0	342	0.89	179	218	< 1.0	< 1.0	< 0.050	2.72	0.117	109	0.0195	< 0.0050	< 0.0010	< 0.050	0.0011	0.0024	0.60	0.93
LC_MW_ER4B^	LC_MW_ER4B_WG_Q1-2021_N	2021 03 25	4.4	6.8	8.19	529	215	7.79	279	493	< 1.0	292	< 0.10	185	226	< 1.0	< 1.0	< 0.050	3.43	0.118	93.0	0.0097	3.34	< 0.0010	0.335	0.0012	< 0.0020	< 0.50	< 0.50
	LC_MW_ER4B_WG_Q2-2021-N	2021 06 23	8.7	7.44	4.58	450.8	157.3	8.01	228	434	< 1.0	291	0.29	184	225	< 1.0	< 1.0	< 0.050	1.15	0.210	54.8	< 0.0050	1.78	< 0.0010	0.120	< 0.0010	< 0.0020	< 0.50	0.79
	LC_MW_ER4B_WG_Q3-2021_N	2021 08 29	12.9	7.3	4.35	512	84	8.02	284	466	< 1.0	313	< 0.10	186	228	< 1.0	< 1.0	< 0.050	1.60	0.175	65.9	0.0088	1.72	< 0.0010	0.128	< 0.0010	< 0.0020	< 0.50	1.75
	LC_MW_ER4B	2021 11 19	6.6	7.45	5.75	523	83	8.05	257	529	< 1.0	344	< 0.10	218	266	< 1.0	< 1.0	< 0.050	2.21	0.140	82.3	0.0073	2.81	< 0.0010	0.263	0.0010	< 0.0020	0.67	1.97
Blanks																													
Field Blanks																													
LC_PIZ1206C	LC_MT3_WG_2021-01-25_NP	2021 01 29	-	-	-	-	-	5.38	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	-	-	-	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
LC_PIZP1105	WG_Q1-2021_011	2021 03 24	-	-	-	-	-	5.07	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
-	RG_MW_MC11B_WG_2021_08_19_NP	2021 08 19	-	-	-	-	-	4.29	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	0.089	< 0.0010	< 0.0020	< 0.50	< 0.50
LC_PIZ1206C	LC_MT3_WG_2021-Q3_NP	2021 08 25	-	-	-	-	-	5.45	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
LC_MW_CP1A	LC_MW_MC10B_WG_2021_09_01_NP	2021 09 01	-	-	-	-	-	-	< 0.50	-	< 1.0	< 10	< 0.10	-	-	-	-	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	1.98	2.24
LC_PIZP1105	WG_Q3-2021_008_MT3	2021 09 16	-	-	-	-	-	5.01	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
LC_PIZP1101	WG_Q4-2021_011_MT2	2021 11 23	-	-	-	-	-	5.11	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0313	< 0.0050	< 0.0010	0.057	< 0.0010	< 0.0020	< 0.50	< 0.50
LC_PIZP1105	WG_Q4-2021_013_MT3	2021 11 22	-	-	-	-	-	5.54	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
LC_MW_SRD2B	LC_MW_MC10B_WG_2021_11_24_NP	2021 11 24	-	-	-	-	-	6.24	1.11	3.4	< 1.0	< 10	0.51	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	0.18	< 0.020	0.37	< 0.0050	0.0088	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
Trip Blanks																													
	LC_RD3_WG_2021-01-25_NP	2021 01 29	-	-	-	-	-	5.36	-	< 2.0	< 1.0	< 10	< 0.10	< 1.0	-	-	-	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	WG_Q1-2021_012	2021 03 24	-	-	-	-	-	4.86	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0061	< 0.0050	0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	WG_Q2-2021_006	2021 06 10	-	-	-	-	-	5.31	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0063	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	LC_MW_MC10C_WG_2021_09_01_NP	2021 09 01	-	-	-	-	-	-	< 0.50	-	< 1.0	< 10	< 0.10	-	-	-	-	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	1.87	1.91
	WG_Q3-2021_009_RD2	2021 09 16	-	-	-	-	-	4.91	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	0.240	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	WG_Q4-2021_012_RD2	2021 11 22	-	-	-	-	-	5.87	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0085	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	LC_MW_MC10C_WG_2021_11_24_NP	2021 11 24	-	-	-	-	-	5.13	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[c] Standard varies with Hardness.

[f] Standard varies with pH and Temperature. Temperature assumed 10C.

[g] Standard varies with Chloride.

TABLE LC-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (LCO)

Sample Location	Sample ID	Sample (yyyy mm dd)	Hardness	Dissolved Metals: Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[f]
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[b]	n/a	10[d]	40	20-90[b]	n/a	40-160[b]	n/a	n/a	n/a	0.25	10,000	250-1,500[b]	n/a	20	0.5-15[b]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[b]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[d]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[c]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[d]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[d]	20[e]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[g]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Dry Creek (+ denotes part of Study Area 2)																																		
RG_MW_DC1A+	RG_MW_DC1A_WG_2021_09_29_NP	2021 09 29	246	20.0	< 0.10	2.30	449	< 0.020	< 0.050	22	0.0197	56.1	< 0.10	0.91	0.43	1,380	0.085	11.6	25.8	83.3	< 0.0050	6.57	1.50	2.48	< 0.050	< 0.010	3.62	153	0.017	< 0.10	0.42	0.226	< 0.50	2.7
	RG_MW_MC10A_WG_2021_09_29_NP	Duplicate	244	19.5	< 0.10	2.30	425	< 0.020	< 0.050	24	0.0182	56.1	< 0.10	0.89	0.28	1,380	0.082	12.0	25.4	82.0	< 0.0050	6.57	1.48	2.47	< 0.050	< 0.010	3.72	153	0.015	< 0.10	0.44	0.225	< 0.50	1.1
	QA/QC RPD%		1	3	*	0	5	*	*	*	*	0	*	2	*	0	*	3	2	2	*	0	*	0	*	*	3	0	*	*	*	0	*	*
	RG_MW_DC1A_WG_Q4-2021_NP	2021 11 30	238	1.2	< 0.10	2.15	427	< 0.020	< 0.050	24	< 0.0050	54.4	< 0.10	0.83	< 0.20	1,370	< 0.050	12.5	24.7	74.1	< 0.0050	5.98	1.65	2.56	< 0.050	< 0.010	3.43	136	0.014	< 0.10	< 0.30	0.187	< 0.50	1.0
RG_MW_DC1B+	RG_MW_DC1B_WG_2021_09_29_NP	2021 09 29	235	< 1.0	< 0.10	2.72	526	< 0.020	< 0.050	20	0.0115	53.6	< 0.10	0.89	< 0.20	2,060	< 0.050	16.0	24.7	62.0	< 0.0050	6.04	1.42	2.75	< 0.050	< 0.010	3.27	126	0.017	< 0.10	< 0.30	0.120	< 0.50	1.5
	RG_MW_DC1B_WG_Q4-2021_NP	2021 11 30	225	1.3	< 0.10	2.69	490	< 0.020	< 0.050	26	< 0.0050	50.9	< 0.10	0.89	2.19	1,930	< 0.050	16.3	23.8	60.5	< 0.0050	5.62	1.78	2.75	< 0.050	< 0.010	3.25	118	0.017	< 0.10	< 0.30	0.108	< 0.50	4.3
LC_PIZDC0901	LC_PIZDC0901_WG_Q1-2021_NP	2021 03 18	210	< 1.0	0.17	0.27	153	< 0.020	< 0.050	< 10	0.0695	55.3	0.14	< 0.10	1.24	< 10	< 0.050	2.3	17.4	< 0.10	< 0.0050	0.662	0.99	0.859	2.21	< 0.010	1.40	115	< 0.010	< 0.10	< 0.30	2.10	0.52	< 1.0
	LC_PIZDC0901_WG_Q2-2021_NP	2021 06 27	342	< 1.0	0.16	0.25	235	< 0.020	< 0.050	< 10	0.0876	95.4	< 0.10	< 0.10	0.50	< 10	< 0.050	3.0	25.2	< 0.10	< 0.0050	0.583	0.75	1.14	0.607	< 0.010	2.46	179	< 0.010	< 0.10	< 0.30	2.56	0.62	< 1.0
	LC_PIZDC0901_WG_Q3-2021_NP	2021 08 19	361	1.7	0.20	0.20	224	< 0.020	< 0.050	< 10	0.0806	100	< 0.10	< 0.10	12.0	< 10	0.084	2.9	27.1	0.38	< 0.0050	0.602	1.34	1.28	0.544	< 0.010	2.36	152	0.010	< 0.10	< 0.30	2.19	< 0.50	4.4
	LC_PIZDC0901_WG_Q4-2021_NP	2021 11 12	346	< 1.0	0.38	0.31	268	< 0.020	< 0.050	< 10	0.0722	95.1	0.16	< 0.10	0.69	< 10	0.072	2.9	26.4	0.94	< 0.0050	0.754	1.17	1.33	1.27	< 0.010	2.75	169	0.011	< 0.10	< 0.30	2.94	< 0.50	1.3
LC_PIZDC1306	LC_PIZDC1306_WG_Q1-2021_NP	2021 03 18	236	< 1.0	0.17	< 0.10	189	< 0.020	< 0.050	< 10	0.118	56.6	< 0.10	< 0.10	0.49	< 10	< 0.050	15.0	22.9	< 0.10	< 0.0050	1.77	0.67	2.16	2.15	< 0.010	1.06	64.0	< 0.010	< 0.10	< 0.30	0.762	0.52	2.8
	LC_PIZDC1306_WG_Q2-2021_NP	2021 06 11	259	< 1.0	0.22	< 0.10	163	< 0.020	< 0.050	< 10	0.142	63.6	< 0.10	< 0.10	0.34	< 10	< 0.050	10.2	24.4	0.81	< 0.0050	1.80	1.12	2.08	4.34	< 0.010	0.763	66.2	0.010	< 0.10	< 0.30	0.742	0.56	2.9
	LC_PIZDC1306_WG_Q3-2021_NP	2021 09 17	267	1.6	0.20	< 0.10	165	< 0.020	< 0.050	< 10	0.121	67.0	< 0.10	< 0.10	0.49	< 10	< 0.050	11.2	24.3	< 0.10	< 0.0050	1.87	1.05	2.20	3.67	< 0.010	0.795	68.2	< 0.010	< 0.10	< 0.30	0.834	0.57	3.3
	LC_PIZDC1306_WG_Q4-2021_NP	2021 11 17	241	< 1.0	0.20	< 0.10	162	< 0.020	< 0.050	< 10	0.116	59.6	< 0.10	< 0.10	0.46	< 10	< 0.050	12.0	22.4	< 0.10	< 0.0050	1.86	1.00	2.01	2.68	< 0.010	0.968	68.6	< 0.010	< 0.10	< 0.30	0.907	0.56	3.0
LC_PIZDC1307	LC_PIZDC1307_WG_Q1-2021_NP	2021 03 10	185	< 3.0	< 0.10	1.69	1,540	< 0.020	< 0.050	23	< 0.015	41.5	< 0.10	< 0.10	1.27	779	0.068	73.0	19.8	8.08	< 0.0050	*32.2*	< 0.50	4.90	< 0.050	< 0.010	13.9	140	< 0.010	< 0.10	< 10	0.033	< 0.50	1.9
	LC_PIZDC1307_WG_Q2-2021_NP	2021 05 19	198	< 1.0	< 0.10	1.80	1,530	< 0.020	< 0.050	25	< 0.0150	42.6	< 0.10	< 0.10	1.27	1,070	< 0.050	80.4	22.2	9.12	< 0.0050	*35.2*	< 0.50	5.57	< 0.050	< 0.010	15.8	153	< 0.010	< 0.10	< 0.30	0.026	< 0.50	1.5
	LC_PIZDC1307_WG_Q3-2021_NP	2021 09 17	180	1.4	< 0.10	1.57	1,410	< 0.020	< 0.050	24	< 0.0150	40.0	< 0.10	< 0.10	< 0.20	1,020	< 0.050	77.4	19.5	8.00	< 0.0050	*31.9*	< 0.50	5.12	< 0.050	< 0.010	14.5	135	< 0.010	< 0.10	< 0.30	0.020	< 0.50	1.6
	LC_PIZDC1307S_WG_Q4-2021_NP	2021 11 18	168	2.9	< 0.10	1.71	1,380	< 0.020	< 0.050	22	< 0.0150	36.4	< 0.10	< 0.10	< 0.20	1,180	< 0.050	72.2	18.8	8.15	< 0.0050	*32.4*	< 0.50	4.94	< 0.050	< 0.010	13.7	133	< 0.010	< 0.10	< 0.30	0.023	< 0.50	1.2
LC_PIZDC1308	LC_PIZDC1308_WG_Q1-2021_NP	2021 03 10	245	< 3.0	< 0.10	0.31	503	< 0.020	< 0.050	15	< 0.010	63.4	< 0.10	0.99	< 0.20	730	< 0.050	24.6	21.0	82.2	< 0.0050	9.52	2.23	2.77	< 0.050	< 0.010	6.53	113	0.036	< 0.10	< 10	0.577	< 0.50	2.0
	LC_PIZDC1308_WG_Q2-2021_NP	2021 05 19	430	1.1	0.11	< 0.10	343	< 0.020	< 0.050	11	0.178	115	< 0.10	0.38	0.38	< 10	< 0.050	8.3	34.6	1.77	< 0.0050	1.35	1.18	2.11	0.232	< 0.010	1.60	125	0.014	< 0.10	< 0.30	1.81	< 0.50	4.0
	LC_PIZDC1308_WG_Q3-2021_NP	2021 09 17	366	< 1.0	< 0.10	< 0.10	300	< 0.020	< 0.050	12	0.0854	99.3	< 0.10	0.65	0.54	38	< 0.050	9.9	28.6	24.9	< 0.0050	2.13	1.25	2.14	0.091	< 0.010	1.97	104	0.017	< 0.10	< 0.30	1.44	< 0.50	2.6
	LC_PIZDC1308D_WG_Q4-2021_NP	2021 11 18	315	< 1.0	< 0.10	0.14	381	< 0.020	< 0.050	13	0.0392	82.8	< 0.10	0.71	0.24	250	< 0.050	14.1	26.2	62.2	< 0.0050	4.74	1.37	2.42	0.068	< 0.010	2.78	114	0.024	< 0.10	< 0.30	1.13	< 0.50	1.5
LC_PIZDC1404S	LC_PIZDC1404S_WG_Q1-2021_NP	2021 03 17	198	< 3.0	< 0.10	2.13	233	< 0.020	< 0.050	< 10	< 0.0050	48.9	< 0.10	0.33	< 0.20	1,040	< 0.050	5.1	18.5	29.0	< 0.0050	3.36	1.20	1.55	< 0.050	< 0.010	1.08	47.3	< 0.010	< 0.10	< 10	0.555	< 0.50	2.4
	LC_PIZDC1404S_WG_Q2-2021_NP	2021 06 24	197	1.7	< 0.10	2.10	234	< 0.020	< 0.050	< 10	< 0.0050	48.7	< 0.10	0.31	< 0.20	883	< 0.050	5.4	18.4	28.1	< 0.0050	3.33	1.29	1.50	< 0.050	< 0.010	0.840	45.9	< 0.010	< 0.10	< 0.30	0.519	< 0.50	< 1.0
	EXT_GW_TANYA	2021 08 26	191	1.2	< 0.10	1.65	231	< 0.020	< 0.050	< 10	< 0.0050	47.8	< 0.10	0.31	< 0.20	800	< 0.050	5.4	17.4	26.6	< 0.0050	3.20	1.21	1.50	< 0.050	< 0.010	1.28	44.5	< 0.010	< 0.10	< 0.30	0.550	< 0.50	< 1.0
	LC_PIZDC1404S_WG_Q4-2021_NP	2021 11 10	178	1.4	< 0.10	1.56	213	< 0.020	< 0.050	< 10	< 0.0050	45.1	< 0.10	0.29	0.28	767	< 0.050	5.3	15.8	22.8	< 0.0050	3.14	1.25	1.56	< 0.050	< 0.010	0.968	46.0	< 0.010	< 0.10	< 0.30	0.512	< 0.50	< 1.0
LC_PIZDC1404D	LC_PIZDC1404D_WG_Q1-2021_NP	2021 03 17	307	< 3.0	0.15	1.50	4,060	< 0.020	< 0.050	23	< 0.020	58.9	< 0.10	1.10	< 0.20	1,480	< 0.050	561	38.9	34.2	< 0.0050	*20.0*	0.61	26.9	0.053	< 0.010	35.2	243	< 0.010	< 0.10	< 10	0.121	< 0.50	3.5
	LC_PIZDC1404D_WG_Q2-2021_NP	2021 06 24	293	1.5	0.12	1.99	4,090	< 0.020	< 0.050	26	< 0.0050	57.2	< 0.10	1.06	0.47	1,990	< 0.050	585	36.4	32.3	< 0.0050	*20.4*	0.64	25.6	< 0.050	< 0.010	33.4	229	< 0.010	< 0.10	< 0.30	0.123	< 0.50	2.8
	LC_PIZDC1404D_WG_Q3-2021-NP	2021 08 26	280	2.2	0.13	1.82	3,970	< 0.020	< 0.050	25	< 0.0050	54.9	< 0.10	1.02	0.46	2,000	< 0.050	548	34.8	32.0	< 0.0050	*19.0*	0.55	24.4	< 0.050	< 0.010	33.0	216	< 0.010	< 0.10	< 0.30	0.113	< 0.50	2.2
	LC_PIZDC1404D_WG_Q4-2021_NP	2021 11 10	280	2.4	0.13	1.56	3,940	< 0.020	< 0.050	25	< 0.0050	57.1	< 0.10	0.96	< 0.20	1,930	< 0.050	569	33.3	31.0	< 0.0050	*19.5*	0.55	25.8	< 0.050	< 0.010	33.0	237	< 0.010	< 0.10	< 0.30	0.114	< 0.50	1.9

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

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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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
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SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

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[g] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

TABLE LC-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (LCO)

Sample Location	Sample ID	Sample (yyyy mm dd)	Hardness	Dissolved Metals: Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[f]
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[b]	n/a	10[d]	40	20-90[b]	n/a	40-160[b]	n/a	n/a	n/a	0.25	10,000	250-1,500[b]	n/a	20	0.5-15[b]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[b]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[d]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[c]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[d]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[d]	20[e]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[g]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LCO Phase I Centre Line Creek, West Line Creek, and Lower Line Creek																																		
LC_MW20_01	LC_MW20_01_WG_2021-01-25_NP	2021 01 28	577	< 3.0	< 0.10	< 0.10	63.5	< 0.020	< 0.050	13	0.0288	144	0.29	< 0.10	0.52	< 10	< 0.050	44.4	52.7	0.41	< 0.0050	0.508	< 0.50	1.04	***57.1***	< 0.010	11.4	286	< 0.010	< 0.10	< 10	2.05	< 0.50	1.4
	LC_MW20_01_WG_2021-04-09_NP	2021 04 16	562	27.4	< 0.10	< 0.10	67.0	< 0.020	< 0.050	12	0.0304	143	0.14	< 0.10	1.31	11	0.060	48.2	49.9	1.76	< 0.0050	0.535	< 0.50	1.03	***63.9***	< 0.010	10.4	288	< 0.010	< 0.10	< 0.30	2.16	< 0.50	26.8
	LC_MW20_01_WG_2021-Q3_NP	2021 08 26	470	1.1	< 0.10	< 0.10	55.5	< 0.020	< 0.050	13	0.0284	120	0.11	< 0.10	1.03	< 10	< 0.050	48.0	41.4	1.40	< 0.0050	0.607	< 0.50	1.02	***42.3***	< 0.010	8.72	239	< 0.010	< 0.10	< 0.30	2.03	< 0.50	2.6
	LC_MW20_01_WG_2021-Q4_NP	2021 11 23	505	1.4	< 0.10	< 0.10	56.4	< 0.020	< 0.050	13	0.0324	126	0.12	< 0.10	0.59	< 10	< 0.050	46.2	46.2	0.25	< 0.0050	0.510	< 0.50	1.02	***52.5***	< 0.010	9.56	237	< 0.010	< 0.10	< 0.30	2.12	< 0.50	2.5
LC_MW20_02A	LC_MW20_02A_WG_2021-01-25_NP	2021 01 28	452	< 3.0	< 0.10	0.78	67.2	< 0.020	< 0.050	< 10	< 0.0050	110	< 0.10	< 0.10	< 0.20	3,080	< 0.050	16.8	43.0	*209*	< 0.0050	5.07	< 0.50	0.632	< 0.050	< 0.010	8.82	321	< 0.010	< 0.10	< 10	0.128	< 0.50	< 1.0
	LC_MW20_02A_WG_2021-04-09_NP	2021 04 17	435	1.1	< 0.10	0.70	60.6	< 0.020	< 0.050	< 10	< 0.0050	109	< 0.10	< 0.10	< 0.20	2,990	< 0.050	20.6	39.6	*207*	< 0.0050	4.53	< 0.50	0.658	< 0.050	< 0.010	8.34	303	< 0.010	< 0.10	< 0.30	0.181	< 0.50	1.1
	LC_MW20_02A_WG_2021-Q3_NP	2021 08 24	428	1.5	< 0.10	0.63	54.1	< 0.020	< 0.050	< 10	< 0.0050	109	< 0.10	< 0.10	< 0.20	3,060	< 0.050	20.2	37.8	*217*	< 0.0050	3.98	< 0.50	0.699	0.144	< 0.010	8.25	286	< 0.010	0.16	< 0.30	0.232	< 0.50	2.0
	LC_MW20_02A_WG_2021-Q4_NP	2021 11 24	454	< 1.0	< 0.10	0.64	55.2	< 0.020	< 0.050	< 10	< 0.0050	118	< 0.10	< 0.10	< 0.20	3,410	< 0.050	22.9	38.8	*237*	< 0.0050	3.56	< 0.50	0.673	< 0.050	< 0.010	8.49	294	< 0.010	< 0.10	< 0.30	0.261	< 0.50	2.2
LC_MW20_02B	LC_MW20_02B_WG_2021-01-25_NP	2021 01 28	545	< 3.0	< 0.10	< 0.10	100	< 0.020	< 0.050	12	0.0294	139	0.18	< 0.10	0.48	< 10	< 0.050	39.1	48.3	0.12	< 0.0050	0.504	< 0.50	1.10	***46.9***	< 0.010	10.4	278	< 0.010	< 0.10	< 10	1.52	< 0.50	1.3
	LC_MW20_02B_WG_2021-04-09_NP	2021 04 17	515	< 1.0	< 0.10	< 0.10	98.5	< 0.020	< 0.050	12	0.0242	133	0.18	< 0.10	0.69	< 10	0.067	42.4	44.5	0.83	< 0.0050	1.66	< 0.50	1.10	***46.4***	< 0.010	8.84	264	< 0.010	< 0.10	< 0.30	1.58	< 0.50	2.0
	LC_MW20_02B_WG_2021-Q3_NP	2021 08 24	449	1.2	< 0.10	0.10	88.4	< 0.020	< 0.050	12	0.0429	116	0.10	< 0.10	1.78	< 10	0.176	39.3	38.6	1.61	< 0.0050	0.503	< 0.50	1.15	***39.5***	< 0.010	8.28	229	< 0.010	0.28	< 0.30	1.46	< 0.50	4.9
	LC_MW20_02B_WG_2021-Q4_NP	2021 11 24	458	2.0	< 0.10	< 0.10	89.0	< 0.020	< 0.050	13	0.0309	120	0.11	< 0.10	0.95	< 10	< 0.050	40.1	38.4	0.42	< 0.0050	0.482	< 0.50	0.981	***39.5***	< 0.010	8.13	228	< 0.010	0.15	< 0.30	1.39	< 0.50	4.2
LC_MW20_03	LC_MW20_03_WG_2021-01-25_NP	2021 02 08	328	< 3.0	< 0.10	1.80	290	< 0.020	< 0.050	12	0.0188	84.8	< 0.10	0.56	0.37	365	< 0.050	11.7	28.3	90.8	< 0.0050	1.42	1.36	0.979	< 0.050	< 0.010	3.94	248	0.015	< 0.10	< 10	0.684	< 0.50	5.4
	LC_CC3_WG_2021-01-25_NP	Duplicate	326	< 3.0	< 0.10	1.86	291	< 0.020	< 0.050	12	0.0071	84.3	< 0.10	0.53	0.28	342	< 0.050	11.5	28.1	90.6	< 0.0050	1.40	1.36	0.981	< 0.050	< 0.010	4.04	244	0.017	< 0.10	< 10	0.712	< 0.50	5.2
	QA/QC RPD%		1	*	*	3	0	*	*	*	*	1	*	6	*	7	*	2	1	0	*	1	*	0	*	*	3	2	*	*	*	4	*	4
	LC_MW20_03_WG_2021-04-09_NP	2021 04 17	311	< 1.0	< 0.10	2.18	257	< 0.020	< 0.050	14	0.0064	82.8	< 0.10	0.54	< 0.20	803	< 0.050	12.3	25.4	82.2	< 0.0050	1.38	0.84	0.974	< 0.050	< 0.010	3.63	251	0.014	< 0.10	< 0.30	0.612	< 0.50	3.7
	LC_MW20_03_WG_2021-Q3_NP	2021 08 26	307	< 1.0	< 0.10	1.88	282	< 0.020	< 0.050	11	0.0131	83.4	< 0.10	0.52	0.90	774	0.066	9.9	24.0	83.9	< 0.0050	1.29	1.05	0.898	0.060	< 0.010	3.32	235	0.011	< 0.10	< 0.30	0.626	< 0.50	5.8
	LC_MW20_03_WG_2021-Q4_NP	2021 11 24	315	1.1	< 0.10	2.04	297	< 0.020	< 0.050	12	0.0150	84.0	< 0.10	0.53	0.31	810	< 0.050	10.6	25.6	85.8	< 0.0050	1.18	1.06	0.864	< 0.050	< 0.010	3.45	224	0.014	< 0.10	< 0.30	0.627	< 0.50	5.0
LC_PIZ1206A	LC_PIZ1206A_WG_2021-01-25_NP	2021 01 28	1,660	< 3.0	< 0.20	< 0.20	29.0	< 0.040	< 0.10	< 20	0.053	303	0.23	< 0.20	0.77	< 20	< 0.10	30.5	220	< 0.20	< 0.0050	1.74	< 1.0	2.33	***425***	< 0.020	2.79	235	< 0.020	< 0.20	< 10	*15.6*	< 1.0	3.0
	LC_PIZ1206A_WG_2021-04-09_NP	2021 04 15	1,570	< 1.0	0.14	0.10	29.3	< 0.020	< 0.050	14	0.0540	302	0.19	< 0.10	1.58	< 10	0.114	28.6	199	0.27	< 0.0050	2.82	0.70	2.64	***389***	< 0.010	2.68	221	< 0.010	< 0.10	< 0.30	*13.2*	< 0.50	3.2
	LC_PIZ1206A_WG_2021-Q3_NP	2021 08 25	1,180	1.1	0.14	0.11	23.7	< 0.020	< 0.050	14	0.0568	223	0.16	< 0.10	0.90	< 10	0.124	26.9	152	0.57	< 0.0050	2.02	0.52	2.12	***290***	< 0.010	2.78	181	< 0.010	< 0.10	< 0.30	*12.5*	< 0.50	4.4
	LC_CC3_WG_2021-Q3_NP	Duplicate	1,080	< 1.0	0.13	< 0.10	21.9	< 0.020	< 0.050	14	0.0500	203	0.15	< 0.10	0.94	< 10	0.076	25.6	139	0.52	< 0.0050	1.88	< 0.50	1.96	***291***	< 0.010	2.61	166	< 0.010	< 0.10	< 0.30	*12.0*	< 0.50	3.6
	QA/QC RPD%		9	*	*	*	8	*	*	*	13	9	*	*	*	*	*	5	9	9	*	7	*	8	0	*	6	9	*	*	*	4	*	*
	LC_PIZ1206A_WG_2021-Q4_NP	2021 11 22	1,210	1.3	0.14	< 0.10	25.6	< 0.020	< 0.050	16	0.0488	232	0.20	< 0.10	2.04	< 10	0.051	29.2	153	0.22	< 0.0050	1.69	0.52	2.32	***303***	< 0.010	2.26	178	< 0.010	< 0.10	< 0.30	*12.9*	< 0.50	5.5
	LC_CC3_WG_2021-Q4_NP	Duplicate	1,130	< 1.0	0.14	< 0.10	24.2	< 0.020	< 0.050	13	0.0397	212	0.20	< 0.10	1.78	< 10	< 0.050	26.3	147	0.23	< 0.0050	1.67	< 0.50	2.09	***315***	< 0.010	2.05	176	< 0.010	< 0.10	< 0.30	*13.2*	< 0.50	4.6
	QA/QC RPD%		7	*	*	*	6	*	*	*	21	9	*	*	14	*	*	10	4	*	*	1	*	10	4	*	10	1	*	*	*	2	*	*
LC_PIZ1206C	LC_PIZ1206C_WG_2021-01-25_NP	2021 01 29	623	< 3.0	0.94	< 0.10	28.4	< 0.020	< 0.050	17	0.0555	141	0.64	< 0.10	1.90	< 10	0.245	25.6	65.7	1.13	< 0.0050	1.56	0.71	1.06	***68.9***	< 0.010	19.2	214	< 0.010	< 0.10	< 10	3.26	< 0.50	8.9
	LC_PIZ1206C_WG_2021-04-09_NP	2021 04 16	610	162	0.97	0.18	46.9	< 0.020	< 0.050	20	0.0502	145	0.83	0.16	4.28	146	1.06	30.5	60.3	25.9	< 0.0050	8.18	1.56	1.25	***72.6***	0.020	16.8	218	0.011	0.19	4.47	3.49	< 0.50	14.0
	LC_PIZ1206C_WG_2021-Q3_NP	2021 08 25	579	< 1.0	0.76	0.11	25.2	< 0.020	< 0.050	20	0.0355	133	0.45	< 0.10	2.04	< 10	0.110	36.4	60.0	1.61	< 0.0050	3.50	0.75	1.16	***73.8***	< 0.010	21.3	214	< 0.010	0.15	< 0.30	3.64	< 0.50	8.2
	LC_PIZ1206C_WG_2021-Q4_NP	2021 11 23	607	< 1.0	0.76	0.11	25.1	< 0.020	< 0.050	24	0.0302	134	0.49	< 0.10	1.87	< 10	0.056	42.4	66.1	0.26	< 0.0050	3.28	0.66	1.22	***89.6***	< 0.010	24.8	206	< 0.010	0.20	< 0.30	4.13	< 0.50	8.6
LC_PIZ1211N	LC_PIZ1211N_WG_2021-01-25_NP	2021 02 08	825	< 3.0	0.29	< 0.10	49.0	< 0.020	< 0.050	15	0.0406	182	0.13	< 0.10	< 0.20	< 10	< 0.050	76.2	90.0	< 0.10	< 0.0050	2.21	1.96	2.02	***127***	< 0.010	11.2	339	< 0.010	< 0.10	< 10	6.51	< 0.50	1.3
	LC_PIZ1211N_WG_2021-04-09_NP	2021 04 16	649	2.3	0.28	< 0.10	41.8	< 0.020	< 0.050	16	0.0471	139	0.12	< 0.10	0.44	< 10	< 0.050	62.0	73.3	0.50	< 0.0050	2.13	1.52	1.86	***96.3***	< 0.010	10.0	271	< 0.010	< 0.10	< 0.30	5.65	< 0.50	2.0
	LC_PIZ1211N_WG_2021-Q3_NP	2021 08 24	778	< 1.0	0.24	< 0.10	46.8	< 0.020	< 0.050	22	0.0619	166	0.11	< 0.10	0.60	< 10	< 0.050	51.5	88.3	0.23	< 0.0050	1.69	1.81	1.99	***170***	< 0.010	7.33	311	< 0.010	0.11	< 0.30	6.61	< 0.50	2.4
	LC_PIZ1211N_WG_2021-Q4_NP	2021 11 23	685	1.9	0.26	< 0.10	42.9	< 0.020	< 0.050	20	0.0541	145	0.10	< 0.10	< 0.20	< 10	< 0.050	64.8	78.5	< 0.10	< 0.0050	1.70	1.89	2.02	***120***	< 0.010	10.3	270	< 0.010	< 0.10	< 0.30	5.67	< 0.50	2.3

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[c] Standard varies with pH.

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TABLE LC-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (LCO)

Sample Location	Sample ID	Sample (yyyy mm dd)	Hardness	Dissolved Metals																														
			mg/L	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 mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[b]	n/a	10[d]	40	20-90[b]	n/a	40-160[b]	n/a	n/a	n/a	0.25	10,000	250-1,500[b]	n/a	20	0.5-15[b]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[b]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[d]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[c]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[d]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[d]	20[e]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[g]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LCO Phase I Centre Line Creek, West Line Creek, and Lower Line Creek																																		
LC_PIZ1212	LC_PIZ1212_WG_2021-01-25_NP	2021 01 29	869	< 3.0	0.30	0.10	54.1	< 0.020	< 0.050	15	0.0994	185	0.16	< 0.10	1.48	< 10	0.140	73.5	99.0	0.23	< 0.0050	2.27	4.59	2.00	***139***	< 0.010	12.0	333	< 0.010	< 0.10	< 10	6.74	< 0.50	6.9
	LC_PIZ1212_WG_2021-04-09_NP	2021 04 16	702	< 1.0	0.28	< 0.10	48.0	< 0.020	< 0.050	17	0.0784	151	0.13	< 0.10	0.38	< 10	< 0.050	62.7	78.8	< 0.10	< 0.0050	1.97	3.48	1.86	***119***	< 0.010	10.1	285	< 0.010	< 0.10	< 0.30	5.94	< 0.50	3.8
	LC_PIZ1212_WG_2021-Q3_NP	2021 08 24	620	1.7	0.29	0.11	41.5	< 0.020	< 0.050	20	0.0856	138	0.11	< 0.10	0.87	< 10	0.103	60.6	67.0	1.38	< 0.0050	1.60	4.04	1.98	***99.6***	< 0.010	8.82	255	< 0.010	< 0.10	< 0.30	4.88	< 0.50	5.5
	LC_PIZ1212_WG_2021-Q4_NP	2021 11 23	714	1.1	0.28	< 0.10	45.9	< 0.020	< 0.050	19	0.0916	152	< 0.10	< 0.10	0.45	< 10	< 0.050	65.4	81.2	< 0.10	< 0.0050	1.67	4.66	1.99	***127***	< 0.010	10.0	268	< 0.010	< 0.10	< 0.30	5.91	< 0.50	5.8
WL_MW-15-02-A	WL_MW-15-02-A_WG_2021-SA-01_N	2021 06 22	302	2.0	0.15	0.23	181	< 0.020	< 0.050	24	0.0243	85.1	4.45	< 0.10	2.43	< 10	0.056	12.0	21.8	0.38	< 0.0050	3.37	1.11	1.50	0.148	< 0.010	17.1	471	0.026	< 0.10	< 0.30	3.26	< 0.50	3.9
	WL_MW-15-02-A_WG_2021-SA-02_N	2021 11 04	234	< 1.0	< 0.10	0.95	236	< 0.020	< 0.050	10	0.0221	69.7	0.46	0.16	0.35	< 10	< 0.050	7.5	14.6	120	< 0.0050	2.54	0.62	1.08	0.149	< 0.010	6.24	124	0.017	< 0.10	< 0.30	1.32	< 0.50	< 1.0
WL_MW-15-02-B	WL_MW-15-02-B_WG_2021-SA-01_N	2021 06 23	576	1.4	0.10	0.15	157	< 0.020	< 0.050	10	0.0303	176	< 0.10	< 0.10	3.10	< 10	0.083	7.4	33.2	2.86	< 0.0050	0.279	0.77	1.61	16.0	< 0.010	2.06	196	0.017	< 0.10	< 0.30	0.531	< 0.50	9.8
	WL_MW-15-02-B_WG_2021-SA-02_N	2021 11 02	607	< 1.0	< 0.10	0.14	202	< 0.020	< 0.050	< 10	0.0327	188	< 0.10	< 0.10	0.29	< 10	< 0.050	8.2	33.4	5.78	< 0.0050	0.210	0.72	1.54	***33.4***	< 0.010	2.05	212	0.015	< 0.10	< 0.30	0.607	< 0.50	< 1.0
WL_MW-15-04-B	WL_MW-15-04-B_WG_2021-SA-01_N	2021 06 23	660	7.6	< 0.10	5.90	797	< 0.020	< 0.050	14	0.0156	191	0.10	9.56	0.25	*17,100*	< 0.050	5.3	44.6	*2,560*	< 0.0050	2.55	18.8	1.90	0.221	< 0.010	7.69	506	0.025	< 0.10	0.52	2.41	< 0.50	5.2
	WL_MW-15-04-B_WG_2021-SA-02_N	2021 11 04	625	3.0	< 0.10	8.33	1,060	< 0.020	< 0.050	12	< 0.0050	172	0.12	11.5	< 0.20	*27,800*	< 0.050	6.5	47.4	*2,450*	< 0.0050	4.49	20.6	1.96	0.190	< 0.010	11.8	332	< 0.010	< 0.10	0.57	0.684	< 0.50	2.2
LC_MW_CP1A	LC_MW_CP1A_WG_2021_09_01_NP	2021 09 01	280	2.1	0.14	0.18	40.7	< 0.020	< 0.050	41	0.0116	71.2	0.20	0.28	< 0.20	< 10	< 0.050	20.8	24.9	35.5	0.0052	1.76	0.96	1.63	***53.8***	< 0.010	26.2	454	0.016	0.22	< 0.30	3.02	< 0.50	1.5
	LC_MW_MC10A_WG_2021_09_01_NP	Duplicate	278	2.4	0.13	0.20	39.3	< 0.020	< 0.050	40	0.0077	71.1	0.17	0.27	< 0.20	< 10	< 0.050	20.5	24.3	35.1	< 0.0050	1.74	0.92	1.60	***52.8***	< 0.010	26.2	445	0.012	0.23	< 0.30	3.02	< 0.50	1.7
	QA/QC RPD%		1	*	*	*	4	*	*	*	*	0	*	*	*	*	*	1	2	1	*	1	*	2	2	*	0	2	*	*	*	0	*	*
	LC_MW_CP1A_Q4-2021_NP	2021 11 24	272	3.3	0.13	0.19	32.2	< 0.020	< 0.050	39	0.0136	68.2	0.12	0.19	0.38	< 10	< 0.050	18.3	24.8	51.2	< 0.0050	1.26	1.03	1.53	***52.2***	< 0.010	8.57	412	0.012	0.31	< 0.30	1.82	< 0.50	2.4
LC_MW_CP1B	LC_MW_CP1B_WG_2021_09_01_NP	2021 09 01	335	< 1.0	< 0.10	< 0.10	102	< 0.020	< 0.050	36	0.0291	87.8	0.25	0.12	< 0.20	< 10	< 0.050	21.3	28.2	23.4	< 0.0050	1.60	< 0.50	1.04	***36.3***	< 0.010	5.05	434	< 0.010	< 0.10	< 0.30	1.48	< 0.50	< 1.0
	LC_MW_CP1B_Q4-2021_NP	2021 11 24	324	1.1	< 0.10	< 0.10	118	< 0.020	< 0.050	32	0.0136	84.2	0.25	< 0.10	0.21	< 10	< 0.050	18.1	27.7	0.10	< 0.0050	1.22	< 0.50	0.990	***41.2***	< 0.010	4.58	408	< 0.010	< 0.10	< 0.30	1.30	< 0.50	< 1.0
Process Plant (^ denotes part of Study Area 5/6)																																		
RG_MW_LC4A^	RG_MW_LC4A_WG_2021_08_19_NP	2021 08 19	302	1.5	< 0.10	0.29	55.0	< 0.020	< 0.050	12	0.0140	76.0	0.15	< 0.10	< 0.20	< 10	< 0.050	21.5	27.3	4.65	< 0.0050	1.66	0.84	0.83	9.82	< 0.010	4.85	347	< 0.010	< 0.10	< 0.30	2.06	< 0.50	1.2
	RG_MW_LC4A_WG_Q4-2021_NP	2021 11 26	282	2.3	0.34	0.31	41.9	< 0.020	< 0.050	17	0.0234	71.5	0.16	< 0.10	1.32	< 10	< 0.050	23.0	25.1	3.04	< 0.0050	3.50	1.56	1.15	12.6	< 0.010	12.4	333	0.013	1.68	< 0.30	2.50	< 0.50	7.0
RG_MW_LC4B^	RG_MW_LC4B_WG_2021_08_19_NP	2021 08 19	357	2.2	0.18	< 0.10	90.1	< 0.020	< 0.050	13	0.0220	82.9	0.13	< 0.10	0.30	< 10	< 0.050	31.7	36.4	4.51	< 0.0050	1.42	< 0.50	1.08	***23.6***	< 0.010	5.48	178	< 0.010	< 0.10	< 0.30	2.19	< 0.50	< 1.0
	RG_MW_LC4B_WG_Q4-2021_NP	2021 11 26	364	1.3	0.14	< 0.10	79.4	< 0.020	< 0.050	< 10	0.0122	83.8	0.13	< 0.10	< 0.20	< 10	< 0.050	30.3	37.7	0.14	< 0.0050	2.19	< 0.50	0.937	***32.5***	< 0.010	6.05	184	< 0.010	< 0.10	< 0.30	3.00	< 0.50	< 1.0
LC_PIZP1101	LC_PIZP1101_WG_Q1-2021_N	2021 03 22	133	< 3.0	< 0.10	1.07	540	< 0.020	< 0.050	21	< 0.010	28.4	< 0.10	0.17	< 0.20	17	< 0.050	9.2	15.0	*247*	< 0.0050	*11.1*	< 0.50	0.841	< 0.050	< 0.010	21.5	222	< 0.010	0.12	< 10	1.37	0.56	< 1.0
	WG_Q1-2021_010	Duplicate	130	< 3.0	< 0.10	1.09	527	< 0.020	< 0.050	21	< 0.010	28.2	< 0.10	0.17	< 0.20	17	< 0.050	9.3	14.5	*246*	0.0964	*11.1*	< 0.50	0.845	< 0.050	< 0.010	21.3	226	< 0.010	0.12	< 10	1.33	0.60	< 1.0
	QA/QC RPD%		2	*	*	2	2	*	*	*	*	1	*	*	*	*	*	1	3	0	*	0	*	0	*	*	1	2	*	*	*	3	*	*
	LC_PIZP1101_WG_Q2-2021_N	2021 06 10	121	22.7	< 0.10	1.04	474	< 0.020	< 0.050	20	< 0.0050	26.6	< 0.10	0.19	0.21	147	< 0.050	9.1	13.2	*224*	< 0.0050	*13.0*	< 0.50	0.765	< 0.050	< 0.010	20.1	214	< 0.010	< 0.10	0.53	1.40	< 0.50	< 1.0
	WG_Q2-2021_005	Duplicate	120	11.7	< 0.10	1.08	463	< 0.020	< 0.050	20	< 0.0050	26.0	< 0.10	0.18	< 0.20	126	< 0.050	9.0	13.5	*221*	< 0.0050	*12.8*	< 0.50	0.767	< 0.050	< 0.010	20.3	213	< 0.010	< 0.10	0.48	1.36	< 0.50	< 1.0
	QA/QC RPD%		1	64	*	4	2	*	*	*	*	2	*	*	*	15	*	1	2	1	*	2	*	0	*	*	1	0	*	*	*	3	*	*
	LC_PIZP1101_WG_Q3-2021_N	2021 09 21	125	48.2	< 0.10	0.92	460	< 0.020	< 0.050	22	< 0.0150	28.6	< 0.10	0.17	1.81	110	0.063	9.3	13.0	*219*	< 0.0050	*12.3*	< 0.50	0.798	< 0.050	< 0.010	21.0	196	< 0.010	< 0.10	< 2.40	1.69	0.57	1.8
	LC_CC2_PIZP1101_N	Duplicate	122	54.7	< 0.10	0.92	473	< 0.020	< 0.050	22	< 0.0200	27.5	< 0.10	0.17	0.94	108	0.050	9.3	13.0	*222*	< 0.0050	*12.7*	0.53	0.820	< 0.050	< 0.010	21.1	197	< 0.010	< 0.10	1.83	1.72	0.66	1.2
	QA/QC RPD%		2	13	*	0	3	*	*	*	*	4	*	*	*	2	*	0	0	1	*	3	*	3	*	*	0	1	*	*	*	2	*	*
	LC_PIZP1101_WG_Q4-2021_N	2021 11 23	120	4.6	0.55	0.77	618	< 0.020	< 0.050	23	0.0366	25.7	< 0.10	0.22	0.48	< 10	< 0.050	9.2	13.7	198	< 0.0050	*12.7*	1.18	0.942	1.60	< 0.010	21.3	201	0.032	< 0.10	< 0.30	2.43	1.28	< 1.0
	WG_Q4-2021_010_CC3	Duplicate	120	3.2	0.53	0.75	645	< 0.020	< 0.050	22	0.0386	25.3	< 0.10	0.24	0.46	< 10	< 0.050	9.2	13.9	*222*	< 0.0050	*12.0*	1.19	0.960	1.41	< 0.020	21.9	198	0.030	< 0.10	< 0.30	2.36	1.17	< 1.0
	QA/QC RPD%		0	*	4	3	4	*	*	*	5	2	*	*	*	*	*	0	1	11	*	6	*	2	13	*	3	2	*	*	*	3	*	*

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with Hardness.

[c] Standard varies with pH.

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

[e] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

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

[g] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

TABLE LC-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (LCO)

Sample Location	Sample ID	Sample (yyyy mm dd)	Hardness	Dissolved Metals																																
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[f]
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																				
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[b]	n/a	10[d]	40	20-90[b]	n/a	40-160[b]	n/a	n/a	n/a	0.25	10,000	250-1,500[b]	n/a	20	0.5-15[b]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[b]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[d]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[c]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[d]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[d]	20[e]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[g]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Process Plant (^ denotes part of Study Area 5/6)																																				
LC_PIZP1103	LC_PIZP1103_WG_Q1-2021_NP	2021 02 17	137	< 3.0	0.12	1.03	74.6	< 0.020	< 0.050	472	< 0.0050	28.2	< 0.10	0.55	< 0.20	155	< 0.050	118	16.1	*544*	< 0.0050	*12.5*	1.18	1.70	< 0.050	< 0.010	148	801	< 0.010	< 0.10	< 10	2.07	< 0.50	2.1
	LC_PIZP1103_WG_Q2-2021_NP	2021 05 13	139	2.5	0.25	1.28	80.3	< 0.020	< 0.050	470	< 0.0100	29.5	0.12	0.57	9.37	147	< 0.050	122	15.8	*574*	< 0.0050	9.37	1.34	1.64	< 0.050	< 0.010	128	848	< 0.010	0.17	< 0.30	1.65	< 0.50	6.4
	LC_PIZP1103_WG_Q3-2021_NP	2021 08 20	137	1.8	0.25	1.00	67.2	< 0.020	< 0.050	*543*	< 0.0150	28.0	0.20	0.24	1.26	19	< 0.050	114	16.4	172	< 0.0050	*28.2*	0.68	1.64	< 0.050	< 0.010	142	833	0.011	< 0.10	< 0.30	1.97	0.66	2.9
	LC_PIZP1103_WG_Q4-2021_N	2021 10 22	136	2.2	0.23	0.87	61.2	< 0.020	< 0.050	469	< 0.0150	29.7	0.20	0.12	1.57	< 10	< 0.050	112	15.1	80.0	< 0.0050	*22.8*	0.53	1.53	< 0.050	< 0.010	127	767	< 0.010	< 0.10	< 0.30	1.95	< 0.50	1.8
LC_PIZP1104	LC_PIZP1104_WG_Q1-2021_N	2021 03 25	595	< 1.0	< 0.10	0.64	288	< 0.020	< 0.050	24	0.0212	159	0.71	0.76	< 0.20	1,420	< 0.050	24.9	48.0	*314*	< 0.0050	1.82	8.72	2.79	0.143	< 0.010	15.1	538	< 0.010	< 0.10	< 0.30	2.99	< 0.50	2.8
	LC_PIZP1104_WG_Q2-2021_NP	2021 05 31	575	6.1	< 0.10	1.38	401	< 0.020	< 0.050	18	0.0169	147	< 0.10	1.34	< 0.20	3,240	< 0.050	19.8	50.4	*737*	< 0.0050	2.57	3.99	2.42	< 0.050	< 0.010	13.1	500	< 0.010	< 0.10	< 0.30	3.97	< 0.50	4.9
	LC_PIZP1104_WG_Q3-2021_NP	2021 09 16	558	2.4	0.91	0.24	300	< 0.020	< 0.050	22	0.100	145	< 0.10	0.11	0.27	< 10	< 0.050	23.2	47.6	96.3	< 0.0050	1.95	2.48	2.70	0.266	< 0.010	14.7	494	0.075	0.44	< 0.30	3.27	< 0.50	1.6
	LC_PIZP1104_WG_Q4-2021_NP	2021 11 22	572	1.6	< 0.10	0.51	243	< 0.020	< 0.050	28	0.0168	145	< 0.10	0.62	0.78	961	< 0.050	23.9	51.1	*268*	< 0.0050	1.09	2.22	2.98	0.105	< 0.010	16.1	504	0.019	< 0.10	< 0.30	2.95	< 0.50	4.0
LC_PIZP1105	LC_PIZP1105_WG_Q1-2021_N	2021 03 24	740	4.0	30.4	0.67	102	< 0.020	< 0.050	23	0.116	204	0.11	0.81	0.29	< 10	< 0.050	22.5	56.1	*275*	< 0.0050	0.884	3.00	2.33	0.200	0.015	18.2	446	0.040	1.06	< 0.30	0.544	< 0.50	10.6
	WG_Q1-2021_013	Duplicate	735	4.9	29.6	0.65	109	< 0.020	< 0.050	22	0.138	197	< 0.10	0.84	0.28	10	< 0.050	21.6	59.0	*287*	< 0.0050	0.877	3.12	2.41	0.166	< 0.010	18.7	448	0.040	1.07	< 0.30	0.528	< 0.50	11.4
	QA/QC RPD%		1	*	3	3	7	*	*	*	17	3	*	4	*	*	*	4	5	4	*	1	4	3	*	*	3	0	*	1	*	3	*	7
	LC_PIZP1105_WG_Q2-2021_N	2021 06 11	782	13.7	3.82	0.14	117	< 0.020	< 0.050	24	0.240	221	< 0.10	0.38	< 0.20	< 10	< 0.050	21.9	55.9	*257*	< 0.0050	0.365	2.18	2.26	0.236	< 0.010	16.3	504	0.050	< 0.10	< 0.30	0.389	< 0.50	44.6
	WG_Q2-2021_005B	Duplicate	712	17.2	4.03	0.12	120	< 0.020	< 0.050	21	0.231	189	< 0.10	0.35	< 0.20	< 10	< 0.050	20.4	58.2	*242*	< 0.0050	0.301	2.10	2.22	0.126	< 0.010	15.1	441	0.039	< 0.10	< 0.30	0.329	< 0.50	59.7
	QA/QC RPD%		9	23	5	*	3	*	*	*	4	16	*	*	*	*	*	7	4	6	*	19	*	2	*	*	8	13	*	*	*	17	*	29
	LC_PIZP1105_WG_Q3-2021_NP	2021 09 16	687	3.3	0.96	< 0.10	115	< 0.020	< 0.050	20	0.105	183	< 0.10	< 0.10	0.24	< 10	< 0.050	20.9	55.8	38.9	< 0.0050	0.378	1.41	2.12	0.272	< 0.010	15.7	421	0.046	0.20	< 0.30	0.320	< 0.50	2.5
	WG_Q3-2021_007_CC3	Duplicate	684	2.8	0.98	< 0.10	112	< 0.020	< 0.050	20	0.142	182	< 0.10	< 0.10	0.27	< 10	< 0.050	21.1	55.7	82.2	< 0.0050	0.297	1.43	2.12	0.236	< 0.010	15.6	411	0.043	0.20	< 0.30	0.311	< 0.50	3.3
	QA/QC RPD%		0	*	2	*	3	*	*	*	30	1	*	*	*	*	*	1	0	72	*	24	*	0	*	*	1	2	*	*	*	3	*	*
	LC_PIZP1105_WG_Q4-2021_N	2021 11 22	720	1.4	0.11	0.12	109	< 0.020	< 0.050	21	0.0665	193	< 0.10	0.70	0.46	63	< 0.050	21.0	57.9	165	< 0.0050	0.321	2.74	2.04	0.091	< 0.010	14.7	422	0.016	0.28	< 0.30	0.350	< 0.50	4.0
	WG_Q4-2021_010_CC2	Duplicate	713	2.1	0.10	0.16	111	< 0.020	< 0.050	20	0.0682	186	< 0.10	0.74	< 0.20	68	< 0.050	20.2	60.4	169	< 0.0050	0.308	2.84	2.12	0.108	< 0.010	15.4	416	0.018	0.30	< 0.30	0.334	< 0.50	4.6
	QA/QC RPD%		1	*	*	*	2	*	*	*	3	4	*	6	*	8	*	4	4	2	*	4	4	4	*	*	5	1	*	*	*	5	*	*
LC_MW_ERX1A^	LC_MW_ERX1A_WG_2021_11_24_NP	2021 11 24	126	2.5	0.56	0.18	37.2	< 0.020	< 0.050	254	0.0088	26.1	< 0.10	0.76	0.33	< 10	< 0.050	132	14.8	180	< 0.0050	4.00	0.94	3.02	0.140	< 0.010	125	486	0.024	1.21	< 0.30	0.792	< 0.50	2.8
LC_MW_ERX1B^	LC_MW_ERX1B_WG_2021_11_24_NP	2021 11 24	255	2.5	0.22	0.20	116	< 0.020	< 0.050	42	0.283	59.4	< 0.10	1.01	0.46	< 10	0.155	31.3	25.9	*490*	< 0.0050	*11.3*	1.56	3.35	4.40	< 0.010	65.6	277	0.063	0.16	< 0.30	2.41	< 0.50	3.1
LC_MW_SRD1A^	RG_MW_ERXA_WG_2021_09_03_NP	2021 09 03	345	2.7	1.23	0.53	177	< 0.020	< 0.050	26	0.0287	79.8	0.10	0.17	1.33	< 10	< 0.050	41.0	35.3	28.8	< 0.0050	*23.2*	1.44	1.10	***34.5***	< 0.010	13.5	217	0.013	1.85	< 0.30	1.40	< 0.50	8.8
	LC_MW_SRD1A_WG_Q4-2021_NP	2021 12 01	399	2.3	< 0.10	< 0.10	103	< 0.020	< 0.050	12	0.0148	92.8	0.14	< 0.10	0.64	< 10	< 0.050	20.3	40.6	4.95	< 0.0050	1.05	< 0.50	1.14	***43.2***	< 0.010	3.61	189	< 0.010	< 0.10	< 0.30	1.90	< 0.50	1.2
LC_MW_SRD1B^	LC_MW_SRD1B_WG_2021_08_19_NP	2021 08 19	322	3.9	< 0.10	< 0.10	68.6	< 0.020	< 0.050	< 10	0.0113	74.4	0.22	< 0.10	< 0.20	< 10	< 0.050	14.0	33.1	2.58	< 0.0050	0.721	< 0.50	0.90	***32.2***	< 0.010	2.62	131	< 0.010	< 0.10	< 0.30	1.34	< 0.50	< 1.0
	RG_MW_MC11A_WG_2021_08_19_NP	Duplicate	330	4.4	< 0.10	< 0.10	67.4	< 0.020	< 0.050	< 10	0.0131	78.1	0.19	< 0.10	< 0.20	< 10	< 0.050	14.6	32.8	2.61	< 0.0050	0.718	< 0.50	0.90	***32.3***	< 0.010	2.60	136	< 0.010	< 0.10	< 0.30	1.39	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	*	2	*	*	*	*	5	*	*	*	*	*	4	1	1	*	0	*	0	0	*	1	4	*	*	*	4	*	*
	LC_MW_SRD1B_WG_Q4-2021_NP	2021 12 01	407	3.2	< 0.10	< 0.10	93.5	< 0.020	< 0.050	10	0.0132	95.0	1.57	< 0.10	0.30	< 10	< 0.050	20.1	41.2	0.64	< 0.0050	2.00	0.65	1.10	***43.2***	< 0.010	3.70	191	< 0.010	< 0.10	< 0.30	1.87	< 0.50	< 1.0
LC_MW_SRD2A^	LC_MW_SRD2A_WG_2021_11_24_NP	2021 11 24	43.8	17.0	0.42	0.39	405	< 0.020	< 0.050	491	0.0196	9.43	< 0.10	< 0.10	< 0.20	< 10	< 0.050	412	4.92	20.8	< 0.0050	*49.6*	0.76	2.40	0.222	< 0.010	172	266	< 0.010	1.04	< 0.30	0.333	0.67	1.7
LC_MW_SRD2B^	LC_MW_SRD2B_WG_2021_11_24_NP	2021 11 24	558	2.1	< 0.10	0.11	149	< 0.020	< 0.050	27	0.0307	144	0.13	0.12	0.52	< 10	< 0.050	25.2	48.2	20.2	< 0.0050	0.832	1.00	1.90	***21.1***	< 0.010	10.4	428	< 0.010	< 0.10	< 0.30	1.64	< 0.50	3.5
	LC_MW_MC10A_WG_2021_11_24_NP	Duplicate	555	1.9	< 0.10	0.13	149	< 0.020	< 0.050	25	0.0326	143	0.12	0.12	0.51	< 10	< 0.050	25.0	48.0	20.6	< 0.0050	0.764	0.96	1.88	***21.2***	< 0.010	10.3	429	< 0.010	< 0.10	< 0.30	1.64	< 0.50	3.5
	QA/QC RPD%		1	*	*	*	0	*	*	*	6	1	*	*	*	*	*	1	0	2	*	9	*	1	0	*	1	0	*	*	*	0	*	*

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with Hardness.

[c] Standard varies with pH.

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

[e] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

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

[g] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

TABLE LC-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (LCO)

Sample Location	Sample ID	Sample (yyyy mm dd)	Hardness	Dissolved Metals																																
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[f]
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																				
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[b]	n/a	10[d]	40	20-90[b]	n/a	40-160[b]	n/a	n/a	n/a	0.25	10,000	250-1,500[b]	n/a	20	0.5-15[b]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[b]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[d]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[c]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[d]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[d]	20[e]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[g]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Elk River Valley (^ denotes part of Study Area 6)																																				
LC_MW_ER4A^	LC_MW_ER4A_WG_Q1-2021_N	2021 03 25	262	< 1.0	< 0.10	< 0.10	51.1	< 0.020	< 0.050	< 10	< 0.0050	73.6	< 0.10	< 0.10	< 0.20	109	< 0.050	5.7	18.9	47.2	< 0.0050	3.88	< 0.50	0.559	< 0.050	< 0.010	2.63	315	< 0.010	< 0.10	< 0.30	0.210	< 0.50	< 1.0
	LC_MW_ER4A_WG_Q2-2021-N	2021 06 23	244	1.6	< 0.10	< 0.10	48.6	< 0.020	< 0.050	< 10	< 0.0050	67.5	< 0.10	< 0.10	< 0.20	140	< 0.050	5.4	18.3	48.6	< 0.0050	3.34	< 0.50	0.515	< 0.050	< 0.010	2.69	287	< 0.010	< 0.10	< 0.30	0.237	< 0.50	< 1.0
	LC_MW_ER4A_WG_Q3-2021_N	2021 08 29	278	1.5	< 0.10	< 0.10	53.5	< 0.020	< 0.050	< 10	< 0.0050	78.3	< 0.10	< 0.10	< 0.20	146	< 0.050	6.4	20.0	54.8	< 0.0050	4.77	< 0.50	0.600	< 0.050	< 0.010	2.88	344	< 0.010	< 0.10	< 0.30	0.288	< 0.50	< 1.0
	LC_MW_ER4A	2021 11 19	246	1.2	< 0.10	< 0.10	51.3	< 0.020	< 0.050	< 10	< 0.0050	67.4	< 0.10	< 0.10	< 0.20	149	< 0.050	5.4	18.8	51.6	< 0.0050	4.86	< 0.50	0.534	< 0.050	< 0.010	2.50	292	< 0.010	< 0.10	< 0.30	0.266	< 0.50	< 1.0
LC_MW_ER4B^	LC_MW_ER4B_WG_Q1-2021_N	2021 03 25	279	1.0	< 0.10	< 0.10	79.5	< 0.020	< 0.050	< 10	0.0141	75.3	0.16	< 0.10	0.24	< 10	< 0.050	6.8	22.1	< 0.10	< 0.0050	1.14	< 0.50	0.442	16.4	< 0.010	2.91	251	< 0.010	< 0.10	< 0.30	0.986	< 0.50	< 1.0
	LC_MW_ER4B_WG_Q2-2021-N	2021 06 23	228	< 1.0	< 0.10	< 0.10	67.2	< 0.020	< 0.050	< 10	0.0132	61.0	0.10	< 0.10	< 0.20	< 10	< 0.050	7.5	18.3	< 0.10	< 0.0050	1.26	< 0.50	0.411	9.35	< 0.010	1.89	203	< 0.010	< 0.10	< 0.30	0.902	< 0.50	< 1.0
	LC_MW_ER4B_WG_Q3-2021_N	2021 08 29	284	< 1.0	< 0.10	< 0.10	98.2	< 0.020	< 0.050	< 10	0.0213	77.6	0.12	< 0.10	0.37	< 10	< 0.050	10.4	22.0	< 0.10	< 0.0050	1.56	< 0.50	0.565	7.47	< 0.010	2.34	279	< 0.010	< 0.10	< 0.30	1.16	< 0.50	< 1.0
	LC_MW_ER4B	2021 11 19	257	< 1.0	< 0.10	< 0.10	86.1	< 0.020	< 0.050	< 10	0.0176	69.3	0.13	< 0.10	0.28	< 10	< 0.050	8.1	20.4	< 0.10	< 0.0050	1.21	< 0.50	0.462	15.0	< 0.010	2.33	250	< 0.010	< 0.10	< 0.30	1.03	< 0.50	< 1.0
Blanks																																				
Field Blanks																																				
LC_PIZ1206C	LC_MT3_WG_2021-01-25_NP	2021 01 29	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
LC_PIZP1105	WG_Q1-2021_011	2021 03 24	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
-	RG_MW_MC11B_WG_2021_08_19_NP	2021 08 19	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	1.37	< 0.50	< 0.10	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
LC_PIZ1206C	LC_MT3_WG_2021-Q3_NP	2021 08 25	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
LC_MW_CP1A	LC_MW_MC10B_WG_2021_09_01_NP	2021 09 01	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.10	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
LC_PIZP1105	WG_Q3-2021_008_MT3	2021 09 16	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
LC_PIZP1101	WG_Q4-2021_011_MT2	2021 11 23	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
LC_PIZP1105	WG_Q4-2021_013_MT3	2021 11 22	< 0.50	1.6	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
LC_MW_SRD2B	LC_MW_MC10B_WG_2021_11_24_NP	2021 11 24	1.11	< 1.0	< 0.10	< 0.10	0.35	< 0.020	< 0.050	< 10	< 0.0050	0.308	< 0.10	< 0.10	0.74	< 10	< 0.050	< 1.0	0.0822	0.79	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	0.073	1.19	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	1.7
Trip Blanks																																				
	LC_RD3_WG_2021-01-25_NP	2021 01 29	-	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	WG_Q1-2021_012	2021 03 24	< 0.50	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	WG_Q2-2021_006	2021 06 10	< 0.50	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	LC_MW_MC10C_WG_2021_09_01_NP	2021 09 01	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.10	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	WG_Q3-2021_009_RD2	2021 09 16	< 0.50	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	WG_Q4-2021_012_RD2	2021 11 22	< 0.50	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	LC_MW_MC10C_WG_2021_11_24_NP	2021 11 24	< 0.50	< 1.0	< 0.10	< 0.10	0.10	< 0.020	< 0.050	< 10	< 0.0050	0.085	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	0.0171	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	0.33	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	1.0

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with Hardness.

[c] Standard varies with pH.

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

[e] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

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

[g] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

TABLE LC-05: Summary of Analytical Results Compared to Secondary Screening Criteria for Selenium (LCO)

Sample Location	Sample ID	Sample (yyyy mm dd)	SPO/Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
Compliance Point			GH_FR1 (0200378)	63
			LC_LCDSSLCC (E297110)	50
			LC_LC5 (0200028)	51
			EV_ER4 (0200027)	23
LCO Phase I Centre Line Creek, West Line Creek, and Lower Line Creek				
LC_MW20_01	LC_MW20_01_WG_2021-01-25_NP	2021 01 28	LC_LCDSSLCC (E297110)	57.1
	LC_MW20_01_WG_2021-04-09_NP	2021 04 16	LC_LCDSSLCC (E297110)	63.9
	LC_MW20_01_WG_2021-Q3_NP	2021 08 26	LC_LCDSSLCC (E297110)	42.3
	LC_MW20_01_WG_2021-Q4_NP	2021 11 23	LC_LCDSSLCC (E297110)	52.5
LC_MW20_02B	LC_MW20_02B_WG_2021-01-25_NP	2021 01 28	LC_LCDSSLCC (E297110)	46.9
	LC_MW20_02B_WG_2021-04-09_NP	2021 04 17	LC_LCDSSLCC (E297110)	46.4
	LC_MW20_02B_WG_2021-Q3_NP	2021 08 24	LC_LCDSSLCC (E297110)	39.5
	LC_MW20_02B_WG_2021-Q4_NP	2021 11 24	LC_LCDSSLCC (E297110)	39.5
LC_PIZ1206A	LC_PIZ1206A_WG_2021-04-09_NP	2021 04 15	LC_LCDSSLCC (E297110)	389
	LC_PIZ1206A_WG_2021-Q3_NP	2021 08 25	LC_LCDSSLCC (E297110)	290
	LC_CC3_WG_2021-Q3_NP	Duplicate	LC_LCDSSLCC (E297110)	291
	LC_PIZ1206A_WG_2021-Q4_NP	2021 11 22	LC_LCDSSLCC (E297110)	303
	LC_CC3_WG_2021-Q4_NP	Duplicate	LC_LCDSSLCC (E297110)	315
LC_PIZ1206C	LC_PIZ1206C_WG_2021-01-25_NP	2021 01 29	LC_LCDSSLCC (E297110)	68.9
	LC_PIZ1206C_WG_2021-04-09_NP	2021 04 16	LC_LCDSSLCC (E297110)	72.6
	LC_PIZ1206C_WG_2021-Q3_NP	2021 08 25	LC_LCDSSLCC (E297110)	73.8
	LC_PIZ1206C_WG_2021-Q4_NP	2021 11 23	LC_LCDSSLCC (E297110)	89.6
LC_PIZ1211N	LC_PIZ1211N_WG_2021-01-25_NP	2021 02 08	LC_LCDSSLCC (E297110)	127
	LC_PIZ1211N_WG_2021-04-09_NP	2021 04 16	LC_LCDSSLCC (E297110)	96.3
	LC_PIZ1211N_WG_2021-Q3_NP	2021 08 24	LC_LCDSSLCC (E297110)	170
	LC_PIZ1211N_WG_2021-Q4_NP	2021 11 23	LC_LCDSSLCC (E297110)	120
LC_PIZ1212	LC_PIZ1212_WG_2021-01-25_NP	2021 01 29	LC_LCDSSLCC (E297110)	139
	LC_PIZ1212_WG_2021-04-09_NP	2021 04 16	LC_LCDSSLCC (E297110)	119
	LC_PIZ1212_WG_2021-Q3_NP	2021 08 24	LC_LCDSSLCC (E297110)	99.6
	LC_PIZ1212_WG_2021-Q4_NP	2021 11 23	LC_LCDSSLCC (E297110)	127
WL_MW-15-02-B	WL_MW-15-02-B_WG_2021-SA-01_N	2021 06 23	LC_LCDSSLCC (E297110)	16.0
	WL_MW-15-02-B_WG_2021-SA-02_N	2021 11 02	LC_LCDSSLCC (E297110)	33.4
LC_MW_CP1A	LC_MW_CP1A_WG_2021_09_01_NP	2021 09 01	LC_LCDSSLCC (E297110)	53.8
	LC_MW_MC10A_WG_2021_09_01_NP	Duplicate	LC_LCDSSLCC (E297110)	52.8
	QA/QC RPD%			2
	LC_MW_CP1A_Q4-2021_NP	2021 11 24	LC_LCDSSLCC (E297110)	52.2
LC_MW_CP1B	LC_MW_CP1B_WG_2021_09_01_NP	2021 09 01	LC_LCDSSLCC (E297110)	36.3
	LC_MW_CP1B_Q4-2021_NP	2021 11 24	LC_LCDSSLCC (E297110)	41.2
Process Plant (^ denotes part of Study Area 5/6)				
RG_MW_LC4A^	RG_MW_LC4A_WG_Q4-2021_NP	2021 11 26	LC_LC5 (0200028)	12.6
RG_MW_LC4B^	RG_MW_LC4B_WG_2021_08_19_NP	2021 08 19	LC_LC5 (0200028)	23.6
	RG_MW_LC4B_WG_Q4-2021_NP	2021 11 26	LC_LC5 (0200028)	32.5
LC_MW_SRD1A^	RG_MW_ERXA_WG_2021_09_03_NP	2021 09 03	EV_ER4 (0200027)	34.5
	LC_MW_SRD1A_WG_Q4-2021_NP	2021 12 01	EV_ER4 (0200027)	43.2
LC_MW_SRD1B^	LC_MW_SRD1B_WG_2021_08_19_NP	2021 08 19	EV_ER4 (0200027)	32.2
	RG_MW_MC11A_WG_2021_08_19_NP	Duplicate	EV_ER4 (0200027)	32.3
	QA/QC RPD%			0
	LC_MW_SRD1B_WG_Q4-2021_NP	2021 12 01	EV_ER4 (0200027)	43.2
LC_MW_SRD2B^	LC_MW_SRD2B_WG_2021_11_24_NP	2021 11 24	EV_ER4 (0200027)	21.1
	LC_MW_MC10A_WG_2021_11_24_NP	Duplicate	EV_ER4 (0200027)	21.2
	QA/QC RPD%			0
Elk River Valley (^ denotes part of Study Area 5/6)				
LC_MW_ER4B^	LC_MW_ER4B_WG_Q1-2021_N	2021 03 25	EV_ER4 (0200027)	16.4
	LC_MW_ER4B	2021 11 19	EV_ER4 (0200027)	15.0

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

< Denotes concentration less than indicated detection limit.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

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

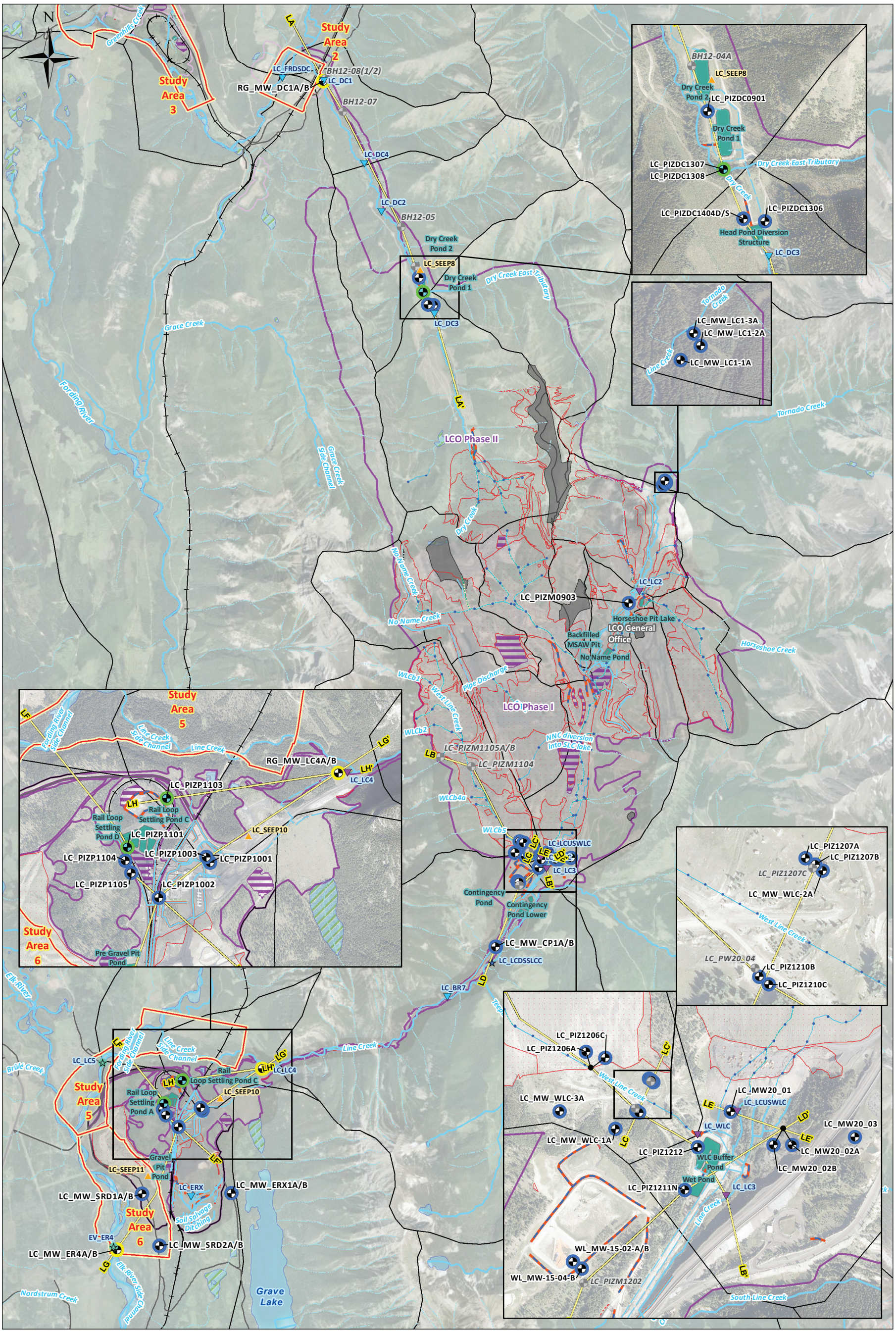
* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

SHADED Concentration greater than SPO by Area/Compliance Point by Area

Drawings:

LC-01: Sample Location Plan – Line Creek Operations
LC-02: Groundwater Elevations from Q4 2021 and Inferred Groundwater Flow Direction – Line Creek Operations
LC-03: Line Creek Operations Inferred Geological Cross Section LA-LA'
LC-04: Line Creek Operations Inferred Geological Cross Section LB-LB'
LC-05: Line Creek Operations Inferred Geological Cross Section LC-LC'
LC-06: Line Creek Operations Inferred Geological Cross Section LD-LD'
LC-07: Line Creek Operations Inferred Geological Cross Section LE-LE'
LC-08: Line Creek Operations Inferred Geological Cross Section LF-LF'
LC-09: Line Creek Operations Inferred Geological Cross Section LG-LG'
LC-10: Line Creek Operations Inferred Geological Cross Section LH-LH'
LC-11: Spatial Distribution of Nitrate Nitrogen in Groundwater – Line Creek Operations
LC-12: Spatial Distribution of Sulphate in Groundwater – Line Creek Operations
LC-13: Spatial Distribution of Dissolved Cadmium in Groundwater – Line Creek Operations
LC-14: Spatial Distribution of Dissolved Selenium in Groundwater – Line Creek Operations



Legend

Groundwater Stations[4]
- Monitoring Well
- Background well included in the RGMP
- Well included in the RGMP
- Well included in the SSGMP
- Well included in both the RGMP and the SSGMP
- Monitoring Well (Other Programs)

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Monitoring
- Seep

Site Features
- Highway
- Secondary Road
- Rails
- Geological Cross Section
- Study Areas
- Tailings/Settling Pond
- End-Pit Lake
- Pit
- Stockpiles
- Waste Dump (Spoils)

- Watersheds
- LCO Permitted Boundary
- Other Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel

- Island
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:60000 Scale)

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. Overlapping wells have been adjusted for clarity.

References:
1. Information provided by Teck Coal Limited.
2.Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 0.3 0.6 1.2 1.8 2.4 3 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Sample Location Plan - Line Creek Operations

CHK'D: RS | BY: CW | DATE: 2022-03-21 | SCALE: 1:60,000 | COORD SYS: NAD 1983 UTM Zone 11N | Ref Num: DRAWING LC-01

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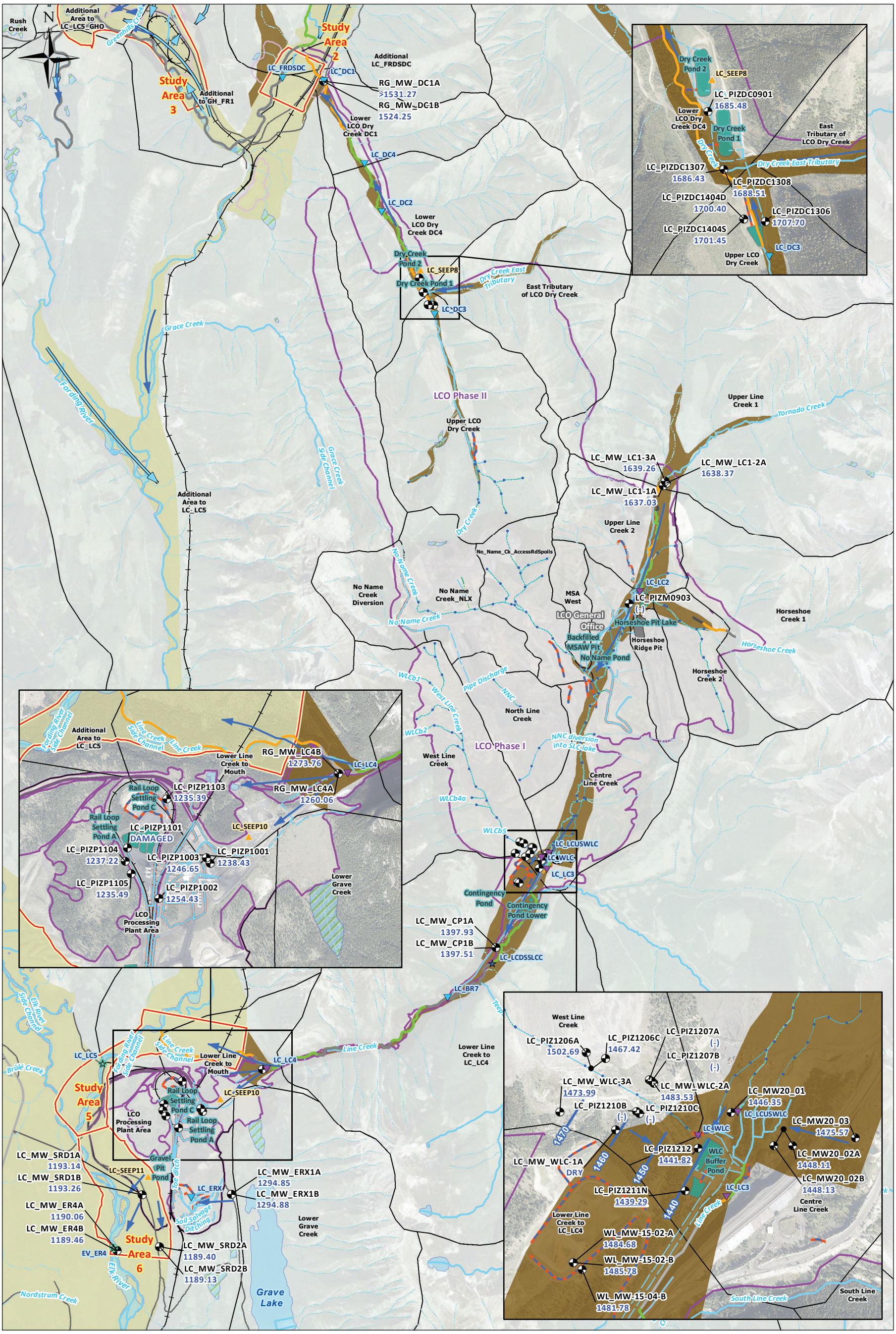
Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Legend

- **Groundwater Stations**[4]
  - Monitoring Well
- **Surface Water Stations**
  - Compliance Point
  - Order Station
  - Receiving Environment Monitoring
  - Seep
- **Flow Accretion**
  - Gaining
  - Losing
  - No Change
- Insufficient Information
- **Site Features**
  - Highway
  - Secondary Road
  - Rails
  - Interpreted GW flow direction
  - Interpreted GW contours (masl)
  - Study Areas
  - Tailings/Settling Pond
  - End-Pit Lake
- Watersheds
  - LCO Permitted Boundary
  - Other Mine Permitted Areas
  - Interpreted Tributary Valley-bottom Extent
  - Interpreted Main Valley-bottom Extent
- **Water Features**
  - Stream + Stream Ditch
  - Intermittent + Indefinite Stream
- Subsurface
  - Ditch
  - Rock Drain
  - Water Pipeline
  - Bypass/Diversion Channel
  - Island
  - Lake/River Bed
  - Wetted Area/Wetland (Based on 1:60000 Scale)

1184.86 Water level Q4 (masl) - used in contouring

1184.86 Water level Q4 (masl) - not used in contouring

Castle FR_FRABCH_A Watershed ID

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. Overlapping wells have been adjusted for clarity.
5. Stations used to assess flow status are not shown on the map. Readers are referred to report references.
6. Flow accretion studies completion dates:
   · GHO Tributaries, Elk River, Fording River: combined 2019/2020 studies
   · Dry Creek: November, 2018
   · Line Creek: October, 2020
7. Groundwater elevation contours could not be completed due to lateral and vertical spatial distribution of wells.

References:
1. Information provided by Teck Coal Limited.
2.Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

0 0.3 0.6 1.2 1.8 2.4 3 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Groundwater Elevations from Q4 2021 and Inferred Groundwater Flow Direction

CHK'D: RS | DATE: 2022-03-21 | SCALE: 1:60,000 | Ref Num:

BY: CW | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING LC-02

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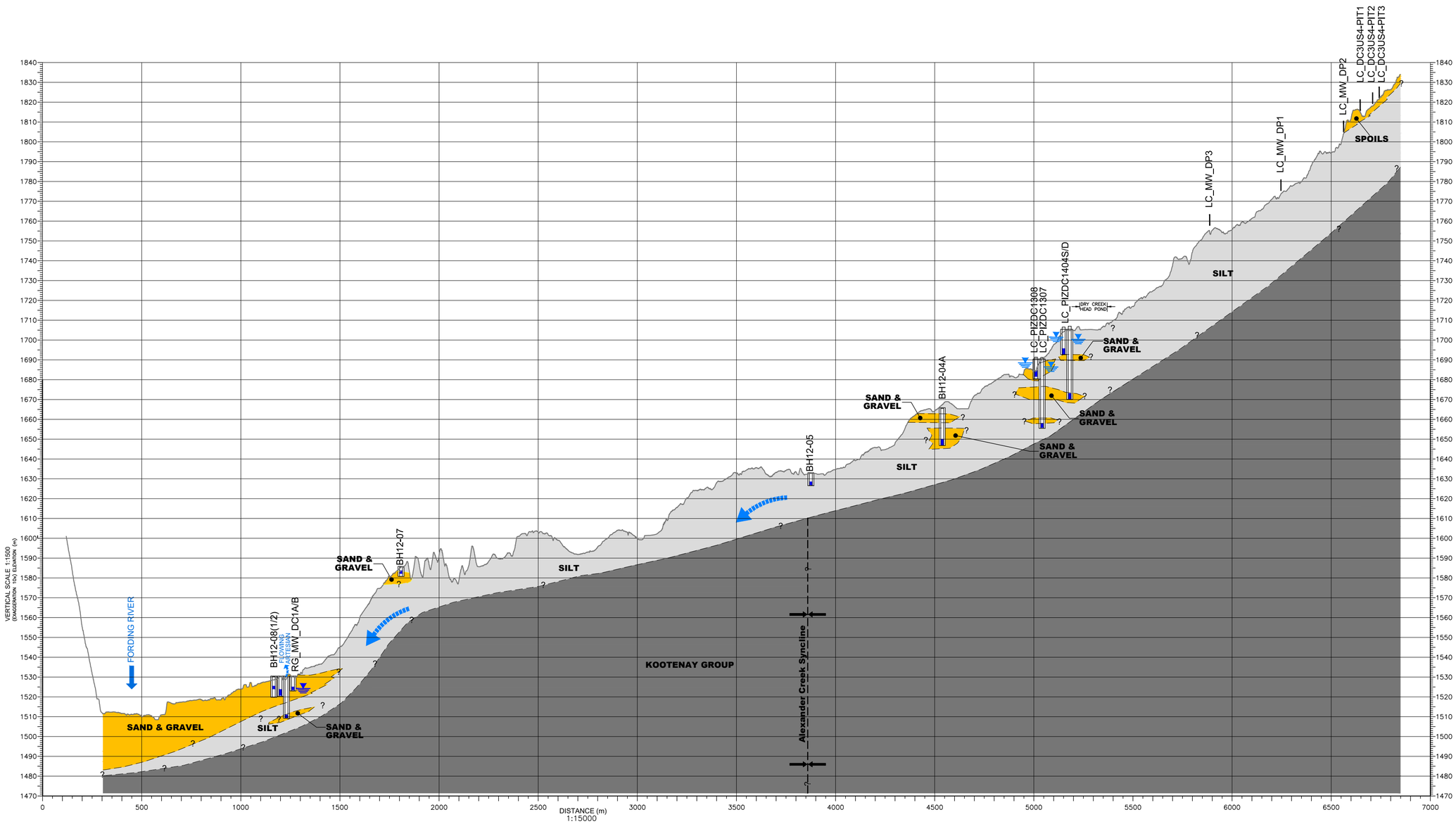
LA
NORTHWEST

LA'
SOUTHEAST



LEGEND

- SAND & GRAVEL
- SILT
- INFERRED STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)
- INFERRED GROUNDWATER FLOW DIRECTION

BOREHOLE LEGEND

EV_BCgw (05~70m)

- WELL OFFSET FROM SECTION LINE
- SOLID PIPE
- SLOTTED PIPE
- END OF BOREHOLE

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. MINOR EDITS ON CROSS SECTIONS WHICH INCLUDE WELLS DRILLED IN Q3 AND Q4 2021.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-03-14	ISSUED TO CLIENT	AJK	MG

CLIENT NAME: TECK COAL LIMITED
–

PROJECT LOCATION: LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
LINE CREEK OPERATIONS
- INFERRED GEOLOGICAL CROSS SECTION LA-LA'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2021-10-01	DWG No: DRAWING LC-03 REV.: 0
CHK'D: KC	PLOT: 20220314.1442	CADFILE: 635544-X2R18	

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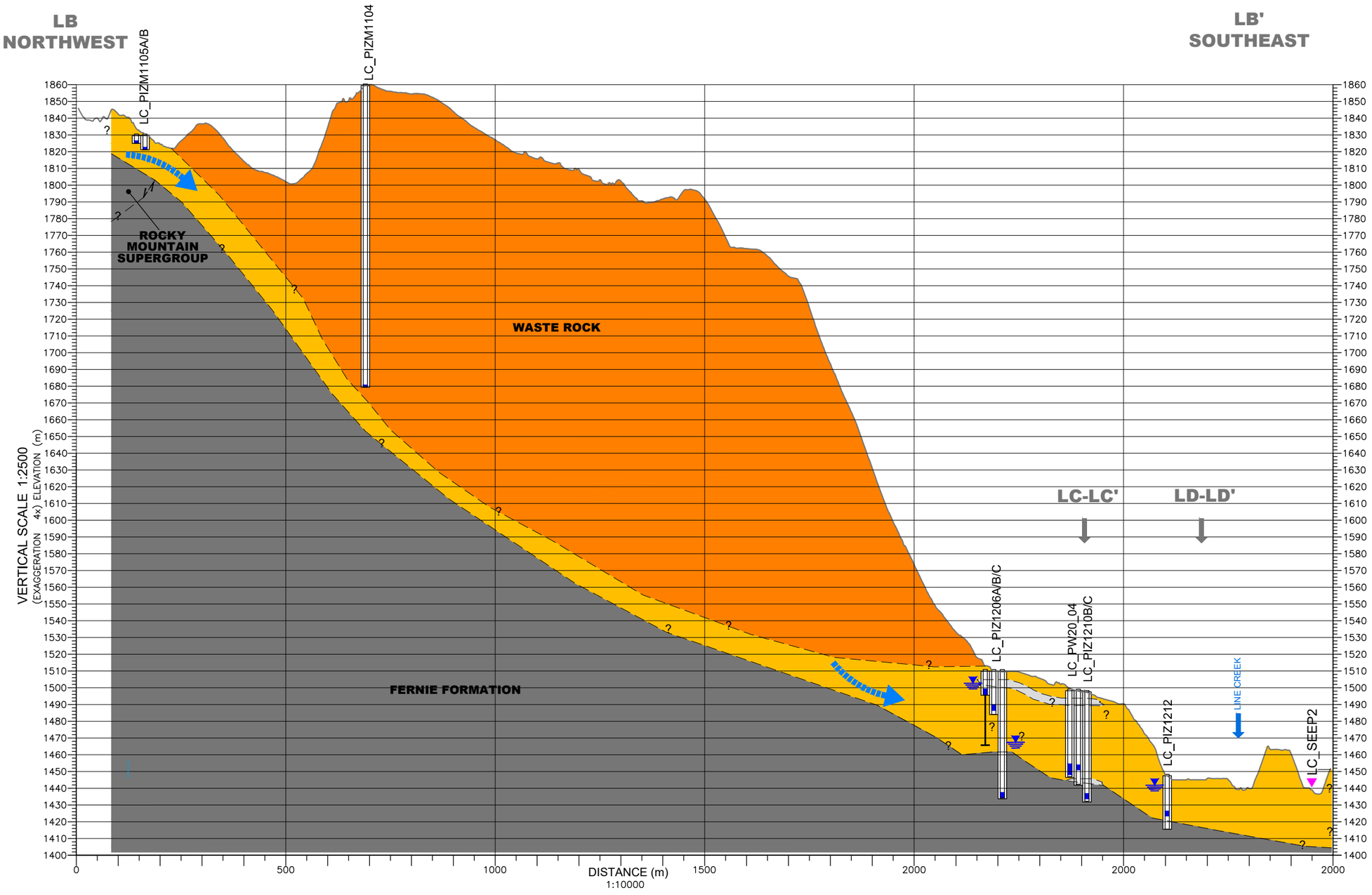
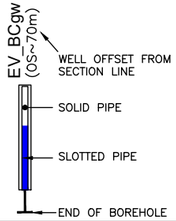


LEGEND

- WASTE ROCK
- SAND & GRAVEL
- SILT
- BEDROCK

- INFERRED STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)
- SEEP
- INFERRED GROUNDWATER FLOW DIRECTION
- THRUST FAULT

BOREHOLE LEGEND



NOTES

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2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.
5. MINOR EDITS ON CROSS SECTIONS WHICH INCLUDE WELLS DRILLED IN Q3 AND Q4 2021.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-03-14	ISSUED TO CLIENT	AJK	MG

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
LINE CREEK OPERATIONS
- INFERRED GEOLOGICAL CROSS SECTION LB-LB'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2021-10-01	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220314.1505	CADFILE: 635544-X2R18	**DRAWING LC-04**

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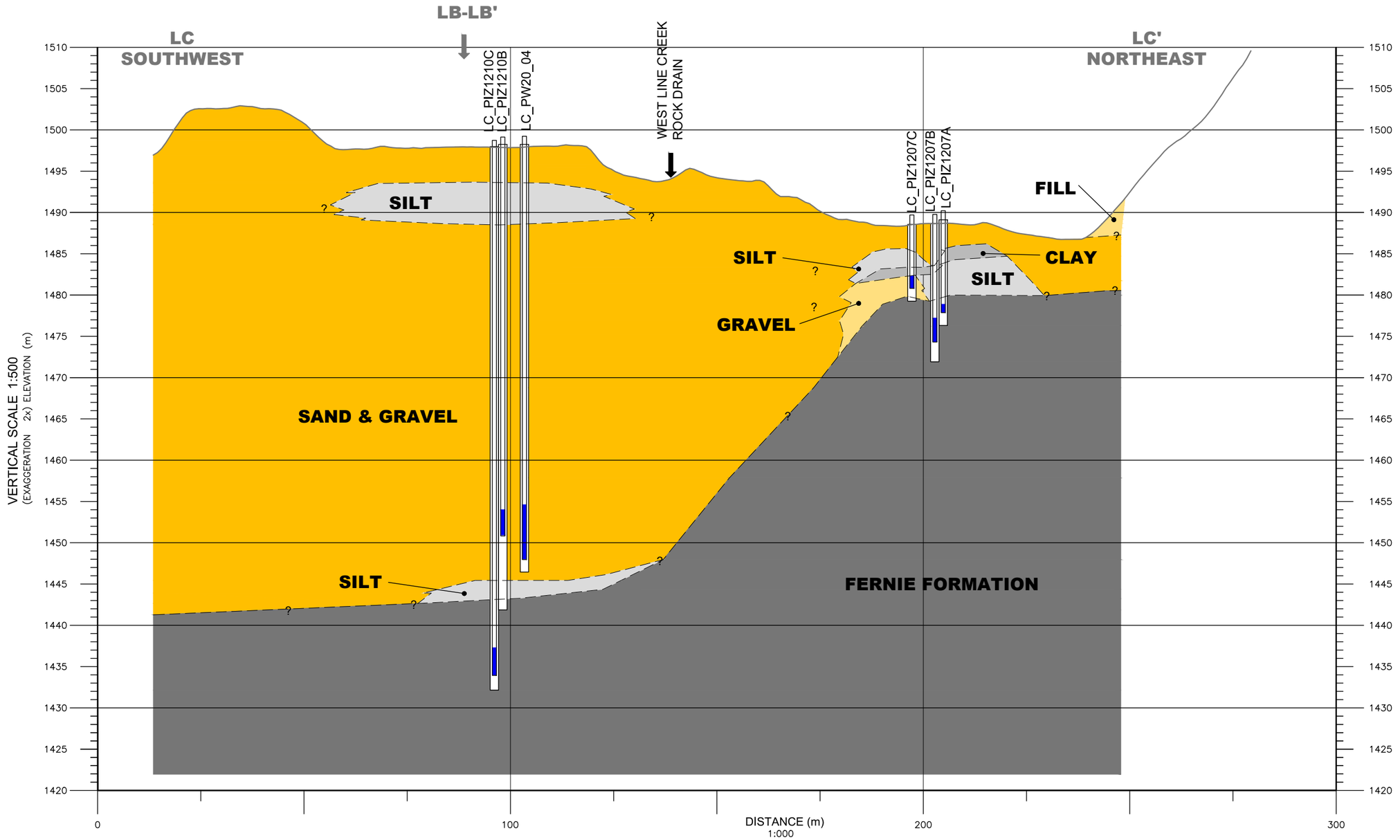


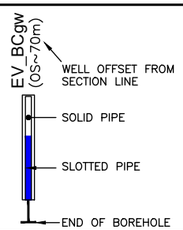
LEGEND

- FILL
- SAND & GRAVEL
- SILT
- CLAY
- BEDROCK

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

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. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.
5. MINOR EDITS ON CROSS SECTIONS WHICH INCLUDE WELLS DRILLED IN Q3 AND Q4 2021.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-03-14	ISSUED TO CLIENT	AJK	MG

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
LINE CREEK OPERATIONS
- INFERRED GEOLOGICAL CROSS SECTION LC-LC'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2021-10-01	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220314.1444	CADFILE: 635544-X2R18	**DRAWING LC-05**

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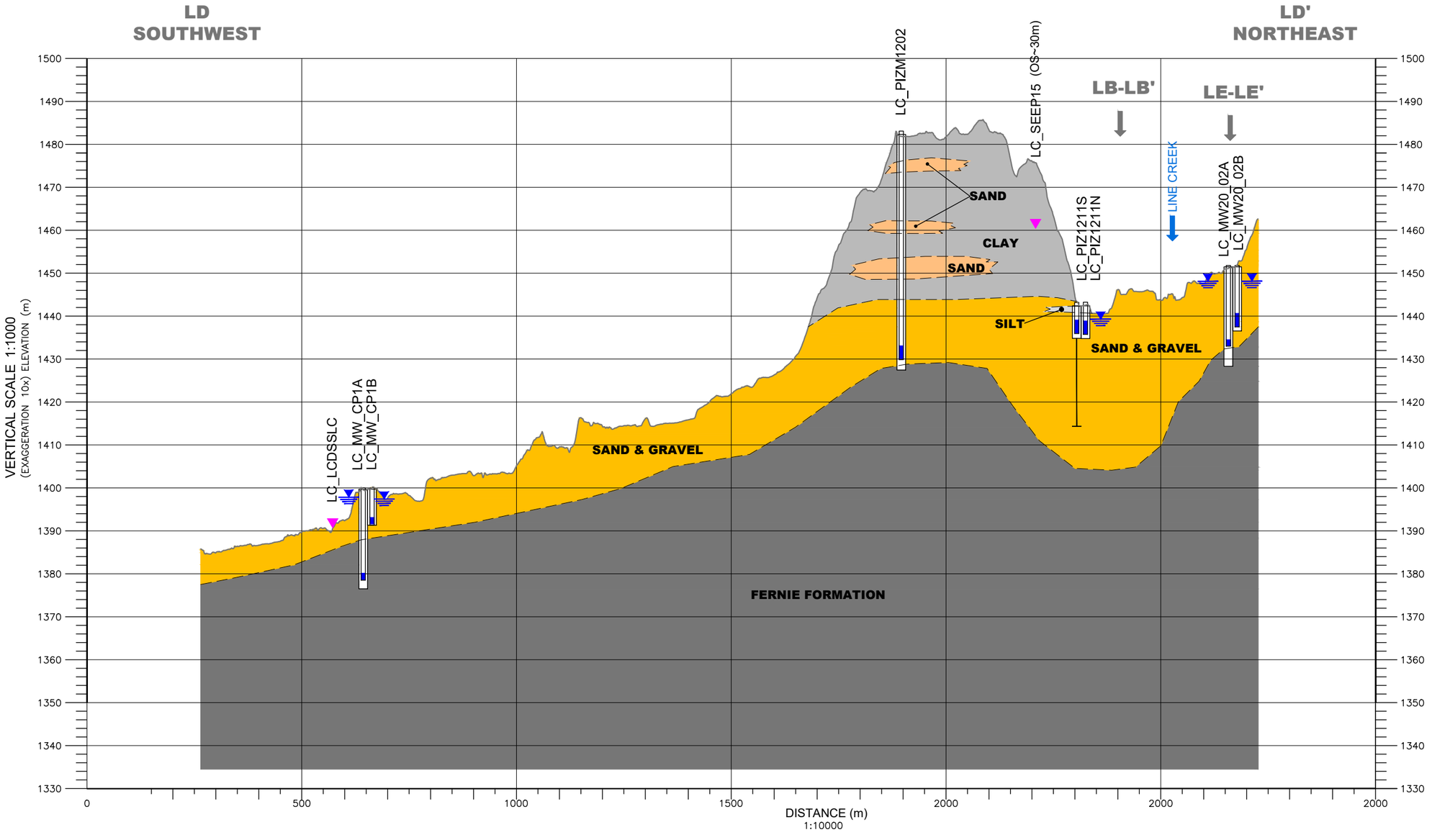


LEGEND

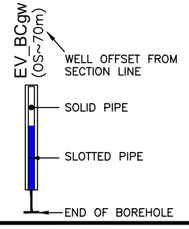
- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

SEEP

BOREHOLE LEGEND



NOTES

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2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.
5. MINOR EDITS ON CROSS SECTIONS WHICH INCLUDE WELLS DRILLED IN Q3 AND Q4 2021.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-03-14	ISSUED TO CLIENT	AJK	MG

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
LINE CREEK OPERATIONS
- INFERRED GEOLOGICAL CROSS SECTION LD-LD'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2021-10-01	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220314.1445	CADFILE: 635544-X2R18	**DRAWING LC-06**

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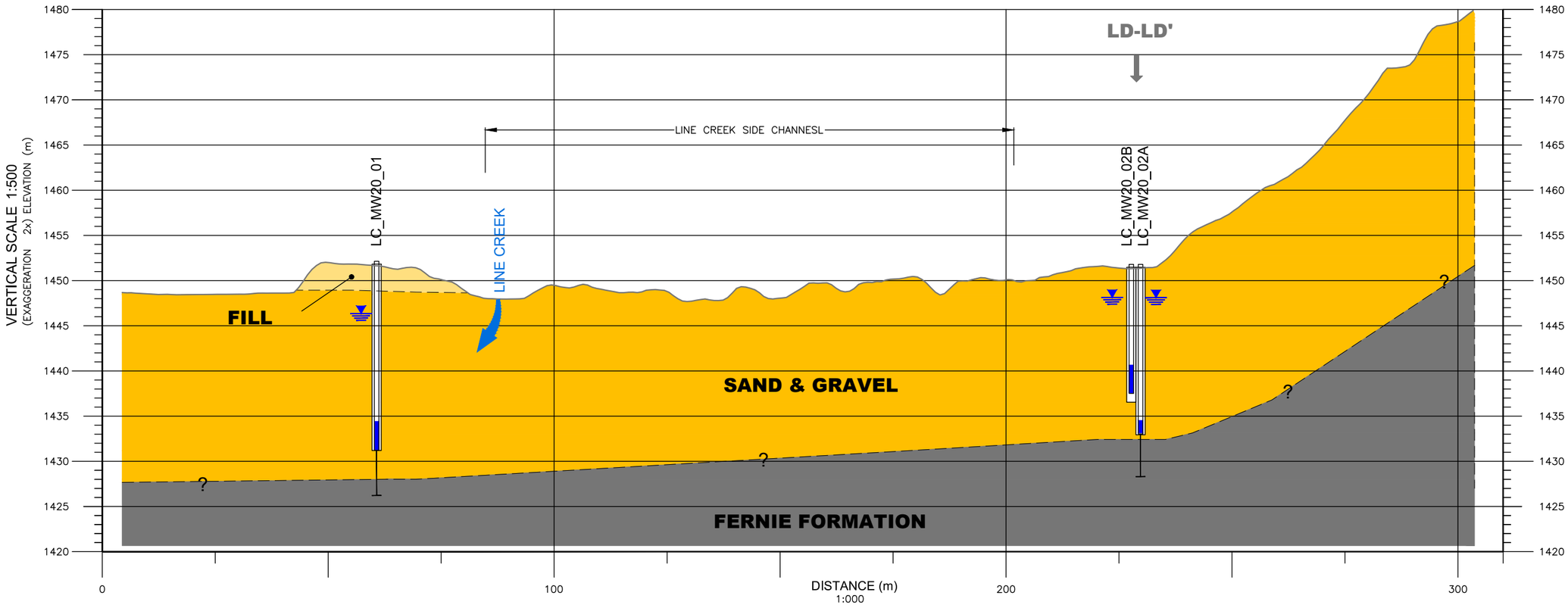
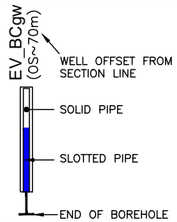


LEGEND

- FILL
- SAND & GRAVEL
- BEDROCK
- – – – – INFERRED STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



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REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022–03–14	ISSUED TO CLIENT	AJK	MG

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
LINE CREEK OPERATIONS
- INFERRED GEOLOGICAL CROSS SECTION LE-LE'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2021–10–01	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220314.1446	CADFILE: 635544–X2R18	**DRAWING LC-07**

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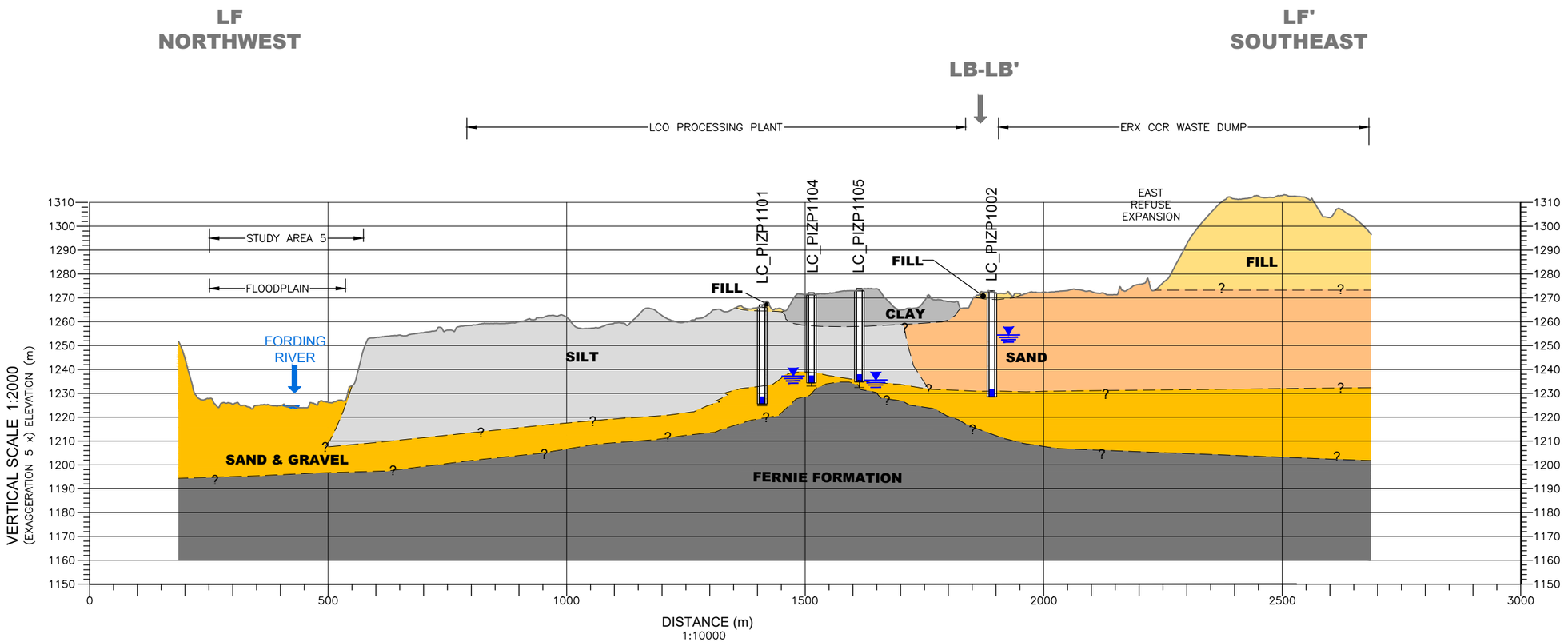


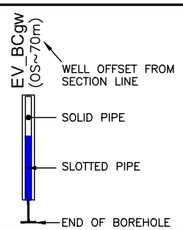
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND (WITH GRAVEL)
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



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REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-03-14	ISSUED TO CLIENT	AJK	MG

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
LINE CREEK OPERATIONS
- INFERRED GEOLOGICAL CROSS SECTION LF-LF'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2021-10-01	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220314.1447	CADFILE: 635544-X2R18	**DRAWING LC-08**

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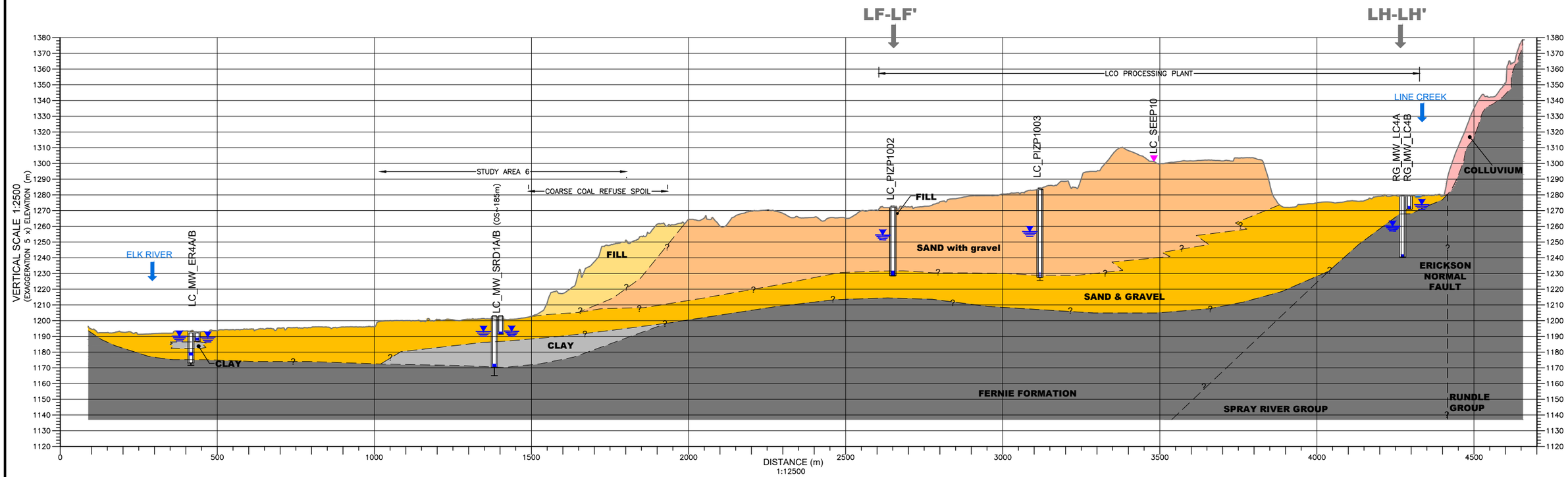


LEGEND

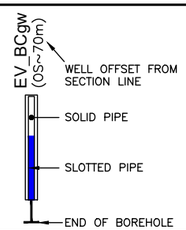
- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND (WITH GRAVEL)
- SILT
- CLAY
- BEDROCK

— — — — INFERRED STRATIGRAPHIC BOUNDARY

SEEP

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



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REFERENCE DRAWINGS

–	–	–
DWG. NO.	DATE	DESCRIPTION

REVISIONS

0	2022-03-14	ISSUED TO CLIENT	AJK	MG
REV.	DATE	DESCRIPTION	BY	CHK

CLIENT NAME:
TECK COAL LIMITED
–

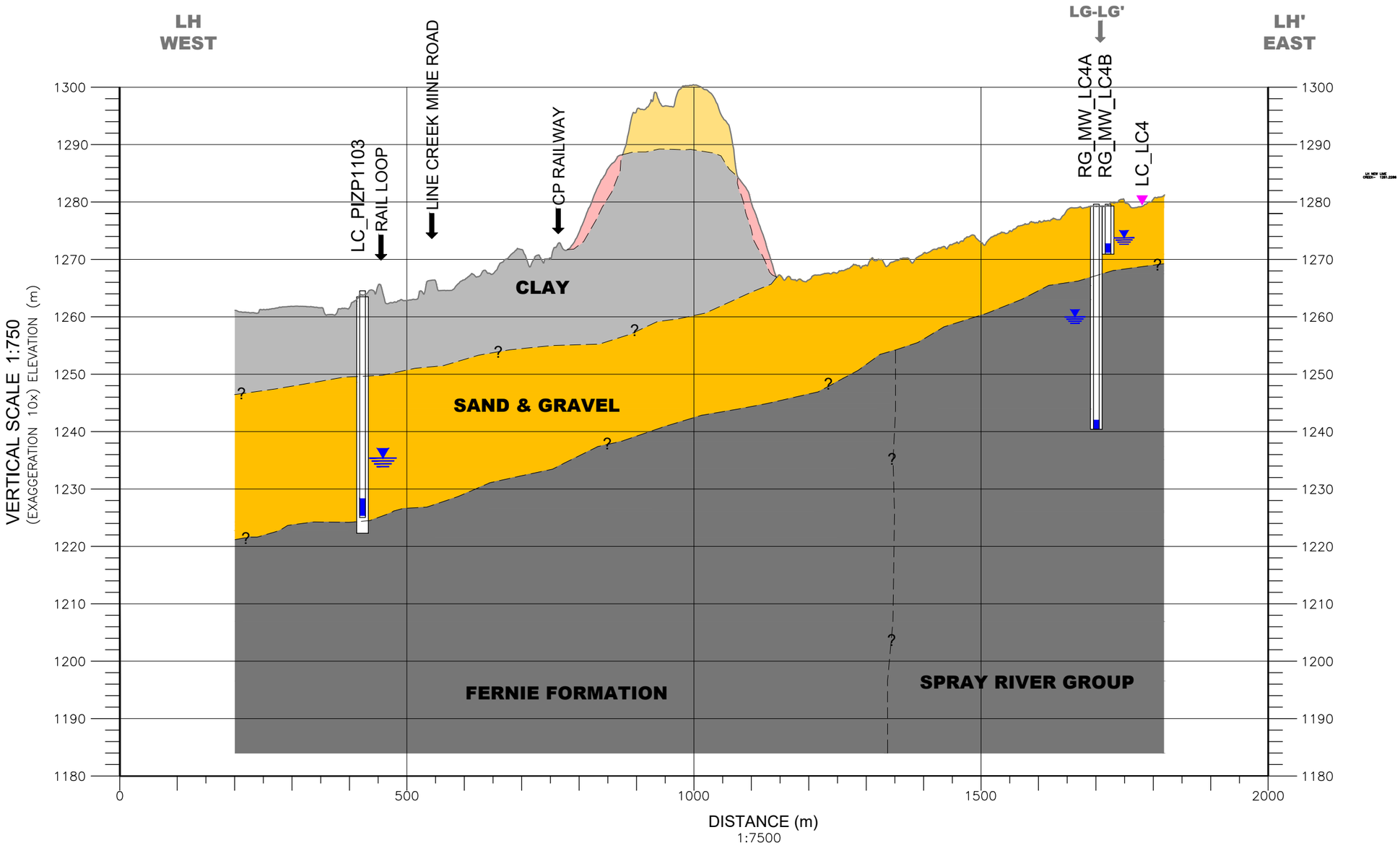
PROJECT LOCATION:
LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
LINE CREEK OPERATIONS
- INFERRED GEOLOGICAL CROSS SECTION LG-LG'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2021-10-01	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220314.1447	CADFILE: 635544-X2R18	DRAWING LC-09

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG



LEGEND

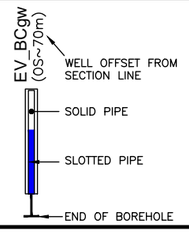
- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

SURFACE WATER STATION

BOREHOLE LEGEND



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REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-03-14	ISSUED TO CLIENT	AJK	MG

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
LINE CREEK OPERATIONS
- INFERRED GEOLOGICAL CROSS SECTION LH-LH'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2021-10-01	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220314.1448	CADFILE: 635544-X2R18	**DRAWING LC-10**

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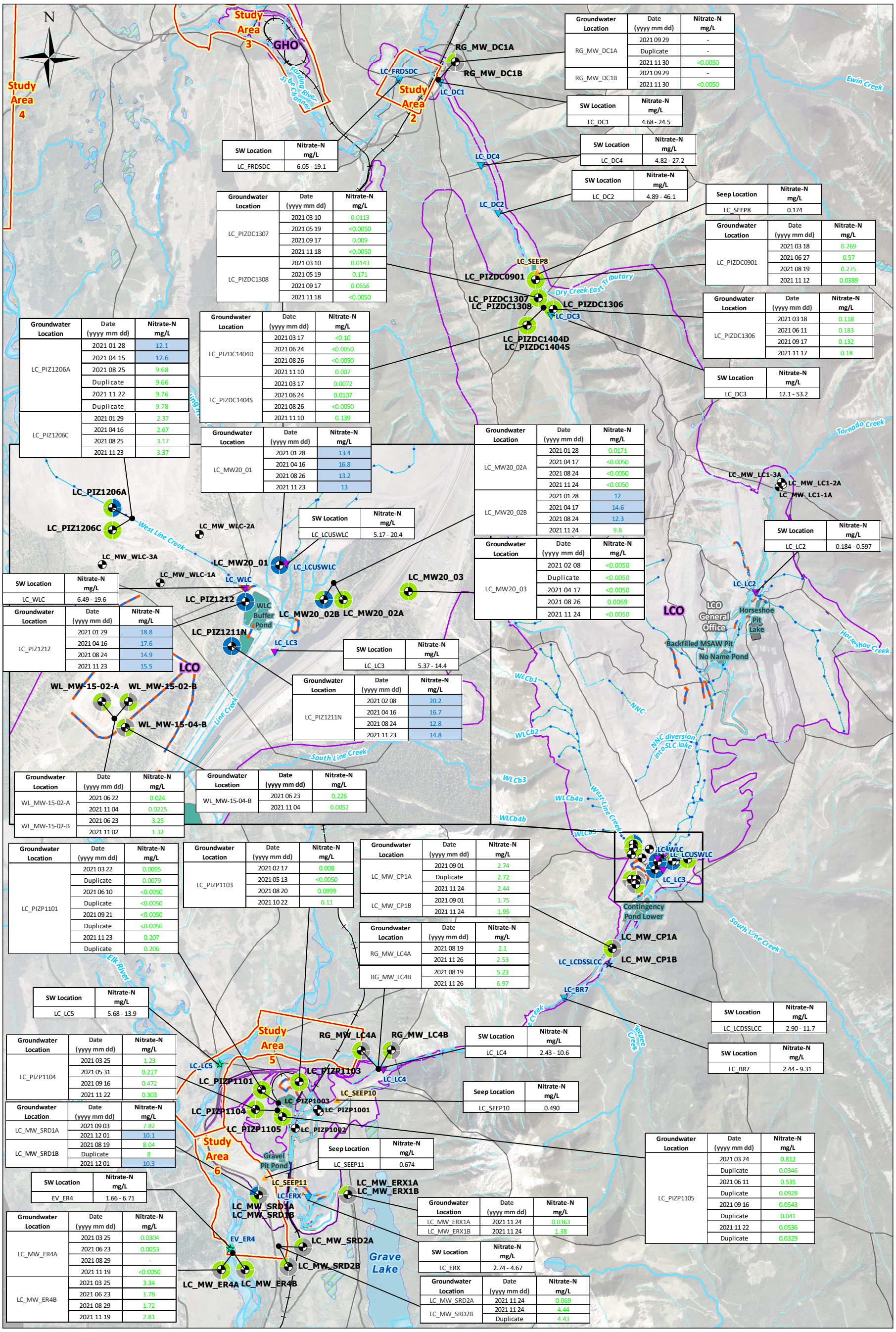


Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
RG_MW_DC1A	2021 09 29	-
	Duplicate	-
	2021 11 30	<0.0050
RG_MW_DC1B	2021 09 29	-
	2021 11 30	<0.0050

SW Location	Nitrate-N mg/L
LC_DC1	4.68 - 24.5

SW Location	Nitrate-N mg/L
LC_DC4	4.82 - 27.2

SW Location	Nitrate-N mg/L
LC_DC2	4.89 - 46.1

SW Location	Nitrate-N mg/L
LC_FRDSDC	6.05 - 19.1

Seep Location	Nitrate-N mg/L
LC_SEEP8	0.174

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZDC1307	2021 03 10	0.0113
	2021 05 19	<0.0050
	2021 09 17	0.009
	2021 11 18	<0.0050
LC_PIZDC1308	2021 03 10	0.0143
	2021 05 19	0.171
	2021 09 17	0.0656
	2021 11 18	<0.0050

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZDC0901	2021 03 18	0.269
	2021 06 27	0.57
	2021 08 19	0.275
	2021 11 12	0.0389

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZDC1306	2021 03 18	0.118
	2021 06 11	0.183
	2021 09 17	0.132
	2021 11 17	0.18

SW Location	Nitrate-N mg/L
LC_DC3	12.1 - 53.2

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZ1206A	2021 01 28	12.1
	2021 04 15	12.6
	2021 08 25	9.68
	Duplicate	9.66
	2021 11 22	9.76
	Duplicate	9.78
LC_PIZ1206C	2021 01 29	2.37
	2021 04 16	2.67
	2021 08 25	3.17
	2021 11 23	3.37

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZDC1404D	2021 03 17	<0.10
	2021 06 24	<0.0050
	2021 08 26	<0.0050
	2021 11 10	0.007
LC_PIZDC1404S	2021 03 17	0.0072
	2021 06 24	0.0107
	2021 08 26	<0.0050
	2021 11 10	0.139

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_MW20_01	2021 01 28	13.4
	2021 04 16	16.8
	2021 08 26	13.2
	2021 11 23	13

SW Location	Nitrate-N mg/L
LC_LCUSWLC	5.17 - 20.4

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_MW20_02A	2021 01 28	0.0171
	2021 04 17	<0.0050
	2021 08 24	<0.0050
	2021 11 24	<0.0050
LC_MW20_02B	2021 01 28	12
	2021 04 17	14.6
	2021 08 24	12.3
	2021 11 24	9.8

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_MW20_03	2021 02 08	<0.0050
	Duplicate	<0.0050
	2021 04 17	<0.0050
	2021 08 26	0.0069
	2021 11 24	<0.0050

SW Location	Nitrate-N mg/L
LC_LC2	0.184 - 0.597

SW Location	Nitrate-N mg/L
LC_WLC	6.49 - 19.6

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZ1212	2021 01 29	18.8
	2021 04 16	17.6
	2021 08 24	14.9
	2021 11 23	15.5

SW Location	Nitrate-N mg/L
LC_LC3	5.37 - 14.4

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZ1211N	2021 02 08	20.2
	2021 04 16	16.7
	2021 08 24	12.8
	2021 11 23	14.8

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
WL_MW-15-02-A	2021 06 22	0.024
	2021 11 04	0.0225
WL_MW-15-02-B	2021 06 23	3.25
	2021 11 02	1.32

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
WL_MW-15-04-B	2021 06 23	0.226
	2021 11 04	0.0052

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZP1101	2021 03 22	0.0095
	Duplicate	0.0079
	2021 06 10	<0.0050
	Duplicate	<0.0050
	2021 09 21	<0.0050
	Duplicate	<0.0050
	2021 11 23	0.207
	Duplicate	0.206

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZP1103	2021 02 17	0.008
	2021 05 13	<0.0050
	2021 08 20	0.0999
	2021 10 22	0.11

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_MW_CP1A	2021 09 01	2.74
	Duplicate	2.72
	2021 11 24	2.44
LC_MW_CP1B	2021 09 01	1.75
	2021 11 24	1.95

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
RG_MW_LC4A	2021 08 19	2.1
	2021 11 26	2.53
RG_MW_LC4B	2021 08 19	5.23
	2021 11 26	6.97

SW Location	Nitrate-N mg/L
LC_LC5	5.68 - 13.9

SW Location	Nitrate-N mg/L
LC_LC4	2.43 - 10.6

SW Location	Nitrate-N mg/L
LC_LCDSSLCC	2.90 - 11.7

SW Location	Nitrate-N mg/L
LC_BR7	2.44 - 9.31

Seep Location	Nitrate-N mg/L
LC_SEEP10	0.490

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZP1104	2021 03 25	1.23
	2021 05 31	0.217
	2021 09 16	0.472
	2021 11 22	0.303

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_MW_SRD1A	2021 09 03	7.82
	2021 12 01	10.1
LC_MW_SRD1B	2021 08 19	8.04
	Duplicate	8
	2021 12 01	10.3

Seep Location	Nitrate-N mg/L
LC_SEEP11	0.674

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_PIZP1105	2021 03 24	0.812
	Duplicate	0.0346
	2021 06 11	0.535
	Duplicate	0.0928
	2021 09 16	0.0543
	Duplicate	0.041
	2021 11 22	0.0536
	Duplicate	0.0329

SW Location	Nitrate-N mg/L
EV_ER4	1.66 - 6.71

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_MW_ER4A	2021 03 25	0.0304
	2021 06 23	0.0053
	2021 08 29	-
	2021 11 19	<0.0050
LC_MW_ER4B	2021 03 25	3.34
	2021 06 23	1.78
	2021 08 29	1.72
	2021 11 19	2.81

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_MW_ERX1A	2021 11 24	0.0363
LC_MW_ERX1B	2021 11 24	1.38

SW Location	Nitrate-N mg/L
LC_ERX	2.74 - 4.67

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
LC_MW_SRD2A	2021 11 24	0.069
LC_MW_SRD2B	2021 11 24	4.44
	Duplicate	4.43

Legend

Groundwater Stations[4]
- Monitoring

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Monitoring
- Seep

Site Features
- Highway
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- End-Pit Lake
- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

Q4 Q1 / Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Primary Screening Criteria	Nitrate-N mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

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. Locations of overlapping wells have been adjusted for clarity.
5. Nitrate-N = Nitrate Nitrogen

References:
1. Data provided by Teck Coal Limited.

0 250 500 1,000 1,500 2,000 2,500 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

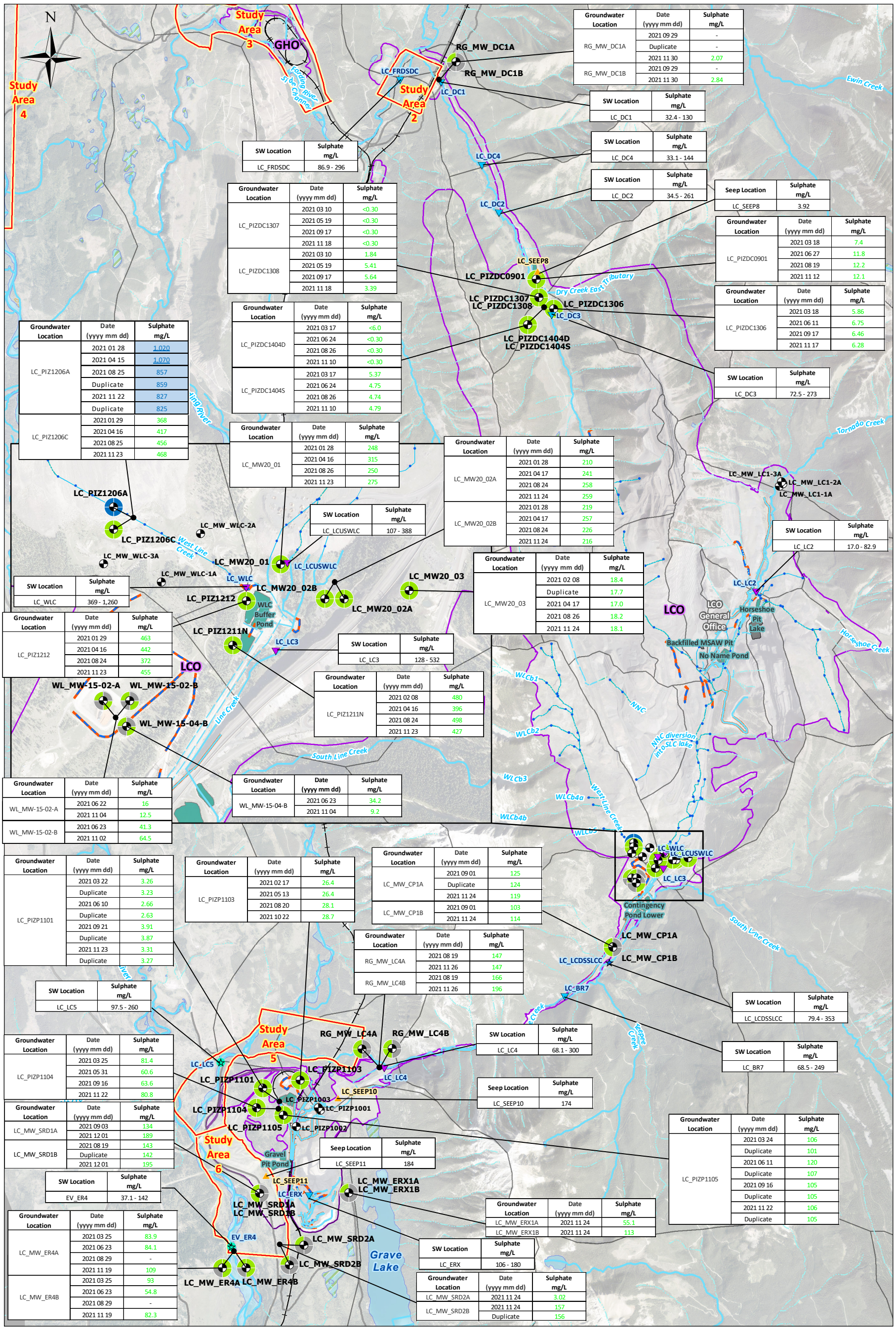
SNC·LAVALIN

Line Creek Operations - Spatial Distribution of Nitrate Nitrogen in Groundwater

CHK'D: RS | BY: CW | DATE: 2022-03-21 | SCALE: 1:60,000 | COORD SYS: NAD 1983 UTM Zone 11N | Ref Num: DRAWING LC-11

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GISMap Series\635544_2021 RGMP SSGMP Annual Report\635544-66-SpatialDist_N_LCO.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
RG_MW_DC1A	2021 09 29	-
	Duplicate	-
	2021 11 30	2.07
RG_MW_DC1B	2021 09 29	-
	2021 11 30	2.84

SW Location	Sulphate mg/L
LC_DC1	32.4 - 130

SW Location	Sulphate mg/L
LC_DC4	33.1 - 144

SW Location	Sulphate mg/L
LC_DC2	34.5 - 261

Seep Location	Sulphate mg/L
LC_SEEP8	3.92

SW Location	Sulphate mg/L
LC_FRDSDC	86.9 - 296

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZDC1307	2021 03 10	<0.30
	2021 05 19	<0.30
	2021 09 17	<0.30
	2021 11 18	<0.30
LC_PIZDC1308	2021 03 10	1.84
	2021 05 19	5.41
	2021 09 17	5.64
	2021 11 18	3.39

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZDC0901	2021 03 18	7.4
	2021 06 27	11.8
	2021 08 19	12.2
	2021 11 12	12.1

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZDC1306	2021 03 18	5.86
	2021 06 11	6.75
	2021 09 17	6.46
	2021 11 17	6.28

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZDC1404D	2021 03 17	<6.0
	2021 06 24	<0.30
	2021 08 26	<0.30
	2021 11 10	<0.30
LC_PIZDC1404S	2021 03 17	5.37
	2021 06 24	4.75
	2021 08 26	4.74
	2021 11 10	4.79

SW Location	Sulphate mg/L
LC_DC3	72.5 - 273

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZ1206A	2021 01 28	1,020
	2021 04 15	1,070
	2021 08 25	857
	Duplicate	859
	2021 11 22	827
	Duplicate	825
LC_PIZ1206C	2021 01 29	368
	2021 04 16	417
	2021 08 25	456
	2021 11 23	468

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_MW20_01	2021 01 28	248
	2021 04 16	315
	2021 08 26	250
	2021 11 23	275

SW Location	Sulphate mg/L
LC_LCUSWLC	107 - 388

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_MW20_02A	2021 01 28	210
	2021 04 17	241
	2021 08 24	258
	2021 11 24	259
LC_MW20_02B	2021 01 28	219
	2021 04 17	257
	2021 08 24	226
	2021 11 24	216

SW Location	Sulphate mg/L
LC_LC2	17.0 - 82.9

SW Location	Sulphate mg/L
LC_WLC	369 - 1,260

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_MW20_03	2021 02 08	18.4
	Duplicate	17.7
	2021 04 17	17.0
	2021 08 26	18.2
	2021 11 24	18.1

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZ1212	2021 01 29	463
	2021 04 16	442
	2021 08 24	372
	2021 11 23	455

SW Location	Sulphate mg/L
LC_LC3	128 - 532

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZ1211N	2021 02 08	480
	2021 04 16	396
	2021 08 24	498
	2021 11 23	427

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
WL_MW-15-02-A	2021 06 22	16
	2021 11 04	12.5
WL_MW-15-02-B	2021 06 23	41.3
	2021 11 02	64.5

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
WL_MW-15-04-B	2021 06 23	34.2
	2021 11 04	9.2

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZP1101	2021 03 22	3.26
	Duplicate	3.23
	2021 06 10	2.66
	Duplicate	2.63
	2021 09 21	3.91
	Duplicate	3.87
	2021 11 23	3.31
	Duplicate	3.27

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZP1103	2021 02 17	26.4
	2021 05 13	26.4
	2021 08 20	28.1
	2021 10 22	28.7

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_MW_CP1A	2021 09 01	125
	Duplicate	124
	2021 11 24	119
LC_MW_CP1B	2021 09 01	103
	2021 11 24	114

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
RG_MW_LC4A	2021 08 19	147
	2021 11 26	147
RG_MW_LC4B	2021 08 19	166
	2021 11 26	196

SW Location	Sulphate mg/L
LC_LC4	68.1 - 300

SW Location	Sulphate mg/L
LC_LCDSSLCC	79.4 - 353

SW Location	Sulphate mg/L
LC_BR7	68.5 - 249

SW Location	Sulphate mg/L
LC_LC5	97.5 - 260

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZP1104	2021 03 25	81.4
	2021 05 31	60.6
	2021 09 16	63.6
	2021 11 22	80.8

Seep Location	Sulphate mg/L
LC_SEEP10	174

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_MW_SRD1A	2021 09 03	134
	2021 12 01	189
LC_MW_SRD1B	2021 08 19	143
	Duplicate	142
	2021 12 01	195

Seep Location	Sulphate mg/L
LC_SEEP11	184

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZP1105	2021 03 24	106
	Duplicate	101
	2021 06 11	120
	Duplicate	107
	2021 09 16	105
	Duplicate	105
	2021 11 22	106
	Duplicate	105

SW Location	Sulphate mg/L
EV_ER4	37.1 - 142

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_MW_ERX1A	2021 11 24	55.1
LC_MW_ERX1B	2021 11 24	113

SW Location	Sulphate mg/L
LC_ERX	106 - 180

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_MW_ER4A	2021 03 25	83.9
	2021 06 23	84.1
	2021 08 29	-
	2021 11 19	109
LC_MW_ER4B	2021 03 25	93
	2021 06 23	54.8
	2021 08 29	-
	2021 11 19	82.3

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
LC_MW_SRD2A	2021 11 24	3.02
LC_MW_SRD2B	2021 11 24	157
	Duplicate	156

Legend

Groundwater Stations[4]
- Monitoring

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Monitoring
- Seep

Site Features
- Highway
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- End-Pit Lake
- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Primary Screening Criteria	Sulphate mg/L
CSR Aquatic Life	1,280 - 4,290
CSR Irrigation Watering	n/a
CSR Livestock Watering	1000
CSR Drinking Water	500

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. Locations of overlapping wells have been adjusted for clarity.

References:
1. Data provided by Teck Coal Limited.

0 250 500 1,000 1,500 2,000 2,500 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

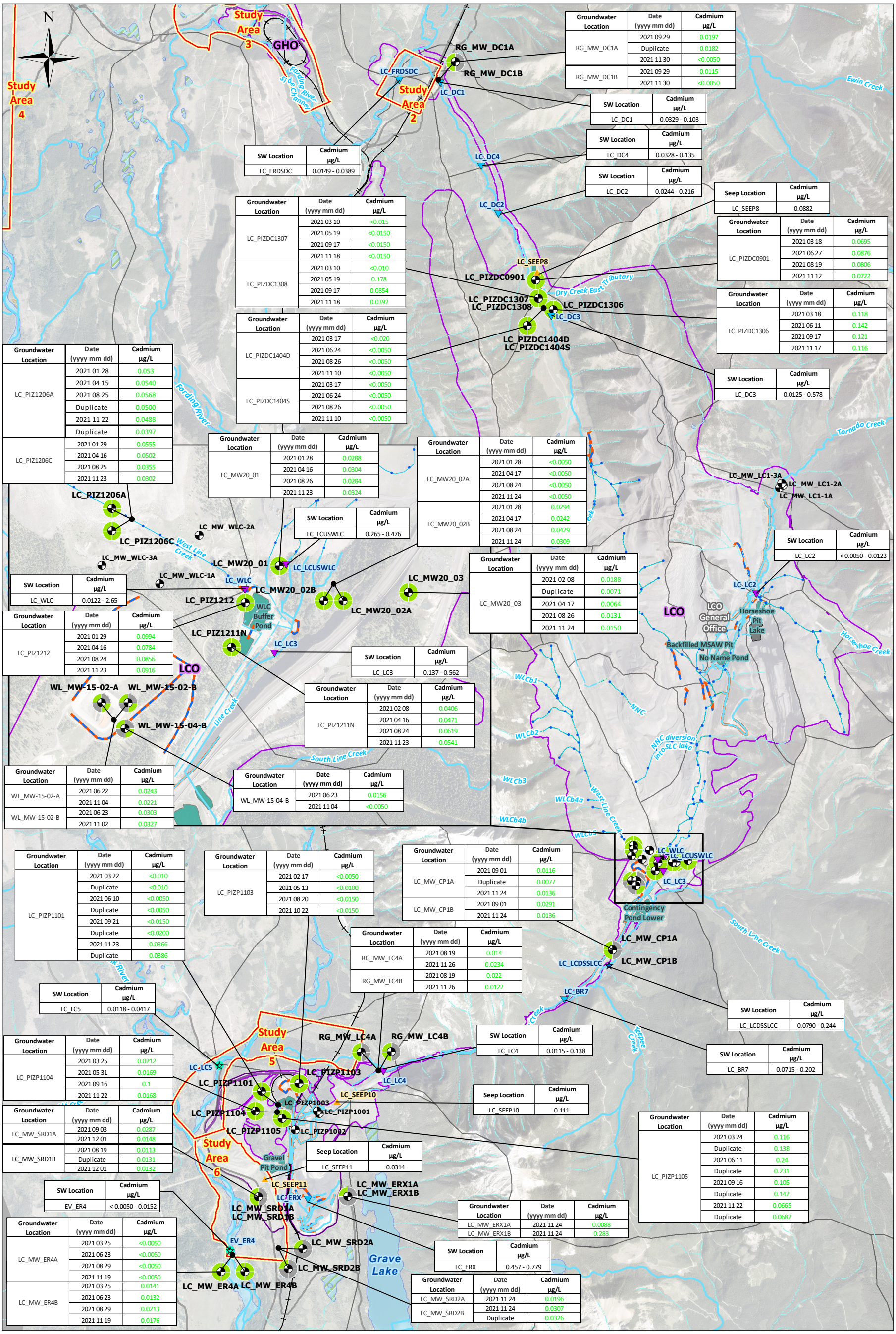
SNC·LAVALIN

Line Creek Operations - Spatial Distribution of Sulphate in Groundwater

CHK'D: RS | BY: CW | DATE: 2022-03-21 | SCALE: 1:60,000 | COORD SYS: NAD 1983 UTM Zone 11N | Ref Num: DRAWING LC-12

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GISMap Series\635544_2021 RGMP SSGMP Annual Report\635544-67-SpatialDist_SO4_LCO.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
RG_MW_DC1A	2021 09 29	0.0197
	Duplicate	0.0182
	2021 11 30	<0.0050
RG_MW_DC1B	2021 09 29	0.0115
	2021 11 30	<0.0050

SW Location	Cadmium µg/L
LC_DC1	0.0329 - 0.103

SW Location	Cadmium µg/L
LC_DC4	0.0328 - 0.135

SW Location	Cadmium µg/L
LC_DC2	0.0244 - 0.216

SW Location	Cadmium µg/L
LC_FRDSDC	0.0149 - 0.0389

Seep Location	Cadmium µg/L
LC_SEEP8	0.0882

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZDC1307	2021 03 10	<0.015
	2021 05 19	<0.0150
	2021 09 17	<0.0150
	2021 11 18	<0.0150
LC_PIZDC1308	2021 03 10	<0.010
	2021 05 19	0.178
	2021 09 17	0.0854
	2021 11 18	0.0392

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZDC0901	2021 03 18	0.0695
	2021 06 27	0.0876
	2021 08 19	0.0806
	2021 11 12	0.0722

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZDC1306	2021 03 18	0.118
	2021 06 11	0.142
	2021 09 17	0.121
	2021 11 17	0.116

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZDC1404D	2021 03 17	<0.020
	2021 06 24	<0.0050
	2021 08 26	<0.0050
	2021 11 10	<0.0050
LC_PIZDC1404S	2021 03 17	<0.0050
	2021 06 24	<0.0050
	2021 08 26	<0.0050
	2021 11 10	<0.0050

SW Location	Cadmium µg/L
LC_DC3	0.0125 - 0.578

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZ1206A	2021 01 28	0.053
	2021 04 15	0.0540
	2021 08 25	0.0568
	Duplicate	0.0500
	2021 11 22	0.0488
	Duplicate	0.0397
LC_PIZ1206C	2021 01 29	0.0555
	2021 04 16	0.0502
	2021 08 25	0.0355
	2021 11 23	0.0302

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_MW20_01	2021 01 28	0.0288
	2021 04 16	0.0304
	2021 08 26	0.0284
	2021 11 23	0.0324

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_MW20_02A	2021 01 28	<0.0050
	2021 04 17	<0.0050
	2021 08 24	<0.0050
	2021 11 24	<0.0050
LC_MW20_02B	2021 01 28	0.0294
	2021 04 17	0.0242
	2021 08 24	0.0429
	2021 11 24	0.0309

SW Location	Cadmium µg/L
LC_LCUSWLC	0.265 - 0.476

SW Location	Cadmium µg/L
LC_LC2	< 0.0050 - 0.0123

SW Location	Cadmium µg/L
LC_WLC	0.0122 - 2.65

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_MW20_03	2021 02 08	0.0188
	Duplicate	0.0071
	2021 04 17	0.0064
	2021 08 26	0.0131
	2021 11 24	0.0150

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZ1212	2021 01 29	0.0994
	2021 04 16	0.0784
	2021 08 24	0.0856
	2021 11 23	0.0916

SW Location	Cadmium µg/L
LC_LC3	0.137 - 0.562

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZ1211N	2021 02 08	0.0406
	2021 04 16	0.0471
	2021 08 24	0.0619
	2021 11 23	0.0541

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
WL_MW-15-02-A	2021 06 22	0.0243
	2021 11 04	0.0221
WL_MW-15-02-B	2021 06 23	0.0303
	2021 11 02	0.0327

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
WL_MW-15-04-B	2021 06 23	0.0156
	2021 11 04	<0.0050

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZP1101	2021 03 22	<0.010
	Duplicate	<0.010
	2021 06 10	<0.0050
	Duplicate	<0.0050
	2021 09 21	<0.0150
	Duplicate	<0.0200
	2021 11 23	0.0366
	Duplicate	0.0386

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZP1103	2021 02 17	<0.0050
	2021 05 13	<0.0100
	2021 08 20	<0.0150
	2021 10 22	<0.0150

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_MW_CP1A	2021 09 01	0.0116
	Duplicate	0.0077
	2021 11 24	0.0136
LC_MW_CP1B	2021 09 01	0.0291
	2021 11 24	0.0136

SW Location	Cadmium µg/L
LC_LC5	0.0118 - 0.0417

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
RG_MW_LC4A	2021 08 19	0.014
	2021 11 26	0.0234
RG_MW_LC4B	2021 08 19	0.022
	2021 11 26	0.0122

SW Location	Cadmium µg/L
LC_LC4	0.0115 - 0.138

SW Location	Cadmium µg/L
LC_LCDSSLCC	0.0790 - 0.244

SW Location	Cadmium µg/L
LC_BR7	0.0715 - 0.202

Seep Location	Cadmium µg/L
LC_SEEP10	0.111

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZP1104	2021 03 25	0.0212
	2021 05 31	0.0169
	2021 09 16	0.1
	2021 11 22	0.0168

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_PIZP1105	2021 03 24	0.116
	Duplicate	0.138
	2021 06 11	0.24
	Duplicate	0.231
	2021 09 16	0.105
	Duplicate	0.142
	2021 11 22	0.0665
	Duplicate	0.0682

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_MW_SRD1A	2021 09 03	0.0287
	2021 12 01	0.0148
LC_MW_SRD1B	2021 08 19	0.0113
	Duplicate	0.0131
	2021 12 01	0.0132

Seep Location	Cadmium µg/L
LC_SEEP11	0.0314

SW Location	Cadmium µg/L
EV_ER4	< 0.0050 - 0.0152

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_MW_ERX1A	2021 11 24	0.0088
LC_MW_ERX1B	2021 11 24	0.283

SW Location	Cadmium µg/L
LC_ERX	0.457 - 0.779

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_MW_ER4A	2021 03 25	<0.0050
	2021 06 23	<0.0050
	2021 08 29	<0.0050
	2021 11 19	<0.0050
LC_MW_ER4B	2021 03 25	0.0141
	2021 06 23	0.0132
	2021 08 29	0.0213
	2021 11 19	0.0176

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
LC_MW_SRD2A	2021 11 24	0.0196
LC_MW_SRD2B	2021 11 24	0.0307
	Duplicate	0.0326

Legend

Groundwater Stations[4]
- Monitoring

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Monitoring
- Seep

Site Features
- Highway
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- End-Pit Lake
- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

^ Dissolved phase of the parameter is shown in the spatial plot.

Primary Screening Criteria	Cadmium^ µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Limited.

0 250 500 1,000 1,500 2,000 2,500 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

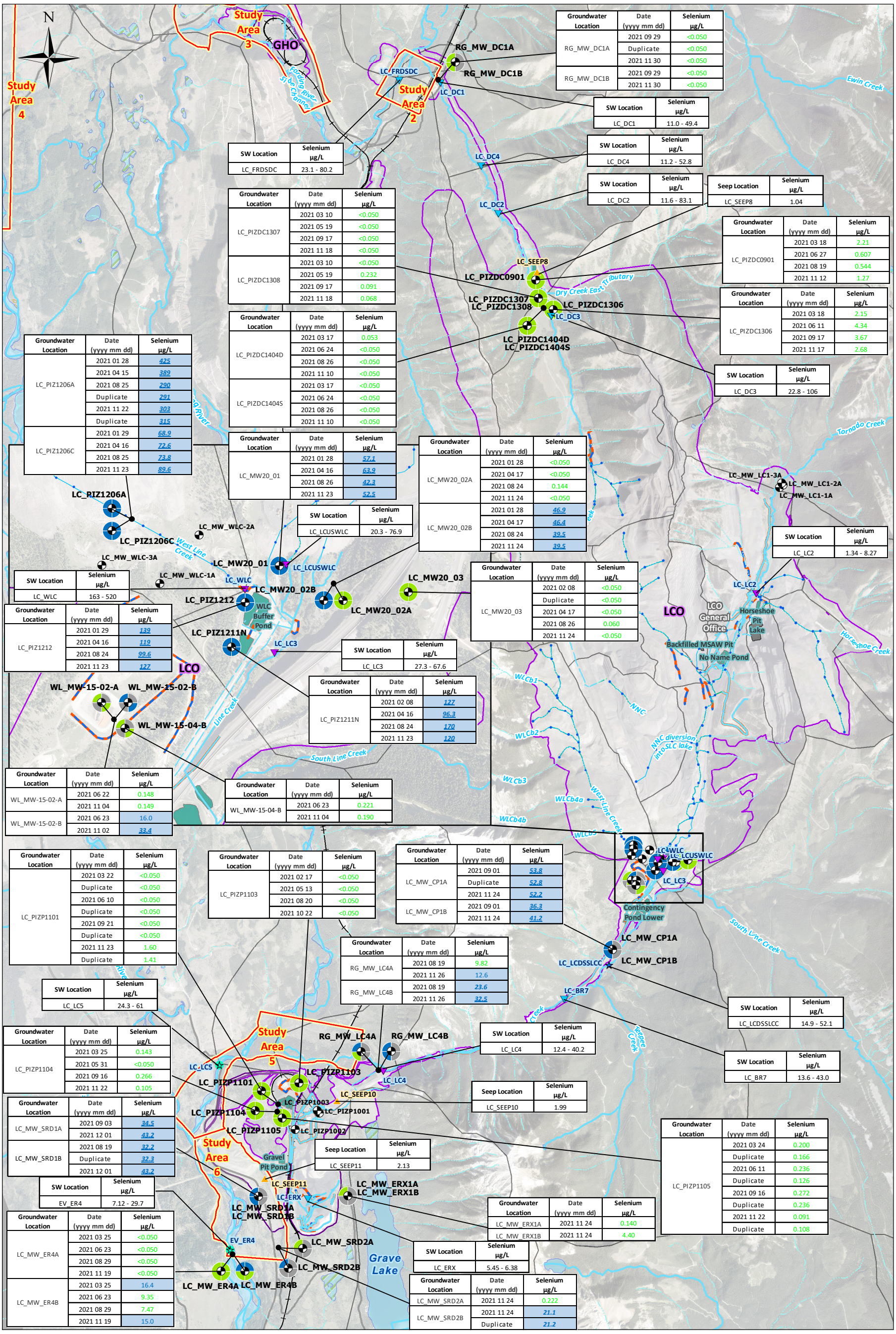
Line Creek Operations - Spatial Distribution of Dissolved Cadmium in Groundwater

CHK'D: RS | DATE: 2022-03-21 | SCALE: 1:60,000
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

Ref Num: DRAWING LC-13

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-68-SpatialDist_Cd_LCO.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
RG_MW_DC1A	2021 09 29	<0.050
	Duplicate	<0.050
	2021 11 30	<0.050
RG_MW_DC1B	2021 09 29	<0.050
	2021 11 30	<0.050

SW Location	Selenium µg/L
LC_DC1	11.0 - 49.4

SW Location	Selenium µg/L
LC_DC4	11.2 - 52.8

SW Location	Selenium µg/L
LC_DC2	11.6 - 83.1

Seep Location	Selenium µg/L
LC_SEEP8	1.04

SW Location	Selenium µg/L
LC_FRDSDC	23.1 - 80.2

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZDC1307	2021 03 10	<0.050
	2021 05 19	<0.050
	2021 09 17	<0.050
	2021 11 18	<0.050
LC_PIZDC1308	2021 03 10	<0.050
	2021 05 19	0.232
	2021 09 17	0.091
	2021 11 18	0.068

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZDC0901	2021 03 18	2.21
	2021 06 27	0.607
	2021 08 19	0.544
	2021 11 12	1.27

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZDC1306	2021 03 18	2.15
	2021 06 11	4.34
	2021 09 17	3.67
	2021 11 17	2.68

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZDC1404D	2021 03 17	0.053
	2021 06 24	<0.050
	2021 08 26	<0.050
	2021 11 10	<0.050
LC_PIZDC1404S	2021 03 17	<0.050
	2021 06 24	<0.050
	2021 08 26	<0.050
	2021 11 10	<0.050

SW Location	Selenium µg/L
LC_DC3	22.8 - 106

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZ1206A	2021 01 28	425
	2021 04 15	389
	2021 08 25	290
	Duplicate	291
	2021 11 22	303
	Duplicate	315
LC_PIZ1206C	2021 01 29	68.9
	2021 04 16	72.6
	2021 08 25	73.8
	2021 11 23	89.6

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_MW20_01	2021 01 28	57.1
	2021 04 16	63.9
	2021 08 26	42.3
	2021 11 23	52.5

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_MW20_02A	2021 01 28	<0.050
	2021 04 17	<0.050
	2021 08 24	0.144
	2021 11 24	<0.050
LC_MW20_02B	2021 01 28	46.9
	2021 04 17	46.4
	2021 08 24	39.5
	2021 11 24	39.5

SW Location	Selenium µg/L
LC_LCUSWLC	20.3 - 76.9

SW Location	Selenium µg/L
LC_LC2	1.34 - 8.27

SW Location	Selenium µg/L
LC_WLC	163 - 520

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_MW20_03	2021 02 08	<0.050
	Duplicate	<0.050
	2021 04 17	<0.050
	2021 08 26	0.060
	2021 11 24	<0.050

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZ1212	2021 01 29	139
	2021 04 16	119
	2021 08 24	99.6
	2021 11 23	127

SW Location	Selenium µg/L
LC_LC3	27.3 - 67.6

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZ1211N	2021 02 08	127
	2021 04 16	96.3
	2021 08 24	170
	2021 11 23	120

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
WL_MW-15-02-A	2021 06 22	0.148
	2021 11 04	0.149
WL_MW-15-02-B	2021 06 23	16.0
	2021 11 02	33.4

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
WL_MW-15-04-B	2021 06 23	0.221
	2021 11 04	0.190

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZP1101	2021 03 22	<0.050
	Duplicate	<0.050
	2021 06 10	<0.050
	Duplicate	<0.050
	2021 09 21	<0.050
	Duplicate	<0.050
	2021 11 23	1.60
	Duplicate	1.41

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZP1103	2021 02 17	<0.050
	2021 05 13	<0.050
	2021 08 20	<0.050
	2021 10 22	<0.050

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_MW_CP1A	2021 09 01	53.8
	Duplicate	52.8
	2021 11 24	52.2
LC_MW_CP1B	2021 09 01	36.3
	2021 11 24	41.2

SW Location	Selenium µg/L
LC_LC5	24.3 - 61

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
RG_MW_LC4A	2021 08 19	9.82
	2021 11 26	12.6
RG_MW_LC4B	2021 08 19	23.6
	2021 11 26	32.5

SW Location	Selenium µg/L
LC_LC4	12.4 - 40.2

SW Location	Selenium µg/L
LC_LCDSSLCC	14.9 - 52.1

SW Location	Selenium µg/L
LC_BR7	13.6 - 43.0

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZP1104	2021 03 25	0.143
	2021 05 31	<0.050
	2021 09 16	0.266
	2021 11 22	0.105

Seep Location	Selenium µg/L
LC_SEEP10	1.99

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_MW_SRD1A	2021 09 03	34.5
	2021 12 01	43.2
LC_MW_SRD1B	2021 08 19	32.2
	Duplicate	32.3
	2021 12 01	43.2

Seep Location	Selenium µg/L
LC_SEEP11	2.13

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_PIZP1105	2021 03 24	0.200
	Duplicate	0.166
	2021 06 11	0.236
	Duplicate	0.126
	2021 09 16	0.272
	Duplicate	0.236
	2021 11 22	0.091
	Duplicate	0.108

SW Location	Selenium µg/L
EV_ER4	7.12 - 29.7

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_MW_ER4A	2021 03 25	<0.050
	2021 06 23	<0.050
	2021 08 29	<0.050
	2021 11 19	<0.050
LC_MW_ER4B	2021 03 25	16.4
	2021 06 23	9.35
	2021 08 29	7.47
	2021 11 19	15.0

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_MW_ERX1A	2021 11 24	0.140
LC_MW_ERX1B	2021 11 24	4.40

SW Location	Selenium µg/L
LC_ERX	5.45 - 6.38

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
LC_MW_SRD2A	2021 11 24	0.222
LC_MW_SRD2B	2021 11 24	21.1
	Duplicate	21.2

Legend

Groundwater Stations[4]
- Monitoring

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Monitoring
- Seep

Site Features
- Highway
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- End-Pit Lake
- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

^ Dissolved phase of the parameter is shown in the spatial plot.

Primary Screening Criteria	Selenium^ µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Limited.

0 250 500 1,000 1,500 2,000 2,500 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Line Creek Operations - Spatial Distribution of Dissolved Selenium in Groundwater

CHK'D: RS | DATE: 2022-03-21 | SCALE: 1:60,000 | Ref Num:
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING LC-14

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-69-SpatialDist_Se_LCO.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

Attachment I: Borehole Logs

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Dry Creek

Borehole No. : RG_BH_DC1A

PAGE 1 OF 3

Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	683032
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 09 09
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: RG_MW_DC1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, some silt, containing cobbles, dark brown, loose, damp (topsoil).					70	
1	At 0.9 m - contains organic material.						
	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, trace silt, containing cobbles (80->150 mm), brown, loose, damp.						
2	At 2.4 m - orange oxidation.						
3	At 3.4 m - moist.					100	
4	At 4.6 m - wet.						
5	At 5.2 m - orange oxidation.						GROUT
6						80	
7	SILTY SAND, fine grained sand, trace gravel, coarse, subrounded, dark grey, dense, moist.						
8							
9	SILTY SAND, fine grained sand, trace gravel, coarse, subrounded, grey-brown, dense, moist.					100	
10	Between 9.4 m and 10.4 m - stratified layers of silt (100 mm) and fine grained sand (10 mm).						

NOTES

QA/QC: SD 2021 09 22 Print Date:2021-09-24

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Dry Creek

Borehole No. : RG_BH_DC1A

PAGE 2 OF 3

Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	683032
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 09 09
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: RG_MW_DC1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SILTY SAND, fine grained sand, trace gravel, coarse, subrounded, grey-brown, dense, moist. *(continued)*						
	At 10.0 m - 5 mm seam of medium grained sand, wet.						
11	At 11.0 m - 10 mm seam of medium grained sand, wet.						
	Between 11.3 m and 11.6 m - some fine to coarse gravel, subrounded.						
12						100	
13							
	GRAVELLY SILT, fine to coarse gravel, subrounded, trace sand, fine to medium grained, dark grey, very dense, damp.						
14							GROUT
15						100	
	CLAYEY SILT, trace sand, fine grained, dark grey, very stiff, medium plasticity, damp.						
16							
	At 16.8 m - 5 mm seam of fine to medium grained sand.						
17							
18	GRAVELLY SILT, fine to coarse gravel, subrounded, some clay, dark grey, dense, moist.					100	
19							SAND
	At 19.2 m - seam of medium to coarse grained sand.						RG_MW_DC1A
20							

NOTES

QA/QC: SD 2021 09 22 Print Date:2021-09-24

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Dry Creek

Borehole No. : RG_BH_DC1A

PAGE 3 OF 3

Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	683032
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 09 09
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

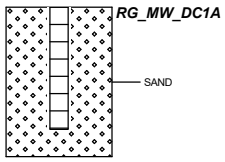
Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: RG_MW_DC1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4	
20	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, some clay, trace silt, dark grey, loose, wet. *(continued)*							
21	GRAVELLY SILT, fine to coarse gravel, subrounded, trace clay, dark grey, very dense, moist. At 21.0 m - 50 mm seam of coarse grained sand. Bottom of hole at 21.3 m.							
22								
23								
24								
25								
26								
27								
28								
29								
30								



NOTES

QA/QC: SD 2021 09 22 Print Date:2021-09-24

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Dry Creek

Borehole No. : RG_BH_DC1B

PAGE 1 OF 1

Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	683032
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 09 10
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: RG_MW_DC1B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, some silt, dark brown, loose, dense, contains organic material.					80	
1	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, trace silt, containing cobbles (80->150 mm), brown, loose, damp.						
2	At 2.1 m - 100 mm seam of silt, dark grey,						
3						100	
4	At 3.4 m - wet.						
5	At 5.2 m - orange oxidation.						
6						100	
7	Between 7.0 m and 7.3 m - some silt.						
	SILTY SAND, fine grained sand, trace gravel, coarse, subrounded, dark grey, dense, wet.						
8	Bottom of hole at 7.5 m.						
9							
10							

Soil Vapour (ppm): 10^1 10^2 10^3 10^4

BENTONITE
RG_MW_DC1B
SAND
BENTONITE

NOTES

QS/QC: SD 2021 09 22 Print Date:2021-09-24

LC_PIZDC0901

WELL LITHOLOGY & CONSTRUCTION FORM

Well Number:
GA-DC1-A

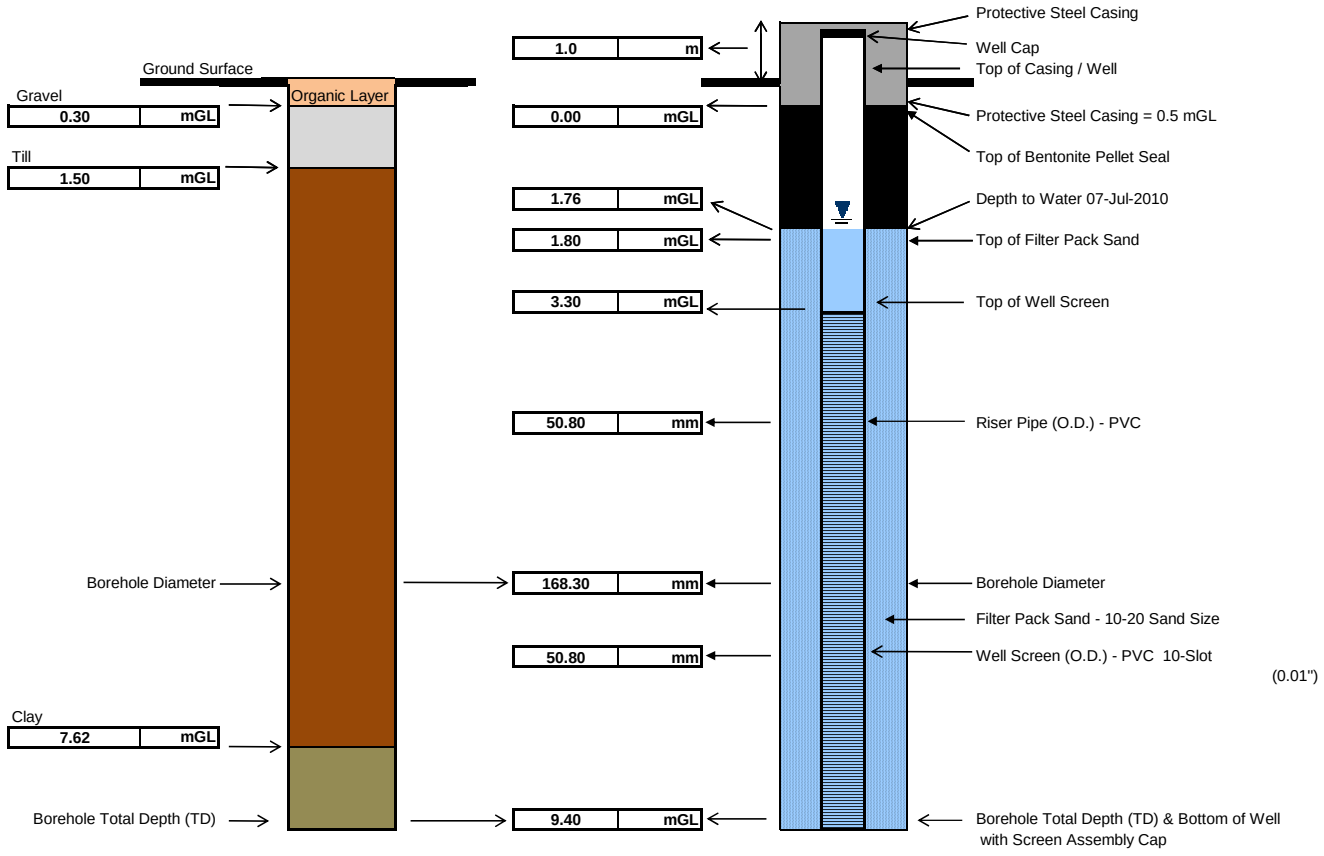
Project Number:	0913490005-1109-1002
Project Name:	Teck Coal Line Creek Operations
Location:	Elk Valley, British Columbia, Canada
Site Area:	Dry Creek

Completion Date:	31-Oct-09
Drill Contractor:	Beck Drilling
Drilling Method:	ODEX
Personnel:	Tim Crowell

Well Summary Table		
Northing	658048	NAD83
Easting	5541500	NAD83
Ground Elevation	1692	masl
Top of Casing Elevation	1693	masl
Water Level Elevation	1690	masl

Input Parameters
Datum Reference:
mGL
Diameter Units:
mm

Borehole Lithology ***Water Monitoring Well***



Note:
mGL = metres below ground level
mm = millimetres
masl = metres above sea level

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC_PIZDC1306

SHEET 1 OF 2

LOCATION: See Location Plan

N: 5541058.793 E: 658278.011

BORING DATE: August 18, 2013

DATUM: UTM Zone 11 (Nad 83)
Elev = 1708.15 masl

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		1708.14							Stickup =0.9 m
0	Sonic Rig - SR152 Boart Longyear Group	SILTY GRAVEL, angular to sub-angular, poorly-graded, some sand, trace clay, low plasticity, w~PL, moist, loose to compact		0.00							Cement **WL= 0.21 meters above ground surface on 21 Aug 2013**
1											
2											
3											
4											
5											Bentonite Plug
6											
				1701.29							
7		Gravelly CLAYEY SILT, some angular to sub-angular, poorly-graded gravel, some sand, low to medium plasticity, dark brown to black, w~PL, moist, compact to dense --- Compact below 7.6 m		6.86							
8											
9											
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RQ

CHECKED:

DATA ENTRY: VI

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS.GPJ CALGARY.GDT 10/11/13

DATA ENTRY: VI

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC_PIZDC1306

SHEET 2 OF 2

LOCATION: See Location Plan

N: 5541058.793 E: 658278.011

BORING DATE: August 18, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic Rig - SR152 Boart LongYear Group	Gravelly CLAYEY SILT, some angular to sub-angular, poorly-graded gravel, some sand, low to medium plasticity, dark brown to black, w~PL, moist, compact to dense *(continued)* --- Boulder (>300 mm in diameter) at 10.4 m		1697.48 10.67							Bentonite Plug
11		Silty SANDY GRAVEL, angular to sub-angular,trace clay, occasional cobbles, dark brown to black, w~PL, moist, dence to very dence									
12											Bentonite Seal
13											
14											10/20 Colorado Silica Sand
15											
16		--- Boulder at 16.8 m		1691.38 16.76							Slotted Screen Section
17		End of MONITORING WELL. Notes: WL= water level. masl = metres above sea level.									
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS.GPJ CALGARY.GDT 10/11/13

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RQ

CHECKED:

DATA ENTRY: VI

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC_PIZDC1307

SHEET 1 OF 4

LOCATION: See Location Plan

N: 5541229.978 E: 658168.873

BORING DATE: August 19, 2013

DATUM: UTM Zone 11 (Nad 83)
Elev = 1690.51 masl

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		1690.50							Stickup= 0.71 m
0	Sonic Rig - SR152 Boart Longyear Group	FILL		0.00							Cement
				1689.74							
1		ORGANIC SOIL, black		0.76							
				1689.13							
2		GRAVEL and SAND, sub-angular to angular (up to 100 mm in diameter), some silt, w<PL, compact to dense		1.37							*WL=2.31 mbgs 24 Aug 2013
3				1687.15							
4		SILTY GRAVEL, sub-rounded to sub-angular (up to 50 mm in diameter), some sand, trace clay, w~PL, wet, compact		3.35							
5											Bentonite Plug
6				1684.41							
		SILTY GRAVEL, angular to sub-angular, some sand, trace clay, local cobbles, w~PL, moist, very dense		6.10							
7											
8				1681.97							
		GRAVELY SILT, sub-rounded to sub-angular, trace sand, trace clay, w~PL, wet, very dense		8.53							
9											
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS.GPJ CALGARY.GDT 10/11/13

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT

CHECKED:

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC_PIZDC1307

SHEET 2 OF 4

LOCATION: See Location Plan

N: 5541229.978 E: 658168.873

BORING DATE: August 19, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic Rig - SR152 Boart Longyear Group	GRAVELY SILT, sub-rounded to sub-angular, trace sand, trace clay, w~PL, wet, very dense *(continued)*									
11											
12		--- w<PL, moist to dry below 12.2 m									
13											
				1676.79							
				13.72							
14		SILTY GRAVEL, sub-rounded to sub-angular, some sand, trace clay, w<PL, moist, dense									
15											Bentonite Plug
16											
17		--- Gravel is sub-angular to angular, w~PL, wet below 16.8 m									
18											
19		--- Gravel is sub-rounded to sub-angular, moist to locally dry, loose below 18.3 m									
				1670.69							
				19.81							
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED:

DATA ENTRY: VI

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS.GPJ CALGARY.GDT 10/11/13

DATA ENTRY: VI

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC_PIZDC1307

SHEET 3 OF 4

LOCATION: See Location Plan

N: 5541229.978 E: 658168.873

BORING DATE: August 19, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Sonic Rig - SR152 Boart LongYear Group	SANDY SILT, some sub-rounded to sub-angular gravel, localized sub-rounded to sub-angular cobbles (up to 150 mm in diameter), brown to dark brown, w~PL, moist, compact to dense, stiff *(continued)*									
21											
22											
23				1667.34							
		SANDY GRAVEL, sub-angular to angular (up to 100 mm in diameter), some silt, light brown to grey, w<PL, dry, very loose		23.16 1667.04 23.47							
24		SANDY SILT, some sub-rounded to sub-angular gravel, localized sub-rounded to sub-angular cobbles (up to 100 mm in diameter), brown to dark brown, w~PL, moist, very dense, stiff									Bentonite Plug
25											
				1664.60							
26		SILT, some sand, some sub-rounded to sub-angular gravel (<30 mm in diameter), brown to dark brown, w~PL, wet, compact to dense, firm		25.91							
27											
28											
29											Bentonite Seal
30											

CONTINUED NEXT PAGE

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED:

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS.GPJ CALGARY.GDT 10/11/13

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC_PIZDC1307

SHEET 4 OF 4

LOCATION: See Location Plan

N: 5541229.978 E: 658168.873

BORING DATE: August 19, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30				1660.33							
		SILTY GRAVEL, sub-rounded to sub-angular (<50 mm in diameter), localized clay, w<PL, dry, very dense, hard --- Localized zones of increased clay, very dry		30.18							Bentonite Seal
31											
32	Sonic Rig - SR152 Boart LongYear Group			1658.50							
		SILT, some sand, some sub-angular to angular gravel, localized boulders, dark brown, w<PL, moist, dense		32.00							10/20 Colorado Silica Sand
33											
34											Slotted Screen Section
35				1655.45							
		End of MONITORING WELL. Notes: WL= water level. masl = metres above sea level. * WL measured while LC_PIZDC1309 was flowing at surface. mbgs= metres below ground surface.		35.05							
36											
37											
38											
39											
40											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED:

DATA ENTRY: VI

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS.GPJ CALGARY.GDT 10/11/13

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC_PIZDC1308

SHEET 1 OF 2

LOCATION: See Location Plan
N: 5541232.317 E: 658167.9

BORING DATE: August 21, 2013

DATUM: UTM Zone 11 (Nad 83)
Elev = 1690.42 masl

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m
		Ground Surface		1690.42			
0	Sonic Rig - SR152 Boart Longyear Group	FILL		0.00 1689.65			
1		ORGANIC SOIL, black		0.76 1688.59			
2		SANDY GRAVEL, sub-angular to angular (up to 100 mm in diameter), some silt, w<PL, dry, very loose		1.83 1688.28			
		SILTY GRAVEL, sub-rounded to sub-angular (up to 50 mm in diameter), some sand, trace clay, w~PL, wet, loose		2.13 1685.84			
4		SILTY GRAVEL, angular to sub-angular, some sand, trace clay, local cobbles, w~PL, moist to wet, compact		4.57			
5		--- Localized dry loose gravel zone (looks like pad fill material, fresh, dry, powdery, likely sloughed into hole) from 5.5 to 5.8 m					
6		--- Localized dry loose gravel zone (looks like pad fill material, fresh, dry, powdery, likely sloughed into hole) from 6.6 to 6.7 m					
7		GRAVELY SILT, sub-rounded to sub-angular, trace sand, trace clay, w~PL, wet, dense to very dense		1682.80 7.62			
8		--- Decrease in gravel and clay content below 8.5 m					
9							
10		*CONTINUED NEXT PAGE*					

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa — nat V. + Q - ● rem V. ⊕ U - ○: 10 20 30 40

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-6} 10^{-5} 10^{-4} 10^{-3}

WATER CONTENT PERCENT: Wp — W — Wl: 10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

Stickup= 0.95 m

Cement

***WL=0.50 mbgs 24 Aug 2013**

Bentonite Plug

Bentonite Seal

10/20 Colorado Silica Sand

Slotted Screen Section

Bentonite Seal

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT

CHECKED:

DATA ENTRY: VI

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS.GPJ CALGARY.GDT 10/11/13

DATA ENTRY: IPG

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC-PIZDC1402

SHEET 1 OF 2

LOCATION: See Location Plan, West side of Dry Creek

BORING DATE: April 25, 2014

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ○W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									Stickup = 1.14 m
0	DR-24 – Air Rotary 150 mm Casing Sierra Drilling & Blasting Ltd.	TOPSOIL – (OL) Gravelly ORGANIC SILT, angular, some sand, roots and rootlets, black, moist, loose		0.00							
		(ML) SANDY SILT, light brown, moist, compact		0.30							Bentonite Grout
1		TILL – (MH) Sandy gravelly CLAYEY SILT, sub-rounded, contains cobbles, dark brown, cohesive, w<PL, very soft to soft		0.91							
2											
3											
4		--- Becoming grey, firm at 4.0 m									Bentonite Pellet Plug
5											
6		TILL – (MH) Sandy gravelly CLAYEY SILT, sub-rounded, contains cobbles, grey-brown, cohesive, w<PL, soft to firm		5.64							
7											
8											Colorado Silica Sand
9											
10		*CONTINUED NEXT PAGE*									Slotted Section

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS_APPENDIX.GPJ CALGARY.GDT 10/30/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: DE

CHECKED: JT

DATA ENTRY: IPG

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC-PIZDC1402

SHEET 2 OF 2

LOCATION: See Location Plan, West side of Dry Creek

BORING DATE: April 25, 2014

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	DR-24 – Air Rotary 150 mm Casing Sierra Drilling & Blasting Ltd.	TILL – (MH) Sandy gravelly CLAYEY SILT, sub-rounded, contains cobbles, grey-brown, cohesive, w<PL, soft to firm *(continued)* --- Becoming firm to stiff at 10.2 m									
11											Slotted Section
12		(GP-GM) GRAVEL, sub-angular, trace sub-rounded, fine-grained, some silt to silty, dark grey, wet, compact		11.89							Colorado Silica Sand
13		End of MONITORING WELL. NOTES: Standpipe installed to 12.6 m.		12.75							
14											
15											
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS_APPENDIX.GPJ CALGARY.GDT 10/30/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: DE

CHECKED: JT

DATA ENTRY: IPG

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC-PIZDC1401

SHEET 1 OF 4

LOCATION: See Location Plan, West side of Dry Creek

BORING DATE: April 26, 2014

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									Stickup = 1.57 m
0	DR-24 – Air Rotary 219 mm Casing from 0.0 m to 9.8 m; 305 mm Casing from 9.8 m to 10.1 m Sierra Drilling & Blasting Ltd.	TOPSOIL – (OL) Gravelly ORGANIC SILT, angular, some sand, roots and rootlets, black, moist, loose		0.00							
		(ML) SANDY SILT, light brown, moist, compact		0.30							
1		TILL – (ML) Sandy gravelly CLAYEY SILT, sub-rounded, contains cobbles, dark brown, cohesive, w<PL, very soft to soft		0.91							
2											
3											
4		--- Becoming grey, firm at 4.0 m									
5											Bentonite Grout
		--- Water in cutting starting at 5.5 m									
6		(GP) GRAVEL, fine to coarse-grained, dark grey, wet, dense		6.10							
		TILL – (ML) Sandy gravelly CLAYEY SILT, sub-rounded, contains cobbles, grey-brown, w>PL, soft		6.71							
7		--- w<PL, very stiff from 7.3 to 8.8 m									
8											
9		--- w>PL, soft at 8.8 m									
10											

CONTINUED NEXT PAGE

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS_APPENDIX.GPJ CALGARY.GDT 10/30/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: DE

CHECKED: JT

DATA ENTRY: IPG

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC-PIZDC1401

SHEET 2 OF 4

LOCATION: See Location Plan, West side of Dry Creek

BORING DATE: April 26, 2014

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ○W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	DR-24 – Air Rotary Sierra Drilling & Blasting Ltd.	TILL – (ML) Sandy gravelly CLAYEY SILT, sub-rounded, contains cobbles, grey-brown, w>PL, soft *(continued)*									
11											
12											
13		(GM) Sandy SILTY GRAVEL, angular, grey, moist, dense		12.80							
14											
15											Bentonite Grout
16		TILL – (ML) Sandy gravelly CLAYEY SILT, sub-rounded, contains cobbles, grey-brown, w<PL, soft		15.24							
17		--- Boulder at 17.7 m									
18											
19											
20		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS_APPENDIX.GPJ CALGARY.GDT 10/30/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: DE

CHECKED: JT

DATA ENTRY: IPG

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC-PIZDC1401

SHEET 3 OF 4

LOCATION: See Location Plan, West side of Dry Creek

BORING DATE: April 26, 2014

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	DR-24 – Air Rotary Sierra Drilling & Blasting Ltd.	TILL – (ML) Sandy gravelly CLAYEY SILT, sub-rounded, contains cobbles, grey-brown, w<PL, soft *(continued)*									
21											
22											
23											Bentonite Grout
24		--- Cobble / boulder content increasing (possible silty gravel layers) at 24.1 m									
25											
26		--- Cobbles decreasing at 25.9 m									
27											
28											Bentonite Pellet Plug
29											
30		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS_APPENDIX.GPJ CALGARY.GDT 10/30/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: DE

CHECKED: JT

DATA ENTRY: IPG

PROJECT No.: 13-1345-0010

RECORD OF MONITORING WELL: LC-PIZDC1401

SHEET 4 OF 4

LOCATION: See Location Plan, West side of Dry Creek

BORING DATE: April 26, 2014

DATUM: Local

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30		TILL – (ML) Sandy gravelly CLAYEY SILT, sub-rounded, contains cobbles, grey-brown, w<PL, soft *(continued)*									Bentonite Pellet Plug
31											Colorado Silica Sand
32	DR-24 – Air Rotary Sierra Drilling & Blasting Ltd.										
33		(GP) SANDY GRAVEL, fine to medium-grained, sub-angular with trace sub-rounded, some silt, dark grey, wet, dense		32.31							
34											Slotted Section
35											Colorado Silica Sand
36		End of MONITORING WELL. NOTES: Standpipe installed to 35.3 m.		35.36							
37											
38											
39											
40											

BOREHOLE - EXPANDED ADD. LAB TESTING 13.1345.0010_BH LOGS_APPENDIX.GPJ CALGARY.GDT 10/30/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: DE

CHECKED: JT

Borehole No: **LC_MW_LC1-1A**

Teck Coal Limited

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: Upper Line Creek	Ground Elev: 1642.52 m
Elk Valley, British Columbia	UTM: 661955.34 E; 5538175.93 N; Z 11

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	Elevation (m)
0		GRAVEL (FILL) - sandy, fine grained gravel - (Gravel - 66%; Sand - 24%; Silt & Clay - 10%) - damp		GW		6.1		1642
3		GRAVEL - sandy, some silt, subangular gravel, wet, brown				9.4		1640
5	Solid stem auger (102 mm)	- rounded cobbles to 125 mm diameter - (Gravel - 60%; Sand - 26%; Silt & Clay - 14%) Dec5/21				9.7		1638
6		- fine grained angular to subangular gravel, cobbles to 125 mm diameter		GW		8.3		1636
9		- cobbly, trace sand				8.5		1634
11		SAND - gravelly, trace silt, subangular to subrounded gravel, well graded, wet to very wet, compact, dark brown		SW		9.3		1631
12		GRAVEL - sandy, trace silt, subangular to subrounded gravel, fine grained sand, well graded, very wet, compact, dark brown		GW				1630
13		- at 13.59 m, intermixed with CLAY - some sand, moist, firm, medium plastic, dark brown						1629
14		CLAY - some silt, some gravel, wet, brown - damp, firm		CI				1628
15		END OF BOREHOLE (15.24 metres) water - 5.49 metres below ground on December 5, 2021 Monitoring well installed to 13.98 metres Monitoring well diameter: 55 mm Screened Interval: 10.93 - 13.98 metres below ground 020 Slot Size 10/20 Filter Sand Top of sand: 9.75 metres below ground Top of PVC: 1643.620 masl						1627
20								1623

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 15.24 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 December 3
Logged By: Carl Forkheim	Completion Date: 2021 December 4
Reviewed By: Stephan Klump	Page 1 of 1

Teck Coal Limited

Borehole No: LC_MW_LC1-2A

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: Upper Line Creek	Ground Elev: 1645.1 m
Elk Valley, British Columbia	UTM: 662008.42 E; 5538214.14 N; Z 11

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	SPT (N)	Moisture Content (%)	Soluble Sulphates (%) 1 2 3 4 / Plastic Limit Moisture Content Liquid Limit 20 40 60 80	SPT (N) 20 40 60 80	Elevation (m)
0		GRAVEL (FILL) - sandy, dry - white		GW			6.1			1645
1										1644
2		CLAY - silty, some sand, some gravel, subangular gravel to 20 mm diameter, moist to wet, firm, medium plastic, dark brown		CI			18.8			1643
3		GRAVEL - sandy, some silt, subangular gravel, brown - wet		GW			7.1			1642
4										1641
5		CLAY - some silt, trace gravel, wet, light brown - at 5.03 m, GRAVEL - sandy, trace silt, trace clay, subrounded to subangular gravel to 50 mm diameter, well graded, very wet, brown - subangular gravel		CH			75.2 8.2		237	1640
6						48	4.3			1639
7	Solid stem auger (102 mm)									1638
8		GRAVEL - very fine grained sand, coarse grained angular to subangular gravel, wet		GW						1637
9										1636
10		CLAY - silty, gravelly, some sand, subangular to subrounded gravel to 50 mm diameter, moist to wet, firm to stiff, medium plastic, dark brown to black		CI			16.7			1635
11		SAND - silty, trace clay, trace gravel, fine grained sand, wet, dark brown		SM						1634
12		GRAVEL - some fine grained sand, angular to subangular gravel, wet, brown		GW			22.6			1633
13		SAND - silty, fine grained sand, wet, brown		SM						1632
14		GRAVEL, COBBLES AND SAND - fine grained sand, angular to subangular gravel, wet, dark brown		GW						1631
15										1630
16		CLAY - some angular gravel, damp, light brown - at 15.70 m, GRAVEL - sandy, trace clay, trace silt, subrounded to subangular gravel to 50 mm diameter, well graded, very wet, brown - sandy, fine grained sand, wet, dark brown		CI						1629
17										1628
18		- at 16.92 m, SAND - silty, trace gravel, trace clay, very wet, compact, dark brown								1627
19		END OF BOREHOLE (18.29 metres) water - 6.73 metres below ground on December 5, 2021 Monitoring well installed to 14.67 metres Monitoring well diameter: 55 mm Screened Interval: 11.62 - 14.67 metres below ground								1626
20										

Dec5/21

Dec5/21

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 18.29 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 December 3
Logged By: Megan Savage	Completion Date: 2021 December 3
Reviewed By: Stephan Klump	Page 1 of 2

Teck Coal Limited

Borehole No: **LC_MW_LC1-2A**

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: Upper Line Creek	Ground Elev: 1645.1 m
Elk Valley, British Columbia	UTM: 662008.42 E; 5538214.14 N; Z 11

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	SPT (N)	Moisture Content (%)	Soluble Sulphates (%) 1 2 3 4 / Plastic Limit Moisture Content Liquid Limit 20 40 60 80	SPT (N) 20 40 60 80	LC_MW_LC1-2A	Elevation (m)
20		020 Slot Size 10/20 Filter Sand Top of sand: 10.67 metres below ground Top of PVC: 1646.135 masl									1625
21											1624
22											1623
23											1622
24											1621
25											1620
26											1619
27											1618
28											1617
29											1616
30											1615
31											1614
32											1613
33											1612
34											1611
35											1610
36											1609
37											1608
38											1607
39											1606
40											

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 18.29 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 December 3
Logged By: Megan Savage	Completion Date: 2021 December 3
Reviewed By: Stephan Klump	Page 2 of 2

Borehole No: **LC_MW_LC1-3A**

Teck Coal Limited

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: Upper Line Creek	Ground Elev: 1647.03 m
Elk Valley, British Columbia	UTM: 661989.64 E; 5538247.11 N; Z 11

Depth (m)	Method	Soil Description	USC	Sample Type	Moisture Content (%)	Elevation (m)
0		GRAVEL (FILL) - sandy, damp	GP		13.1	1647
1		- dry				1646
2		CLAY - silty, wet, brown	CL		6.8	1645
		GRAVEL - sandy, some silt and clay, subangular gravel, wet, brown				
3		- (Gravel - 77%; Sand - 15.1%; Silt & Clay - 7.9%)	GW		8.8	1644
4					5.9	1643
5		COBBLES AND GRAVEL - fine to coarse grained sand, cobbles to 200 mm diameter, wet	GW		1.1	1642
6					4.2	1641
		GRAVEL - some sand, some silt, some clay, coarse grained angular to subangular gravel, fine grained sand, well graded, wet				
7						1640
8	Sonic (102 mm)	- (Gravel - 51%; Sand - 35.8%; Silt & Clay - 13.2%) Dec5/21			7.4	1639 Dec5/21
9						1638
10			GW			1637
11					6.5	1636
12						1635
13		- cobbles to 125 mm diameter				1634
14		SAND - silty, trace clay, fine grained subangular sand, poorly graded, wet, black	SM			1633
15						1632
16		SILT - clayey, wet, black	ML			1631
17		CLAY - silty, sandy, some gravel to gravelly, gravel to 20 mm diameter, damp to moist, stiff, low plastic, dark grey to black - some fine grained gravel, coarse grained sand, dry, hard - dry gravel layer	CL			1630
18		GRAVEL - clayey, silty, angular to rounded gravel, well graded, wet, brown	GC			1629
19						1628
20						

Plastic Limit / Moisture Content / Liquid Limit: 20 40 60 80

LC_MW_LC1-3A

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 24.38 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 December 1
Logged By: Carl Forkheim	Completion Date: 2021 December 1
Reviewed By: Stephan Klump	Page 1 of 2

Borehole No: **LC_MW_LC1-3A**

Teck Coal Limited

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: Upper Line Creek	Ground Elev: 1647.03 m
Elk Valley, British Columbia	UTM: 661989.64 E; 5538247.11 N; Z 11

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	LC_MW_LC1-3A	Elevation (m)
20									1627
				GC					
21	Sonic (102 mm)	CLAY - silty, sandy, trace to some gravel, gravel to 20 mm diameter, damp to wet, soft to hard, low plastic, black		CL					1626
		- dry, very hard							
22		- at 21.80 m, damp to moist, medium plastic, silt pockets, potential precipitates							1625
23		- at 22.71 m, gravel to 50 mm diameter		CI					1624
24									1623
		END OF BOREHOLE (24.38 metres) water - 7.77 metres below ground on December 5, 2021 Monitoring well installed to 13.56 metres Monitoring well diameter: 55 mm Screened Interval: 10.51 - 13.56 metres below ground 020 Slot Size 10/20 Filter Sand Top of sand: 9.45 metres below ground Top of PVC: 1647.768 masl							
25									1622
26									1621
27									1620
28									1619
29									1618
30									1617
31									1616
32									1615
33									1614
34									1613
35									1612
36									1611
37									1610
38									1609
39									1608
40									

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 24.38 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 December 1
Logged By: Carl Forkheim	Completion Date: 2021 December 1
Reviewed By: Stephan Klump	Page 2 of 2

Borehole No: **LC_MW_WLC-1A**

Teck Coal Limited

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: West Line Creek	Ground Elev: 1503.18 m
Elk Valley, British Columbia	UTM: 659753.09 E; 5532228.49 N; Z 11

Depth (m)	Method	Soil Description	USC	Sample Type	SPT (N)	Moisture Content (%)	Elevation (m)
0		TOPSOIL - trace gravel, rootlets, damp, black, (300 mm thick)	TP				1503
1		GRAVEL - silty, clayey, subangular to rounded gravel, damp, black	GM GC			18.3	1502
2					35		1501
3		- trace sand, wood chips			33		1500
4		COBBLES AND GRAVEL - some silt, trace fine grained sand, rootlets, angular to subangular fine gravel, damp, dark grey	GW			11.3	1499
5		- dry - (Gravel - 65%; Sand - 24%; Silt & Clay - 11%)				6.5	1498
6		- large boulder - trace clay					1497
7		CLAY - silty, massive, damp, stiff, brown	CI			19.1	1496
8					20		1495
9	Sonic (102 mm)	- 75 mm thick silt layer - decreasing silt content			7	24.6 22.5	1494
10		- wet					1493
11		SAND - trace silt, fine to coarse grained subrounded to rounded sand, poorly graded, damp, brown - 100 mm thick silty clay band	SP			9	1492
12		CLAY - trace silt, wet, soft, medium plastic, black	CI				1491
13		SAND - trace to some silt, fine to coarse grained subrounded to rounded sand, damp, brown	SW				1490
14		- 150 mm thick silt layer - damp, brown					1489
15		- trace gravel to 150 mm - finer grained sand					1488
16		- gradual transition to silt and fine grained sand					1487
17		SAND - some gravel, trace silt, subrounded to subangular gravel to 40 mm diameter, well graded, damp to wet, loose, brown	SW				1486
18		CLAY - silty, some rounded gravel, damp, stiff, low plastic, black	CL				1485
19							1484
20		- gradual transition to gravelly, no visible silt, trace coarse					

Soluble Sulphates (%): 1 2 3 4

Plastic Limit / Moisture Content / Liquid Limit: 20 40 60 80

SPT (N): 20 40 60 80

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 48.77 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 November 27
Logged By: Carl Forkheim	Completion Date: 2021 November 27
Reviewed By: Stephan Klump	Page 1 of 3

Teck Coal Limited

Borehole No: LC_MW_WLC-1A

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: West Line Creek	Ground Elev: 1503.18 m
Elk Valley, British Columbia	UTM: 659753.09 E; 5532228.49 N; Z 11

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	SPT (N)	Moisture Content (%)	Soluble Sulphates (%) 1 2 3 4 / Plastic Limit Moisture Content Liquid Limit 20 40 60 80	SPT (N) 20 40 60 80	LC_MW_WLC-1A	Elevation (m)
20		subangular sand, subangular gravel, hard									1483
21				CL							1482
22		- cobbles 75 to 100 mm diameter - trace silt, fine rounded to angular gravel, dry to damp									1481
23		- silty, some angular gravel, damp, brown GRAVEL - clayey, silty, trace coarse grained sand, fine grained gravel to cobbles, damp, hard, dark grey									1480
24		- cobbles, dry									1479
25		- 200 mm thick silty clay band									1478
26		- wet for 900 mm									1477
27		- 200 mm thick silty clay and gravel layer, compact - pulverized cobble									1476
28		- pulverized cobble									1475
29	Sonic (102 mm)	- pulverized cobble									1474
30											1473
31				GC							1472
32		- some coarse grained sand									1471
33											1470
34		- cobbles for 600 mm									1469
35											1468
36		- some clayey silty gravel									1467
37											1466
38											1465
39		- 460 mm thick silty clay layer									1464
40											

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 48.77 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 November 27
Logged By: Carl Forkheim	Completion Date: 2021 November 27
Reviewed By: Stephan Klump	Page 2 of 3

Borehole No: **LC_MW_WLC-1A**

Teck Coal Limited

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: West Line Creek	Ground Elev: 1503.18 m
Elk Valley, British Columbia	UTM: 659753.09 E; 5532228.49 N; Z 11

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	SPT (N)	Moisture Content (%)	Soluble Sulphates (%) 1 2 3 4 / Plastic Limit Moisture Content Liquid Limit 20 40 60 80	SPT (N) 20 40 60 80	LC_MW_WLC-1A	Elevation (m)
40											
41	Sonic (102 mm)	- 600 mm thick band of cobbles to 150 mm diameter - 600 mm thick silt layer - some clay, trace gravel, damp, hard									1463
42											1462
43		- gradual transition to more clay and silt content									1461
44				GC GM GM							1460
45		- 900 mm thick layer of increasing silt content, subangular to subrounded gravel, moist to wet									1459
46		- cobbles to 150 mm diameter									1458
47		- 600 mm thick clayey layer - moist, high plastic									1457
48		BEDROCK - pulverized, dry - weathered, hard clay		BEDROCK							1456
49		END OF BOREHOLE (48.77 metres) water - dry on December 14, 2021 Monitoring well installed to 47.24 metres Monitoring well diameter: 55 mm Screened Interval: 44.19 - 47.24 metres below ground 020 Slot Size 10/20 Filter Sand Top of sand: 43.28 metres below ground Top of PVC: 1504.107 masl									1455
50											1454
51											1453
52											1452
53											1451
54											1450
55											1449
56											1448
57											1447
58											1446
59											1445
60											1444

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 48.77 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 November 27
Logged By: Carl Forkheim	Completion Date: 2021 November 27
Reviewed By: Stephan Klump	Page 3 of 3

Teck Coal Limited

Borehole No: **LC_MW_WLC-2A**

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: West Line Creek	Ground Elev: 1488.33 m
Elk Valley, British Columbia	UTM: 659868.79 E; 5532370.14 N; Z 11

Method: Sonic (102 mm)

Depth (m)	Soil Description	USC	SPT (N)	Moisture Content (%)
0	TOPSOIL - rootlets, damp, (60 mm thick)	TP		
	SILT - some subangular gravel to 75 mm diameter, trace fine grained sand, trace clay, damp, soft, low plastic, brown - (Gravel - 8%; Sand - 32%; Silt - 45%; Clay - 15%) - increasing clayey gravel content	ML	21	13.4 14.8 18.6
	GRAVEL - clayey, silty, sandy, trace cobbles, angular to rounded gravel, damp - cobbles to 125 mm diameter - at 4.11 m, CLAY - silty, gravelly, some sand, subangular gravel to 40 mm diameter, moist, low to medium plastic, dark brown - (Gravel - 41%; Sand - 35.9%; Silt & Clay - 23.1%) - 300 mm thick gravelly clay layer - trace coarse grained sand, low plastic - dry, increasing hardness	GC GM		12.6 9.9 6.9
	MUDSTONE (BEDROCK) - weathered, trace fine grained sandy layers - dry, hard, black	BEDROCK		6.4 9.7

Water level: Dec14/21 (about 4.8 m)

END OF BOREHOLE (9.14 metres)
water - 4.80 metres below on December 14, 2021
Monitoring well installed to 5.94 metres
Monitoring well diameter: 55 mm
Screened Interval: 4.42 - 5.94 metres below ground
020 Slot Size
10/20 Filter Sand
Top of sand: 3.51 metres below ground
Top of PVC: 1489.474 masl

Plot legend: Plastic Limit – Moisture Content – Liquid Limit (20, 40, 60, 80); ■ SPT (N) ■ (20, 40, 60, 80)

Depth (m): 0–20; Elevation (m): 1488–1469

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 9.14 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 November 30
Logged By: Carl Forkheim	Completion Date: 2021 November 30
Reviewed By: Stephan Klump	Page 1 of 1

Teck Coal Limited

Borehole No: **LC_MW_WLC-3A**

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: West Line Creek	Ground Elev: 1511.42 m
Elk Valley, British Columbia	UTM: 659582.96 E; 5532281.38 N; Z 11

Depth (m)	Method	Soil Description	USC	Sample Type	SPT (N)	Moisture Content (%)	Elevation (m)
0		SAND AND GRAVEL - rootlets, (300 mm thick)	SW				1511
1		GRAVEL - sandy, some silt, boulders, angular to subangular gravel, medium to coarse grained sand, well graded, grey to brown	GW			5.1	1510
		- (Gravel - 66%; Sand - 25%; Silt & Clay - 9%)					
2							1509
3					64	23.2	1508
4							1507
		- some clay					
5			GW		26	18.5	1506
6					51	12.8	1505
		- no visible silt or boulders					
7		- some silt, boulders				7.2	1504
8					12		1503
		- 200 mm thick silt layer - some gravel, damp, brown					
9	Sonic (102 mm)	- (Gravel - 10%; Sand - 26%; Silt & Clay - 64%)				22.7	1502
		- gravelly			29		
10		SAND - trace silt, fine grained sand, damp, brown				28	1501
11							1500
12		- 200 mm thick wet layer	SP				1499
13							1498
14		- 150 mm thick dry layer					1497
		- 150 mm thick wet, gravel, sand and silt layer					
15		CLAY AND SAND - gravelly, coarse grained sand, angular gravel, moist, dense, low to medium plastic, black	CL				1496
		- cobbles to 125 mm diameter	CH				
16		CLAY - trace silt to silty, gravelly, dry to moist, hard, high plastic, dark grey to black					1495
		- wet					
17		GRAVEL - sandy, silty, angular to subangular, damp, brown					1494
18		- pulverized limestone and dolostone, cobbles, free water	GM				1493
19							1492
20							

Plastic Limit 20 | Moisture Content 40 | Liquid Limit 80 (60)

SPT (N) 20 40 60 80

LC_MW_WLC-3A

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 47.85 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 November 23
Logged By: Carl Forkheim	Completion Date: 2021 November 23
Reviewed By: Stephan Klump	Page 1 of 3

Teck Coal Limited

Borehole No: **LC_MW_WLC-3A**

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: West Line Creek	Ground Elev: 1511.42 m
Elk Valley, British Columbia	UTM: 659582.96 E; 5532281.38 N; Z 11

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80)	LC_MW_WLC-3A	Elevation (m)
20											
	Sonic (102 mm)	- silty, clayey, cobbly, no visible sand, angular to subangular gravel, moist, dense									1491
21											1490
22											1489
23											1488
24				GM							1487
25		- 300 mm thick sand layer - trace subangular gravel, coarse grained sand									1486
26		- 900 mm thick clayey, silty layer - trace coarse grained sand, moist									1485
27											1484
28		- 600 mm thick sandy layer, some clay, some silt, trace cobbles									1483
29		No recovery									1482
30											1481
31											1480
32		SAND - trace fine grained angular to subangular gravel, medium grained sand									1479
33		- at 33.07 m, CLAY - silty, some sand, some gravel, subrounded to subangular gravel to 50 mm diameter, moist, firm, medium plastic, brown									1478
34		- at 33.38 m, gravelly, subangular to subrounded gravel to 60 mm diameter									1477
35		- 300 mm thick dry zone		SP							1476
36											1475
37											1474
38		GRAVEL - clayey, some sand and silt, angular gravel, damp									1473
39				GC							1472
40		- 600 mm thick sand layer - coarse grained angular sand,									

Dec14/21

Dec14/21

Contractor: Mud Bay Drilling	Completion Depth: 47.85 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 November 23
Logged By: Carl Forkheim	Completion Date: 2021 November 23
Reviewed By: Stephan Klump	Page 2 of 3

TETRA TECH

Borehole No: **LC_MW_WLC-3A**

Teck Coal Limited

Project: LCO Phase 2 Water Treatment	Project No: ENW.GENV03056-01
Location: West Line Creek	Ground Elev: 1511.42 m
Elk Valley, British Columbia	UTM: 659582.96 E; 5532281.38 N; Z 11

Depth (m)	Method	Soil Description	SOIL SYMBOL	USC	Sample Type	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80)	LC_MW_WLC-3A	Elevation (m)
40											
41	Sonic (102 mm)	moist		GC							1471
42		CLAY - some sand, some gravel, some rounded cobbles, damp to moist, very stiff, low plastic, black		CL							1470
43		GRAVEL - sandy, silty, clayey, angular gravel, damp, brown, iron inclusions		GM							1469
44		- hard									1468
45											1467
46		CLAY - trace gravel, hard, dark grey		CL							1466
47		- weathered bedrock inclusions									1465
48		END OF BOREHOLE (47.85 metres) water - 37.43 metres below ground on December 14, 2021 Monitoring well installed to 45.72 metres Monitoring well diameter: 55 mm Screened Interval: 42.67 - 45.72 metres below ground 020 Slot Size 10/20 Filter Sand Top of sand: 42.06 metres below ground Top of PVC: 1511.415 masl									1464
49											1463
50											1462
51											1461
52											1460
53											1459
54											1458
55											1457
56											1456
57											1455
58											1454
59											1453
60											1452

TETRA TECH

Contractor: Mud Bay Drilling	Completion Depth: 47.85 m
Equipment Type: TerraSonic 150CC Rotosonic Drill Rig	Start Date: 2021 November 23
Logged By: Carl Forkheim	Completion Date: 2021 November 23
Reviewed By: Stephan Klump	Page 3 of 3

LC_PIZ1206A

srk consulting — Teck

HOLE ID:	LCO-WLC-12-06a
LOCATION:	Line Creek
PROJECT NO:	1CT017.020
DRILLING CONTRACTOR:	Boart Longyear
DRILLING TYPE:	Sonic
PROJECT:	Teck Coal Watershed R&D
CLIENT:	Teck Coal Ltd.
LOGGED BY:	MJM
BORING DATE:	4-Jul-12 to 7-Jul-12
COORDINATES:	E 659672 N 5532409
DATUM:	NAD 83 Zone 11
GROUND ELEV (m):	1509.919
AZIMUTH:	0 DIP: 90
EOH ELEV. (m):	1465.723
TOTAL DEPTH (m / ft):	44.2 / 145
INSTALLATION TYPE:	2" Mon. Well

P.1 of 1

General Geology: Natural Ground
Levelogger Installation: None (Dry)
Top of PVC Elev (m): 1510.897
Top of PVC Elev (m): 0.978 / 3.21
Water Level (m / ft bgs):
Water Level Note: Dry based on 2012/09/17-20 measurements

Recent Water Level Measurement

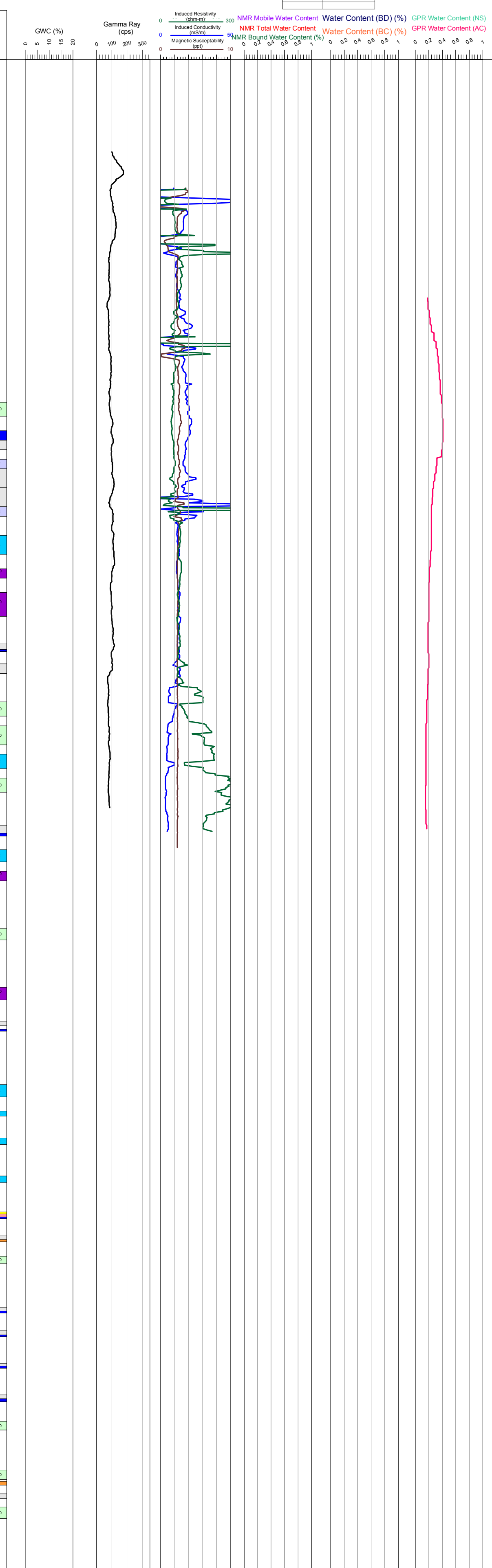
Date	Water Level (ft bgs)

Primary Grain Size: Bedrock, Cobble, Sand, Boulder, Gravel, Silt, Clay, No Recovery

Description	Drilling Notes
	SONIC DRY
Gravel, some sand (GW) - Very dark grayish brown, dry to moist, dense, well-graded, subrounded, non-plastic, massive. Disturbed.	
Sand, few silt, few gravel (SM) - Dark brown, moist to wet, medium dense, well-graded, subrounded, no to low plastic, cohesive, low dilatancy, massive, gradual contact.	Increased sand at 12 feet.
Clay, some silt (CL) - Dark brown, moist, stiff, medium plastic, cohesive, massive, sharp contact.	(Glacial lacustrine from 14.25 to 15 ft)
Sand, some gravel, little silt (SM) - Brown, dry to moist, dense, well-graded, subangular, non-plastic, massive, sharp contact.	Visible pyrite forming in vugs on one gravel piece. Sulfides present. Dolomitic siltstones and sandstones.
Silt, little sand, little clay (ML) - Dark brown, moist to wet, medium, non-plastic, cohesive, low to rapid dilatancy, massive, gradual contact.	Few zones of low plastic throughout.
Sand, few gravel, little silt (SM) - Black, dense, well-graded, subangular, non-plastic, cohesive, massive, gradual contact.	(Glacial till from 33.5 to 35 ft); Medium plastic fines
Sand, some gravel, trace clay (SW-SC) - Black, wet, medium dense, well-graded, subrounded, non-plastic, cohesive, low to rapid dilatancy, massive, gradual contact.	
Gravel, some sand, little silt (GW-GM) - Dark reddish brown, moist, medium dense, well-graded, subrounded, non-plastic, massive, gradual contact.	(Glacial fluvial from 45 to 45.8 ft); Fines cohesive, medium plasticity, gravel subangular to subrounded
Gravel, some sand, trace silt (GW) - Dark reddish brown, moist to wet, medium dense, well-graded, subrounded, non-plastic, massive, gradual contact.	Increasing sand and decreaing moisture.
Sand, few gravel, little silt (SM) - Dark brown, dry, dense, well-graded, subangular, non-plastic, massive, gradual contact.	(Glacial till from 52.5 to 55 ft)
No Recovery. Interpreted as Sand.	Redrilled soils. No reliable definition of transition between units.
Gravel, few sand, little clay (GW-GC) - Dusky red, moist to wet, medium dense, well-graded, subrounded, massive, gradual contact.	Fines are medium plastic and cohesive, gravel is subangular
Sand, some gravel, little silt (SM) - Dark reddish brown to brown, dry, dense, well-graded, subangular, non-plastic, massive, gradual contact.	(Glacial till from 62 to 65 ft)
Gravel, some silt, little fines (GM) - Dark reddish gray, moist to wet, medium dense, well-graded, subrounded, non-plastic, massive, gradual contact.	Carbonates present in some gravel, siltstone or sandstone, sulfide smell disseminated afinitic; Changes to dry to moist, carbonates present in some gravel, siltstone or sandstone, sulfide smells.
Sand, some gravel, little silt (SM) - Dark brown, moist, dense, well-graded, subangular, no to low plastic, massive, gradual contact.	Cohesive matrix, sulfide smell.
Lean clay, some sand, few gravel (CL) - Dark reddish gray, wet, soft, well-graded, subangular, medium plastic, cohesive, massive, gradual contact.	Gravel and Sand are well graded, up to small cobble size. Sulfide smell.
Sand, some gravel/cobble, little silt (SM) - Brown, dry, very dense, well-graded, subangular, non-plastic, cohesive, massive, gradual contact.	Fine grained sandstone / siltstone gravels. Aphanitic sulfides with dolomite / (high fizz calcite?). Hot temperature from dry dense drilling. Very gradual transition to this unit, 93-98ft. Becomes moist, Some gravel do not have sulfide smells (sandstone possibly containing dolomite). Clay lumps, posible decomposing gravels.
Sand, little gravel and cobble, little clay (SC) - Black, moist, very dense, well-graded, angular, low plastic, cohesive, massive, gradual contact.	Fine grained sandstone gravels with carbonate mineralization on outides, fizz on scratched surfaces inside. Gravel distributed throughout, max grain size small cobbles to course gravel. Boiled vegetable smell. Very fine, reflective minerals (posibly pyrite)109 -115 feet. Carbonate minerals. Basal till.
Clay, few sand, little gravel (CL) - Very dark brown, moist to wet, very stiff, well-graded, angular, medium plastic, cohesive, massive, gradual contact.	(Glacial till from 115 to 121 ft); Becomes dry to damp gradually over a few feet.
Sand, some gravel/cobble, little clay (SC) - Black, moist, dense, well-graded, subangular, low plastic, cohesive fines, massive, gradual contact.	Gravel coating carbonate alteration. Few internal gravel carbonate.
Gravel, some sand, little clay (GC) - Black, wet, medium dense, well-graded, subrounded, non-plastic, cohesive fines, massive, gradual contact.	Oxidization / staining on gravel surface; Sulfur smell, some decomposing gravel. Carbonate gravel coatings.; EOH @ 145ft. Practical drill limit reached.

Sample No. and Type: 30006ABCD, 30007C, 30007AB, 30005CDE, 30005AB, 30008AB, 30008CDE, 30009ABC, 30010ABCDE, 30011ABCDE, 30012AB, 30012C, 30013AB, 30014ABCD, 30015ABCD, 30016ABC, 30017ABCD, 30018AB, 30018C, 30019ABC, 30020ABCDE, 30021ABCD, 30022ABCDE, 30023AB, 30023C, 30024ABC, 30025ABC, 30026ABC, 30027ABC, 30028A, 30028B, 30028C, 30029AB, 30029CD, 30030ABCD, 30031AB, 30031C, 30032AB, 30032C, 30033AB, 30033C, 30034AB, 30034C, 30035ABCD, 30036ABCD, 30037CD, 30037AB, 30038ABCD

Depth (m / ft) and Elev (m): 0 m / 0 ft; 10 ft; 5 m / 1505; 20 ft; 30 ft; 10 m / 1500; 40 ft; 15 m / 1495 / 50 ft; 60 ft; 20 m / 1490; 70 ft; 80 ft; 25 m / 1485; 90 ft; 30 m / 1480 / 100 ft; 110 ft; 35 m / 1475; 120 ft; 130 ft; 40 m / 1470; 140 ft; 45 m; 150 ft



Well Legend: Chips, Cuttings, Casing, Gas Port, Water Port, Slough, Sand, PVC, Screen, Sump

Sample Analysis Type
A = Geochemical
B = Isotopes
C = Microbial
D = Cultivation
E = Anaerobic Cultivation

Sample Legend: A, AB, ABC, ABCD, ABCDE, AC, ACD, B, C, CD, CDE

LC_PIZ1206C

srk consulting | Teck

HOLE ID: LCO-WLC-12-06c	COORDINATES: E 659679 N 5532410		
LOCATION: Line Creek	DATUM: NAD 83 Zone 11		
PROJECT NO: 1CT017.020	GROUND ELEV (m): 1509.801		
DRILLING CONTRACTOR: JR Drilling	AZIMUTH: 0 DIP: 90		
DRILLING TYPE: Air Rotary	EOH ELEV. (m): 1433.601		
PROJECT: Teck Coal Watershed R&D	TOTAL DEPTH (m / ft): 76.2 / 250	P.1 of 1	
CLIENT: Teck Coal Ltd.	LOGGED BY: LD/BS	INSTALLATION TYPE: 4" Mon. Well	
	BORING DATE: 3-Aug-12 to 4-Aug-12		

General Geology: Natural Ground
Levelogger Installation: Yes (Level)
Top of PVC Elev (m): 1510.886
Top of PVC Elev (m): 1.085 / 3.56
Water Level (m / ft bgs): 42.02 / 137.9
Water Level Note: Water level based on 2012/09/17-20 measurements

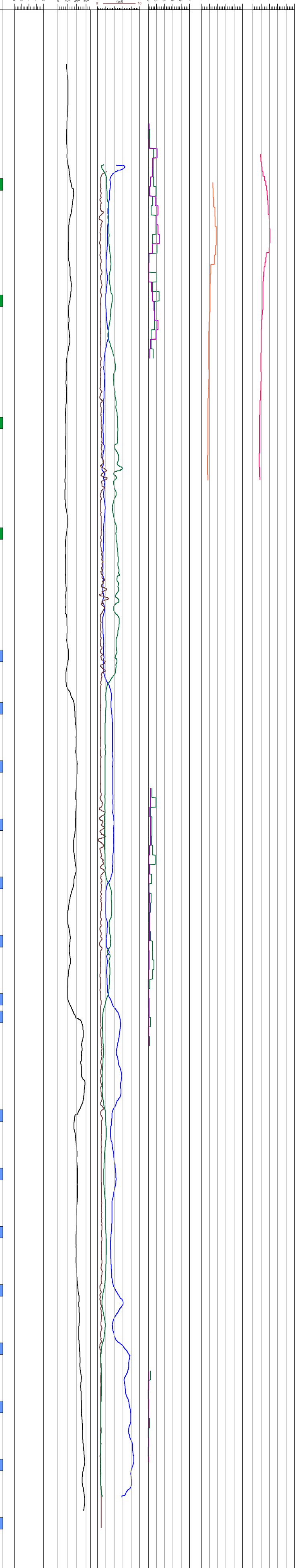
Recent Water Level Measurement

Date	Water Level (ft bgs)

Depth (m, ft) | Elev (m) | Primary Grain Size: Bedrock, Boulder, Clay, Cobble, Gravel, No Recovery, Sand, Silt | Drilling Notes | Well Details | Sample No. and Type

Primary Grain Size / Description	Drilling Notes	Sample No. and Type
Interpretation: Well-graded Gravel (GW); Cuttings: Sand, some silt, trace gravel (SW) - Brown, moist, dense, well-graded.	Lots of boulders and cobbles, easy to drill	
Clay, some silt, trace gravel (CL-CH) - Brown to grey, wet, stiff, medium plastic.	Mottled, gap-graded	32159AC
Silt (ML) - Gray, wet, non-plastic, low dilatancy.		
Clay, some silt, trace sand (CL) - Brown, stiff, low plastic.		
Gravel, some sand (GP) - Gray, moist, dense, subangular to angular.	Clay ended, back to rock	
Gravel, some silt, sand and clay (GW) - Gray, very dense, subangular to angular.	Free water encountered	32160AC
Interpretation: Sand(SW); Cuttings: Gravel, some sand and silt (GW) - Brown, saturated, dense.	Sandy, lots of cobbles and boulders; Water lost into a different unit; Sand and fines strongly react with HCl	32161AC
Gravel, some sand and silt (GW) - Brown, saturated, dense.	Lots of large boulders - mostly siltstone with sandstone pieces, water is dirty, indicating silt; More rounded pieces	32162AC
Gravel, some sand and silt (GW) - Brown, dense.		32163ACD
Silt, some clay, sand and gravel (ML) - Brown, wet, stiff.	Materials very wet, difficult to tell plasticity and gradation	32164ACD
Interpretation: Well-graded sand with silt and gravel to Silt with sand (SW - ML); Cuttings: Silt, some clay, sand and gravel (ML) - Brown, wet, stiff.	Moist, return is better, easier to drill, lots of fizziness with HCL, subround gravel, occassional cobbles (Till-like), 1500rpm; Becoming wet, fizzy; Less wet (Likely water filled fissures in the till)	32165ACD, 32166ACD
Gravel, some sand and silt (GW) - Dry to moist, very dense, well-graded, subrounded to subangular.	Cuttings are dryer, more gravelly, reacts with HCl; Becomes moist to wet	32167ACD, 32169ACD
Bedrock, weathered - Siltstone with some sand, gravel and clay from weathering. Brown, dry to moist, very dense.	Highly weathered siltstone bedrock; Becomes dry; Some rounded gravel pieces, colour becomes lighter gray; Becomes dry with subrounded gravel pieces, reacts with HCl; Reacts with HCl; Siltstone pieces are freshly broken (angular), occasional clayey chunks; EOH @ 250ft	32170ACD, 32172ACD, 32173ACD, 32174ACD, 32175ACD, 32176ACD, 32177ACD, 32178ACD, 32179ACD, 32180ACD

Well Details: water level 137.9



Well Legend: Chips, Cuttings, Casing, Gas Port, Water Port, Slough, Sand, PVC, Screen, Sump

Sample Analysis Type
A = Geochemical
B = Isotopes
C = Microbial
D = Cultivation
E = Anaerobic Cultivation

Sample Legend: A, AB, ABC, ABCD, ABCDE, AC, ACD, B, C, CD, CDE

srk consulting

Teck

PROJECT: Teck Coal Watershed R&D
CLIENT: Teck Coal Ltd.

HOLE ID: LCO-WLC-12-07a
LOCATION: Line Creek
PROJECT NO: 1CT017.020
DRILLING CONTRACTOR: Boart Longyear
DRILLING TYPE: Sonic
LOGGED BY: LD/AL/MP
BORING DATE: 25-Jul-12 to 26-Jul-12

COORDINATES: E 659855 N 5532380
DATUM: NAD 83 Zone 11
GROUND ELEV (m): 1489.111
AZIMUTH: 0 DIP: 90
EOH ELEV. (m): 1476.3094
TOTAL DEPTH (m / ft): 12.8 / 42
INSTALLATION TYPE: 4" Vapour Well

General Geology: Natural Ground
Levelogger Installation: None (Dry)
Top of PVC Elev (m): 1490.197
Top of PVC Elev (m): 1.086 / 3.56
Water Level (m / ft bgs):
Water Level Note: Dry based on 2012/09/17-20 measurements

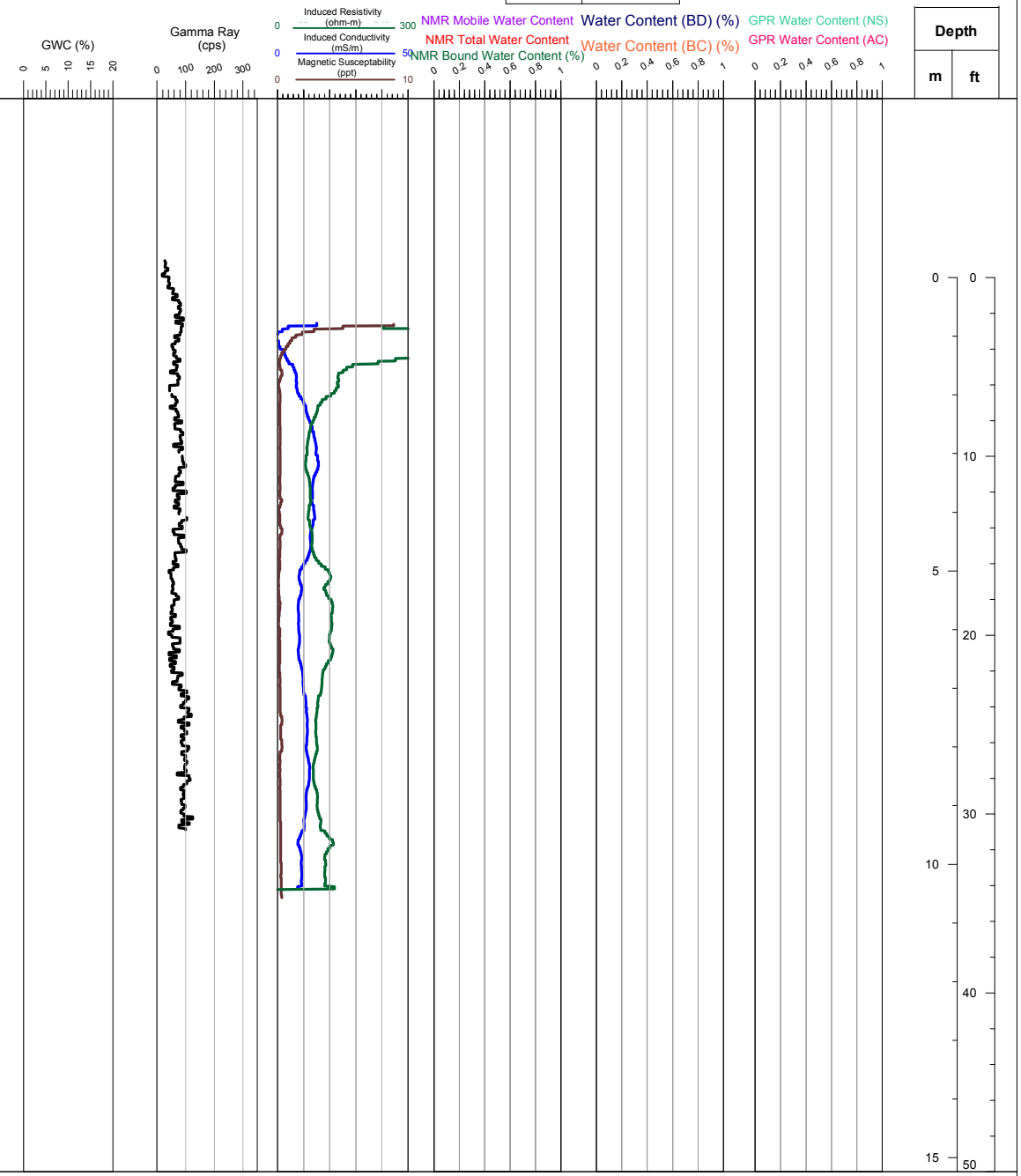
Recent Water Level Measurement

Date	Water Level (ft bgs)

LC_PIZ1207A

Primary Grain Size: Bedrock, Boulder, Clay, Cobble, Gravel, No Recovery, Sand, Silt

Depth m	Depth ft	Elev (m)	Drilling Notes	Well Details	Sample No. and Type
0	0		SONIC DRY		
			Carbonates present throughout this hole		
			Boulder 8" in diameter		30326ABC
			Sand, some clay and cobble, trace silt (SW - SM) - Very dark gray, moist, stiff, well-graded, subrounded, low plastic, low dilatancy, massive. Gradual contact.		30327ABCDE
					30328ABC
10		1485	Clay with silt, some to few sand and cobble (CL) - Black, moist, stiff, well-graded, subrounded, low plastic, cohesive, low dilatancy, massive. Gradual contact.		30329ABC
			Pressure build up in core barrel, lost sample on ground. Attemped to recover last 5 ft and it was extruded forcfully into the core box. Included in picture but not logged or sampled. It was unconsolodated fine material with some pebbles that were from till		
5	20		No Recovery. Interpreted as Silt.		
			Gravel likely pieces of weathered bedrock		
			Silt, little clay and gravel (ML) - Very dark grayish brown, dry, soft to medium, well-graded, subangular, non-plastic, low dilatancy, massive. Gradual contact.		30330ABC
			Trace sulphides and oxidation in clay chunks to 30ft		
			Clay rich area on top of weathered bedrock - contact with bedrock zone		
			Silt, some clay, trace sand (ML) - Very dark grayish brown, dry, soft to medium, well-graded, subangular, low plastic, low dilatancy, massive, gradual contact.		30331ABC
10	30	1480	Bedrock. Dry sonic drilling pulverized into fines, subangluar to angular pieces of bedrock remain. Weathering difficult to interpret. Bedrock fine sandstone or siltstone		30332ABC
			Bedrock, weathered - Dry, well-graded, subangular, low to medium plastic, cohesive, low dilatancy, massive. Gradual contact.		30333ABC
15	40		EOH @ 42ft		
	50				



Well Legend
Chips, Cuttings, Casing, Gas Port, Water Port, Slough, Sand, PVC, Screen, Sump

Sample Analysis Type
A = Geochemical
B = Isotopes
C = Microbial
D = Cultivation
E = Anaerobic Cultivation

Sample Legend
A, AB, ABC, ABCD, ABCDE, AC, ACD, B, C, CD, CDE

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Teck

PROJECT: Teck Coal Watershed R&D
CLIENT: Teck Coal Ltd.

HOLE ID: LCO-WLC-12-07b
LOCATION: Line Creek
PROJECT NO: 1CT017.020
DRILLING CONTRACTOR: JR Drilling
DRILLING TYPE: Air Rotary
LOGGED BY: JK
BORING DATE: 7-Jul-12 to 7-Jul-12

COORDINATES: E 659863 N 5532375
DATUM: NAD 83 Zone 11
GROUND ELEV (m): 1488.674
AZIMUTH: 0 DIP: 90
EOH ELEV. (m): 1471.91
TOTAL DEPTH (m / ft): 16.76 / 55
INSTALLATION TYPE: 4" Mon. Well

General Geology: Natural Ground
Levelogger Installation: Yes (Baro and Level)
Top of PVC Elev (m): 1489.776
Top of PVC Elev (m): 1.102 / 3.62
Water Level (m / ft bgs): 12.75 / 41.8
Water Level Note: Water level based on 2012/09/17-20 measurements

Recent Water Level Measurement

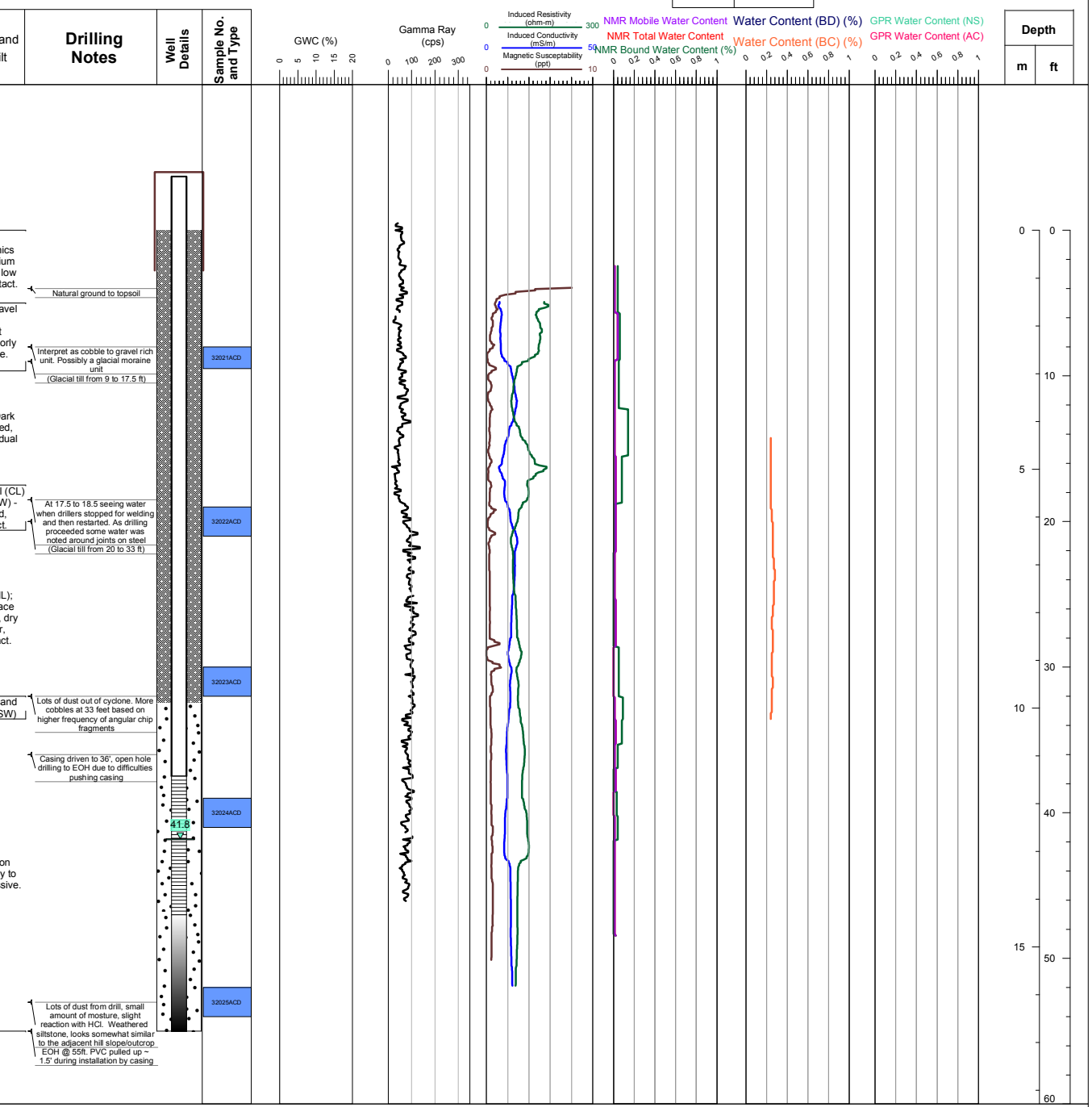
Date	Water Level (ft bgs)

LC_PIZ1207B

Primary Grain Size

Bedrock, Boulder, Clay, Cobble, Gravel, No Recovery, Sand, Silt

Depth m	Depth ft	Elev (m)	Drilling Notes	Well Details	Sample No. and Type
0	0				
			Sand, some silt, little gravel, trace organics (SW - SM) - Very dark gray, moist, medium dense, subrounded to subangular, no to low plastic, cohesive, massive. Gradual contact.		
			Natural ground to topsoil		
			Interpretation: Cobble to Well-graded Gravel (GW) Cuttings: Gravel, some sand, little silt (GP-GM) - Gray, dry to moist, dense, poorly graded, subangular to angular, massive. Gradual contact.		
			Interpret as cobble to gravel rich unit. Possibly a glacial moraine unit (Glacial till from 9 to 17.5 ft)		32021ACD
3	10	1485	Sand, some silt and gravel (SM-SW) - Dark brown, moist, medium dense, well-graded, subrounded to subangular, massive, gradual contact.		
			Interpretation: Sandy lean clay with gravel (CL) Cuttings: Sand, some gravel, little silt (SW) - Black, moist to wet, dense, well-graded, subrounded, massive. Gradual contact.		
			At 17.5 to 18.5 seeing water when drillers stopped for welding and then restarted. As drilling proceeded some water was noted around joints on steel (Glacial till from 20 to 33 ft)		32022ACD
6	20		Interpretation: Sandy silt with gravel (ML); Cuttings: Sand, some silt, few gravel, trace clay (SM-GM) - Very dark grayish brown, dry to moist, dense, subangular to angular, cohesive fines, massive, gradual contact.		
		1480			
	30				32023ACD
9			Interpretation: Well-graded gravel with sand to Well-graded sand with gravel (GW - SW)		
			Lots of dust out of cyclone. More cobbles at 33 feet based on higher frequency of angular chip fragments		
			Casing driven to 36', open hole drilling to EOH due to difficulties pushing casing		
12	40				32024ACD
				41.8	
		1475	Bedrock, weathered, - Siltstone based on gravel cuttings (GM) - Very dark gray, dry to moist, dense, subangular to angular, massive. Gradual contact.		
15	50				
			Lots of dust from drill, small amount of mosture, slight reaction with HCl. Weathered siltstone, looks somewhat similar to the adjacent hill slope/outcrop		32025ACD
			EOH @ 55ft. PVC pulled up ~ 1.5' during installation by casing		
18	60				



Well Legend

Chips, Cuttings, Casing, Gas Port, Water Port, Slough, Sand, PVC, Screen, Sump

Sample Analysis Type

A = Geochemical
B = Isotopes
C = Microbial
D = Cultivation
E = Anaerobic Cultivation

Sample Legend

A, AB, ABC, ABCD, ABCDE, AC, ACD, B, C, CD, CDE

LC_PIZ1210B

HOLE ID:	LCO-WLC-12-10b
LOCATION:	Line Creek
PROJECT NO:	1CT017.020
DRILLING CONTRACTOR:	Boart Longyear
DRILLING TYPE:	Sonic Dry Wet@175' to free casing
PROJECT:	Teck Coal Watershed R&D
CLIENT:	Teck Coal Ltd.
LOGGED BY:	MP
BORING DATE:	21-Jul-12 to 25-Jul-12
COORDINATES:	E 659817 N 5532283
DATUM:	NAD 83 Zone 11
GROUND ELEV (m):	1498.252
AZIMUTH:	0 DIP: 90
EOH ELEV. (m):	1441.864
TOTAL DEPTH (m / ft):	56.39 / 185
INSTALLATION TYPE:	4" Mon. Well

P.1 of 1

General Geology: Natural Ground
Levelogger Installation: Yes (Level)
Top of PVC Elev (m): 1499.086
Top of PVC Elev (m): 0.834 / 2.74
Water Level (m / ft bgs): 44 / 144.4
Water Level Note: Water level based on 2012/09/17-20 measurements. Bentonite noted in water during initial purging.

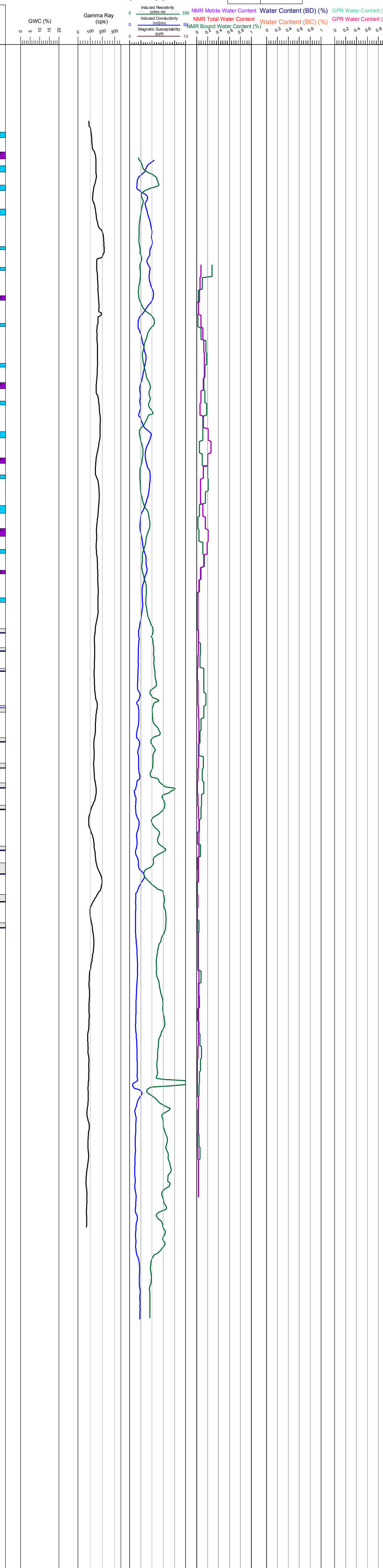
Recent Water Level Measurement

Date	Water Level (ft bgs)

Primary Grain Size: Bedrock, Boulder, Clay, Cobble, Gravel, No Recovery, Sand, Silt

Description	Drilling Notes
	SONIC DRY
Gravel, some sand, trace silt (GW) - Very dark gray, dry to moist, loose, well-graded, non-plastic, massive. Gradual contact.	Becomes progressively more silty at 5ft
Silt, some sand and clay, little gravel (ML) - Dark gray, dry to moist, soft, well-graded, subangular, low plastic, cohesive, low dilatancy, massive. Sharp contact.	(Glacial lacustrine from 15 to 24.3 ft)
Silt, few clay (ML) - Dark yellowish brown, moist, stiff, poorly graded, medium to high plastic, cohesive, low to rapid dilatancy, massive, sharp contact.	
Silt (ML) - Very dark grayish brown, dry, loose, poorly graded, subrounded, non-plastic, low to rapid dilatancy, massive. Sharp contact.	Dry well graded sand (Glacial lacustrine from 25 to 30 ft)
Silt (ML) - Dark brown, wet, stiff, poorly graded, medium to high plastic, cohesive, rapid dilatancy, massive, sharp contact.	
Sand, some silt and clay, trace gravel (SP-SM) - Dark gray, moist, loose, poorly graded, subrounded, non-plastic, low dilatancy, massive, gradual contact.	Becomes progressively sandier towards the bottom of the run, less gravel and clay Medium to fine grained sand
Silt, some clay (ML) - Brown, wet, soft, cohesive, low to rapid dilatancy, massive, sharp contact.	(Glacial lacustrine from 45 to 47.3 ft)
Silt, some clay, little sand and gravel (ML) - Dark grayish brown, moist, stiff, well-graded, subrounded, low to medium plastic, cohesive, low dilatancy, massive, sharp contact.	(Glacial fluvial from 47.3 to 48.2 ft) (Glacial fluvial from 48.2 to 55 ft)
Sand, some silt and clay, trace gravel (SP-SM) - Dark grayish brown, moist, loose, poorly graded, subrounded, non-plastic, low dilatancy, massive, sharp contact.	(Glacial fluvial from 55 to 55.6 ft)
Clay, some silt, little sand (CL) - Dark grayish brown, wet, soft, poorly graded, subrounded, non-plastic, low dilatancy, massive, sharp contact.	More fine sand, cobbles
Silt, some clay, few sand, trace gravel (ML) - Very dark brown, moist, stiff, well-graded, subrounded, low to medium plastic, cohesive, low dilatancy, massive. Gradual contact.	Sample was warm
Clay, some silt and sand, trace gravel (CL) - Dark gray, dry, stiff, well-graded, subrounded, low to medium plastic, cohesive, low dilatancy, massive. Gradual contact.	
Clay, some silt and sand, trace gravel (CL) - Dark grayish brown, moist, medium, well-graded, subrounded, low plastic, cohesive, low dilatancy, massive. Gradual contact.	Changes to dry, gray, soft Last 8in dry
Gravel, some silt and sand, little clay (GC-GM) - Very dark gray, moist, stiff, well-graded, subangular, low plastic, low dilatancy, massive. Sharp contact.	
Gravel, little clay and silt (GC-GM) - Light brownish gray, dry, soft, well-graded, subangular, low plastic, low dilatancy, massive. Sharp contact.	
Gravel, some clay ad silt (GC-GM) - Light brownish gray, dry, medium, well-graded, subrounded, low plastic, cohesive, low dilatancy, massive. Sharp contact.	Changes to moist, dark grayish brown Changes to dry, light brownish gray Changes to moist, dark grayish brown
Gravel, some clay and silt (GC-GM) - Dark grayish brown, moist, medium to stiff, well-graded, subrounded, low plastic, cohesive, low dilatancy, massive. Sharp contact.	
Gravel, some silt and clay, little sand (GC-GM) - Light brownish gray, dry, loose, well-graded, subangular, low plastic, low dilatancy, massive, sharp contact.	(Glacial fluvial from 125 to 126.5 ft) (Glacial fluvial from 126.5 to 133.4 ft)
Gravel, some silt, clay ad sand (GM) - Very dark gray, dry to moist, medium to stiff, well-graded, subangular, low plastic, cohesive, low dilatancy, massive, sharp contact.	
Gravel, little sand, silt and clay (GM) - Dark grayish brown, wet, loose, well-graded, subangular, low plastic, low dilatancy, massive, sharp contact.	(Glacial fluvial from 133.4 to 135 ft) (Glacial fluvial from 135 to 144 ft)
Gravel, little clay and sand, few silt (GM-GC) - Very dark gray, moist, stiff, well-graded, subangular, low plastic, cohesive, low dilatancy, massive, sharp contact.	
Gravel, some clay, trace cobble (GC) - Very dark gray, moist to wet, dense, well-graded, subangular, low plastic, cohesive, low dilatancy, massive, sharp contact.	(Glacial fluvial from 144 to 145 ft) (Glacial fluvial from 145 to 150.5 ft)
Gravel, some sand, little clay and silt (GW-GM) - Gray, wet, loose, well-graded, subangular, low plastic, low to rapid dilatancy, massive, sharp contact.	
Sand, little gravel, silt and clay, trace cobble (SW-SM) - Gray, moist, stiff, well-graded, subangular, non plastic, cohesive, low to rapid dilatancy, massive, sharp contact.	(Glacial fluvial from 150.5 to 165 ft)
Silt, some gravel and clay, little sand (ML-GM) - Very dark grayish brown, dry to moist, medium to stiff, well-graded, subrounded, low to medium plastic, cohesive, low dilatancy, massive. Gradual contact.	
Weathered Bedrock	Used three truckloads of tracer water to free casing/bit; core washed out by trace water Flushed hole with tracer water to remove slough EOH @ 185ft

Well Details: water level 144.4



Well Legend: Chips, Cuttings, Casing, Gas Port, Water Port, Slough, Sand, PVC, Screen, Sump

Sample Analysis Type
A = Geochemical
B = Isotopes
C = Microbial
D = Cultivation
E = Anaerobic Cultivation

Sample Legend: A, AB, ABC, ABCD, ABCDE, AC, ACD, B, C, CD, CDE

LC_PIZ1210C

srk consulting
Teck

HOLE ID:	LCO-WLC-12-10c
LOCATION:	Line Creek
PROJECT NO:	1CT017.020
DRILLING CONTRACTOR:	JR Drilling
DRILLING TYPE:	Air Rotary
PROJECT:	Teck Coal Watershed R&D
CLIENT:	Teck Coal Ltd.
LOGGED BY:	JK
BORING DATE:	9-Jul-12 to 10-Jul-12
COORDINATES:	E 659825 N 5532277
DATUM:	NAD 83 Zone 11
GROUND ELEV (m):	1497.586
AZIMUTH:	0 DIP: 90
EOH ELEV. (m):	1431.7492
TOTAL DEPTH (m / ft):	65.84 / 216
INSTALLATION TYPE:	4" Mon. Well

P.1 of 1

General Geology: Natural Ground
Levelogger Installation: Yes (Baro and Level)
Top of PVC Elev (m): 1498.321
Top of PVC Elev (m): 0.735 / 2.41
Water Level (m / ft bgs): 46.24 / 151.7
Water Level Note: Water level based on 2012/09/17-20 measurements

Recent Water Level Measurement

Date	Water Level (ft bgs)

Columns: Depth (m, ft); Elev (m); Primary Grain Size (Bedrock, Boulder, Clay, Cobble, Gravel, No Recovery, Sand, Silt); Drilling Notes; Well Details; Sample No. and Type; GWC (%) (0, 5, 10, 15, 20); Gamma Ray (cps) (0, 100, 200, 300); Induced Resistivity (ohm-m) 0–300; Induced Conductivity (mS/m) 0–50; Magnetic Susceptability (ppt) 0–10; NMR Mobile Water Content; NMR Total Water Content; NMR Bound Water Content (%) (0–1); Water Content (BD) (%); Water Content (BC) (%) (0–1); GPR Water Content (NS); GPR Water Content (AC) (0–1); Depth (m, ft)

Description	Drilling Notes
Gravel, some sand few to little silt (GW-GM) - Grayish brown, dry to moist, medium dense, well-graded, angular, massive, gradual contact.	Material used to build the pad , cobble rich till
Interpretation: Well-graded Gravel with silt and sand (GW-GM) Cuttings: Sand, some gravel and clay (SW-SC) - Very dark gray, moist, medium dense, well-graded, angular, no to low plastic, cohesive, massive, gradual contact.	
Silt, little to trace sand, clay (ML) - Dark olive gray, moist to wet, stiff, cohesive, massive, gradual contact.	
Silt, some sand, little to trace gravel (ML) - Dark olive gray, wet to saturated, stiff, cohesive, massive, gradual contact.	May be some lamination present (see faint lines in some of the cutting clumps).
Sand, some gravel (SW) - Dark brown, moist, medium dense, well-graded, subrounded, massive, gradual contact.	
Interpretation: Sandy Silt (ML); Cuttings: Sand, some silt, few to little gravel (SM) - Dark grayish brown, moist, loose, well-graded, massive, gradual contact.	
Sand, few silt, little to trace gravel (SW-SM) - Very dark grayish brown, wet, medium dense, cohesive, low dilatancy, massive, gradual contact.	Mainly fine sand, small amounts of water coming from casing
Interpretation: Sandy lean Clay (CL); Cuttings: Sand, some clay, few gravel to clay, some sand, few gravel (SC-CL) - Black, moist to wet, dense, cohesive, massive, gradual contact.	Drill was having hard time progressing through this unit. started to see more gravel?
Silt, some sand, little to trace gravel (ML) - Very dark grayish brown, moist to wet, stiff, massive, gradual contact.	
Sand, some gravel, few clay to gravel, some sand, few clay (SC-GC) - Dark brown, moist to wet, dense, well-graded, subrounded, low dilatancy, massive, gradual contact.	
Sand, some gravel, little to trace silt, trace clay (SW) - Very dark grayish brown, moist, medium dense, well-graded, subrounded to angular, massive, gradual contact.	
Sand, some gravel, trace clay to gravel, some sand, trace clay (GW-SW) - Very dark grayish brown, moist, dense, well-graded, subangular to angular, massive, gradual contact.	When washed lots of different materials, not from one large boulder. Both sandstone and siltstone present
Gravel , some sand, little clay (GW-GM) - Very dark grayish brown, dry to moist, medium dense, subangular, massive, gradual contact.	Slight odor, increased cobbles. Lots of fizzing with acid (may be dolomite). Sandstone with colour similar to the gravels and c
Interpretation: Well-graded Gravel with silt and sand (GW-GM); Cuttings: Sand, some gravel, little to trace silt (SW-SM) - Very dark grayish brown, dry to moist, medium dense, subangular, massive, gradual contact.	
Interpretation: Well-graded Gravel with silt and sand (GW-GM); Cuttings: Sand, some gravel, little silt (SW-SM) - Dark olive gray, moist, medium dense, subrounded to subangular, massive, gradual contact.	Most of the fines appear to be washed out
Interpretation: Well-graded Gravel with silt and sand (GW-GM); Cuttings: Sand, some gravel, trace silt (GW-SW) - Dark olive gray, wet, medium dense, well-graded, subrounded to subangular, massive, gradual contact.	
Interpretation: Sandy/Gravelly Silt to Silty Gravel with Sand (ML-GM) Cuttings: Sand, some gravel to gravel, some sand (GW-SW) - Olive brown, saturated, medium dense, well-graded, subangular to angular, massive, gradual contact.	Lots of water, coarser, increased gravel, lots of sandstone, powdered rock/gravel. Reacts with HCl, possibly dolomite
Bedrock, weathered, Gravel some sand (GW) - Black, wet, dense, angular, massive, gradual contact.	Fragments when crushed, may be siltstone. Some coal present.
Bedrock, weathered, Sand some silt, little gravel to Sand few silt, few gravel (SM-SW) - Dry to moist, dense, subangular, massive, gradual contact.	Siltstone fragments.
	EOH @ 216ft

Water level: 151.7

Sample: 32050ACD

Well Legend
Chips, Cuttings, Casing, Gas Port, Water Port, Slough, Sand, PVC, Screen, Sump

Sample Analysis Type
A = Geochemical
B = Isotopes
C = Microbial
D = Cultivation
E = Anaerobic Cultivation

Sample Legend
A, AB, ABC, ABCD, ABCDE, AC, ACD, B, C, CD, CDE

srk consulting

Teck

PROJECT: Teck Coal Watershed R&D
CLIENT: Teck Coal Ltd.

HOLE ID: LCO-WLC-12-11N
LOCATION: Line Creek
PROJECT NO: 1CT017.020
DRILLING CONTRACTOR: Boart Longyear
DRILLING TYPE: Sonic
LOGGED BY: MP/MJM
BORING DATE: 14-Jul-12 to 16-Jul-12

COORDINATES: E 659964 N 5532041
DATUM: NAD 83 Zone 11
GROUND ELEV (m): 1442.395
AZIMUTH: 0 DIP: 90
EOH ELEV. (m): 1434.775
TOTAL DEPTH (m / ft): 7.62 / 25
INSTALLATION TYPE: 2" Mon. well (x2)

General Geology:
Levelogger Installation:
Top of PVC Elev (m): 1443.245
Top of PVC Elev (m): 0.85 / 2.79
Water Level (m / ft bgs): 2.41 / 7.9
Water Level Note:

Recent Water Level Measurement

Date	Water Level (ft bgs)

LC_PIZ1211N

Primary Grain Size

Bedrock, Boulder, Clay, Cobble, Gravel, No Recovery, Sand, Silt

Depth m	Depth ft	Elev (m)	Drilling Notes	Well Details	Sample No. and Type
0	0	1440	Silt and clay, little sand, little gravel (ML) - Very dark gray, wet, loose, low to medium plastic, cohesive, low to rapid dilatancy, massive.	SONIC DRY; TWO LOGS PRODUCED FOR HOLE LCO-WLC-12-11 WITH THE SAME STRATIGRAPHY INFORMATION BUT DIFFERENT WELL DETAILS No recovery 0-4.5 feet (Glacial till from 4.5 to 25 ft)	7.9	
5	20	1435	Gravel, few sand, little silt (GM) - Very dark gray, wet, loose, well-graded, no to low plastic, cohesive fines, massive, gradual contact.	Increasing gravel and cobbles Becomes moist	
10	30				

GWC (%) 0 5 10 15 20

Gamma Ray (cps) 0 100 200 300

Induced Resistivity (ohm-m) 0 300
Induced Conductivity (mS/m) 0 50
Magnetic Susceptability (ppt) 0 10

NMR Mobile Water Content
NMR Total Water Content
NMR Bound Water Content (%)
Water Content (BD) (%)
Water Content (BC) (%)
GPR Water Content (NS)
GPR Water Content (AC)
0 0.2 0.4 0.6 0.8 1

Well Legend

Chips, Cuttings, Casing, Gas Port, Water Port, Slough, Sand, PVC, Screen, Sump

Sample Analysis Type

A = Geochemical
B = Isotopes
C = Microbial
D = Cultivation
E = Anaerobic Cultivation

Sample Legend

A, AB, ABC, ABCD, ABCDE, AC, ACD, B, C, CD, CDE

LC_PIZ1212

srk consulting
Teck

HOLE ID: LCO-WLC-12-12
LOCATION: Line Creek
PROJECT NO: 1CT017.020
DRILLING CONTRACTOR: Boart Longyear
DRILLING TYPE: Sonic
PROJECT: Teck Coal Watershed R&D
CLIENT: Teck Coal Ltd.
LOGGED BY: MP
BORING DATE: 16-Jul-12 to 18-Jul-12

COORDINATES: E 660004 N 5532172
DATUM: NAD 83 Zone 11
GROUND ELEV (m): 1447.477
AZIMUTH: 0 DIP: 90
EOH ELEV. (m): 1415.473
TOTAL DEPTH (m / ft): 32 / 105
INSTALLATION TYPE: 4" Mon. Well

General Geology: Natural Ground
Levelogger Installation: Yes (Baro and Level)
Top of PVC Elev (m): 1448.261
Top of PVC Elev (m): 0.784 / 2.57
Water Level (m / ft bgs): 4.96 / 16.3
Water Level Note: Water level based on 2012/09/17-20 measurements

Recent Water Level Measurement

Date	Water Level (ft bgs)

Primary Grain Size: Bedrock, Boulder, Clay, Cobble, Gravel, No Recovery, Sand, Silt

Lithology (Depth m / ft; Elev (m))

- Sand, some silt, little gravel (SM) - Very dark grayish brown, dry, very loose, well-graded, subangular, non-plastic, low dilatancy, massive. Sharp contact.
- Sand, little silt, trace gravel and clay (SW-SM) - Black, moist, loose, subangular, low plastic, low dilatancy. Fluvial , sharp contact.
- Gravel, little silt (GW-GM) - Dark gray, wet, loose, non-plastic, rapid dilatancy. Sharp contact.
- Gravel, little silt (GM) - Dark gray, moist, soft, well-graded, subrounded, low to medium plastic, cohesive, low dilatancy, massive, gradual contact.
- Gravel, little silt and clay (GM) - Gray, dry, soft, low plastic, massive.
- Gravel, little clay, silt and sand (GM) - Dark grayish brown, moist, medium to stiff, low to medium plastic, cohesive, massive.
- Gravel, some clay, little sand and silt (GC) - Very dark gray, moist, stiff, well-graded, low to medium plastic, low dilatancy, massive.
- Gravel, little clay, sand and silt (GC) - Very dark grayish brown, moist, medium to stiff, well-graded, subrounded, low to medium plastic, cohesive, massive, gradual contact.
- Gravel, little clay, sand and silt (GC) - Very dark grayish brown, dry to moist, medium to stiff, well-graded, subrounded, low to medium plastic, cohesive, massive, gradual contact.
- Gravel, some clay and silt, little sand (GC) - Grayish brown, dry, medium to stiff, well-graded, subrounded, low to medium plastic, cohesive, low dilatancy, massive, sharp contact.
- Gravel, some clay, little sand, few silt (CL) - Very dark grayish brown, dry to moist, medium to stiff, well-graded, subrounded, low to medium plastic, cohesive, massive, gradual contact.
- Gravel, some silt, little sand and clay (GC) - Dry, medium to stiff, well-graded, subrounded, no to low plastic, cohesive, low to rapid dilatancy, massive. Sharp contact.
- Clay, few silt and sand, trace gravel (CH) - Dark brown, moist, stiff, poorly graded, rounded, medium to high plastic, cohesive, low dilatancy, massive.
- Gravel, some silt, little sand, trace silt (GC) - Very dark brown, wet, soft, well-graded, subrounded, medium plastic, cohesive, low dilatancy.
- Gravel, some clay, little sand (GC) - Very dark brown, moist, stiff, poorly graded, subangular, medium to high plastic, cohesive, low to rapid dilatancy, massive, sharp contact.
- Gravel, some sand, trace silt and clay (GM) - Dark grayish brown, dry, stiff, poorly graded, medium plastic, cohesive, low dilatancy, massive, sharp contact.
- Gravel, some sand, little clay (GM) - Very dark grayish brown, dry, stiff, subangular, medium to high plastic, cohesive, low dilatancy, massive, gradual contact.
- Gravel and Cobble, few silt and cla, trace sand (GM) - Dark grayish brown, dry to moist, stiff, poorly graded, high plastic, cohesive, low dilatancy, massive, gradual contact.
- Bedrock, weathered - Brown, dry.

Depth scale (m): 0, 5, 10, 15, 20, 25, 30; (ft): 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110
Elev (m): 1445, 1440, 1435, 1430, 1425, 1420, 1415

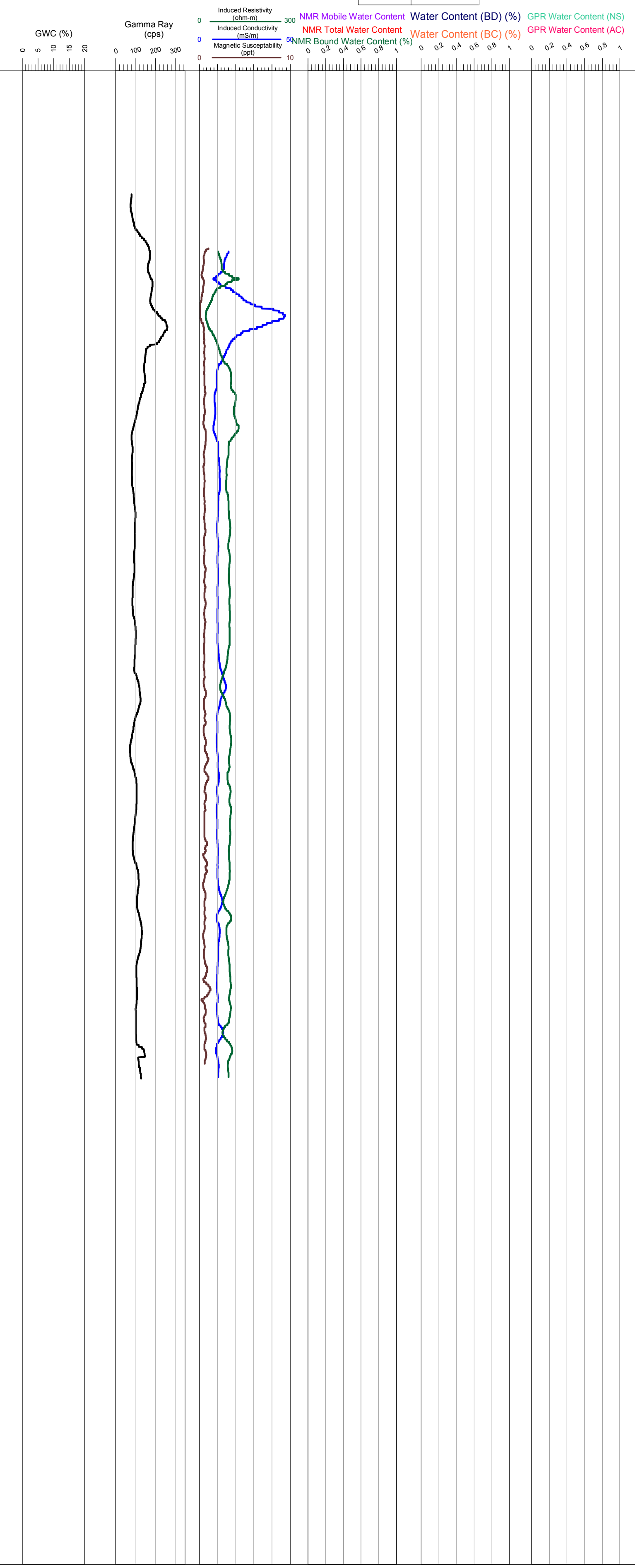
Drilling Notes

- SONIC DRY
- Fill from previous construction activities, some cobbles present
- Becomes dense and very hard, dry to moist and very dark brown
- Too wet to tell alteration
- (Glacial from 15 to 30 ft)
- Becomes clayey
- Becomes damp to 25ft
- Becomes medium dense and medium plastic
- Becomes dry at 34.1
- Large 6" cobble @ 35ft
- Some cobbles up to 6" in diameter
- Becomes dense, oxidation staining present
- Trace cobbles up to 6", iron staining, moist on inside, mayhave dried on outside due to drilling
- (Glacial from 58.3 to 60 ft)
- Trace cobbles up to 6", iron staining, moist on inside, mayhave dried on outside due to drilling
- Has dry and moist areas throughout, gravel and cobbles throughout
- (Glacial from 65 to 67.8 ft)
- (Glacial till from 67.8 to 75 ft)
- Too saturated to gather full sample
- Only receiving 5ft at a time, drill picking up water from zone above
- Went through sandstone boulder, core very hot. Gravel and cobbles disappear. Becomes medium plastic, medium dense, dark grayish brown, low dilatancy.
- Hot. Becomes very dark grayish brown, medium to high plasticity, dense.
- Hot. Becomes dark grayish brown, moist, high plastic.
- Becomes medium dense, hot
- Sandstone rock broken into cobbles and rock flour from drilling
- Siltstone broken up by drill, rock has carbonates
- EOH @ 105ft

Well Details: water level 16.3

Sample No. and Type

30198ABC, 30199ABC, 30200ABCDE, 30201ABC, 30202ABC, 30203ABCDE, 30204ABC, 30205ABC, 30206ABCDE, 30207ABC, 30208ABC, 30209ABCDE, 30210ABC, 30211ABC, 30212ABCDE, 30213ABC, 30214ABC, 30215ABC, 30216ABC, 30217ABCDE, 30218ABC, 30219ABCDE, 30220ABC, 30221ABC, 30222ABC, 30223ABC, 30224ABC, 30225ABC



Well Legend
Chips, Cuttings, Casing, Gas Port, Water Port, Slough, Sand, PVC, Screen, Sump

Sample Analysis Type
A = Geochemical
B = Isotopes
C = Microbial
D = Cultivation
E = Anaerobic Cultivation

Sample Legend
A, AB, ABC, ABCD, ABCDE, AC, ACD, B, C, CD, CDE

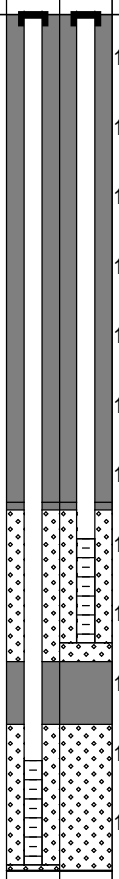
WL_MW-15-02-A/B

AWTF Landfill GW Monitoring Wells	Teck Coal	BOREHOLE NO: AWTF-MW-15-02
West Line Creek	Drill: Sonic Drill	PROJECT: ENVMIN03066-01
British Columbia	5531822.81N; 659624.35E; Zone 10	ELEVATION: 1493.72 m

SAMPLE TYPE: DISTURBED | NO RECOVERY | SPT | A-CASING | SHELBY TUBE | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	NOTES & COMMENTS
0	SAND AND GRAVEL (FILL) - up to cobble size, damp, dark brown		MW-15-02A pipe stickup = 0.88 metres MW-15-02B pipe stickup = 0.83 metres
1			
2	SILT - sandy, clayey, gravelly, dry, stiff, dark brown to grey		
3	- some cobbles		
	SAND - silty, subangular, coarse grained, wet, compact, dark grey		
4	SILT - gravelly, clayey, wet to dry with depth, stiff, low plastic, dark grey - dry		
	- wet		
5	SAND - silty, cobbly, coarse grained, dark grey		
	SILT - sandy, gravelly, dry to damp, stiff, low plastic, dark grey		
6	- dry, dark grey to black, some interbedded coal - some cobbles, loose, brown black		
7			
	- compact		
8	B SAND - silty, gravelly, coarse grained, subangular, wet, dark grey		
9			
	A CLAY - silty, sandy, moist, soft, low plastic, dark grey		
10	- no visible sand, medium plastic		
11	- some gravel, stiff		
12			
13	END OF BOREHOLE (12.30 metres) AWTF-MW-15-02A installed to 12.22 metres water - 9.29 metres on June 16, 2015 AWTF-MW-15-02B installed to 9.03 metres water - 8.02 metres on June 16, 2015		
14			
15			
16			
17			
18			
19			
20			



TETRA TECH EBA

LOGGED BY: JB	COMPLETION DEPTH: 12.3 m
REVIEWED BY: CF	COMPLETE: 15/05/26
DRAWING NO:	Page 1 of 1

WL_MW-15-04-A/B

AWTF Landfill GW Monitoring Wells	Teck Coal	BOREHOLE NO: AWTF-MW-15-04
West Line Creek	Drill: Sonic Drill	PROJECT: ENVMIN03066-01
British Columbia	5531802.38N; 659651.03E; Zone 10	ELEVATION: 1488.14 m

SAMPLE TYPE: DISTURBED | NO RECOVERY | SPT | A-CASING | SHELBY TUBE | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	NOTES & COMMENTS
0	GRAVEL AND COBBLES - silty, damp, dark brown		MW-15-04A pipe stickup = 0.80 metres MW-15-04B pipe stickup = 0.77 metres
1			
2	CLAY - silty, moist, stiff, medium brown grey, boulder pushed out of the way		
3	- gravelly, orange brown oxidation staining		
4 B	- wet, soft		
5	- moist, stiff, plastic, light brown grey, yellowish brown oxidation		
6	- wet, soft, medium grey brown, some light yellowish brown oxidation		
7	- some gravel, moist to wet		
8	- moist, medium grey		
9 A			
10	SAND - very fine grained, wet, black CLAY - moist, stiff, plastic, dark grey		
11	END OF BOREHOLE (10.50 metres) AWTF-MW-15-04A installed to 10.45 metres water - 8.89 metres on June 16, 2015 AWTF-MW-15-04B installed to 6.83 metres water - 3.91 metres on June 16, 2015		
12			
13			
14			
15			
16			
17			
18			
19			
20			

AWTF-MW-15-04A | AWTF-MW-15-04B

Elevation (m): 1488.0, 1487.0, 1486.0, 1485.0, 1484.0, 1483.0, 1482.0, 1481.0, 1480.0, 1479.0, 1478.0, 1477.0, 1476.0, 1475.0, 1474.0, 1473.0, 1472.0, 1471.0, 1470.0, 1469.0

TETRA TECH EBA

LOGGED BY: JB	COMPLETION DEPTH: 10.5 m
REVIEWED BY: CF	COMPLETE: 15/05/29
DRAWING NO:	Page 1 of 1

LC_PIZM0903

WELL LITHOLOGY & CONSTRUCTION FORM

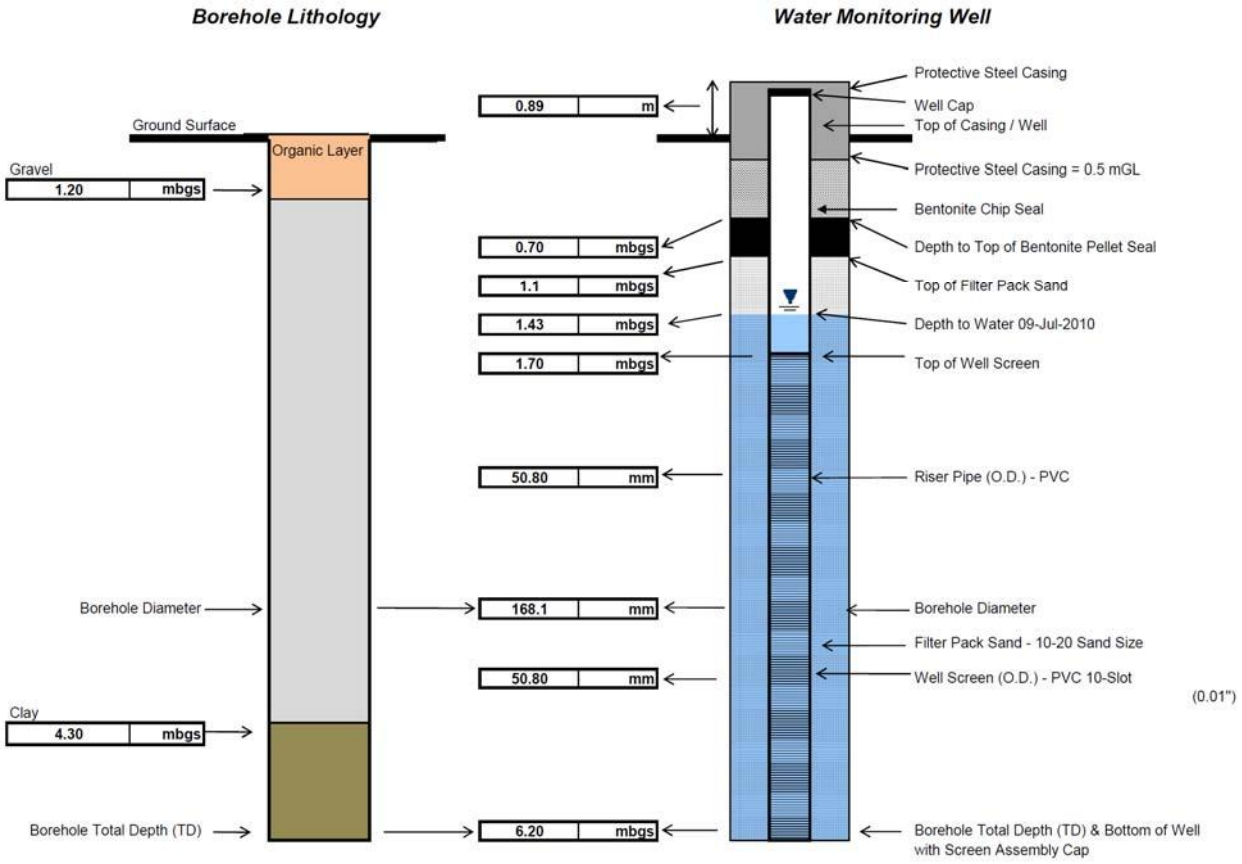
Well Number:
GA-LC1-A

Project Number:	0913490005-1109-1002
Project Name:	Teck Coal Line Creek Operations
Location:	Elk Valley, British Columbia, Canada
Site Area:	Line Creek

Completion Date:	30-Oct-09
Drill Contractor:	Beck Drilling
Drilling Method:	ODEX
Personnel:	Tim Crowell

Well Summary Table		
Northing	661410	NAD83
Easting	5536285	NAD83
Ground Elevation	1587.0	masl
Top of Casing Elevation	1587.9	masl
Water Level Elevation	1585.6	masl

Input Parameters
Datum Reference:
mbgs
Diameter Units:
mm



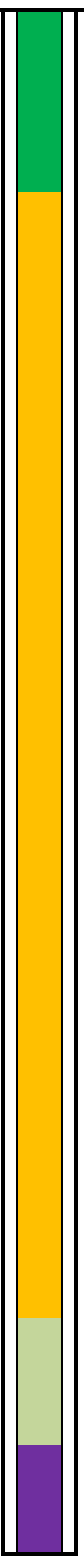
Note:
mbgs = metres below ground surface
mm = millimetres
masl = metres above sea level

Teck LCO
Monitoring Well Drilling Logs

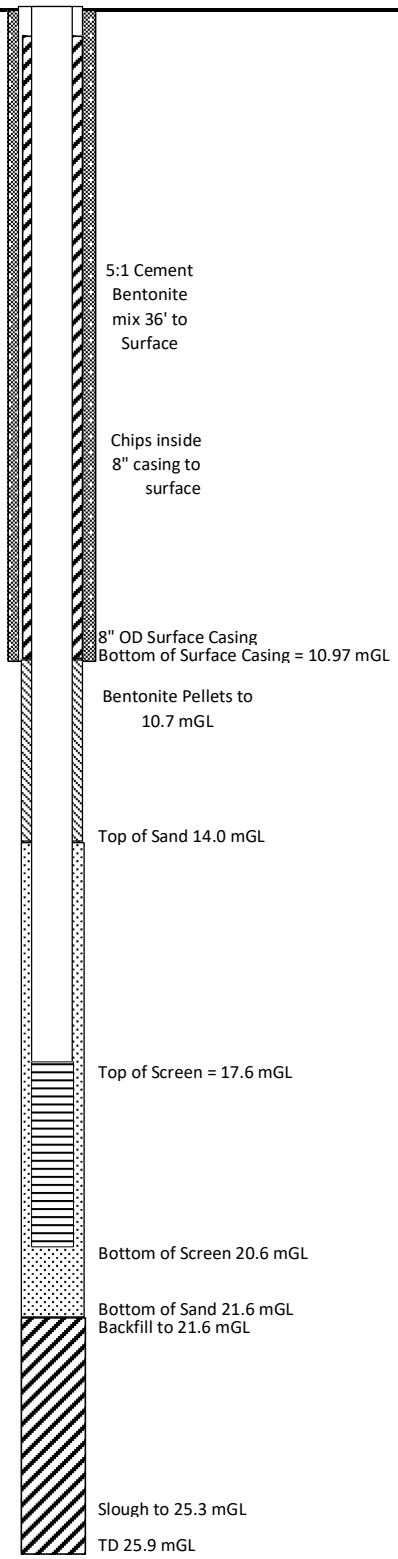
WELL ID : LC_MW20_01

Depth (ftGL)	Depth (mGL)	Lithological Description
		NOTE: This is the proposed installation and is pending actual depths
0	0	
1	0.3048	
2	0.6096	
3	0.9144	
4	1.2192	0 - 3.0 mGL: FILL, sandy gravel, very fine to fine sand, angular to rounded, brown, dry, Boulders prevelant 7-10'.
5	1.524	
6	1.8288	
7	2.1336	
8	2.4384	
9	2.7432	
10	3.048	
11	3.3528	
12	3.6576	3.1 - 4.6 mGL: GRAVEL, with sand, medium to coarse, well graded, sub-angular to rounded, dry until 12' then wet.
13	3.9624	
14	4.2672	
15	4.572	
16	4.8768	
17	5.1816	4.6 - 6.1 mGL: GRAVEL, coarse to very coarse, well graded, angular to sub-rounded, varied colour, wet
18	5.4864	
19	5.7912	
20	6.096	
21	6.4008	
22	6.7056	6.1 - 7.6 mGL: Silty Sandy GRAVEL, coarse to very coarse, angular to sub-rounded, brown, wet.
23	7.0104	
24	7.3152	
25	7.62	
26	7.9248	
27	8.2296	7.6 - 9.1 mGL: GRAVEL, coarse to very coarse, well graded, angular to sub-rounded, varied colour, wet
28	8.5344	
29	8.8392	
30	9.144	
31	9.4488	9.1 - 10.7 mGL: GRAVEL, fine to very coarse, well graded, angular to sub-rounded, varied colour, wet. Appearance of water indicates sand and possibly some silt also present but washing out of collected cuttings.
32	9.7536	
33	10.0584	
34	10.3632	
35	10.668	
36	10.9728	
37	11.2776	
38	11.5824	
39	11.8872	
40	12.192	
41	12.4968	
42	12.8016	
43	13.1064	
44	13.4112	10.7 - 16.8 mGL: Silty Sandy GRAVEL, course gravel, medium sand, well graded, angular to sub-rounded, brown, wet.
45	13.716	
46	14.0208	
47	14.3256	
48	14.6304	
49	14.9352	
50	15.24	
51	15.5448	
52	15.8496	
53	16.1544	
54	16.4592	
55	16.764	
56	17.0688	
57	17.3736	
58	17.6784	
59	17.9832	
60	18.288	
61	18.5928	16.8 - 21.9 mGL: Silty Sandy GRAVEL, course gravel, medium sand, well graded, angular to sub-rounded, brown, wet. Water seemed to be lost at 72', Driller also noted it started to feel different at the controls and that the casing was going in easier. Pulled back to 71' and returned water, noticed significant colour change, from a brown to a dark brown.
62	18.8976	
63	19.2024	
64	19.5072	
65	19.812	
66	20.1168	
67	20.4216	
68	20.7264	
69	21.0312	
70	21.336	
71	21.6408	
72	21.9456	
73	22.2504	
74	22.5552	
75	22.86	22.9 - 24.4 mGL: Silty SAND, fine sand, loss of water, moist.
76	23.1648	
77	23.4696	
78	23.7744	
79	24.0792	
80	24.384	
81	24.6888	24.4 - 25.9 mGL: SHALE, weathered, soft, fissile, blackish grey, dry.
82	24.9936	
83	25.2984	
84	25.6032	

Lithology



Well Depths



Legend			
Waste Rock/Fill		Silty Sand	
Gravel		Clayey Silt	
Sand & Gravel		Silty Clay	
Sand		Clay	
Silty Gravel		Shale	
Gravelly Silt		No Recovery	
Silt			

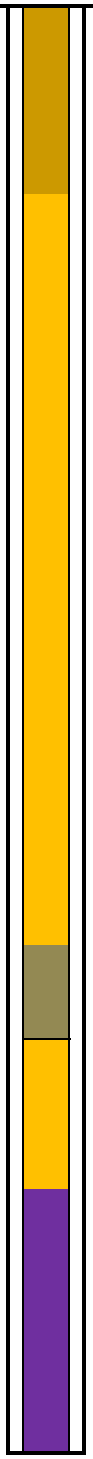
WELL ID : LC_MW20_02A and LC_MW20_02B

Teck

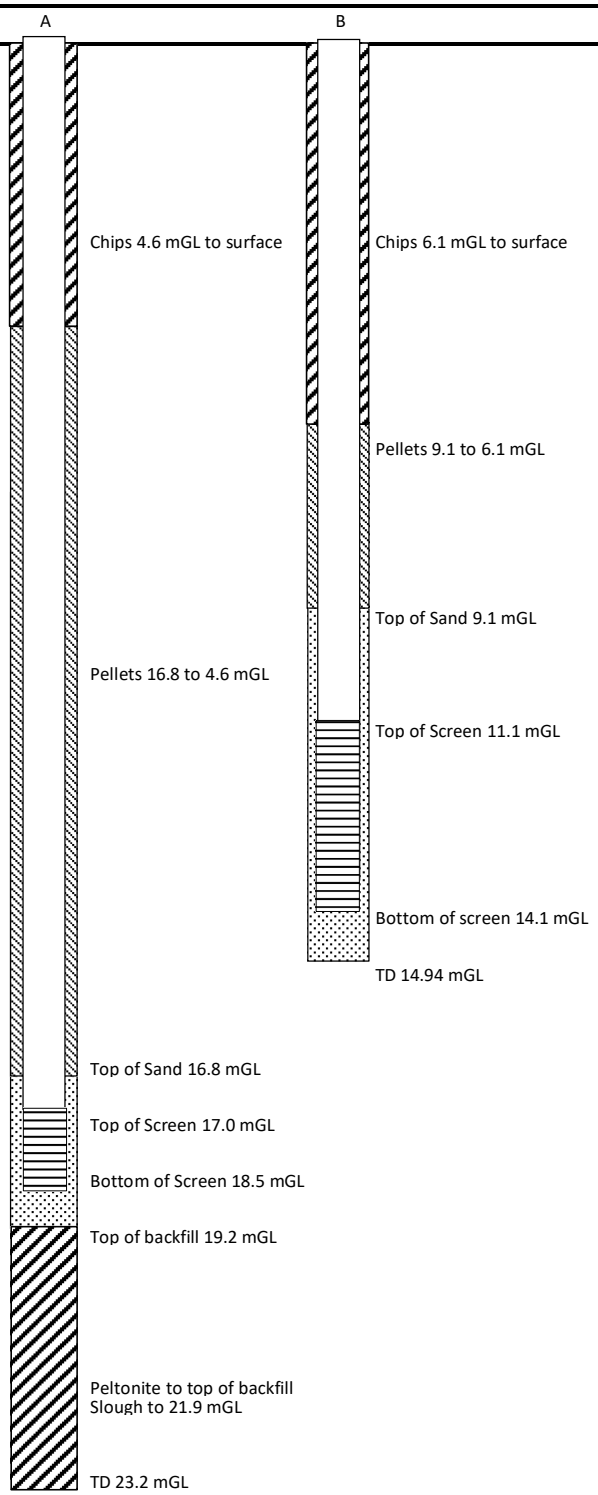
NOTE: This is the proposed installation and is pending actual depths

Depth (ftGL)	Depth (mGL)	Lithological Description
0	0	
1	0.3048	
2	0.6096	
3	0.9144	
4	1.2192	0 - 3.0 mGL: SAND and GRAVEL, coarse sands, fine to coarse gravel, well graded, angular to sub-rounded, brown, dry.
5	1.524	
6	1.8288	
7	2.1336	
8	2.4384	
9	2.7432	
10	3.048	
11	3.3528	3.0 - 4.6 mGL: GRAVEL, with sand, trace silt, medium to coarse grained gravel, sub-angular to sub-rounded, well graded, medium grained sand. Brown, dry. Wet at 15', driller thinks water was encountered at 13' but only observed at 15'.
12	3.6576	
13	3.9624	
14	4.2672	
15	4.572	
16	4.8768	4.6 - 6.1 mGL: GRAVEL, some sand and silt, well graded, angular to sub-rounded. Brown, wet. The way the cuttings are angular the how it is drilling it would be larger/cobbles downhole.
17	5.1816	
18	5.4864	
19	5.7912	
20	6.096	
21	6.4008	
22	6.7056	
23	7.0104	
24	7.3152	6.1 - 9.1 mGL: GRAVEL and SAND, trace silt, medium to coarse sand, well graded, sub-rounded, lost angular at around 21'. Light brown to brown, wet. Cuttings are dry due to circulation issues with formation water.
25	7.62	
26	7.9248	
27	8.2296	
28	8.5344	
29	8.8392	
30	9.144	
31	9.4488	
32	9.7536	
33	10.0584	
34	10.3632	
35	10.668	
36	10.9728	
37	11.2776	
38	11.5824	9.1 - 15.2 mGL: GRAVEL, well graded, angular to sub-rounded, brown, wet. Fines are washing out with waater when circulated uphole, observations of water colour and consistency suggest silty sand present. At 45' in 02B orange/red shale noticed in cuttings, were not observed in 02A at this depth. Similar colour change noticed at 49' compared to 51' at 02A.
39	11.8872	
40	12.192	
41	12.4968	
42	12.8016	
43	13.1064	
44	13.4112	
45	13.716	
46	14.0208	
47	14.3256	
48	14.6304	
49	14.9352	
50	15.24	
51	15.5448	15.2 - 16.8 mGL: Silty GRAVEL, angular to sub-angular, well graded, colour change from brown to greyish blue at 51'. WET. Driller thought bedrock at first but pushed casing through. Potentially slab/boulder.
52	15.8496	
53	16.1544	
54	16.4592	
55	16.764	
56	17.0688	16.8 - 18.3 mGL: GRAVEL, angular, well graded, shale-sandstone rocks, yellowish brown and blueish grey, wet.
57	17.3736	
58	17.6784	
59	17.9832	
60	18.288	
61	18.5928	18.3 - 19.0 mGL: GRAVEL, with silty sand, angular to sub-angular, well graded, brown, wet.
62	18.8976	
63	19.2024	
64	19.5072	
65	19.812	
66	20.1168	
67	20.4216	
68	20.7264	
69	21.0312	19.2 - 23.2 mGL: SHALE, soft, blackish blue, fissile, dry, organic shale.
70	21.336	
71	21.6408	
72	21.9456	
73	22.2504	
74	22.5552	
75	22.86	
76	23.1648	

Lithology



Well Depths



Legend			
Waste Rock/Fill		Silty Sand	
Gravel		Clayey Silt	
Sand & Gravel		Silty Clay	
Sand		Clay	
Silty Gravel		Shale	
Gravelly Silt		No Recovery	
Silt			

WELL ID : LC_MW20_03

Depth (mGL)	Depth (mSL)	Lithological Description
Teck		NOTE: This is the proposed installation and is pending actual depths
0	0	
1	0.3048	
2	0.6096	
3	0.9144	
4	1.2192	
5	1.524	
6	1.8288	0 - 4.6 mGL: WASTE ROCK, very fine to coarse, angular, black, dry. Last 2' was shale refuse, angular, fissile, greyish blue.
7	2.1336	
8	2.4384	
9	2.7432	
10	3.048	
11	3.3528	
12	3.6576	
13	3.9624	
14	4.2672	
15	4.572	
16	4.8768	
17	5.1816	
18	5.4864	
19	5.7912	
20	6.096	
21	6.4008	
22	6.7056	4.6 - 9.1 mGL: WASTE ROCK, shale refuse, angular, greyish blue, dry.
23	7.0104	
24	7.3152	
25	7.62	
26	7.9248	
27	8.2296	
28	8.5344	
29	8.8392	
30	9.144	
31	9.4488	
32	9.7536	9.1 - 10.7 mGL: SILT, trace organics, soft to firm, dark brown, dry-moist.
33	10.0584	
34	10.3632	
35	10.668	
36	10.9728	
37	11.2776	10.7 - 11.9 mGL: Clayey SILT, soft to firm, dark brown, dry-moist.
38	11.5824	
39	11.8872	
40	12.192	
41	12.4968	
42	12.8016	
43	13.1064	
44	13.4112	11.9 - 15.2 mGL: CLAY, trace silt, soft to firm, w=PL rolled to small diameter, light brown, moist.
45	13.716	
46	14.0208	
47	14.3256	
48	14.6304	
49	14.9352	
50	15.24	
51	15.5448	15.2 - 16.8 mGL: CLAY, very soft, brown, wet. Driller did add water to flush casing to get returns back. Hammer won't 'fire' basically just pushing down hole.
52	15.8496	
53	16.1544	
54	16.4592	
55	16.764	
56	17.0688	
57	17.3736	
58	17.6784	
59	17.9832	
60	18.288	
61	18.5928	
62	18.8976	
63	19.2024	
64	19.5072	16.8 - 22.9 mGL: CLAY, some silt, very soft, brown, wet. Driller added water to flush casing to get returns back. Trace fine gravel, angular.
65	19.812	
66	20.1168	
67	20.4216	
68	20.7264	
69	21.0312	
70	21.336	
71	21.6408	
72	21.9456	
73	22.2504	
74	22.5552	
75	22.86	
76	23.1648	
77	23.4696	
78	23.7744	
79	24.0792	
80	24.384	
81	24.6888	
82	24.9936	
83	25.2984	
84	25.6032	22.9-29.0 mGL: SILT and CLAY, brown, soft, wet. Driller still pumping water as returns are clogging without it. No excess water has been observed other than what is pumped downhole.
85	25.908	
86	26.2128	
87	26.5176	
88	26.8224	
89	27.1272	
90	27.432	
91	27.7368	
92	28.0416	
93	28.3464	
94	28.6512	
95	28.956	
96	29.2608	
97	29.5656	
98	29.8704	
99	30.1752	
100	30.48	
101	30.7848	
102	31.0896	
103	31.3944	
104	31.6992	29.0-35.1 mGL: SILT and CLAY, some sand, brown, soft, wet. Driller is still pumping water due to clogging issues. No water picked up in section.
105	32.004	
106	32.3088	
107	32.6136	
108	32.9184	
109	33.2232	
110	33.528	
111	33.8328	
112	34.1376	
113	34.4424	
114	34.7472	
115	35.052	
116	35.3568	
117	35.6616	
118	35.9664	
119	36.2712	
120	36.576	
121	36.8808	35.1 - 39.6 mGL: SAND (started at 118'), very fine, brown, wet. Poorly graded. May have picked up some water but not much.
122	37.1856	
123	37.4904	
124	37.7952	
125	38.1	
126	38.4048	
127	38.7096	
128	39.0144	
129	39.3192	
130	39.624	
131	39.9288	
132	40.2336	39.6-41.1 mGL: CLAY, soft to firm, w=PL, brown, wet. Driller still adding water. CLAY stops at 133'.
133	40.5384	
134	40.8432	
135	41.148	
136	41.4528	41.1 - 42.7 mGL: CLAY and BOULDERS (TILL), soft, brown, wet. "gravel" in cuttings is angular fine to medium and resulting from drilling through boulders. Driller noted the bit and casing were catching at some points but for the most part drilled like clay. Still pumping water down hole.
137	41.7576	
138	42.0624	
139	42.3672	
140	42.672	
141	42.9768	42.7 - 43.9 mGL: SILT, some fine gravel (rounded) firm to stiff, cohesive (came out as little round balls), w=PL, dark brown, dry.
142	43.2816	
143	43.5864	
144	43.8912	

Lithology

Well Depths

- Chips 31.7 mGL to Surface
- Pellets 35.0 to 31.7 mGL
- Top of Sand 35.0 mGL
- Top of Screen 36.0 mGL
- Bottom of Screen 39.0 mGL
- Bottom of Sand 39.6 mGL
- Chips TD to 39.6 mGL
- TD 44.2 mGL

Legend			
Waste Rock/Fill		Silty Sand	
Gravel		Clayey Silt	
Sand & Gravel		Silty Clay	
Sand		Clay	
Silty Gravel		Shale	
Gravelly Silt		No Recovery	
Silt			

FINAL

LC_MW_CP1A

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_WLCA

PAGE 1 OF 3

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 27
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_WLCA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SILTY SAND, fine to medium grained sand, trace gravel, fine, subrounded to subangular, black, loose, damp, contains coal fragments (spoils).						
1	SAND and GRAVEL, fine grained sand, fine gravel, subrounded to subangular, some silt, dark brown, loose, damp, fill material.						
2							
3	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, trace silt, containing cobbles, brown, loose, damp.						
4							
5	At 4.6 m - wet, contains wood fragments.						
6	SAND and GRAVEL, fine to coarse grained sand, fine gravel, subangular, containing cobbles, brown, dense, wet.						
7	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular to subrounded, dense, dry.						
8	At 8.2 m - wet, produced water when started drilling.						
9	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, trace silt, brown, loose, wet.						
10							

BENTONITE

NOTES

QA/QC: SD 2021 09 29 Print Date:2021-10-01

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_WLCA

PAGE 2 OF 3

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 27
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
Sample Interval
Air Rotary

Water/NAPL Levels
Water Level 1
Water Level 2
NAPL
NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_WLCA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, trace silt, brown, loose, wet. *(continued)*						
	Between 10.7 m and 11.0 m - some silt.						
11	GRAVEL, fine to coarse, subrounded to subangular, trace silt, containing cobbles, brown, dense, wet.						
12	SAND and GRAVEL (TILL), fine to coarse grained sand, fine gravel, some silt, trace clay, brown, medium dense, low plasticity, moist.						
	SILTY CLAY (TILL), trace sand, fine to coarse grained, trace gravel, fine, subangular, brown, dense, medium plasticity, moist.						
13	WEATHERED BEDROCK, shale, brown-grey, dry, dusty.						
14	BEDROCK, shale, grey-brown, fractured, dry.						
15	Between 15.2 m and 17.4 m - damp.						
16							
17	Between 17.4 m and 19.8 m - fractured, wet.						
18							
19							
20	Between 19.8 m and 21.3 m - large fractures.						

BENTONITE

LC_MW_WLCA
SAND

NOTES

QA/QC: SD 2021 09 29 Print Date:2021-10-01

SNC·LAVALIN

Client
Teck Coal Limited

Borehole No. : LC_BH_WLCA

Location
Regional Groundwater Monitoring

PAGE 3 OF 3

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 27
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
Sample Interval
Air Rotary

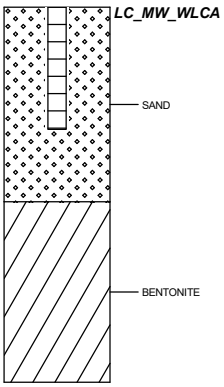
Water/NAPL Levels
Water Level 1
Water Level 2
NAPL
NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_WLCA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
20	BEDROCK, shale, grey-brown, fractured, dry. *(continued)*						
21	BEDROCK, shale, black, competent, soft.						
	At 21.6 m - fracture.						
22							
	At 22.6 m - fracture.						
23	Bottom of hole at 23.2 m.						
24							
25							
26							
27							
28							
29							
30							



Well ID	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation	Stick Up Height
	Easting	Northing	masl	masl	m
LC_MW_CP1A	659277.9	5530776	1402.757	1403.431	0.674
LC_MW_CP1B	659276.8	5530775	1402.785	1403.495	0.71

NOTES

QA/QC: SD 2021 09 29 Print Date:2021-10-01

FINAL

LC_MW_CP1B

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_WLCB

PAGE 1 OF 2

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 27
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_WLCB

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SILTY SAND, fine to medium grained, trace gravel, fine, dark grey, loose, damp.						
1	SAND and GRAVEL (FILL), fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, trace silt, containing cobbles, brown, loose, damp. Between 0.9 m and 1.5 m - some silt.						
2							
3	At 2.7 m - boulder.						
4							
5	SAND and GRAVEL, medium to coarse grained sand, fine to coarse gravel, subrounded to subangular, containing cobbles, brown, loose, wet, contains wood fragments.						
6	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, some silt, trace clay, moist.						
7	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, trace silt, containing cobbles/boulders, brown, dense, dry.						
8	Between 7.6 m and 7.9 m - seam fine to medium grained sand.						
9	At 8.2 m - boulder. SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, trace silt, containing cobbles, brown, loose, wet. At 8.8 m - boulder. At 9.1 m - boulder.						
10	Between 9.8 m and 10.1 m - some silt, trace clay.						

BENTONITE

LC_MW_WLCB

SAND

NOTES

QA/QC: SD 2021/09/29 Print Date:2021-10-01

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_WLCB

PAGE 2 OF 2

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 27
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
Sample Interval
Air Rotary

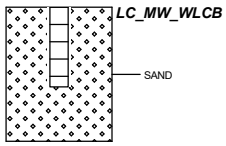
Water/NAPL Levels
Water Level 1
Water Level 2
NAPL
NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_WLCB

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, trace silt, containing cobbles, brown, loose, wet. *(continued)*						
11	Bottom of hole at 11.1 m.						
12							
13							
14							
15							
16							
17							
18							
19							
20							



Well ID	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation	Stick Up Height
	Easting	Northing	masl	masl	m
LC_MW_CP1A	659277.9	5530776	1402.757	1403.431	0.674
LC_MW_CP1B	659276.8	5530775	1402.785	1403.495	0.71

NOTES

QA/QC: SD 2021/09/29 Print Date:2021-10-01

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring - Line Creek

Borehole No. : RG_BH_LCA

PAGE 1 OF 4

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	SE
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 10
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: RG_MW_LCA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine gravel, trace silt, dark brown, damp.						
	SAND, fine to medium grained, trace gravel, trace silt, brown, loose, dry.						
1	Between 1.5 m and 1.8 m - containing cobbles.						
2	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, brown, dry.						
3							
4							
5	At 4.9 m - dark brown, damp.						
6	At 5.8 m - moist.						
	At 6.4 m - moist to wet.						
7							
8							
9							
10	Between 9.4 m and 10.1 m - containing cobbles.						

BENTONITE

NOTES
Casing: 0 – 37.3 m; Screen Interval: 37.3 – 38.9 m; Total Depth: 38.9 m
Bentonite: 0 – 7.1 m; Sand Pack: 36.9 – 38.9 m
Casing: 2-inch Schedule 40 PVC; Screens: 2-inch Schedule 40 PVC, 0.100 slot size; Sand Pack: 10/20 Frac Sand

QA/QC: KH 2021 09 15 Print Date:2021-09-21

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring - Line Creek

Borehole No. : RG_BH_LCA

PAGE 2 OF 4

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	SE
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 10
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Soil Vapour (ppm)
10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: RG_MW_LCA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
10	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, brown, dry. *(continued)*					
11	BEDROCK, shale, grey, dry.					
12						
13						
14						
15						
16						
17						
18						
19						
20						

BENTONITE

NOTES
Casing: 0 – 37.3 m; Screen Interval: 37.3 – 38.9 m; Total Depth: 38.9 m
Bentonite: 0 – 7.1 m; Sand Pack: 36.9 – 38.9 m
Casing: 2-inch Schedule 40 PVC; Screens: 2-inch Schedule 40 PVC, 0.100 slot size; Sand Pack: 10/20 Frac Sand

QA/QC: KH 2021 09 15 Print Date:2021-09-21

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring - Line Creek

Borehole No. : RG_BH_LCA

PAGE 3 OF 4

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	SE
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 10
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale
Soil Vapour (ppm)
10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: RG_MW_LCA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
20	BEDROCK, shale, grey, dry. *(continued)*					
21						
22						
23						
24						
25						
26						
27	At 26.5 m - dark grey. At 27.0 m - light grey.					
28						
29	Between 29.0 m and 29.6 m - dark grey. At 29.6 m - light grey.					
30						

BENTONITE

NOTES
Casing: 0 – 37.3 m; Screen Interval: 37.3 – 38.9 m; Total Depth: 38.9 m
Bentonite: 0 – 7.1 m; Sand Pack: 36.9 – 38.9 m
Casing: 2-inch Schedule 40 PVC; Screens: 2-inch Schedule 40 PVC, 0.100 slot size; Sand Pack: 10/20 Frac Sand

QA/QC: KH 2021 09 15 Print Date:2021-09-21

FINAL

RG_MW_LC4A

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring - Line Creek

Borehole No. : RG_BH_LCA

PAGE 4 OF 4

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	SE
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 10
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
Sample Interval
Air Rotary

Water/NAPL Levels
Water Level 1
Water Level 2
NAPL
NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: RG_MW_LCA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
30	BEDROCK, shale, grey, dry. *(continued)*						
31							
32	Between 32.0 m and 32.3 m - dark grey.						
33							
34	At 33.8 m - dark grey. At 34.1 m - light grey.						
35							
36							
37							
38	At 38.1 m - light tan.						
39	Bottom of hole at 38.9 m.						
40							

BENTONITE
RG_MW_LCA
SAND

Well ID	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation	Stick Up Height
	Easting	Northing	masl	masl	m
RG_MW_LC4A	655532.8	5528823	1279.456	1280.292	0.836
RG_MW_LC4B	655535.1	5528823	1279.502	1280.334	0.832

NOTES
Casing: 0 – 37.3 m; Screen Interval: 37.3 – 38.9 m; Total Depth: 38.9 m
Bentonite: 0 – 7.1 m; Sand Pack: 36.9 – 38.9 m
Casing: 2-inch Schedule 40 PVC; Screens: 2-inch Schedule 40 PVC, 0.100 slot size; Sand Pack: 10/20 Frac Sand

QA/QC: KH 2021 09 15 Print Date:2021-09-21

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring - Line Creek

Borehole No. : RG_BH_LCB

PAGE 1 OF 1

Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	683032
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	TBD	Borehole Logged By:	SE
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 08 13
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
Sample Interval
Air Rotary

Water/NAPL Levels
Water Level 1
Water Level 2
NAPL
NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: RG_MW_LCB

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, brown, dry.						
	SAND, fine to medium grained, trace gravel, fine, trace silt, brown, loose, dry.						
1							
	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, containing cobbles, light brown, dry.						
2							
3							
4							
5	At 5.2 m - dark brown, damp.						
6	At 6.4 m - damp to moist.						
7							
8							
	Bottom of hole at 8.4 m.						
9							
10							

BENTONITE
RG_MW_LCB
SAND
BENTONITE

Well ID	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation	Stick Up Height
	Easting	Northing	masl	masl	m
RG_MW_LC4A	655532.8	5528823	1279.456	1280.292	0.836
RG_MW_LC4B	655535.1	5528823	1279.502	1280.334	0.832

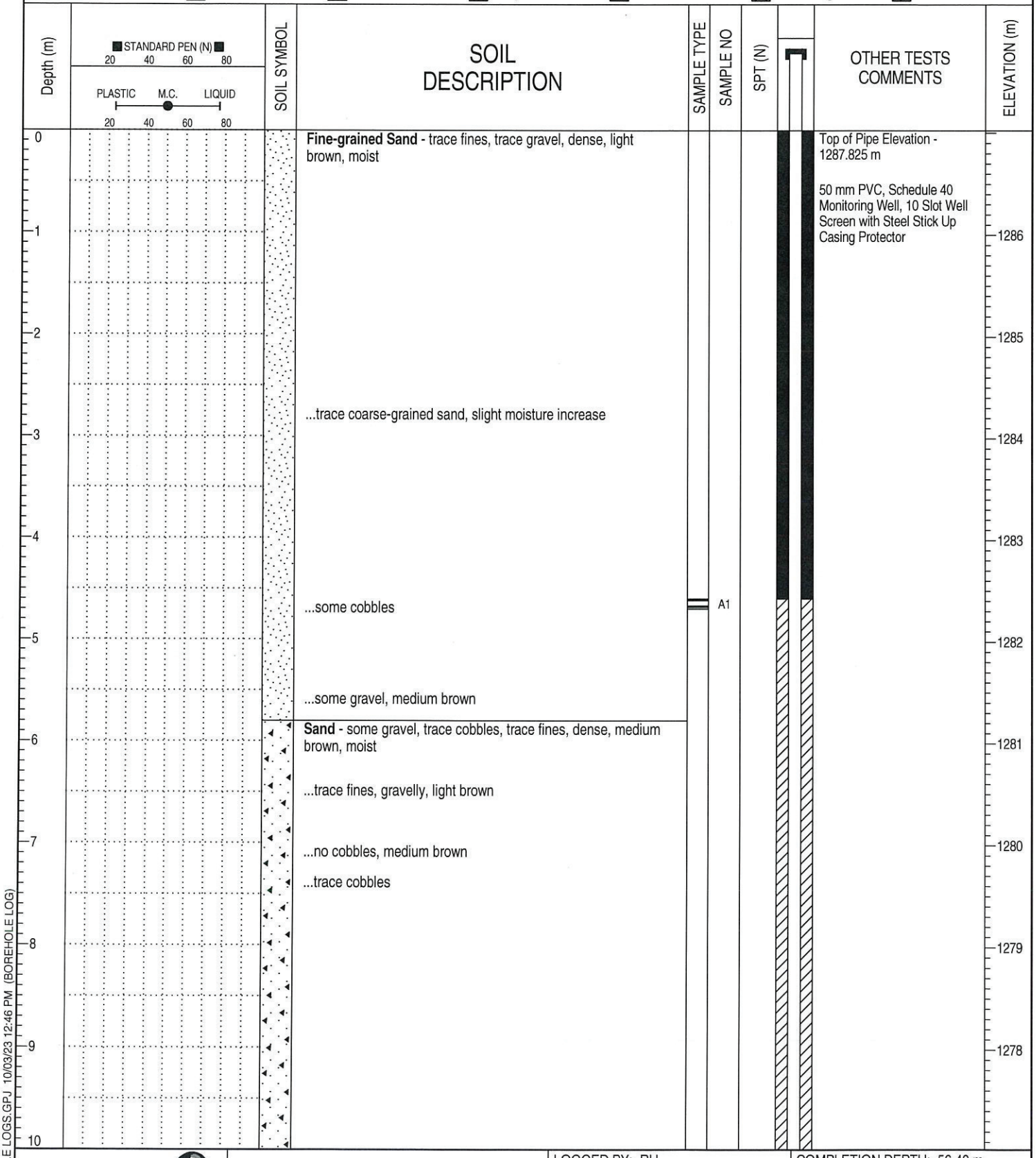
NOTES
Casing: 0 – 8.1 m; Screen Interval: 6.6 – 8.1 m; Total Depth: 8.1 m
Bentonite: 0 – 6.2 m; Sand Pack: 6.2 – 8.1 m; Bentonite: 8.1 - 8.4 m
Casing: 2-inch Schedule 40 PVC; Screens: 2-inch Schedule 40 PVC, 0.100 slot size; Sand Pack: 10/20 Frac Sand

QA/QC: KH 2021 09 15 Print Date:2021-09-21

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-01**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54656.9090,Y - 27929.7910	ELEVATION: 1287.025 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand



BOREHOLE LOGS.GPJ 10/03/23 12:46 PM (BOREHOLE LOG)

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AMEC Earth & Environmental
Medicine Hat, Alberta T1A 8G3

LOGGED BY: RH	COMPLETION DEPTH: 56.40 m
REVIEWED BY: RH	COMPLETION DATE: 1/20/10
Fig. No: 1	Page 1 of 6

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-01**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54656.9090,Y - 27929.7910	ELEVATION: 1287.025 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

Depth (m)	STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
10									
11									1276
12									1275
13									1274
14									1273
15									1272
16									1271
17									1270
18									1269
19									1268
20			...cobbley						

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Medicine Hat, Alberta T1A 8G3

LOGGED BY: RH	COMPLETION DEPTH: 56.40 m
REVIEWED BY: RH	COMPLETION DATE: 1/20/10
Fig. No: 1	Page 2 of 6

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-01**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54656.9090,Y - 27929.7910	ELEVATION: 1287.025 m

SAMPLE TYPE: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand

Depth (m)	STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
20									
21			...trace to some cobbles						1266
22									1265
23									1264
24									1263
25			...some fines, increase in moisture ...decrease in moisture						1262
26									1261
27			...and cobbles						1260
28									1259
29									1258
30									

BOREHOLE LOGS.GPJ 10/03/23 12:46 PM (BOREHOLE LOG)

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AMEC Earth & Environmental
Medicine Hat, Alberta T1A 8G3

LOGGED BY: RH	COMPLETION DEPTH: 56.40 m
REVIEWED BY: RH	COMPLETION DATE: 1/20/10
Fig. No: 1	Page 3 of 6

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-01**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54656.9090,Y - 27929.7910	ELEVATION: 1287.025 m

SAMPLE TYPE: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand

Depth (m)	STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
30			...trace cobbles, some gravel						
31			...trace fines, gravelly, light brown						1256
32			...some fines						1255
33									1254
			...trace fines						
34									1253
35									1252
36									1251
37			...ivory-white sand						1250
			...no ivory-white sand, trace fines						
38									1249
39									1248
40									

BOREHOLE LOGS.GPJ 10/03/23 12:46 PM (BOREHOLE LOG)

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Medicine Hat, Alberta T1A 8G3

LOGGED BY: RH | COMPLETION DEPTH: 56.40 m
REVIEWED BY: RH | COMPLETION DATE: 1/20/10
Fig. No: 1

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-01**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54656.9090,Y - 27929.7910	ELEVATION: 1287.025 m

SAMPLE TYPE: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand

Depth (m)	STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
40									
41									1246
42									1245
43									1244
44									1243
45									1242
46									1241
47									1240
48									1239
49									1238
50									

BOREHOLE LOGS.GPJ 10/03/23 12:46 PM (BOREHOLE LOG)

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AMEC Earth & Environmental
Medicine Hat, Alberta T1A 8G3

LOGGED BY: RH	COMPLETION DEPTH: 56.40 m
REVIEWED BY: RH	COMPLETION DATE: 1/20/10
Fig. No: 1	Page 5 of 6

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-01**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54656.9090,Y - 27929.7910	ELEVATION: 1287.025 m

SAMPLE TYPE: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand

Depth (m)	STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
50									
51									1236
52									1235
53									1234
54			**Coarse-grained Sand** - trace gravel, some fines, dense, medium brown, wet						1233
55									1232
56					A2				1231
57			**END OF BOREHOLE AT 56.4 m**						1230
58									1229
59									1228
60									

BOREHOLE LOGS.GPJ 10/03/23 12:46 PM (BOREHOLE LOG)

amec

AMEC Earth & Environmental
Medicine Hat, Alberta T1A 8G3

LOGGED BY: RH	COMPLETION DEPTH: 56.40 m
REVIEWED BY: RH	COMPLETION DATE: 1/20/10
Fig. No: 1	Page 6 of 6

LC_PIZP1002

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-02**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION: X-54273.7949,Y- 27669.2550	ELEVATION: 1272.131 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

◆ GASTECH VAPOUR ◆ 200 400 600 800

■ STANDARD PEN (N) ■ 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

Depth (m)	SOIL DESCRIPTION	SAMPLE NO	OTHER TESTS COMMENTS	ELEVATION (m)
0	**Sand and Gravel** - dense, grey, damp		Top of Pipe Elevation - 1272.931 m	1272
1	**Sand** - some gravel, trace fines, dense, medium brown, moist		10 m Slot Stainless Steel Screen. 200 m Steel Cased Water Well. Steel casing pulled back to 41.1 m. Surface seal inserted by pouring bentonite powder into annulus during last 4.5 m of drilling. Well developed for 30 minutes at 1-2 gallons/minute. Stick up steel casing protector 1 m above ground surface.	1271
2				1270
3	**Silt and Clay** - some gravel, firm, dark brown, concrete and wood inclusions, moist to wet (FILL)			1269
4				1268
5	**Sand** - some gravel, trace fines, dense, medium brown, moist ...noticable hydrocarbon odour	A1		1267
6				1266
7				1265
8	...faint hydrocarbon odour, damp ...moist	A2		1264
9	...no hydrocarbon odour	A3		1263
10				1262
11	...faint hydrocarbon odour			

BOREHOLE LOGS.GPJ 10/03/23 12:27 PM (BOREHOLE LOG)

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LOGGED BY: RH	COMPLETION DEPTH: 43.60 m
REVIEWED BY: RH	COMPLETION DATE: 1/21/10
Fig. No: 2	Page 1 of 4

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-02**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION: X-54273.7949,Y- 27669.2550	ELEVATION: 1272.131 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

GASTECH VAPOUR 200 400 600 800

STANDARD PEN (N) 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
11	...noticable hydrocarbon odour						1261
12							1260
13			A4				1259
14	...no hydrocarbon odour		A5				1258
15							1257
16							1256
17	...noticable hydrocarbon odour		A6				1255
18	...some cobbles						1254
19	...no hydrocarbon odour		A7				1253
20	...cobbley						1252
21							1251
22							

BOREHOLE LOGS.GPJ 10/03/23 12:27 PM (BOREHOLE LOG)

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-02**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION: X-54273.7949,Y- 27669.2550	ELEVATION: 1272.131 m

SAMPLE TYPE: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand

Depth (m)	GASTECH VAPOUR 200 400 600 800 / STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
22									1250
23	◆				A8				1249
24									1248
25			...fine-grained sand, some gravel						1247
26			...no hydrocarbon odour ...noticable hydrocarbon odour						1246
27									1245
28									1244
29									1243
30									1242
31									1241
32									1240
33									

BOREHOLE LOGS.GPJ 10/03/23 12:27 PM (BOREHOLE LOG)

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LOGGED BY: RH	COMPLETION DEPTH: 43.60 m
REVIEWED BY: RH	COMPLETION DATE: 1/21/10
Fig. No: 2	Page 3 of 4

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-02**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION: X-54273.7949,Y- 27669.2550	ELEVATION: 1272.131 m

SAMPLE TYPE: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand

Depth (m)	GASTECH VAPOUR (200 400 600 800) / STANDARD PEN (N) (20 40 60 80) / PLASTIC M.C. LIQUID (20 40 60 80)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
33									1239
34									1238
35									1237
36									1236
37									1235
38			...no hydrocarbon odour						1234
39									1233
40									1232
41			**Coarse-grained Sand and Gravel** - (angular gravel), silty, dense, medium brown, wet						1231
42									1230
43									1229
44			**END OF BOREHOLE AT 43.6 m**						

BOREHOLE LOGS.GPJ 10/03/23 12:27 PM (BOREHOLE LOG)

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LOGGED BY: RH	COMPLETION DEPTH: 43.60 m
REVIEWED BY: RH	COMPLETION DATE: 1/21/10
Fig. No: 2	Page 4 of 4

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-03**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54627.1430, Y - 27968.0540	ELEVATION: 1283.388 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

STANDARD PEN (N) 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	OTHER TESTS COMMENTS	ELEVATION (m)
0	**Silt** - trace clay, trace gravel, very firm, low plasticity, medium brown, damp				Top of Pipe Elevation - 1284.188 m	1283
1	**Fine-grained Sand** - trace gravel, dense, medium brown, moist				50 mm PVC, Schedule 40 Monitoring Well, 10 Slot Well Screen with Steel Stick Up Casing Protector 200 mm steel casing pulled out to expose 1.32 m of 50 mm PVC screen. Addition extraction of steel casing was not possible after the pipe broke, leaving 200 mm of casing between 27.0 m and 54.4 m	1282
2	...some gravel ...some coarse-grained sand, light brown					1281
3	**Sand** - some gravel, trace fines, dense, medium brown, moist					1280
4	...gravelly					1279
5						1278
6						1277
7	...some cobbles					1276
8	...faint solvent odour		A1			1275
9						1274
10						

BOREHOLE LOGS.GPJ 10/03/23 12:47 PM (BOREHOLE LOG)

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LOGGED BY: RH	COMPLETION DEPTH: 55.80 m
REVIEWED BY: RH	COMPLETION DATE: 1/22/10
Fig. No: 3	Page 1 of 6

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-03**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54627.1430, Y - 27968.0540	ELEVATION: 1283.388 m

SAMPLE TYPE: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand

Depth (m)	STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
10			...and gravel						1273
11			...gravelly						1272
12									1271
13									1270
14			...some gravel, damp						1269
15									1268
16									1267
17			...trace gravel						1266
18									1265
19			...some gravel, moist						1264
20									

BOREHOLE LOGS.GPJ 10/03/23 12:47 PM (BOREHOLE LOG)

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LOGGED BY: RH | COMPLETION DEPTH: 55.80 m
REVIEWED BY: RH | COMPLETION DATE: 1/22/10
Fig. No: 3

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-03**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54627.1430, Y - 27968.0540	ELEVATION: 1283.388 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

STANDARD PEN (N) 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
20								1263
21								1262
22								1261
23		...trace gravel, some fines						1260
24								1259
25								1258
26								1257
27		...trace fines						1256
28								1255
29		...some gravel						1254
30								

BOREHOLE LOGS.GPJ 10/03/23 12:47 PM (BOREHOLE LOG)

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LOGGED BY: RH	COMPLETION DEPTH: 55.80 m
REVIEWED BY: RH	COMPLETION DATE: 1/22/10
Fig. No: 3	Page 3 of 6

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-03**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54627.1430, Y - 27968.0540	ELEVATION: 1283.388 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

Depth (m)	STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
30									1253
31			...some cobbles						1252
32									1251
33									1250
34									1249
35			...some fines						1248
36									1247
37			...trace fines						1246
38									1245
39									1244
40									

BOREHOLE LOGS.GPJ 10/03/23 12:47 PM (BOREHOLE LOG)

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LOGGED BY: RH	COMPLETION DEPTH: 55.80 m
REVIEWED BY: RH	COMPLETION DATE: 1/22/10
Fig. No: 3	Page 4 of 6

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-03**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54627.1430, Y - 27968.0540	ELEVATION: 1283.388 m

SAMPLE TYPE: Shelby Tube | No Recovery | SPT Test (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Slough | Grout | Drill Cuttings | Sand

Depth (m)	STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
40									1243
41			...grey, damp						1242
			...medium brown						
42									1241
43									1240
44									1239
45									1238
			...cobbly						
46									1237
47									1236
48									1235
49									1234
50									

BOREHOLE LOGS.GPJ 10/03/23 12:47 PM (BOREHOLE LOG)

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LOGGED BY: RH	COMPLETION DEPTH: 55.80 m
REVIEWED BY: RH	COMPLETION DATE: 1/22/10
Fig. No: 3	Page 5 of 6

CLIENT: Teck Coal Ltd.	PROJECT: Soil and Groundwater Assessment	BOREHOLE NO: **MW10-03**
DRILLER: J.R. Drilling	LOCATION: Line Creek Mine, Sparwood, B.C.	PROJECT NO: BX05973
DRILL/METHOD: Air Rotary	BOREHOLE LOCATION:X - 54627.1430, Y - 27968.0540	ELEVATION: 1283.388 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

Depth (m)	STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
50									1233
51									1232
52									1231
53									1230
54			**Gravel** - some sand, trace fines, dense, medium brown, wet						
55			**Coarse-grained Sand** - some gravel, some fines, dense, medium brown, wet						1229
56			**END OF BOREHOLE AT 57.8 m**						1228
57									1227
58									1226
59									1225
60									1224

BOREHOLE LOGS.GPJ 10/03/23 12:47 PM (BOREHOLE LOG)

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LOGGED BY: RH	COMPLETION DEPTH: 55.80 m
REVIEWED BY: RH	COMPLETION DATE: 1/22/10
Fig. No: 3	Page 6 of 6

CLIENT: Teck Coal Ltd.	PROJECT: GW Assessment - Effluent Ponds	BOREHOLE NO: **MW11(P)-01**
DRILLER: JR Drilling	LOCATION: Teck - LCO	PROJECT NO: BX06169
DRILL/METHOD: DR-12/ Air Rotary	BOREHOLE LOCATION: Refer to site plan	ELEVATION: 1266.06 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

Depth (m)	SOIL DESCRIPTION	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
0	**SAND**, silty, some gravel, trace clay, loose, compact, medium brown, dry	1			Top of casing (TOC) elevation is 1267.06 mASL. Stick-up = 1.0 m.	1265
1	-gravelly	2				1264
2	**SILT**, sandy, some cobbles, some gravel, compact, grey brown, damp	3				1263
3		4				1262
4		5				1261
5		6				1260
6	**SILTY SAND**, some gravel, compact, medium brown, dry					1259
7		7				1258
8	**SILT** , some cobbles, trace FG sand, firm, medium brown, damp	8				1257
9		9				1256
10		10				1255
11						1254
12						1253
13						1252
14		11				1251
15						1250
16						1249
17		12				1248
18						1247
19	-damp					1246
20	-dry	13				1245
21						1244
22						1243
23		14				1242
24						1241
25						1240
26	-damp	15			Depth to groundwater was 30.81 m from TOC 23 November 2011 (1236.25 mASL).	1239
27						1238
28						1237
29						1236
30						1235
31						1234
32						1233
33	**SAND AND GRAVEL**, dense, brown grey, moist (sub-rounded gravel)				150 mm steel casing installed from surface to 33.5 m.	1232
34		16				1231
35	**CG SAND**, some gravel, dense, brown grey, wet (sub rounded to sub angular)					1230
36		17				1229
37						1228
38	-wet				A 50 mm Schedule 40 slotted PVC screen was installed from 37.5 m to 40.5 m.	1227
39						1226
40						1225
41	**END OF HOLE AT 41.2 m**				$K = 7.4 \times 10^{-4}$ m/s	1224
42	Borehole wet at completion. Monitoring well installed.					1223
43						1222
44						
45						

GASTECH VAPOUR 200 400 600 800

STANDARD PEN (N) 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

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LOGGED BY: RH
REVIEWED BY: LH

COMPLETION DEPTH: 40.50 m
COMPLETION DATE: 11/15/11

CLIENT: Teck Coal Ltd.	PROJECT: GW Assessment - Effluent Ponds	BOREHOLE NO: **MW11(P)-03**
DRILLER: JR Drilling	LOCATION: Teck - LCO	PROJECT NO: BX06169
DRILL/METHOD: DR-12/Air Rotary	BOREHOLE LOCATION: Refer to site plan	ELEVATION: 1263.49 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

GASTECH VAPOUR 200 400 600 800

STANDARD PEN (N) 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
0–14	**CLAY**, some silt, some sand, trace organics, very soft, medium plastic, medium brown, moist					Top of casing (TOC) elevation is 1264.53 mASL. Stick-up = 1.04 m.	1263–1249
14–18	**GRAVEL**, some sand, some fines, compact, medium brown, moist						1249–1245
18–29	**SAND**, silty, some gravel, some cobbles, compact, grey, damp **SILT**, sandy, some gravel, some cobbles, firm, grey, moist					Depth to water was 27.81 m below TOC on 23 November 2011. Groundwater elevation was 1236.72 m ASL.	1245–1234
29–31	**SAND & GRAVEL**, some fines, dense, medium brown, moist to wet **SILT**, clayey, sandy, some gravel, some cobbles, medium brown, moist					The 150 mm steel casing terminates at 31.1 m.	1234–1232
35–38						A 50 mm Schedule 40 slotted PVC screen installed from 35.1 m to 38.1 m.	1228–1225
38–39						$K = 7.4 \times 10^{-8}$ m/s	1225–1224
39–41	**BEDROCK**						1224–1222
41	**END OF BOREHOLE AT 41.2 m** Borehole wet upon completion. Monitoring well installed.						1222–1219

BX06169 - BOREHOLE LOGS - SEPTEMBER 30,2011.GPJ 12/01/04 03:30 PM (BOREHOLE LOG)

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Medicine Hat, Alberta

LOGGED BY: RH	COMPLETION DEPTH: 41.20 m
REVIEWED BY: LH	COMPLETION DATE: 11/18/11

CLIENT: Teck Coal Ltd.	PROJECT: GW Assessment - Effluent Ponds	BOREHOLE NO: **MW11(P)-04**
DRILLER: JR Drilling	LOCATION: Teck - LCO	PROJECT NO: BX06169
DRILL/METHOD: DR-12/Air Rotary	BOREHOLE LOCATION: Refer to site plan	ELEVATION: 1271.15 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

Depth (m)	GASTECH VAPOUR 200 400 600 800 / STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
0–8	◆ 6		**CLAY**, trace silt, trace sand, some cobbles, firm, medium plastic, medium brown, moist -some reddish-pink fragments (fractured cobbles) -cobbley (6.7 to 7.3 m)					Top of casing (TOC) elevation is 1272.10 mASL. Stick-up = 0.95 m.	1270–1263
8–15	◆ 9, ◆ 12, ◆ 15		**SILT**, some cobbles, some sand, tracy clay, firm, light brown, damp -moist -sandy -some sand -sandy -cobbley						1263–1256
15–22	◆ 18, ◆ 21		-some cobbles						1256–1249
22–30	◆ 24, ◆ 27		-some sand -30 cm seam of silty sand, moist						1249–1241
30–33			**SAND & GRAVEL**, silty, some cobbles, dense, medium brown, moist					Steel casing terminates at 30.8 m. Depth to groundwater 34.86 m from TOC on 23 November 2011 (1237.25 mASL).	1241–1238
33–35	▼ 34, ◆ 35							A 50 mm Schedule 40 slotted PVC screen installed from 33.8 m to 36.8 m. K = 3.4 x 10^{-4} m/s	1238–1236
35–36			**SILT**, some cobbles, some sand, trace clay, firm, dark brown, wet						1236–1235
36–37			**SAND & GRAVEL**, silty, some cobbles, dense, medium brown, wet						1235–1234
37–38			**SILT**, some cobbles, some sand, trace clay, firm, dark brown, wet						1234–1233
38–45			**END OF BOREHOLE AT 38.1 m** Borehole wet upon completion. Monitoring well installed.						1233–1227

BX06169 - BOREHOLE LOGS - SEPTEMBER 30,2011.GPJ 12/01/04 03:30 PM (BOREHOLE LOG)

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LOGGED BY: RH	COMPLETION DEPTH: 38.10 m
REVIEWED BY: LH	COMPLETION DATE: 11/21/11

CLIENT: Teck Coal Ltd.	PROJECT: GW Assessment - Effluent Ponds	BOREHOLE NO: **MW11(P)-05**
DRILLER: JR Drilling	LOCATION: Teck - LCO	PROJECT NO: BX06169
DRILL/METHOD: DR-12/Air Rotary	BOREHOLE LOCATION: Refer to site plan	ELEVATION: 1272.94 m

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen

BACKFILL TYPE: Bentonite; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

Depth (m)	GASTECH VAPOUR 200 400 600 800 / STANDARD PEN (N) 20 40 60 80 / PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	WELL INSTALLATION	OTHER TESTS COMMENTS	ELEVATION (m)
0–7			**CLAY**, trace silt, trace sand, some cobbles, firm, medium plastic, medium brown, moist					Top of casing (TOC) elevation is 1273.86 mASL. Stick-up = 0.92 m.	1272–1266
6			-cobbley						
8–21			**SILT**, some cobbles, some sand, tracy clay, firm, orange brown, damp -30 cm seam of silty sand, moist -cobbley, medium brown						1265–1253
21			-boulder						1252
25			-sandy, light brown						1248
32								150 mm steel casing terminates at 32.0 m.	1241
35–37								A 50 mm Schedule 40 slotted PVC screen was installed from 35.1 m to 38.1 m.	1238–1236
37								Depth to groundwater is 38.35 m from TOC on 23 November 2011 (1235.51 mASL).	1235
38–40			**SAND & GRAVEL**, some fines, some cobbles, dense, medium brown, damp **BEDROCK**					K - n/a	1234–1233
40			**END OF BOREHOLE AT 40.5 m** Borehole wet upon completion. Monitoring well installed.						1233
41–45									1232–1229

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Medicine Hat, Alberta

LOGGED BY: RH
REVIEWED BY: LH

COMPLETION DEPTH: 40.50 m
COMPLETION DATE: 11/22/11

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_ERX1A

PAGE 1 OF 3

Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	686625
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	1300.869	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 11 18
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5526826.843	Easting: 655035.574	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_ERX1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	GRAVELLY SAND (TILL), fine to medium grained sand, fine to coarse gravel, subangular to subrounded, some clay, trace silt, brown, medium dense, low plasticity, containing cobbles, damp.					60	
1	Between 0.0 m and 0.6 m - contains organic material, orange oxidation.						
2	Between 2.1 m and 3.0 m - boulder.						
3	Between 3.0 m and 4.6 m - dense.					80	
4							
5	BOULDER, aphanitic, moderate dense, oxidized, thickly bedded.					60	
6						90	
7	SANDY GRAVEL (TILL), fine to coarse gravel, subangular, fine to medium grained sand, some clay, trace silt, grey-brown, dense, low plasticity, damp.						
8							
9	Between 9.1 m and 9.4 m - boulder.					120	
10	SILTY GRAVEL (TILL), fine to coarse gravel, subangular, some clay, trace sand, fine to medium grained, dark brown, dense, low plasticity, damp.						

BENTONITE

NOTES

QA/QC: AH 2022 01 19 Print Date:2022-01-19

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_ERX1A

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Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	686625
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	1300.869	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 11 18
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5526826.843	Easting: 655035.574	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- Reading within indicated scale
- Reading outside indicated scale

10^1 10^2 10^3 10^4

Well Name 1: LC_MW_ERX1A
- Solid PVC
- Slotted PVC

Depth in Metres	Soil Description	Blow Count	% Recovery
10	Between 9.8 m and 10.1 m - light brown oxidization. SILTY GRAVEL (TILL), fine to coarse gravel, subangular, some clay, trace sand, fine to medium grained, dark brown, dense, low plasticity, damp. *(continued)*		
11	Between 11.3 m and 11.6 m - light orange oxidization.		
12		100	
13	SILTY GRAVEL (TILL), fine to coarse gravel, subrounded, some clay, trace sand, fine to coarse grained, dark brown, dense, low plasticity, damp.		
14			
15	Between 15.2 m and 16.2 m - moist.	100	
16	BEDROCK, shale, dark grey, weak.		
17			
18		100	
19			
20			

BENTONITE

SAND

LC_MW_ERX1A

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_ERX1A

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Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	686625
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	1300.869	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 11 18
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5526826.843	Easting: 655035.574	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

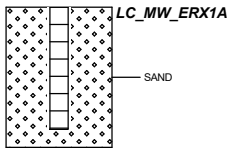
Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_ERX1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
20	BEDROCK, shale, dark grey, weak. *(continued)*						
21	Bottom of hole at 21.2 m.						
22							
23							
24							
25							
26							
27							
28							
29							
30							



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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_ERX1B

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Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	686625
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	1300.856	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 11 19
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5526832.015	Easting: 655034.788	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_ERX1B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	GRAVELLY SAND (TILL), fine to medium grained sand, fine to coarse gravel, subangular to subrounded, some clay, trace silt, containing cobbles, brown, medium dense, low plasticity, damp. Between 0.0 m and 0.6 m - contains organic material.					60	
5	SILTY GRAVEL (TILL), fine to coarse gravel, subangular, some sand, fine to medium grained, trace clay.					70	
6	SANDY GRAVEL (TILL), fine to coarse gravel, subangular, fine to medium grained sand, some clay, trace silt, grey-brown, dense, low plasticity, damp.					100	
9	SILTY GRAVEL (TILL), fine to coarse gravel, subangular, some clay, trace sand, fine to medium grained, dark brown, dense, low plasticity, damp.					100	
10							

BENTONITE

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_ERX1B

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Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	686625
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	1300.856	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 11 19
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5526832.015	Easting: 655034.788	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

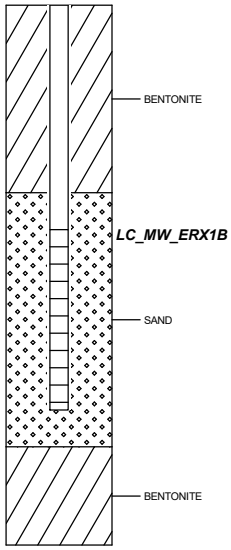
Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_ERX1B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	Between 9.8 m and 11.6 m - orange-brown oxidation. SILTY GRAVEL (TILL), fine to coarse gravel, subangular, some clay, trace sand, fine to medium grained, dark brown, dense, low plasticity, damp. *(continued)*					80	
11							
12							
13							
14	BEDROCK, shale, dark grey, weak.						
	Bottom of hole at 14.6 m.						
15							
16							
17							
18							
19							
20							



NOTES

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LC_MW_SRD1A

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRDA

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Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	631283
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	n/a	Borehole Logged By:	AH
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 08 24
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale
Soil Vapour (ppm)

Solid PVC
Slotted PVC

Well Name 1: LC_MW_SRDA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
0	SILTY SAND, fine grained sand, trace gravel, fine to coarse, subrounded, brown, loose, damp.					
1	SAND and GRAVEL, fine grained sand, fine to coarse gravel, subrounded, trace silt, grey, loose, dry.					
	Between 1.5 m and 3.0 m - less fine grained sand, less silt.					
2						
3						
4	Between 4.0 m and 4.6 m - less sand, less silt, damp.					
	GRAVEL, fine to coarse, subrounded, trace sand, fine grained, grey, loose, dry.					
5						
	SAND and GRAVEL, fine grained sand, fine to coarse gravel, subrounded, brown, loose, dry.					
6						
7	At 7.0 m - moist.					
	GRAVEL, coarse, subrounded, grey, loose, dry.					
8						
	SAND and GRAVEL, fine to medium grained sand, fine to coarse gravel, subrounded, brown, loose, wet.					
9						
10						

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LC_MW_SRD1A

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRDA

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Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	631283
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	n/a	Borehole Logged By:	AH
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 08 24
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Soil Vapour (ppm)

Solid PVC
Slotted PVC

Well Name 1: LC_MW_SRDA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
10	SAND and GRAVEL, fine to medium grained sand, fine to coarse gravel, subrounded, brown, loose, wet. *(continued)*					
11	GRAVEL, fine to coarse, subrounded, trace sand, coarse grained, poorly graded, brown, loose, wet.					
12						
13						
14	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, trace silt, well graded, dark grey, wet.					
15						
16	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, silty, well graded, brown, loose wet.					
17	SANDY CLAY, assumed to be sandy clay, no returns.					
18						
19						
20						

BENTONITE

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRDA

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Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	631283
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	n/a	Borehole Logged By:	AH
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 08 24
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Soil Vapour (ppm)

Solid PVC
Slotted PVC

Well Name 1: LC_MW_SRDA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
20	SANDY CLAY, assumed to be sandy clay, no returns. *(continued)*					
21						
	SANDY CLAY, fine grained sand, some silt, medium plasticity, brown, loose, wet.					
22						
23	Between 22.9 m and 24.4 m - no returns.					
24						
	SILTY CLAY, trace sand, fine grained, soft, medium plasticity, dark brown, wet.					
25						
26	Between 25.9 m and 27.4 m - no returns.					
27						
28						
29	SILTY CLAY, dark brown, soft.					
30						

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SAND

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRDA

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Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	631283
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	n/a	Borehole Logged By:	AH
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 08 24
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
Sample Interval
Air Rotary

Water/NAPL Levels
Water Level 1
Water Level 2
NAPL
NAPL

Reading within indicated scale
Reading outside indicated scale
Soil Vapour (ppm)
10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: LC_MW_SRDA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
30	SILTY CLAY, dark brown, soft. *(continued)*					
31						
32	WEATHERED BEDROCK, shale, dark brown, soft, damp.					
33						
34						
35						
36	BEDROCK, shale, black, competent, soft. Between 36.6 m and 36.9 m - wet.					
37						
38	Bottom of hole at 37.5 m.					
39						
40						

LC_MW_SRDA
SAND
BENTONITE

Well ID	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation
	Easting	Northing	masl	masl
LC_MW_SRD1A	653604	5526818	1202.46	1203.25
LC_MW_SRD1B	653601	5526820	1202.47	1203.16

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Client
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Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRDB

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Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	631283
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	n/a	Borehole Logged By:	SE
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 08 16
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_SRDB

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SILTY SAND, fine grained sand, trace clay, trace gravel, light brown, loose, dry.						
	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular, dry.						
1							
2	GRAVEL, fine to coarse, trace sand, coarse grained, containing cobbles, dry.						
3							
4							
5							
6	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, brown, dry to damp.						
7	At 6.9 m - damp.						
8	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, containing cobbles, dark brown, dry to damp.						
9	At 8.7 m - dry.						
10							

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SAND

LC_MW_SRDB

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRDB

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Drilling Contractor	JR Drilling	Date Monitored	n/a	Project Number:	631283
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	n/a	Borehole Logged By:	SE
Borehole Dia. (m)	0.18	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 08 16
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
Sample Interval
Air Rotary

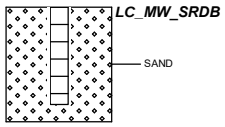
Water/NAPL Levels
Water Level 1
Water Level 2
NAPL
NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_SRDB

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	GRAVEL, moist.						
11	Bottom of hole at 11.0 m.						
12							
13							
14							
15							
16							
17							
18							
19							
20							



Well ID	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation
	Easting	Northing	masl	masl
LC_MW_SRD1A	653604	5526818	1202.46	1203.25
LC_MW_SRD1B	653601	5526820	1202.47	1203.16

NOTES

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRD2A

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Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	686625
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	1197.216	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 11 20
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5525984.264	Easting: 653884.634	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_SRD2A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SILTY SAND, fine grained sand, trace clay, brown, loose, low plasticity, damp, contains rootlets.					70	
1	SAND, fine to medium grained, trace gravel, fine, subrounded, poorly graded, brown, loose, damp.						
2	GRAVEL, fine to coarse, subrounded, some sand, fine to coarse grained, brown, loose, damp, containing cobbles (75-150 mm), subrounded.						
3						70	
4	Between 3.7 m and 4.0 m - some silt.						
5							BENTONITE
6	At 6.1 m - wet. Between 6.1 m and 9.1 m - trace silt.					50	
7							
8							
9	Between 9.1 m and 10.7 m - containing cobbles.					50	
10							

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRD2A

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Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	686625
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	1197.216	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 11 20
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5525984.264	Easting: 653884.634	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale
Soil Vapour (ppm)

Solid PVC
Slotted PVC

Well Name 1: LC_MW_SRD2A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
10	GRAVEL, fine to coarse, subrounded, some sand, fine to coarse grained, brown, loose, damp, containing cobbles (75-150 mm), subrounded. *(continued)*					
11						
12						80
13						
14						
15	GRAVELLY SILT, fine to coarse gravel, subrounded, some sand, fine grained, trace clay, brown, dense, low plasticity, damp.					100
16						
17						
18	SILTY CLAY, some sand, fine to coarse grained, dark brown, medium dense, medium plasticity, damp, laminated 1-2 mm layers of silt and clay.					100
19	SANDY CLAY, fine to medium grained sand, some gravel, fine to coarse, subrounded, some silt, dark grey, medium dense, medium plasticity, moist.					
20						

BENTONITE

LC_MW_SRD2A

SAND

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRD2A

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Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	686625
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	1197.216	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 11 20
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5525984.264	Easting: 653884.634	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

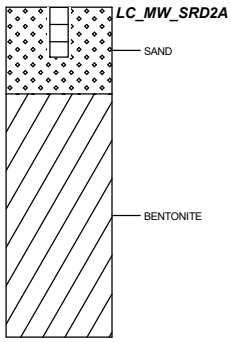
Soil Vapour (ppm)
- Reading within indicated scale
- Reading outside indicated scale

10^1 10^2 10^3 10^4

- Solid PVC
- Slotted PVC

Well Name 1: LC_MW_SRD2A

Depth in Metres	Soil Description	Sample Number	Blow Count	% Recovery
20	SANDY CLAY, fine to medium grained sand, some gravel, fine to coarse, subrounded, some silt, dark grey, medium dense, medium plasticity, moist. *(continued)*			
21	BEDROCK.			80
22				
23	Bottom of hole at 22.8 m.			
24				
25				
26				
27				
28				
29				
30				



NOTES

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_SRD2B

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Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	686625
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	1197.215	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	n/a	Date Drilled:	2021 11 20
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5525982.579	Easting: 653884.742	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_SRD2B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SILTY SAND, fine grained sand, trace clay, loose, low plasticity, damp, contains organic material.					70	
1	SAND, fine to medium grained, trace gravel, fine, subrounded, poorly graded, brown, loose, damp.						
2	GRAVEL, fine to coarse, subrounded, some sand, fine to coarse grained, brown, loose, damp, containing cobbles (75-150 mm), subrounded.						
3						80	
4							
5							
6	At 5.8 m - moist. Between 6.1 m and 9.1 m - trace silt.					50	
7							
8							
9	Bottom of hole at 9.1 m.						
10							

BENTONITE
LC_MW_SRD2B
SAND
SLOUGH

NOTES

QA/QC: AH 2022 01 19 Print Date:2022-01-19

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_ER4A

PAGE 1 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 20	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1192.955	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1193.924	Date Drilled:	2020 05 08
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5525918.369	Easting: 653205.305	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Soil Vapour (ppm)

Solid PVC
Slotted PVC

Well Name 1: LC_MW_ER4A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular to subrounded, some silt, well graded, brown, loose, damp, organics.			ER4A-01		
1	At 0.45 m - no organics.					
2				ER4A-02		
3						
4	At 4.0 m - moist.			**ER4A-03**		
5	At 4.6 m - wet.			ER4A-04		
6						
7	CLAY, some silt, some sand, fine to coarse grained, some gravel, fine to coarse, angular to subangular, well graded, brown, firm, low plastic, wet.			ER4A-05		
8	Below 7.6 m - trace sand, trace gravel.			**ER4A-06**		
9	CLAY, trace sand, fine to coarse grained, brown, firm, medium plastic, damp.			ER4A-07		
10						

BENTONITE

BENTONITE

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_ER4A

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 20	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1192.955	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1193.924	Date Drilled:	2020 05 08
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5525918.369	Easting: 653205.305	Log Typed By:	VL

Drilling Legend: Sample Interval; Odex

Water/NAPL Levels: Water Level 1; Water Level 2; NAPL; NAPL

Reading within indicated scale; Reading outside indicated scale

Soil Vapour (ppm): 10^1 10^2 10^3 10^4

Solid PVC; Slotted PVC

Well Name 1: LC_MW_ER4A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
10	CLAY, trace sand, fine to coarse grained, brown, firm, medium plastic, damp. *(continued)*			ER4A-07		
11	SILT, some clay, brown, soft, wet.			ER4A-08		
12	SAND and SILT, fine grained sand, poorly graded, brown, very soft, wet.			ER4A-09		
13	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, trace silt, well graded, grey, medium dense, wet.			**ER4A-10**		
14						
15	SAND, fine to coarse grained, some gravel, fine to coarse, subrounded to subangular, some silt, well graded, brown, medium dense, wet.			ER4A-11		
16						
17	At 16.8 m - possible weathered bedrock.			ER4A-12		
18	BEDROCK, siltstone, dark grey, weathered, mixed with some sand, fine to coarse grained, trace gravel, subrounded to rounded.					
19	At 19.2 m - bedrock competent, soft.			ER4A-13		
20				ER4A-14		

BENTONITE

LC_MW_ER4A

SAND

BENTONITE

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_ER4A

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 20	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1192.955	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1193.924	Date Drilled:	2020 05 08
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5525918.369	Easting: 653205.305	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_ER4A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4	
20	BEDROCK, siltstone, dark grey, weathered, mixed with some sand, fine to coarse grained, trace gravel, subrounded to rounded. *(continued)*			ER4A-14				BENTONITE
21	Bottom of hole at 21.3 m.							
22								
23								
24								
25								
26								
27								
28								
29								
30								

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : LC_BH_ER4B

PAGE 1 OF 1

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 20	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1192.892	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1193.852	Date Drilled:	2020 05 09
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5525917.200	Easting: 653205.946	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: LC_MW_ER4B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular to subrounded, some silt, well graded, brown, loose, damp, organics.						
1	At 0.45 m - no organics.						
2							
3							
4	At 4.0 m - moist.						
5	At 4.6 m - wet.						
6	CLAY, some silt, some sand, fine to coarse grained, some gravel, fine to coarse, angular to subangular, well graded, brown, firm, low plastic, wet.						
7	Bottom of hole at 6.1 m.						
8							
9							
10							

BENTONITE
LC_MW_ER4B
SAND
BENTONITE

NOTES

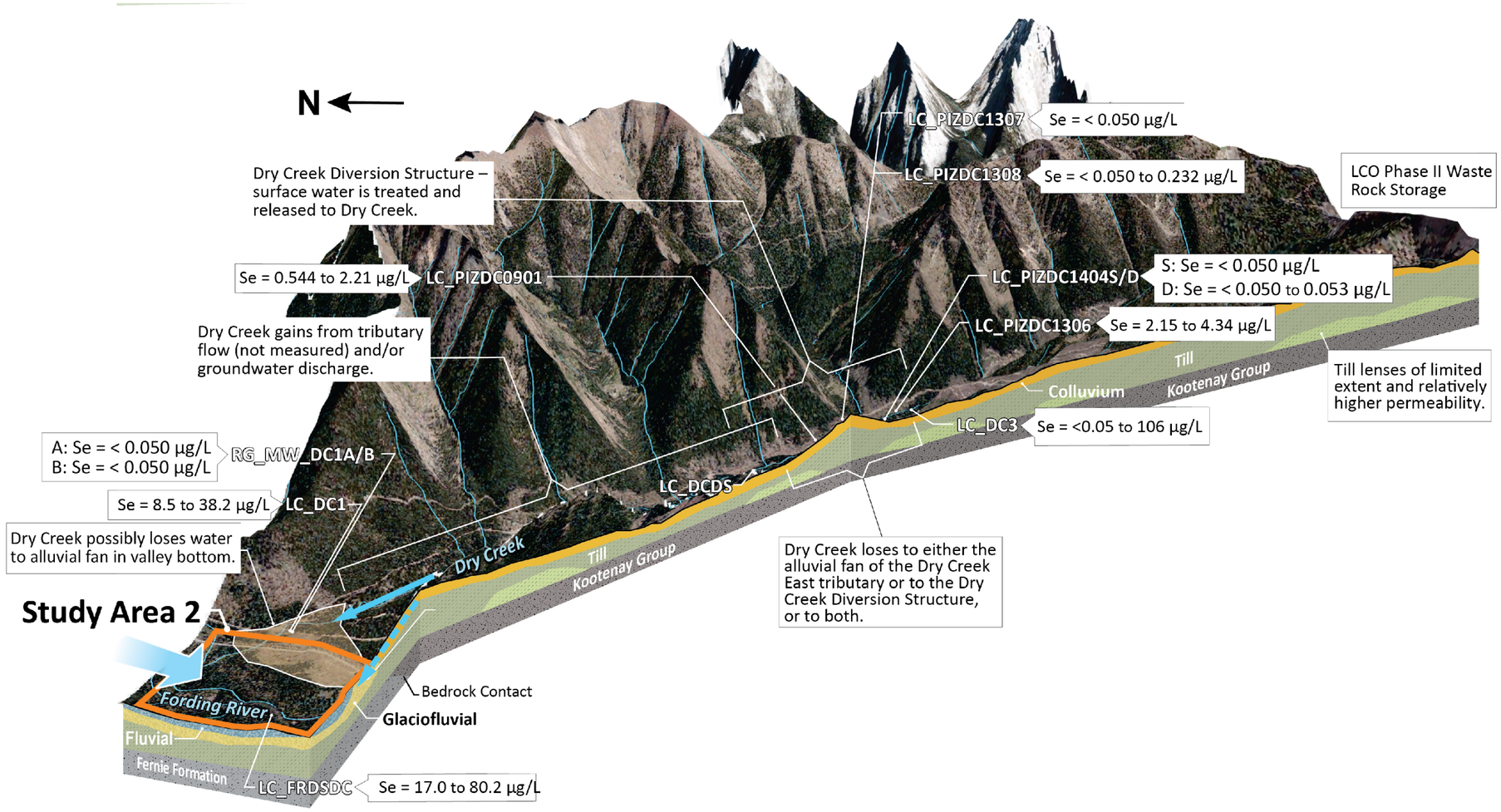
QA/QC: MB 2020 06 22 Print Date:2020-12-02

Attachment II: Block Diagrams

Diagram LC-01: Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at LCO – Dry Creek and Study Area 2

Diagram LC-02: Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at LCO – Centre Line Creek and West Line Creek

Diagram LC-03: Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at LCO – Line Creek, Process Plant, Elk River, and Study Areas 5/6



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

NOTES:
1. Original in colour.
2. All concentrations shown are for 2021 minimum and maximum unless otherwise stated.
3. Subsurface geology is not to scale.
4. Vertical exaggeration 2x for topographic profile.

References:
1. Graphics from Brick Tudor Studios, LLC.
2. Bedrock geology derived from Monahan, 2000, BC Government.

Revisions:
0 - CW - 2022-03-04 - FINAL - MG

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

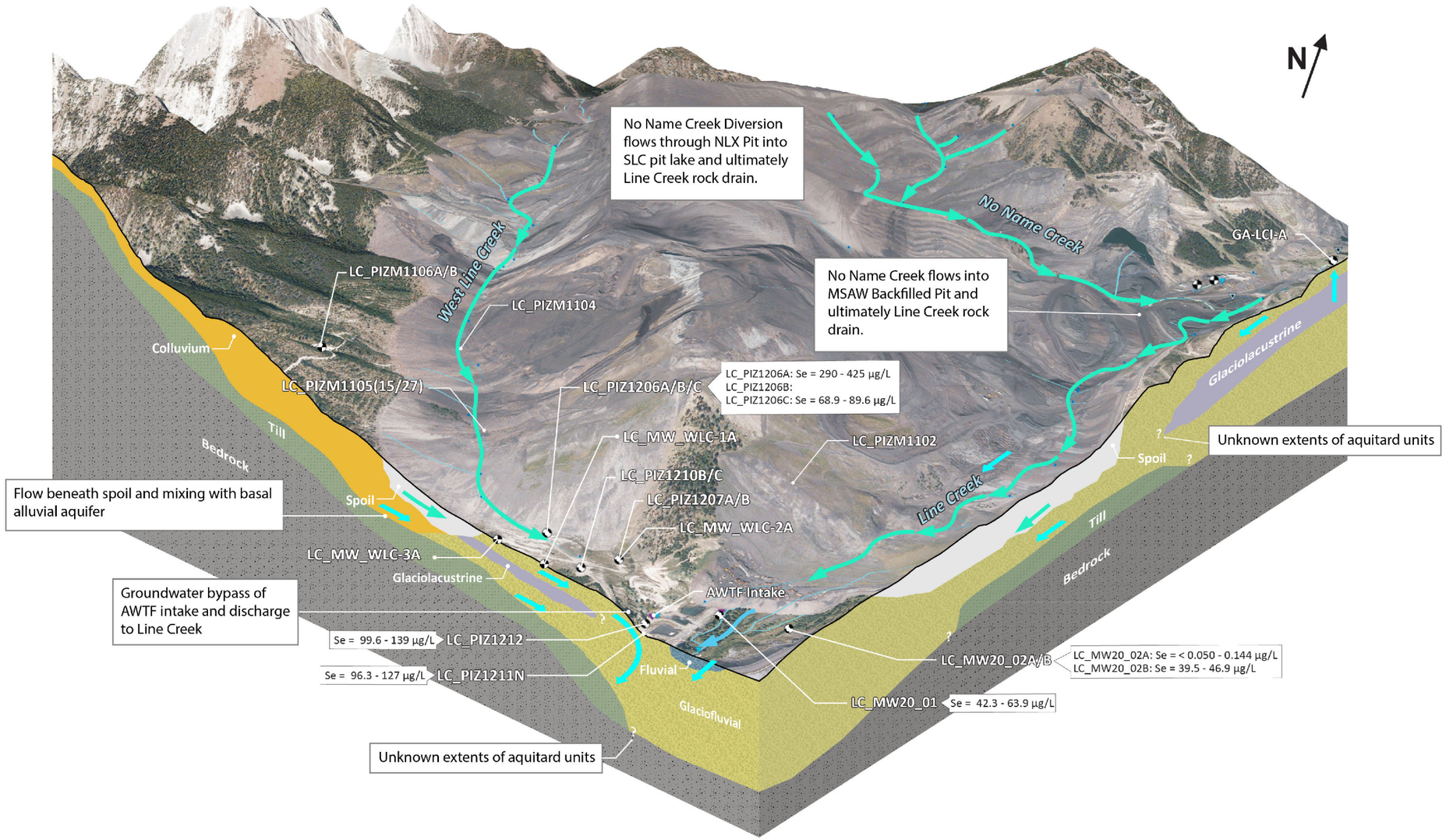
SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at LCO - Dry Creek and Study Area 2

BY: CW	SCALE:	DATE: 2022-03-04	REF No:
CHK'D: MG	Proj Coord Sys:		**DIAGRAM LC-01**

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-BlockDiagram_LC01.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Flow Legend

- Surface Water Flow Pathway
- Subsurface (Rock Drain) Flow Pathway
- Groundwater Flow Pathway

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. All concentrations shown are for 2021 minimum and maximum unless otherwise stated.
4. Sub-surface geology not to scale
5. Vertical exaggeration 2x for topographic profile.
6. Surface water and groundwater concentrations are dissolved selenium.

References:
1. Graphics from Brick Tudor Studios, LLC.
2. Bedrock geology derived from Monahan, 2000, BC Government.

Revisions:
0 - CW - 2022-03-04 - FINAL - MG

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at LCO - Centre Line Creek and West Line Creek

BY:	SCALE:	DATE:	REF No:
CW		2022-03-04	DIAGRAM LC-02
CHK'D: MG	Proj Coord Sys:		

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-BlockDiagram_LC02.mxd

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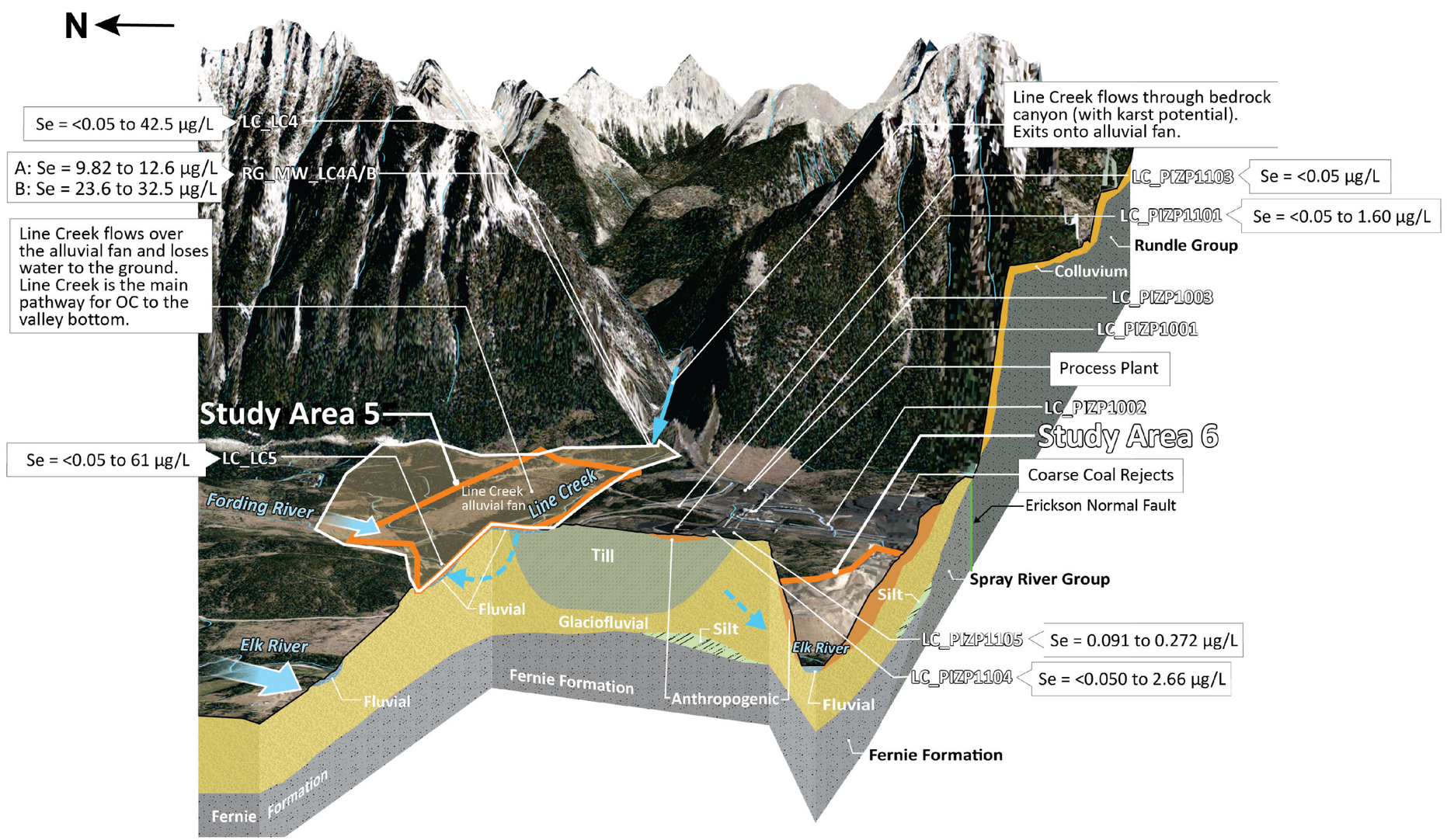

Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

NOTES:
1. Original in colour.
2. All concentrations shown are for 2021 minimum and maximum unless otherwise stated.
3. Subsurface geology is not to scale.
4. Vertical exaggeration 2x for topographic profile.
5. There are multiple hydrostratigraphic zones targeted by the monitoring wells

References:
1. Graphics from Brick Tudor Studios, LLC.
2. Bedrock geology derived from Monahan, 2000, BC Government.

Revisions:
0 - CW - 2022-03-25 - FINAL - MG

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at LCO - Line Creek, Process Plant, Elk River, and Study Areas 5/6

BY:	SCALE:	DATE:	REF No:
CW		2022-03-04	DIAGRAM LC-03
CHK'D: MG	Proj Coord Sys:		

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

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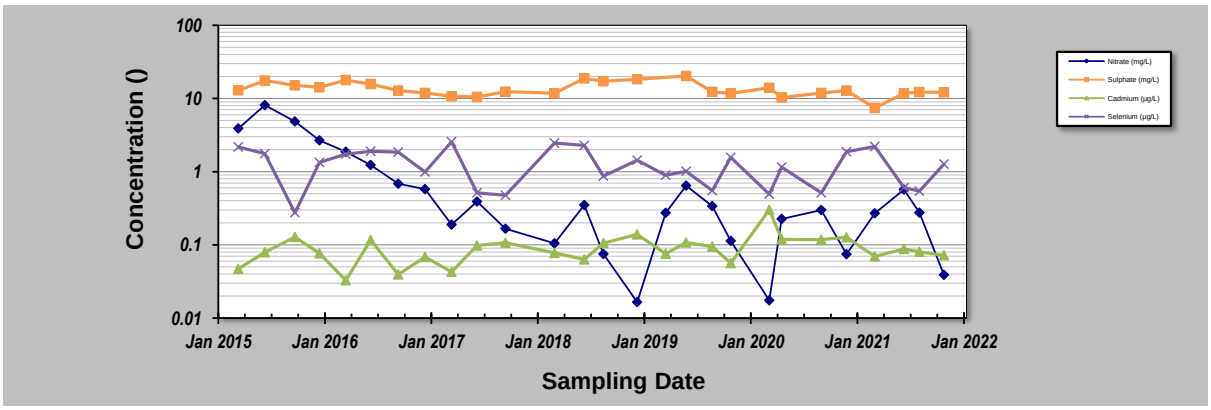
Attachment III: Mann-Kendall Analyses – Line Creek Operations

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	03-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	LC_PIZDC0901
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	LC_PIZDC0901 CONCENTRATION						
1	11-Mar-15	3.900	12.900	0.047	2.180			
2	10-Jun-15	8.100	17.600	0.079	1.760			
3	22-Sep-15	4.850	15.100	0.128	0.275			
4	16-Dec-15	2.670	14.200	0.077	1.340			
5	16-Mar-16	1.870	17.800	0.033	1.740			
6	10-Jun-16	1.230	15.700	0.116	1.900			
7	13-Sep-16	0.685	12.800	0.040	1.850			
8	15-Dec-16	0.575	11.900	0.068	0.990			
9	16-Mar-17	0.189	10.700	0.043	2.560			
10	12-Jun-17	0.390	10.500	0.098	0.513			
11	19-Sep-17	0.166	12.400	0.107	0.476			
12	7-Mar-18	0.105	11.800	0.078	2.460			
13	18-Jun-18	0.351	18.800	0.063	2.290			
14	23-Aug-18	0.075	17.200	0.106	0.867			
15	18-Dec-18	0.017	18.300	0.139	1.430			
16	26-Mar-19	0.273		0.076	0.894			
17	5-Jun-19	0.644	20.300	0.108	1.010			
18	3-Sep-19	0.339	12.300	0.095	0.550			
19	6-Nov-19	0.113	11.700	0.056	1.570			
20	18-Mar-20	0.018	14.000	0.301	0.492			
21	30-Apr-20	0.226	10.300	0.119	1.150			
22	14-Sep-20	0.299	11.900	0.118	0.513			
23	10-Dec-20	0.074	12.800	0.127	1.870			
24	18-Mar-21	0.269	7.400	0.070	2.210			
25	27-Jun-21	0.570	11.800	0.088	0.607			
26	19-Aug-21	0.275	12.200	0.081	0.544			
27	12-Nov-21	0.039	12.100	0.072	1.270			
28								
29								
30								
Coefficient of Variation:		1.77	0.23	0.54	0.54			
Mann-Kendall Statistic (S):		-181	-88	63	-52			
Confidence Factor:		>99.9%	97.3%	90.1%	85.5%			
Concentration Trend:		Decreasing	Decreasing	Prob. Increasing	Stable			



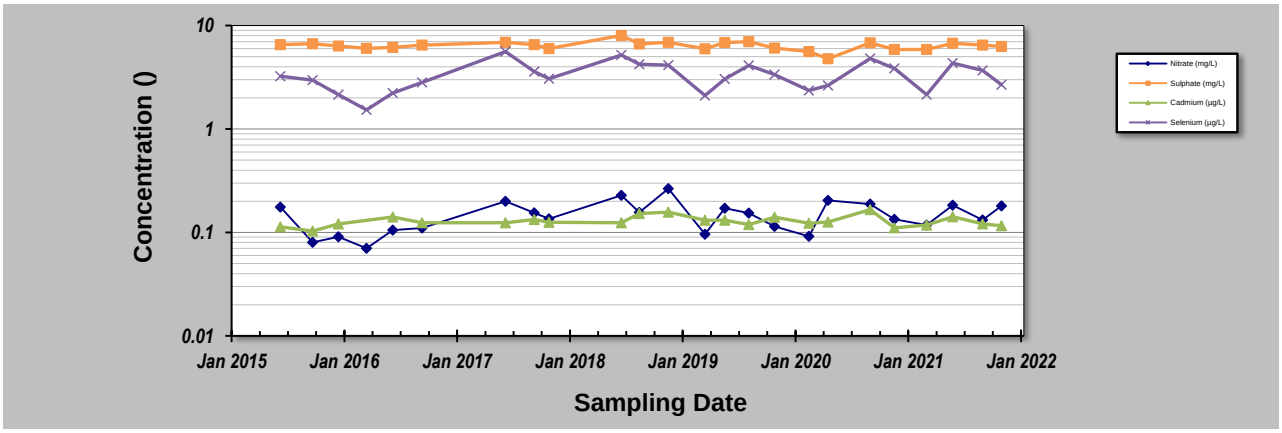
Notes:

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:	03-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	LC_PIZDC1306
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	LC_PIZDC1306 CONCENTRATION						
1	9-Jun-15	0.176	6.530	0.113	3.240			
2	22-Sep-15	0.080	6.670	0.103	2.960			
3	15-Dec-15	0.091	6.330	0.121	2.150			
4	16-Mar-16	0.070	6.010		1.530			
5	10-Jun-16	0.105	6.140	0.141	2.230			
6	13-Sep-16	0.110	6.470	0.124	2.820			
7	12-Jun-17	0.200	6.890	0.124	5.600			
8	14-Sep-17	0.155	6.520	0.133	3.590			
9	1-Nov-17	0.135	6.000	0.125	3.060			
10	25-Jun-18	0.228	8.020	0.124	5.180			
11	23-Aug-18	0.156	6.630	0.152	4.230			
12	26-Nov-18	0.265	6.880	0.157	4.130			
13	25-Mar-19	0.096	5.970	0.131	2.100			
14	29-May-19	0.171	6.850	0.131	3.050			
15	15-Aug-19	0.154	6.970	0.119	4.120			
16	7-Nov-19	0.114	6.060	0.140	3.360			
17	27-Feb-20	0.092	5.590	0.123	2.350			
18	30-Apr-20	0.204	4.770	0.126	2.630			
19	14-Sep-20	0.188	6.820	0.166	4.810			
20	2-Dec-20	0.134	5.880	0.111	3.860			
21	18-Mar-21	0.118	5.860	0.118	2.150			
22	11-Jun-21	0.183	6.750	0.142	4.340			
23	17-Sep-21	0.132	6.460	0.121	3.670			
24	17-Nov-21	0.18	6.28	0.116	2.68			
25								
Coefficient of Variation:		0.34	0.10	0.12	0.32			
Mann-Kendall Statistic (S):		56	-42	10	27			
Confidence Factor:		91.3%	84.4%	59.3%	73.8%			
Concentration Trend:		Prob. Increasing	Stable	No Trend	No Trend			



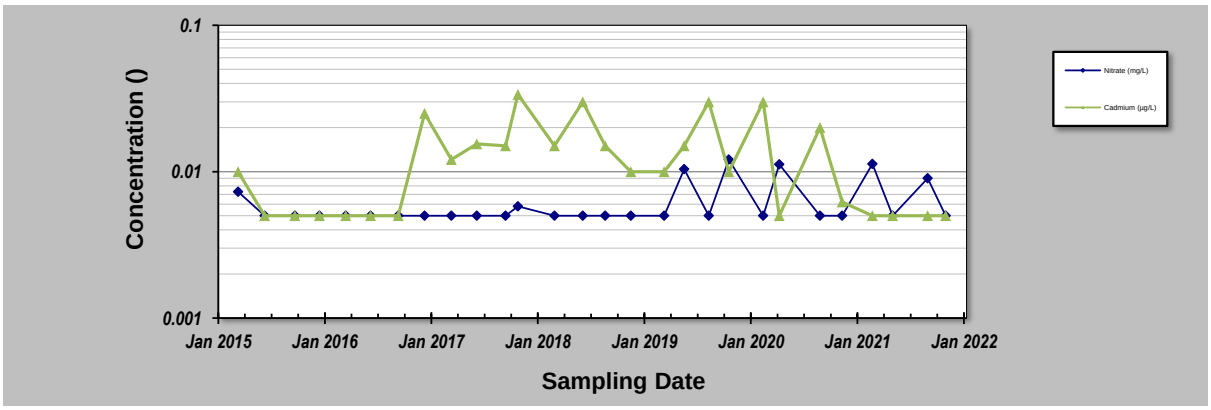
Notes:

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:	03-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	LC_PIZDC1307
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Cadmium (µg/L)					
Sampling Event	Sampling Date	LC_PIZDC1307 CONCENTRATION						
1	10-Mar-15	0.0073	0.0100					
2	10-Jun-15	0.0050	0.0050					
3	22-Sep-15	0.0050	0.0050					
4	16-Dec-15	0.0050	0.0050					
5	16-Mar-16	0.0050	0.0050					
6	10-Jun-16	0.0050	0.0050					
7	13-Sep-16	0.0050	0.0050					
8	13-Dec-16	0.0050	0.0250					
9	16-Mar-17	0.0050	0.0121					
10	12-Jun-17	0.0050	0.0155					
11	19-Sep-17	0.0050	0.0150					
12	1-Nov-17	0.0058	0.0337					
13	7-Mar-18	0.0050	0.0150					
14	13-Jun-18	0.0050	0.0300					
15	29-Aug-18	0.0050	0.0150					
16	26-Nov-18	0.0050	0.0100					
17	21-Mar-19	0.0050	0.0100					
18	29-May-19	0.0104	0.0150					
19	22-Aug-19	0.0050	0.0300					
20	30-Oct-19	0.0121	0.0100					
21	26-Feb-20	0.0050	0.0300					
22	22-Apr-20	0.0112	0.0050					
23	9-Sep-20	0.0050	0.0200					
24	25-Nov-20	0.0050	0.0062					
25	10-Mar-21	0.0113	0.0050					
26	19-May-21	0.0050	0.0050					
27	17-Sep-21	0.0090	0.0050					
28	18-Nov-21	0.0050	0.0050					
29								
30								
Coefficient of Variation:		0.37	0.72					
Mann-Kendall Statistic (S):		54	0					
Confidence Factor:		85.1%	49.2%					
Concentration Trend:		No Trend	Stable					



Notes:

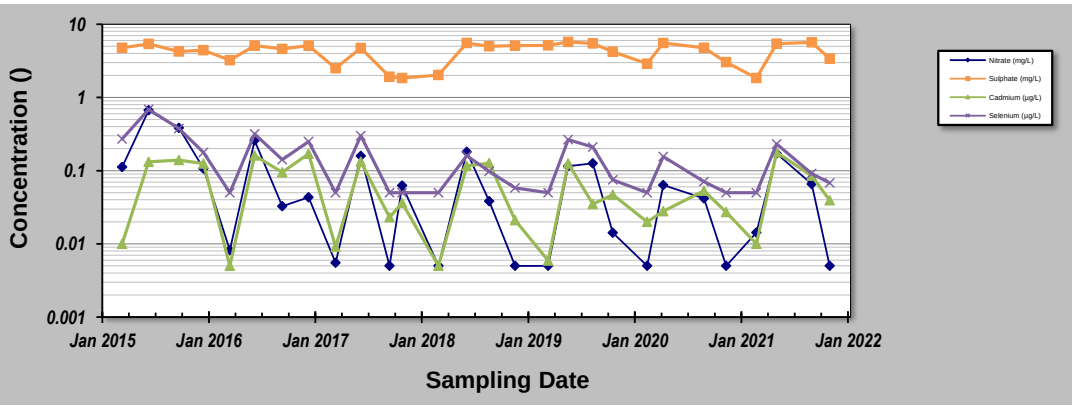
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably 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: 03-Feb-22
Facility Name: Teck Coal Regional Groundwater - LCO
Conducted By: JM/QAQC MG

Job ID: 635544
Location LC_PIZDC1308

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	LC_PIZDC1308 CONCENTRATION						
1	10-Mar-15	0.112	4.78	0.01	0.27			
2	10-Jun-15	0.667	5.38	0.132	0.686			
3	22-Sep-15	0.383	4.24	0.139	0.375			
4	16-Dec-15	0.107	4.41	0.125	0.177			
5	16-Mar-16	0.0082	3.23	0.005	0.05			
6	10-Jun-16	0.258	5.11	0.161	0.317			
7	13-Sep-16	0.0326	4.6	0.095	0.141			
8	13-Dec-16	0.0432	5.09	0.17	0.25			
9	16-Mar-17	0.0055	2.5	0.0091	0.05			
10	12-Jun-17	0.159	4.74	0.133	0.301			
11	19-Sep-17	0.005	1.92	0.023	0.05			
12	1-Nov-17	0.0627	1.84	0.0361	0.05			
13	7-Mar-18	0.005	2.02	0.005	0.05			
14	13-Jun-18	0.181	5.53	0.116	0.16			
15	29-Aug-18	0.0383	5	0.127	0.098			
16	27-Nov-18	0.005	5.1	0.0211	0.058			
17	21-Mar-19	0.005	5.13	0.0059	0.05			
18	29-May-19	0.115	5.74	0.126	0.266			
19	22-Aug-19	0.126	5.47	0.0351	0.21			
20	30-Oct-19	0.0142	4.2	0.0469	0.075			
21	26-Feb-20	0.005	2.9	0.02	0.05			
22	22-Apr-20	0.0636	5.54	0.0279	0.156			
23	9-Sep-20	0.0417	4.77	0.0533	0.071			
24	25-Nov-20	0.005	3.04	0.0272	0.05			
25	10-Mar-21	0.0143	1.84	0.01	0.05			
26	19-May-21	0.171	5.41	0.178	0.232			
27	17-Sep-21	0.0656	5.64	0.0854	0.091			
28	18-Nov-21	0.005	3.39	0.0392	0.068			
29								
30								
Coefficient of Variation:		1.49	0.31	0.84	0.90			
Mann-Kendall Statistic (S):		-91	27	-34	-102			
Confidence Factor:		96.3%	69.5%	74.1%	97.7%			
Concentration Trend:		Decreasing	No Trend	Stable	Decreasing			



Notes:

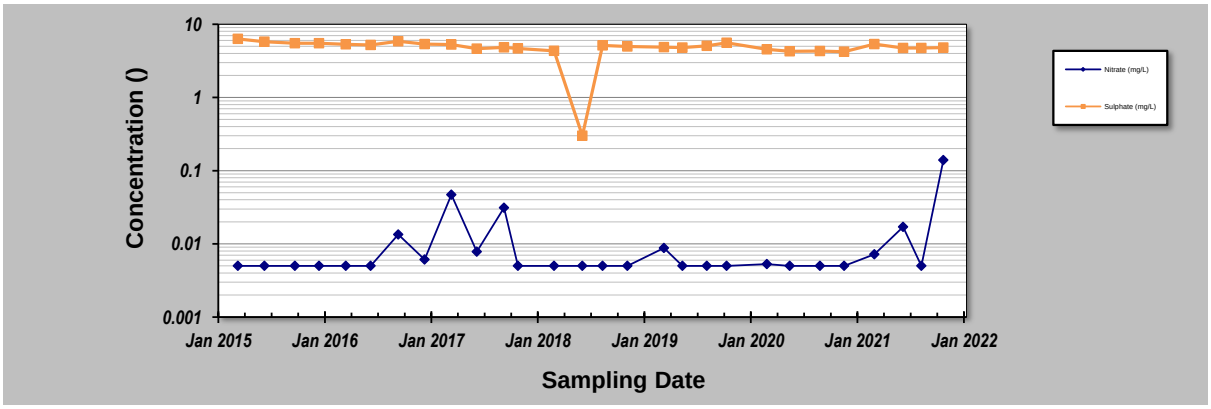
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably 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:	03-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	LC_PIZDC1404S
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)					

Sampling Event	Sampling Date	LC_PIZDC1404S CONCENTRATION						
1	9-Mar-15	0.005	6.3					
2	9-Jun-15	0.005	5.79					
3	22-Sep-15	0.005	5.5					
4	15-Dec-15	0.005	5.52					
5	16-Mar-16	0.005	5.31					
6	10-Jun-16	0.005	5.22					
7	13-Sep-16	0.0134	5.85					
8	13-Dec-16	0.0061	5.36					
9	16-Mar-17	0.0471	5.28					
10	12-Jun-17	0.0078	4.64					
11	14-Sep-17	0.0311	4.82					
12	1-Nov-17	0.005	4.68					
13	6-Mar-18	0.005	4.34					
14	11-Jun-18	0.005	0.3					
15	20-Aug-18	0.005	5.13					
16	14-Nov-18	0.005	4.95					
17	20-Mar-19	0.0088	4.88					
18	23-May-19	0.005	4.8					
19	15-Aug-19	0.005	5.08					
20	23-Oct-19	0.005	5.57					
21	10-Mar-20	0.0053	4.55					
22	28-May-20	0.005	4.28					
23	9-Sep-20	0.005	4.31					
24	2-Dec-20	0.005	4.2					
25	17-Mar-21	0.0072	5.37					
26	24-Jun-21	0.017	4.75					
27	26-Aug-21	0.005	4.74					
28	10-Nov-21	0.139	4.79					
29								
30								
Coefficient of Variation:		1.98	0.21					
Mann-Kendall Statistic (S):		39	-170					
Confidence Factor:		77.2%	>99.9%					
Concentration Trend:		No Trend	Decreasing					



Notes:

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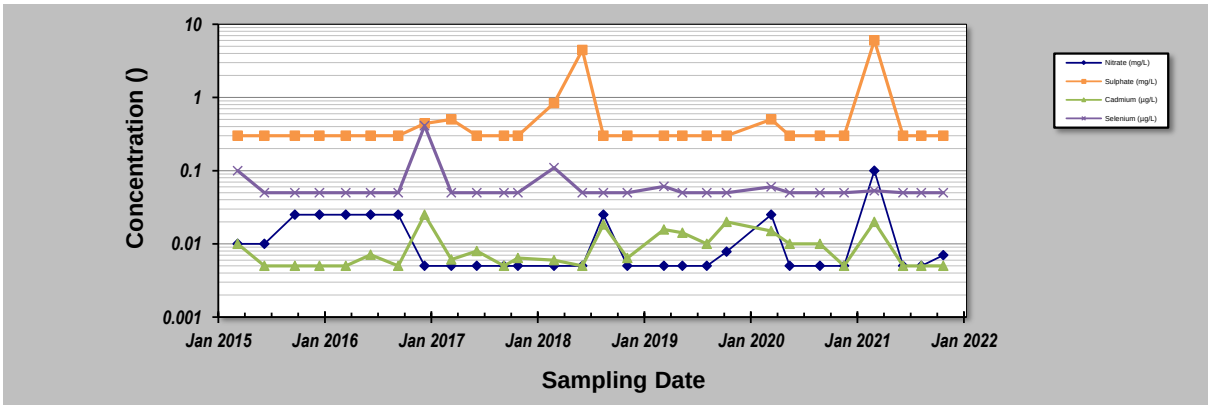
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	03-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	LC_PIZDC1404D
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	LC_PIZDC1404D CONCENTRATION						
1	9-Mar-15	0.01	0.3	0.01	0.1			
2	9-Jun-15	0.01	0.3	0.005	0.05			
3	22-Sep-15	0.025	0.3	0.005	0.05			
4	16-Dec-15	0.025	0.3	0.005	0.05			
5	16-Mar-16	0.025	0.3	0.005	0.05			
6	10-Jun-16	0.025	0.3	0.0071	0.05			
7	13-Sep-16	0.025	0.3	0.005	0.05			
8	13-Dec-16	0.005	0.44	0.025	0.41			
9	16-Mar-17	0.005	0.5	0.0061	0.05			
10	12-Jun-17	0.005	0.3	0.008	0.05			
11	14-Sep-17	0.005	0.3	0.005	0.05			
12	1-Nov-17	0.005	0.3	0.0064	0.05			
13	6-Mar-18	0.005	0.84	0.006	0.11			
14	11-Jun-18	0.005	4.44	0.005	0.05			
15	23-Aug-18	0.025	0.3	0.0184	0.05			
16	14-Nov-18	0.005	0.3	0.0064	0.05			
17	20-Mar-19	0.005	0.3	0.0157	0.061			
18	23-May-19	0.005	0.3	0.0142	0.05			
19	15-Aug-19	0.005	0.3	0.01	0.05			
20	23-Oct-19	0.0078	0.3	0.02	0.05			
21	25-Mar-20	0.025	0.5	0.015	0.06			
22	28-May-20	0.005	0.3	0.01	0.05			
23	9-Sep-20	0.005	0.3	0.01	0.05			
24	2-Dec-20	0.005	0.3	0.005	0.05			
25	17-Mar-21	0.1	6	0.02	0.053			
26	24-Jun-21	0.005	0.3	0.005	0.05			
27	26-Aug-21	0.005	0.3	0.005	0.05			
28	10-Nov-21	0.007	0.3	0.005	0.05			
29								
30								
Coefficient of Variation:		1.36	1.89	0.62	1.01			
Mann-Kendall Statistic (S):		-68	16	47	-15			
Confidence Factor:		90.6%	61.5%	81.7%	60.8%			
Concentration Trend:		Prob. Decreasing	No Trend	No Trend	No Trend			



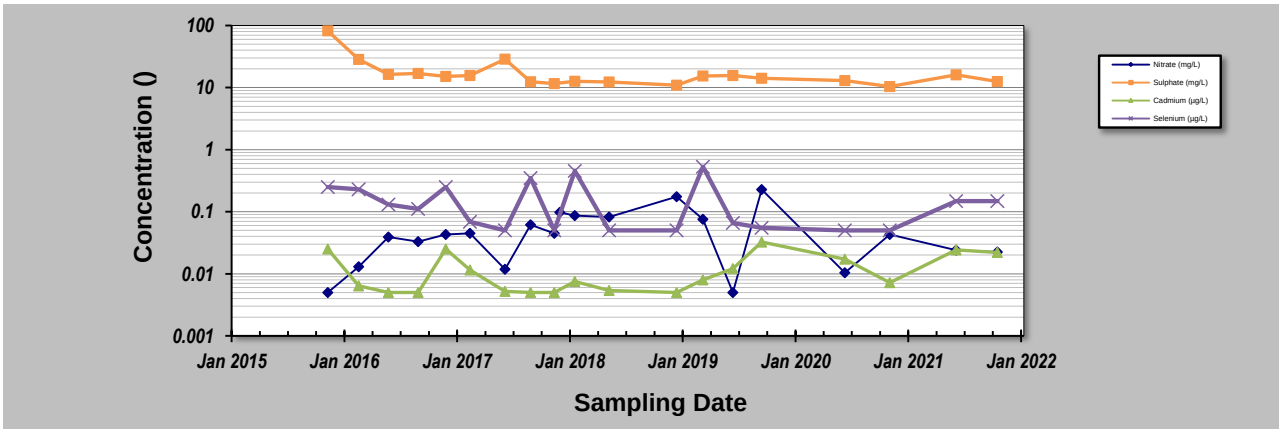
Notes:

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:	03-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	WL_MW-15-02A
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	WL_MW-15-02A CONCENTRATION						
1	11-Nov-15	0.0050	82	0.0250	0.250			
2	20-Feb-16	0.0130	28.5	0.0064	0.230			
3	27-May-16	0.0390	16.4	0.0050	0.130			
4	1-Sep-16	0.0331	16.9	0.0050	0.111			
5	30-Nov-16	0.0431	15.1	0.0250	0.250			
6	17-Feb-17	0.0447	15.7	0.0115	0.069			
7	11-Jun-17	0.0118	28.8	0.0052	0.050			
8	3-Sep-17	0.0616	12.4	0.0050	0.349			
9	19-Nov-17	0.0450	11.6	0.0050	0.050			
10	7-Dec-17	0.0980						
11	25-Jan-18	0.0867	12.6	0.0075	0.454			
12	17-May-18	0.0822	12.3	0.0054	0.050			
13	23-Dec-18	0.1750	10.9	0.0050	0.050			
14	19-Mar-19	0.0755	15.4	0.0080	0.530			
15	25-Jun-19	0.0050	15.6	0.0121	0.066			
16	27-Sep-19	0.2280	14.1	0.0325	0.055			
17	24-Jun-20	0.0104	13	0.0172	0.050			
18	18-Nov-20	0.0431	10.4	0.0072	0.050			
19	22-Jun-21	0.0240	16	0.0243	0.148			
20	4-Nov-21	0.0225	12.5	0.0221	0.149			
21								
22								
23								
24								
25								
Coefficient of Variation:		1.00	0.85	0.73	0.90			
Mann-Kendall Statistic (S):		34	-71	42	-31			
Confidence Factor:		85.6%	99.4%	92.3%	85.1%			
Concentration Trend:		No Trend	Decreasing	Prob. Increasing	Stable			



Notes:

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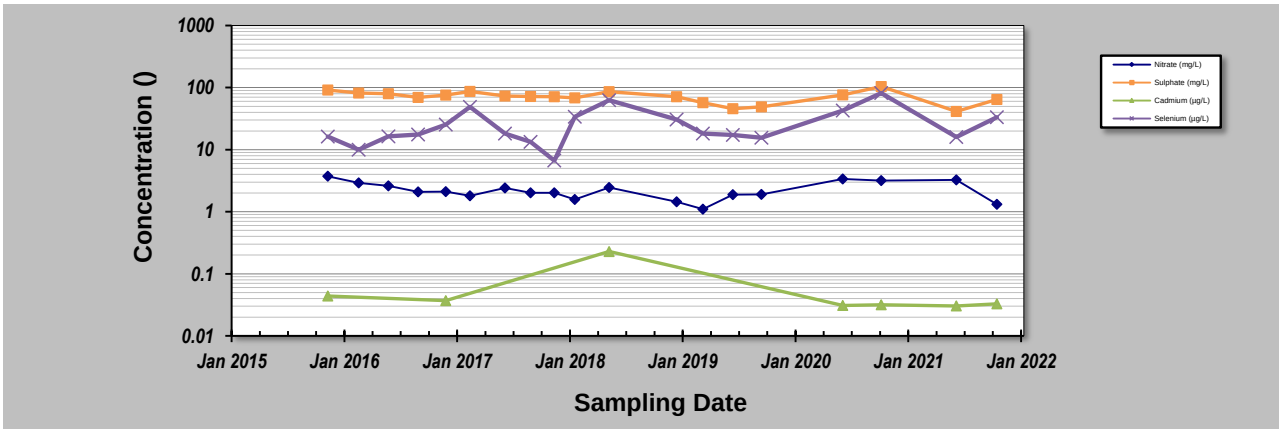
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	03-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	WL_MW-15-02B
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	WL_MW-15-02B CONCENTRATION						
1	11-Nov-15	3.72	91.20	0.0440	16.20			
2	20-Feb-16	2.92	81.90	0.0412	10.00			
3	27-May-16	2.61	79.80	0.0436	16.40			
4	1-Sep-16	2.08	69.40	0.0470	17.60			
5	30-Nov-16	2.11	76.00	0.0370	25.30			
6	17-Feb-17	1.80	86.50	0.0341	48.80			
7	11-Jun-17	2.42	73.10	0.0378	18.20			
8	3-Sep-17	2.02	71.70	0.0434	13.40			
9	19-Nov-17	2.02	71.40	0.0269	6.66			
10	25-Jan-18	1.58	68.10	0.0426	33.90			
11	17-May-18	2.45	86.10	0.2290	62.90			
12	23-Dec-18	1.45	71.60	0.0312	30.50			
13	19-Mar-19	1.10	57.20	0.0219	18.10			
14	25-Jun-19	1.88	45.90	0.0219	17.20			
15	26-Sep-19	1.90	49.10	0.0255	15.60			
16	17-Jun-20	3.37	76.20	0.0308	42.60			
17	21-Oct-20	3.18	104.00	0.0318	81.60			
18	23-Jun-21	3.25	41.30	0.0303	16.00			
19	2-Nov-21	1.32	64.50	0.0327	33.40			
20								
21								
22								
23								
24								
25								
Coefficient of Variation:		0.32	0.22	1.18	0.70			
Mann-Kendall Statistic (S):		-38	-71	-80	39			
Confidence Factor:		90.1%	99.4%	100.0%	90.7%			
Concentration Trend:		Prob. Decreasing	Decreasing	Decreasing	Prob. Increasing			



Notes:

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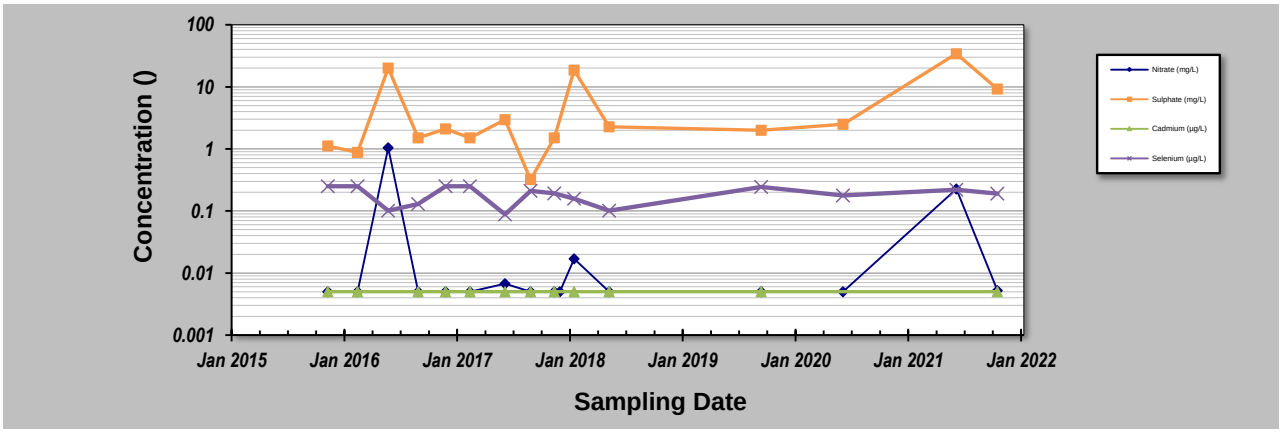
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	25-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	WL_MW-15-04B
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	WL_MW-15-04B CONCENTRATION						
1	11-Nov-15	0.0050	1.12	0.0050	0.250			
2	16-Feb-16	0.0050	0.88	0.0050	0.250			
3	26-May-16	1.0400	20.10	0.0073	0.101			
4	1-Sep-16	0.0050	1.50	0.0050	0.130			
5	29-Nov-16	0.0050	2.10	0.0050	0.250			
6	17-Feb-17	0.0050	1.50	0.0050	0.250			
7	11-Jun-17	0.0067	2.97	0.0050	0.088			
8	3-Sep-17	0.0050	0.32	0.0050	0.211			
9	19-Nov-17	0.0050	1.50	0.0050	0.192			
10	7-Dec-17	0.0050						
11	23-Jan-18	0.0170	18.60	0.0050	0.158			
12	17-May-18	0.0050	2.27	0.0050	0.101			
13	25-Sep-19	0.0050	2.00	0.0050	0.243			
14	18-Jun-20	0.0050	2.50	0.0099	0.177			
15	23-Jun-21	0.2260	34.20	0.0156	0.221			
16	4-Nov-21	0.0052	9.20	0.0050	0.190			
17								
Coefficient of Variation:		3.09	1.47	0.00	0.32			
Mann-Kendall Statistic (S):		15	40	15	-16			
Confidence Factor:		73.3%	97.4%	82.8%	76.7%			
Concentration Trend:		No Trend	Increasing	No Trend	Stable			



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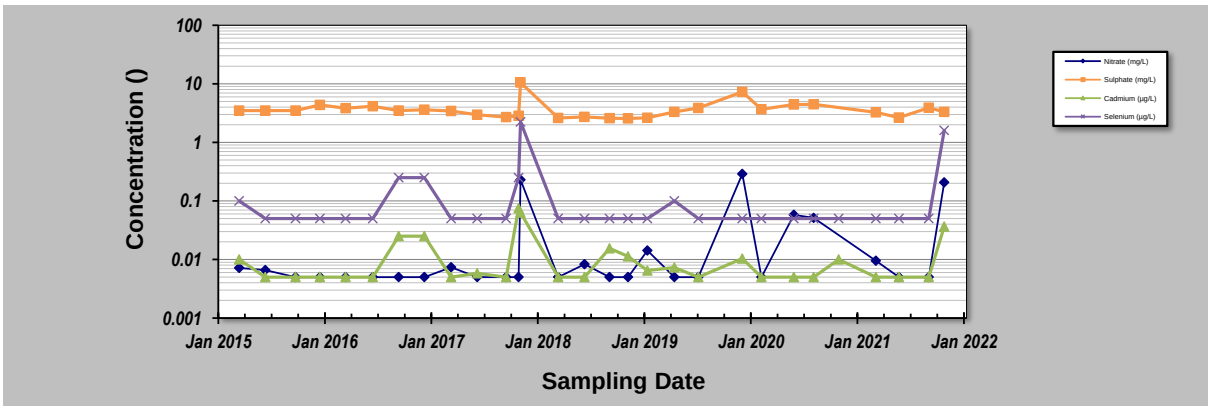
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	03-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	LC_PIZP1101
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	LC_PIZP1101 CONCENTRATION						
1	14-Mar-15	0.0072	3.5	0.01	0.1			
2	12-Jun-15	0.0066	3.49	0.005	0.05			
3	24-Sep-15	0.005	3.49	0.005	0.05			
4	18-Dec-15	0.005	4.35	0.005	0.05			
5	15-Mar-16	0.005	3.83	0.005	0.05			
6	17-Jun-16	0.005	4.14	0.005	0.05			
7	15-Sep-16	0.005	3.5	0.025	0.25			
8	12-Dec-16	0.005	3.62	0.025	0.25			
9	15-Mar-17	0.0074	3.44	0.005	0.05			
10	13-Jun-17	0.005	2.97	0.0058	0.05			
11	21-Sep-17	0.005	2.7	0.005	0.05			
12	3-Nov-17	0.005	2.84	0.075	0.25			
13	10-Nov-17	0.229	10.5	0.0631	2.24			
14	20-Mar-18	0.005	2.61	0.005	0.05			
15	19-Jun-18	0.0083	2.71	0.005	0.05			
16	13-Sep-18	0.005	2.58	0.0155	0.05			
17	16-Nov-18	0.005	2.56	0.0113	0.05			
18	22-Jan-19	0.0143	2.64	0.0065	0.05			
19	25-Apr-19	0.005	3.3	0.0073	0.1			
20	17-Jul-19	0.005	3.88	0.005	0.05			
21	16-Dec-19	0.289	7.3	0.0104	0.05			
22	20-Feb-20	0.005	3.68	0.005	0.05			
23	11-Jun-20	0.058	4.44	0.005	0.05			
24	18-Aug-20	0.0515	4.47	0.005	0.05			
25	13-Nov-20			0.01	0.05			
26	22-Mar-21	0.0095	3.26	0.005	0.05			
27	10-Jun-21	0.005	2.66	0.005	0.05			
28	21-Sep-21	0.005	3.91	0.005	0.05			
29	13-Nov-21	0.207	3.31	0.0366	1.6			
30								
Coefficient of Variation:		2.16	0.43	1.32	2.40			
Mann-Kendall Statistic (S):		64	-24	-6	-25			
Confidence Factor:		89.2%	67.4%	53.7%	67.3%			
Concentration Trend:		No Trend	Stable	No Trend	No Trend			



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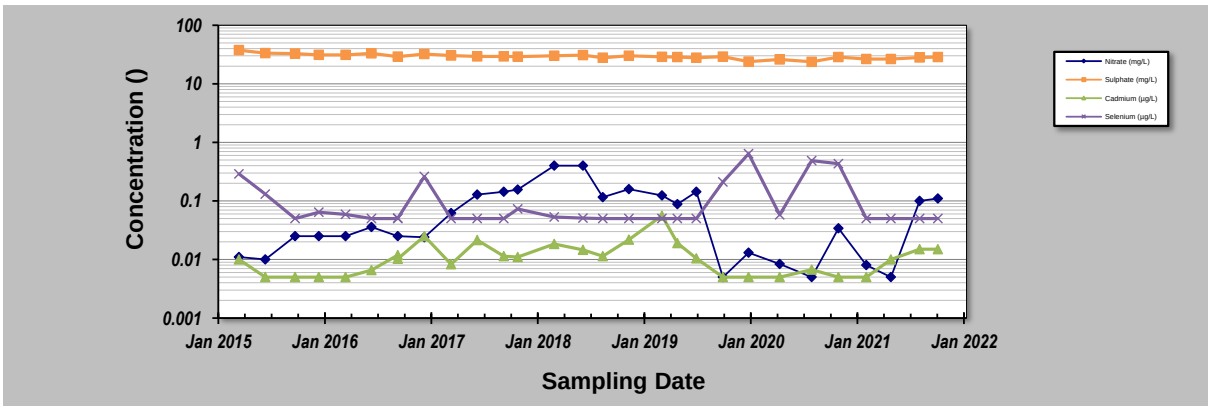
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably 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:	03-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - LCO	Location	LC_PIZP1103
Conducted By:	JM/QAQC MG		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	LC_PIZP1103 CONCENTRATION						
1	13-Mar-15	0.011	37.5	0.01	0.29			
2	12-Jun-15	0.01	33.5	0.005	0.13			
3	23-Sep-15	0.025	32.9	0.005	0.05			
4	14-Dec-15	0.025	31.2	0.005	0.064			
5	15-Mar-16	0.025	31.1	0.005	0.059			
6	13-Jun-16	0.036	33	0.0066	0.05			
7	12-Sep-16	0.025	29.2	0.0119	0.05			
8	12-Sep-16			0.0103	0.051			
9	12-Dec-16	0.0239	32.2	0.025	0.26			
10	15-Mar-17	0.062	30.5	0.0083	0.05			
11	13-Jun-17	0.128	29.3	0.0214	0.05			
12	13-Sep-17	0.144	29.4	0.0114	0.05			
13	31-Oct-17	0.156	29	0.011	0.073			
14	6-Mar-18	0.399	30.1	0.0184	0.053			
15	14-Jun-18	0.4	31	0.0146	0.051			
16	21-Aug-18	0.116	27.8	0.0114	0.05			
17	19-Nov-18	0.159	30	0.0219	0.05			
18	13-Mar-19	0.124	28.8	0.0561	0.05			
19	6-May-19	0.0878	28.7	0.0191	0.05			
20	10-Jul-19	0.144	27.9	0.0105	0.05			
21	10-Oct-19	0.005	29.1	0.005	0.211			
22	7-Jan-20	0.0131	23.9	0.005	0.639			
23	23-Apr-20	0.0084	26.1	0.005	0.058			
24	12-Aug-20	0.005	23.8	0.0067	0.487			
25	12-Nov-20	0.034	28.5	0.005	0.434			
26	17-Feb-21	0.008	26.4	0.005	0.05			
27	13-May-21	0.005	26.4	0.01	0.05			
28	20-Aug-21	0.0999	28.1	0.015	0.05			
29	22-Oct-21	0.11	28.7	0.015	0.05			
30								
Coefficient of Variation:		1.22	0.10	0.83	1.23			
Mann-Kendall Statistic (S):		0	-254	35	-38			
Confidence Factor:		49.2%	>99.9%	73.7%	75.4%			
Concentration Trend:		No Trend	Decreasing	No Trend	No Trend			



Notes:

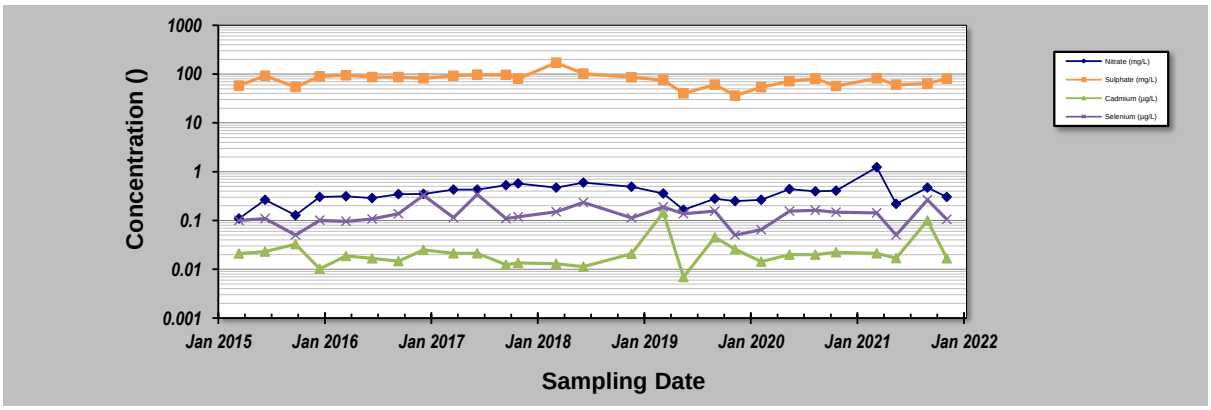
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably 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: 03-Feb-22
Facility Name: Teck Coal Regional Groundwater - LCO
Conducted By: JM/QAQC MG

Job ID: 635544
Location LC_PIZP1104

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	LC_PIZP1104 CONCENTRATION						
1	12-Mar-15							
2	13-Mar-15	0.109	58.1	0.021	0.1			
3	11-Jun-15	0.264	92.4	0.023	0.109			
4	24-Sep-15	0.128	54	0.0326	0.05			
5	17-Dec-15	0.303	89.4	0.0102	0.101			
6	17-Mar-16	0.312	94.1	0.0188	0.096			
7	15-Jun-16	0.288	86.2	0.0167	0.107			
8	14-Sep-16	0.347	86.2	0.0146	0.137			
9	9-Dec-16	0.348	81.4	0.025	0.33			
10	23-Mar-17	0.428	91.8	0.0212	0.114			
11	13-Jun-17	0.431	97.1	0.0212	0.342			
12	20-Sep-17	0.528	96.4	0.0124	0.109			
13	2-Nov-17	0.574	80.6	0.0135	0.119			
14	13-Mar-18	0.472	170	0.013	0.15			
15	15-Jun-18	0.599	102	0.0113	0.235			
16	28-Nov-18	0.491	85.8	0.0208	0.113			
17	18-Mar-19	0.357	74.7	0.146	0.188			
18	27-May-19	0.165	40.3	0.0069	0.137			
19	12-Sep-19	0.279	60.5	0.0453	0.155			
20	21-Nov-19	0.249	36.2	0.0257	0.05			
21	19-Feb-20	0.266	53.4	0.0143	0.065			
22	27-May-20	0.439	71.3	0.0199	0.155			
23	24-Aug-20	0.396	80.9	0.02	0.161			
24	4-Nov-20	0.406	57.1	0.0223	0.147			
25	25-Mar-21	1.23	81.4	0.0212	0.143			
26	31-May-21	0.217	60.6	0.0169	0.05			
27	16-Sep-21	0.472	63.6	0.1	0.266			
28	22-Nov-21	0.303	80.8	0.0168	0.105			
29								
30								
Coefficient of Variation:		0.55	0.32	1.08	0.53			
Mann-Kendall Statistic (S):		81	-87	14	63			
Confidence Factor:		95.2%	96.4%	60.6%	90.1%			
Concentration Trend:		Increasing	Decreasing	No Trend	Prob. Increasing			



Notes:

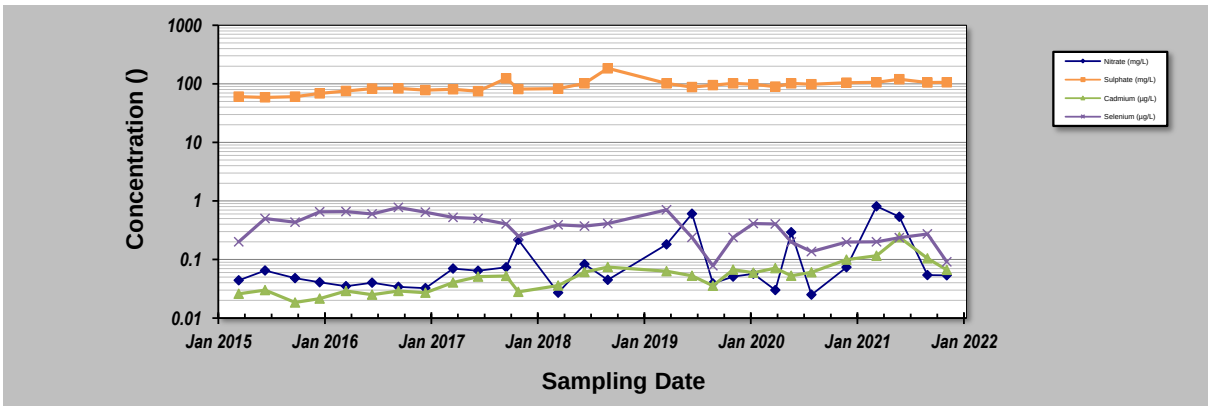
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably 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: 03-Feb-22
Facility Name: Teck Coal Regional Groundwater - LCO
Conducted By: JM/QAQC MG

Job ID: 635544
Location LC_PIZP1105

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	LC_PIZP1105 CONCENTRATION						
1	12-Mar-15	0.044	60.4	0.026	0.2			
2	11-Jun-15	0.065	58.6	0.03	0.502			
3	23-Sep-15	0.048	60.4	0.0185	0.434			
4	17-Dec-15	0.041	68.4	0.0215	0.652			
5	17-Mar-16	0.035	75.3	0.0291	0.657			
6	15-Jun-16	0.04	82.6	0.0251	0.597			
7	14-Sep-16	0.034	83.2	0.0291	0.773			
8	16-Dec-16	0.0323	78.1	0.027	0.64			
9	22-Mar-17	0.07	80.4	0.0404	0.521			
10	16-Jun-17	0.064	74.9	0.0511	0.499			
11	21-Sep-17	0.074	124	0.0523	0.406			
12	2-Nov-17	0.216	81.3	0.028	0.25			
13	20-Mar-18	0.027	82.7	0.0358	0.391			
14	19-Jun-18	0.083	102	0.061	0.37			
15	7-Sep-18	0.045	184	0.0745	0.411			
16	29-Mar-19	0.181	102	0.0633	0.704			
17	25-Jun-19	0.605	87.9	0.0528	0.237			
18	5-Sep-19	0.039	95.2	0.0355	0.078			
19	14-Nov-19	0.051	102	0.067	0.238			
20	23-Jan-20	0.057	97.9	0.0597	0.411			
21	8-Apr-20	0.03	89.2	0.0712	0.406			
22	2-Jun-20	0.293	102	0.0529	0.199			
23	11-Aug-20	0.025	97.9	0.0604	0.137			
24	10-Dec-20	0.074	104	0.0992	0.199			
25	24-Mar-21	0.812	106	0.116	0.2			
26	11-Jun-21	0.535	120	0.24	0.236			
27	16-Sep-21	0.0543	105	0.105	0.272			
28	22-Nov-21	0.0536	106	0.0665	0.091			
29								
30								
Coefficient of Variation:		1.47	0.26	0.75	0.51			
Mann-Kendall Statistic (S):		71	247	259	-182			
Confidence Factor:		91.6%	>99.9%	>99.9%	>99.9%			
Concentration Trend:		Prob. Increasing	Increasing	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.*
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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.

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Appendix XI

Elkview Operations 2021 SSGMP and RGMP Report

- Figures
- Tables
- Drawings
- Attachments
  - I. Borehole Logs
  - II. Block Diagrams
  - III. Mann-Kendall Analyses

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1 Elkview Operations SSGMP and RGMP Report

1.1 Overview

This report presents the results for the 2021 Elkview Operation (EVO) Site-specific Groundwater Monitoring Program (SSGMP) and the 2021 Regional Groundwater Monitoring Program (RGMP) Study Areas 7, 8, 9, 10, and 12. As there is spatial overlap with work completed at Sparwood Area per Permit 107517, the results from the annual sampling program for the Sparwood Area have also been included.

The basis for the SSGMP and RGMP is the conceptual site model (CSM) presented in the approved 2018 SSGMP Update (SNC-Lavalin, 2019a), the 2020 RGMP Update (SNC-Lavalin, 2020) and the 2021 SSGMP Update (SNC-Lavalin, 2021a).

The main surface water courses near EVO are the Elk River, which flows from north to south along the western boundary of EVO, and its tributary, Michel Creek, which flows from the southeast to the northwest along the southwestern boundary of EVO and discharges to the Elk River at the District of Sparwood (Drawing EV-01). There are several tributary watercourses that flow to the Elk River and Michel Creek (Golder, 2015a), including:

- West flowing creeks that discharge to the Elk River (from north to south): EVO Dry Creek (which flows into Harmer Creek); Harmer Creek (which flows into Grave Creek); Grave Creek; Six Mile Creek; Balmer Creek; Fennelon Creek; Feltham Creek; Lindsay Creek (which discharges to ground); Goddard Creek; Cossarini Creek; and Otto Creek; and
- West and south flowing creeks that discharge into Michel Creek (from north to south): Qualtieri Creek; Aqueduct Creek; Spring Creek; Bodie Creek; Gate Creek; South Gate Creek; Adit Creek; Thresher Creek; Milligan Creek; South Pit Creek; and Erickson Creek.

Of the above listed creeks, Grave/Harmer/Dry creeks and Erickson Creek are considered major tributary drainages that originate within EVO boundaries and drain water to the north and south, respectively. A portion of the upper Erickson drainage is overlain by waste rock spoils, and the upslope area of Dry Creek, which drains into Harmer Creek, has also been covered by spoils. Upper Feltham and Lindsay creeks are captured by the Lindsay Interceptor Ditch and flow into Goddard Creek (Drawing EV-01). Qualtieri Creek has also been re-directed to Aqueduct Creek. Bodie, Gate and South Gate creeks flow within the western flank of EVO from rock drains, which daylight prior to discharging into Michel Creek within the valley bottom.

Generally, groundwater in the tributary watersheds is monitored by the EVO SSGMP, while the valley bottoms of Elk River and Michel Creek are monitored by the RGMP. The EVO permitted area overlaps portions of RGMP Study Areas 8, 9 and 10, and some monitoring locations are included in both the EVO SSGMP and RGMP (Drawing EV-01). Study Area 9 has been further subdivided into Study Areas 9a and 9b. Study Area 9a includes drainage from Baldy Ridge to Study Area 12 in Sparwood, while Study Area 9b includes upgradient sources at Bodie and Gate creeks and down-valley flow.

Table A presents the tributary watersheds assessed as part of the EVO SSGMP and linkages to Study Areas associated with the RGMP. The results and discussion presented in the following sections are organized in accordance with these linkages.

Table A: EVO SSGMP Major Tributary Watersheds and Relevant RGMP Study Areas

Upland EVO SSGMP Tributary Watersheds	Downstream Watershed and RGMP Study Area
Dry Creek, Harmer Creek, Grave Creek	Elk River (Study Area 7)
Balmer Creek, Lindsay Creek, Goddard Creek, Otto Creek, Cossarini Creek	Elk River (Study Area 8)
Aqueduct Creek, Qualtieri Creek, Spring Creek, Sparwood Ridge	Michel Creek (Study Area 9a)
Bodie Creek, Gate Creek	Michel Creek (Study Area 9b)
N/A	Elk River (Study Area 12)
Erickson Creek, South Pit Creek	Michel Creek (Study Area 10)

Surficial geology at EVO is characteristic of a post-glacial cordilleran mountain setting. Colluvium covers the upland areas and thicker glaciofluvial and glaciolacustrine deposits are generally located in valley-bottoms (Drawing 5 of the main report; SNC-Lavalin, 2020). Anthropogenically derived materials including waste rock and coarse coal rejects (CCR) from mining operations are present in mining pits, waste spoils, valley flanks and valley-bottoms (SNC-Lavalin, 2021a).

The bedrock encountered in boreholes within the EVO area consists of shale, sandstone, and limestone of the Fernie Formation throughout the Elk River Valley and the western portion of the Michel Creek area and sandstone, siltstone and coal of the Kootenay Group to the east. West of Sparwood, dolomitic sandstone and siltstone of the Spray River Group are present, separated from the Elk River Group by the Bourgeau thrust fault (Drawing 3 of the main report). The Mist Mountain Formation of the Kootenay Group contains the mineable coal seams at EVO and is close to surface along ridge-tops in the eastern part of the Elk Valley and tributary drainages. The Rundle Formation is located west of Erickson Creek and extends northward beyond Harmer and Grave creeks, forming the Erickson Block, which was identified in the 2020 RGMP Update (SNC Lavalin, 2020) for potential karst. Structurally, EVO is underlain by the eastern limb of a broad north-south orientated syncline that includes north-south orientated normal and thrust faults. These faults include the Harmer West Thrust Fault (believed to be the F42 fault identified in Cedar North that intercepted the conveyor tunnel [SNC-Lavalin, 2021a]), the Harmer East Thrust Fault, and the Erickson Fault (Drawing 3 of the main report). As a result, stratigraphic beds of the Kootenay Group dip primarily to the west (Golder, 2015a, 2015b). The bedrock and surficial geology of EVO have been discussed in detail as part of the 2021 SSGMP Update and includes bedrock cross-sections for the area (SNC-Lavalin, 2021a).

1.2 Groundwater Monitoring Locations

Tables 1 and 5 in the main report provide a list of monitoring wells associated with each program, as well as monitoring and/or sampling rationale for each location. Drawing EV-01 shows the locations of monitoring wells relative to key surface water and mine site features. Additional well details are provided in Table EV-01. Manual groundwater level measurements from 2021 and calculated vertical gradients are provided in Table EV-02. Borehole logs are presented in Attachment I, except for the following groundwater supply wells: EV_RCSgw, EV_WH50gw, EV_BRgw, and EV_HW1 (EV_HM1) which are not available. A site plan is provided in Drawing EV-01; quarter four (Q4) groundwater elevations and inferred flow directions are presented on Drawings EV-02 and -03 and cross sections showing well installation, stratigraphy, and groundwater elevations are presented on Drawings EV-04 to -13. Drawings EV-14 to -21 provide a spatial summary of 2021 Order Constituents (OC) concentrations; Block Diagrams for each of the relevant study areas are provided in Attachment II (Diagrams EV-01 to -04).

1.3 Program Modifications

Table B provides a summary and discussion of modifications from the SSGMP and RGMP.

Table B: EVO SSGMP and Relevant RGMP Study Areas – Summary of Program Modification

#	Well ID	Program	Q[a]	Modification	Reason
1	RG_MW_GCA	SSGMP / RGMP	3	Monitoring well installed	To monitor groundwater quality and levels along Grave Creek before the confluence with the Elk River within bedrock.

Notes:
[a] Q denotes Quarter (Q1, Q2, Q3, Q4).

1.4 Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence (Study Area 7)

A summary of 2021 groundwater monitoring and sampling results for the Grave/Harmer Creek Watershed and Study Area 7 is presented in Table C with references to supporting information (Drawings, Figures, Tables, and Appendices)

Table C: Summary of 2021 Groundwater Monitoring and Sampling Results in the Grave/Harmer Creek Watershed and Study Area 7 Elk River Downstream of Grave Creek Confluence

Hydrogeological Information		Description	Reference
Monitoring Locations	Relevant EVO SSGMP/RGMP Wells (Study Area 7)	**Grave/Harmer Creek Watershed:** EV_GV3gwS, EV_GV3gw, EV_MW_GV4A/B, RG_MW_GCA **Downstream of the Elk River/Grave Creek Confluence:** RG_DW-02-20, RG_MW_WW	Drawing EV-01 Table EV-01
	Relevant Monitoring Wells from Other Programs[a]	**Dry Creek:** EV_MW_DC1, EV_MW_DC2, EV_MW_DC4, EV_MW_DC6, EV_MW_DC7 **Harmer Reservoir:** EV_MW_HC1, EV_MW_HC2, EV_MW_HC3, EV_MW_HC4, EV_MW_HC5	
	Relevant Surface Water Monitoring Stations[b]	EV_DC1, EV_HC1, EV_SM1, EV_GV1	
	Relevant Seep Monitoring Locations[b]	No monitored seeps in these watersheds.	
Physical Hydrogeology	Groundwater Elevation Trends	› Groundwater elevations exhibit seasonal trends with the highest levels measured in spring/early summer (June) and the lowest measured in mid-fall (October). Seasonal elevation trends in groundwater followed similar patterns to surface water levels measured at Harmer Creek (EV_HC1). Only one manual groundwater elevation has been collected at RG_MW_GCA (Q4) as this well was installed in Q3. › Data on the hydrograph were compensated with barometric pressure data collected from a transducer/datalogger deployed in EV_MW_SPR1B. › Manual groundwater levels could not be measured at downgradient wells RG_DW-02-20 due to the wellhead configuration. Due to well design and access considerations, a pressure transducer could not be installed in this well.	Drawing EV-02 Table EV-02 Figure EV-01
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – EV_GV3gw and EV_GV3gwS: 0.2 m/m downwards; and – EV_MW_GV4A/B: 0.1 to 0.2 m/m downwards. › A lateral hydraulic gradient could not be calculated since there are only two sets of nested wells that were monitored as part of the annual program; however, groundwater flow is inferred to follow topography.	
Chemistry	2021 SSGMP/RGMP OC Results	› **Grave/Harmer Creek Watershed:** – All OC concentrations were less than primary screening criteria. › **Elk River Downstream of Grave Creek:** – Concentrations above primary screening criteria: ▪ Dissolved selenium: RG_DW_02-20 and RG_MW_WW (all 2021 sampling events); and ▪ Only the duplicate sample at RG_DW-02-20 (Q2) contained selenium (19.4 µg/L) greater than the secondary screening criteria (19 µg/L), which is the highest concentration measured at this well since sampling began in 2014. ▪ All other OC concentrations were less than primary screening criteria.	Table D Drawings EV-14 to -17 Tables EV-03 to -05 Figures EV-02 to -04
	Non-Order Mine-Related and Naturally Occurring Constituents	› **Grave/Harmer Creek Watershed:** – Concentrations above primary screening criteria: ▪ Fluoride: RG_MW_GCA (Q4); ▪ Sodium: RG_MW_GCA (Q4); ▪ Lithium: EV_GC3gw, EV_MW_GV4A/B, RG_MW_GCA during all sampling events; and ▪ Boron: RG_MW_GCA (Q4). › **Elk River Downstream of Grave Creek:** – Concentrations above primary screening criteria: ▪ Lithium: RG_DW-02-20 (Q2). › Based on the Background Assessment (BGA) completed for the 2020 RGMP Update, concentrations of lithium, sodium, boron and fluoride are inferred to be unrelated to mining. The turbidity measurement at RG_MW_GCA was high in Q4 2021 at 556 NTU. › All other constituents were less than primary screening criteria.	Tables EV-03 to -05 SNC-Lavalin, 2020

Table C (Cont'd): Summary of 2021 Groundwater Monitoring and Sampling Results in the Grave/Harmer Creek Watershed and Study Area 7 Elk River Downstream of Grave Creek Confluence

Hydrogeological Information		Description	Reference
Chemistry (Cont'd)	Mann-Kendall Trend Analysis	› Insufficient data to complete robust Mann-Kendall trend analysis at all wells, except EV_GV3gw and RG_DW-02-20. › Increasing trends: GV_GV3gw (dissolved selenium); however, concentrations remain an order of magnitude lower than the primary screening criteria. › All other parameters at GV_GV3gw and RG_DW-02-20 were either decreasing, stable or no trend.	Table E Attachment III

Notes:
[a] - Relevant Monitoring Wells from Other Programs are those in the area that are under evaluation for potential inclusion in the SSGMP and/or RGMP.
[b]: Relevant Surface Water Stations and Seep Monitoring Stations represent a sub-set of the surface water and seepage monitoring stations present in EVO and Study Area 7.

A summary of results for OC compared to primary screening criteria is presented in Table D below.

Table D: Summary of OC Compared to Primary Screening Criteria in the Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence (Study Area 7)

Parameter[1,2,3] / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Grave/Harmer Creek Watershed																
EV_GV3gw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_GV3gwS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_GV4A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_GV4B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_MW_GCA[5]	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	-	NS	NS	NS	-
Elk River Downstream of Grave Creek Confluence																
RG_DW_02-20	-	-	-	-	-	-	-	-	-	-	-	-	15.5	19.4	16.8	12.2
RG_MW_WW	-	-	NS	-	-	-	NS	-	-	-	NS	-	10.8	10.3	NS	11.6
CSR AW	400				1,280 – 4,290[4]				0.5 – 4[4]				20			
CSR IW	n/a				n/a				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			

Notes:
1 Primary screening criteria are *Contaminated Sites Regulation* (CSR), B.C. Reg. 375/96, includes amendments up to B.C. Reg. 179/2021, July 7, 2021, standards for **Aquatic Life (AW),** Drinking Water (DW), Livestock (LW), and *Irrigation (IW)*.
2 '–' denotes result less than primary screening criteria for given constituents.
3, Where a duplicate was collected, the higher concentration is provided in table.
4, Standard varies with hardness.
5 New well installed in Q3 2021.
'NS' denotes no sample.

Mann-Kendall trend analysis was completed for OC where more than seven data points have been measured. A summary of the trend analysis results is provided in Table E.

Table E: Summary of Mann-Kendall Trend Analysis for OC in the Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence (Study Area 7)

Parameter[1,2] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
Grave/Harmer Creek Watershed				
EV_GV3gw	Decreasing	Stable	-	Increasing
Downstream of Grave Creek Confluence (Study Area 7)				
RG_DW-02-20	Stable	No Trend	-	***No Trend***

Notes:
1 Where OC were measured greater than the primary screening criteria in 2021, the trend result is ***italics***. Where the OC were measured greater than the secondary screening criteria for selenium during at least one event in 2021, the result is ***shaded and italics***. Where increasing trends are noted, the cell is shaded yellow.
2 "-" denotes insufficient data to complete trend analysis, including where concentrations were consistently less than or within five times the MDL.

1.4.1 Discussion

Discussion of trends in groundwater quality focuses on dissolved selenium, as it is the only OC identified to have an increasing trend in the Grave/Harmer Creek watershed and it was the only OC measured above primary screening criteria in Study Area 7 (Table E, Attachment III).

1.4.1.1 Grave/Harmer Creek Watershed (Study Area 7)

In 2021, groundwater samples from the Grave Creek/Harmer Creek watershed (EV_GV3gw, EV_GV3gwS, EV_MW_GV4A/B, and RG_MW_GCA) contained concentrations of OCs less than the primary screening criteria; trends (where available) and concentrations were also consistent with historical data.

Nested well pair EV_MW_GV4A/B was installed along Grave Creek prior to the confluence with Harmer Creek and have concentrations of OCs less than the applicable primary screening criteria. In 2021, higher concentrations of dissolved selenium and sulphate were measured in the deep bedrock well EV_MW_GV4A (3.3 to 4.9 µg/L and 89.4 to 128 mg/L, respectively) compared to the shallow well EV_MW_GV4B (3.7 to 4.1 µg/L and 62 to 70.5 mg/L, respectively; Figures EV-02 and -03). Sulphate concentrations in the shallow well were within the range of those observed in surface water at the Harmer Dam outlet (EV_HC1). Selenium to sulphate (as S) ratios [Se:SO_4 (S)] for EV_MW_GV4A/B plot along or just outside of the defined range of natural non-contact water (Figure EV-05). The inferred boundaries defining non-contact water from mine-influenced water are based on 95th percentile concentrations of background wells. Based on the BGA completed by SNC-Lavalin as part of the RGMP Update (SNC-Lavalin, 2020), this well pair is considered a background well. Additional data is currently being collected for this well pair, including isotope data which will provide insight on the relative age of groundwaters, recharge areas and flow paths. Once available, the BGA will be updated to inform whether these wells should continue to be assessed as part of the background dataset.

Monitoring wells EV_GV3gw and EV_GV3gwS have been installed in Grave Creek near the confluence with Harmer Creek. In 2021, concentrations of dissolved selenium in the shallow groundwater at EV_GV3gwS ranged from 2.51 to 3.29 µg/L and in deep groundwater at EV_GV3gw ranged from 4.5 to 4.71 µg/L (Figure EV-02; Drawing EV-17). Although concentrations of dissolved selenium at EV_GV3gw exhibit an increasing trend, concentrations have remained an order of magnitude lower than primary screening criteria and have not expressed a strong seasonal trend compared to surface water concentrations measured in Harmer Creek at EV_HC1 (14.2 to 60.7 µg/L; Figure EV-02) (i.e., the Se concentrations did not show a seasonal spring decline in 2016, or 2018, which is observed at EV_HC1).

Monitoring well RG_MW_GCA was installed in bedrock farther downstream along Grave Creek prior to the confluence with the Elk River (Drawing EV-06; Attachment II – Diagram EV-01). Groundwater from this well also contains concentrations of dissolved selenium (1.42 µg/L) which are an order of magnitude lower than in Harmer Creek (EV_HC1) in Q4 2021 and lower than historical concentrations previously measured in Grave Creek (EV_GV1) (Figure EV-02). During the Q4 2021 sampling event, groundwater collected from RG_MW_GCA contained high measured turbidity at 556 NTU and therefore, may not be representative of groundwater in bedrock in this area. Further development of the monitoring well should be completed to attempt to obtain a more representative water quality sample with turbidity values less than 50 NTU.

Ratios of Se:SO_4 (S) for groundwater from EV_GV3gwS and RG_MW_GCA indicate natural non-contact water (Figure EV-05). Similar to ratios plotted for EV_MW_GV4A/B, the ratios for EV_GV3gw plot outside of the previously defined range for natural non-contact water, suggesting that either some degree of mixing with mine-influenced water and selenium attenuation has occurred or the range of defined natural

concentrations (i.e., 95th percentile concentrations) should be higher. Surface water at EV_HC1 exhibits the chemical signature consistent with mixing of non-contact water and mine-influenced water (shown in Figure EV-05). Although the chemistry is generally similar for EV_GV3gwS/EV_Gv3gw and EV_MW_GV4A/B, the shallower wells generally have lower selenium and sulphate concentrations.

Surface water concentrations of dissolved selenium, nitrate-N and sulphate, and water levels in EV_HC1 fluctuate seasonally and are typically lower during freshet which is consistent with the effect of dilution on constituents in a freshet dominated regime. However, although groundwater elevations also fluctuate seasonally at EV_GV3gwS, EV_GV3gw and EV_MW_GV4A/B in a similar manner to EV_HC1, OC concentrations do not consistently mimic the seasonal variations observed at EV_HC1 (Figures EV-01 to -04). Additional analytical data are required at new well EV_GV3gwS to evaluate any potential seasonal OC fluctuations.

Mine-influenced constituents are known to be transported by surface water as measured at surface water in Dry Creek (EV_DC1) and Harmer Creek (EV_HC1). Both of these tributaries flow into Grave Creek, which has also contained elevated concentrations of OC between 2013 and 2016 (EV_GC1, station deactivated after 2016), relative to groundwater sampled in this watershed (SNC-Lavalin, 2021a). Surface water has not been collected from EV_GC1 since 2016; therefore, a comparison of recent data could not be completed. However, groundwater transport of OC from the Harmer Creek drainage to the Elk River valley bottom is inferred to be minimal based on concentrations of OC less than the screening criteria measured in both shallow (EV_GV3gwS) and relatively deep groundwater (EV_GV3gw) compared to surface water. Furthermore, at RG_MW_GCA, installed near the confluence of Grave Creek and the Elk River, bedrock was encountered at a depth of 1.5 m, which further suggests that the groundwater component along Grave Creek would be minimal in comparison to surface water. This hypothesis is also supported by flow accretion studies that found that Harmer Creek did not lose flow to groundwater on a catchment scale and localized flow loss was regained before Harmer Creek reaches the Harmer Reservoir (Drawing EV-02; SNC-Lavalin, 2021a).The proportional decrease in OC concentrations in surface water downstream in Harmer Creek was inferred not to be to the result aquifer attenuation, but was consistent with mixing (i.e., dilution) with background waters (Lorax Environmental, 2019; SNC-Lavalin, 2020). Overall, surface water is considered the main transport pathway for OC to groundwater in the Elk River valley bottom. Groundwater analytical results from RG_MW_GCA will continue to be collected to evaluate the potential groundwater pathway in bedrock.

Additional monitoring wells were recently installed near the Dry Creek Sedimentation Pond (EV_MW_DC1 through EV_MW_DC7 and EV_PW_DC1) and near the Harmer Reservoir (EV_MW_HC1 through EV_MW_HC5) as shown on Drawing EV-01. As discussed in the SSGMP Update, Dry Creek is expected to represent the main source of mine-influenced groundwater and surface water to the Grave Creek/Harmer Creek Areas (SNC-Lavalin, 2021a). After two years of data has been collected from the Harmer Reservoir wells and Dry Creek wells, which should be sufficient to identify any seasonal or other trends, the results will be reviewed for potential inclusion in the EVO SSGMP.

1.4.1.2 Elk River Downstream of Grave Creek Confluence (Study Area 7)

In 2021, groundwater samples from the Elk River downstream of the Grave Creek confluence (RG_DW-02-20 and RG_MW_WW) had concentrations of OCs less than the primary screening criteria; except for dissolved selenium in both wells; trends (where available) and concentrations were consistent with historical data.

Both RG_DW-20-20 and RG_MW_WW have been installed in the Elk River valley bottom downstream of the confluence with Grave Creek (Drawing EV-01). Infiltration of surface water from the Elk River is considered a key influence on groundwater quality in this area. In 2021, sulphate concentrations in Elk River valley bottom groundwater at RG_DW-02-20 ranged between 63.1 mg/L and 105 mg/L, while dissolved selenium concentrations ranged from 12.2 µg/L and 18.7 µg/L (Figures EV-02 and -03; Drawings EV-15 and -17). Although concentrations of dissolved selenium were greater than the applicable primary standards, the Mann-Kendall trend analysis indicates no obvious trend (Attachment III). Concentrations of nitrate-nitrogen (nitrate-N) at RG_DW-02-20 were less than the primary screening criteria (Figure EV-04) and the Mann-Kendall analysis indicates a stable trend.

Concentrations of sulphate and dissolved selenium in 2021 at RG_MW_WW ranged from 63.4 to 64.7 mg/L and 10.3 to 11.6 µg/L, respectively. The concentrations of OC in both wells were within the range of magnitude of those measured in Elk River surface water at EV_ER4 (upstream from the confluence with Grave Creek; Figures EV-02 to -04) and the $Se:SO_4$ (S) ratios are similar, indicating mixing with mine-influenced water (Figure EV-05). OC concentrations in the Elk River measured at EV_ER4 fluctuate seasonally and are typically lower during freshet, consistent with the effect of dilution on constituents in a freshet dominated regime. Although OC concentrations at RG_DW-02-20 were similar in magnitude to the Elk River, they followed a delayed seasonal trend relative to that observed in surface water, suggesting some lag may be present in groundwater-surface water interactions and/or less dilution occurring in groundwater during freshet. Trends in analytical data will be reviewed for RG_MW_WW once there is a sufficient dataset.

1.5 Elk River Proximal to EVO (Study Area 8)

A summary of 2021 groundwater monitoring and sampling results for the Elk River Proximal to EVO and Study Area 8 is presented in Table F with references to supporting information (Drawings, Figures, Tables, and Appendices).

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Table F: Summary of 2021 Groundwater Monitoring and Sampling Results at the Elk River Proximal to EVO (Study Area 8)

Hydrogeological Information		Description	Reference
Monitoring Locations	Relevant EVO SSGMP/RGMP Wells (Study Area 8)	EV_BALgw, EV_LSgw, EV_GCgw, EV_OCgw, EV_MW_GC1B, RG_DW-03-10 (Sparwood Well 4, PW4)	Drawing EV-01 Table EV-01 SRK, 2022
	Relevant Monitoring Wells from Other Programs[a]	None	
	Relevant Surface Water Monitoring Stations[b]	EV_GC2, EV_LAGD, EV_BLM2, EV_OC1, EV_LC1, EV_ER2	
	Relevant Seep Monitoring Locations[b]	EV_SEEP_PLANT1, EV_SEEP_PLANT10, EV_SEEP_PLANT11, EV_SEEP_PLANT23, EV_SEEP_10MILE5, EV_SEEP_10MILE9, EV_SEEP_CFI1, EV_SEEP_CFI3, EV_WLAGC	
Physical Hydrogeology	Groundwater Elevation Trends	› Groundwater elevations exhibit seasonal trends with the highest levels measured in spring/early summer (June) and the lowest measured in mid-fall (October), except at EV_BALgw, where minimal seasonal fluctuation has been observed. › Groundwater elevations at EV_OCgw have followed less of a defined seasonal trend since January 2015. This may be partially related water levels in nearby Lagoon D, inferred to be losing water to ground.	Drawing EV-02 Table EV-02 Figure EV-06
	Hydraulic Gradients and Flow Direction	› No nested well pairs are present in the area to calculate vertical gradients. › Lateral flow is inferred to follow the Elk River. Wells EV_LSgw and EV_MW_GC1B are both screened in the shallow unconfined sand and gravel aquifer. The lateral gradient between these wells was 0.003 to 0.004 m/m to the south in 2021.	
Chemistry	2021 SSGMP/RGMP OC Results	› All OC concentrations were less than primary screening criteria in 2021.	Table G Drawings EV-14 to -17 Tables EV-03 to -05 Figures EV-07 to -09
	Non-Order Mine-Related and Naturally Occurring Constituents	› Concentrations above primary screening criteria: – Fluoride: EV_OCgw (Q1 to Q4); – Lithium: All wells except RG_DW-03-10 (Q1 to Q4) and EV_GCgw (Q2 and Q3); – Manganese: EV_LSgw and EV_MW_GC1B (Q1 to Q4); and – Strontium: EV_BALgw (Q1 and Q4). › Based on the BGA completed for the 2020 RGMP Update, all parameters were identified as not being related to mining. › All other constituents were less than primary screening criteria.	Tables EV-03 to -04 SNC-Lavalin, 2020
	Mann-Kendall Trend Analysis	› Increasing trends: EV_GCgw (sulphate), EV_OCgw (nitrate, sulphate). Concentrations of these OC remain at least an order of magnitude lower than the primary screening criteria. › All other parameters at EV_LSgw, EV_GCgw, EV_OCgw, EV_BALgw, and RG_DW-03-10 were either decreasing, stable or no trend. › Insufficient data to complete trend analysis at EV_MW_GC1B.	Table H Attachment III

Notes:
[a] - Relevant Monitoring Wells from Other Programs are those in the area that are under evaluation for potential inclusion in the SSGMP and/or RGMP.
[b]: Relevant Surface Water Stations and Seep Monitoring Stations represent a sub-set of the surface water and seepage monitoring stations present in EVO and Study Area 8.

A summary of results for OC compared to primary screening criteria is presented in Table G.

Table G: Summary of OC Compared to Primary Screening Criteria at the Elk River Proximal to EVO (Study Area 8)

Parameter[1,2,3] / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
EV_BALgw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_LSgw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_GCgw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_OCgw**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_GC1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DW-03-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSR AW	400				1,280 – 4,290[4]				0.5 – 4[4]				20			
CSR IW	n/a				n/a				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			
BCWQG (Long-term Average)	3				309 - 429[3]				n/a				2			
BCWQG (Short-term Average)	32.8				n/a				n/a				n/a			

Notes:

1 Primary screening criteria are CSR standards for **Aquatic Life (AW),** Drinking Water (DW), Livestock (LW), and *Irrigation (IW)* except for wells with a ** which indicates the well is within 10 m of surface water and results are compared to BC Water Quality Guideline (BCWQG) for AW.

2 '–' denotes result less than primary screening criteria for given constituents.

3, Where a duplicate was collected, the higher concentration is provided in table.

4, Standard varies with hardness.

'NS' denotes no sample.

Mann-Kendall trend analysis was completed for OC where more than seven data points have been measured. A summary of the trend analysis results is provided in Table H.

Table H: Summary of Mann-Kendall Trend Analysis for OC at the Elk River Proximal to EVO (Study Area 8)

Parameter[1,2] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
EV_BALgw	No Trend	Decreasing	Probably Decreasing	Decreasing
EV_LSgw	Probably Decreasing	Decreasing	-	Decreasing
EV_GCgw	-	Increasing	-	-
EV_OCgw	Increasing	Increasing	-	Decreasing
RG_DW-03-10	Stable	Stable	-	Stable

Notes:

1 Where OC were measured greater than the primary screening criteria in 2021, the trend result is ***italics***. Where the OC were measured greater than the secondary screening criteria for selenium during at least one event in 2021, the result is ***shaded and italics***. Where increasing trends are noted, the cell is shaded yellow.

2 "-" denotes insufficient data to complete trend analysis, including where concentrations were consistently less than or within five times the MDL.

1.5.1 Discussion

In 2021, groundwater samples from the Elk River proximal to EVO and in Study Area 8 (EV_BALgw, EV_LSgw, EV_GCgw, EV_MW_GC1B, EV_OCgw, and RG_DW-03-10) had concentrations of OCs that remained less than the primary screening criteria (Figures EV-07 to -09 and Drawings EV-14 to -17). Concentrations of OCs were generally consistent with historical data; however, the Mann-Kendall trend analysis completed for nitrate-N at EV_OCgw indicated an increasing trend in 2021 (no trend was discernible in 2020). Although an increasing trend in nitrate-N has been observed at EV_OCgw, concentrations remain approximately one order of magnitude less than the applicable *British Columbia Approved Water Quality Guidelines*[1] (BCWQG) for AW. In addition to nitrate-N at EV_OCgw, increasing trends in sulphate have been observed at both EV_OCgw and EV_GCgw, but concentrations remain an order of magnitude below the primary screening criteria. No other increasing trends were observed in this study area.

Dissolved selenium was the only OC with concentrations greater than the BCWQG for AW in the surface waters of the main tributaries in the Elk River watershed (Balmer Creek [EV_BLM2], Lindsay [EV_LC1], Goddard [EV_GC2] and Otto [EV_OC1]). Concentrations of dissolved selenium at EV_BALgw, EV_LSgw, EV_GCgw and EV_OCgw have been less than the screening criteria (less than detection limit at EV_GCgw) and stable or marginally decreasing since 2014 (Figure EV-07). Consistent with previous findings, dissolved selenium concentrations in surface water remain up to two orders of magnitude higher compared to groundwater concentrations in the Elk River drainage (Figure EV-07). The highest dissolved selenium concentrations in surface water were measured at EV_GC2 (Goddard Creek Sedimentation Pond Decant).

Goddard Creek is known to be influenced from seepage through a known fault as it flows from the Cedar North Pit through the conveyor tunnel to the valley bottom (SNC-Lavalin, 2020). Teck is planning to divert flow from the conveyor tunnel for use as process water starting in the spring of 2022 (Teck, 2022). The Lindsay Interceptor Ditch, which collects flow from the upper Lindsay and Feltham Creek drainages, represents the other source of surface water to Goddard Creek. Three settling ponds help to remove suspended sediment prior to discharge to Goddard Marsh.

At EV_MW_GC1B, located immediately northwest of EV_GC2 (Goddard Sedimentation Ponds) and northeast of the Goddard Marsh, the Se:SO_4 (S) ratios observed in shallow groundwater show evidence of selenium reduction (Figure EV-10). Between Q2 and Q4 in 2021, reducing conditions were observed at EV_MW_GC1B; the oxidation-reduction potential ranged from -32.5 and 18.9 mV and dissolved oxygen concentrations were low (0.46 to 0.52 mg/L). These values are lower than previously documented values for deeper groundwater and suggest reducing conditions are present in shallow groundwater (SNC-Lavalin, 2021b). The reducing conditions may be related to surface water infiltration from either the Goddard Sedimentation Ponds or the Goddard Marsh, where a reducing environment within the pond sediments is possible. Selenium reduction may also be occurring in CCR, located upgradient to the east and northeast. Note that surface water at both the Goddard Marsh (at Location EV_GCMARSH01A, 2019 data [Ecofish Research Ltd., 2019]) and the Goddard Sedimentation Ponds are both mine-influenced; however selenium reduction does not appear to be occurring in surface water at either location (Figure EV-10). However, it is possible that it may be occurring within sediments and within groundwater seepage.

[1] *British Columbia Approved Water Quality Guidelines, includes Working Water Quality Guidelines for BC* (BCWQG). British Columbia Ministry of Environment & Climate Change Strategy, updated December 2021.

Seep samples collected from location EV_SEEP_PLANT23, located near EV_MW_GC1B and immediately downgradient of the Goddard Sedimentation Ponds, had an average dissolved selenium concentration of 18.8 µg/L and an average sulphate concentration of 497 mg/L in 2021, which are indicative of mine-influenced water. Both of these average concentrations are higher than what was observed in groundwater at EV_MW_GC1B (maximum 2021 selenium and sulphate concentrations of 5.92 µg/L and 291 mg/L, respectively). Although the sulphate concentrations are of the same order of magnitude to those observed at EV_GC2, the selenium concentrations are more than an order of magnitude lower. The Se:SO4 (S) ratios also indicate that EV_SEEP_PLANT23 water has undergone some selenium reduction but not to the same extent as EV_MW_GC1B (Figure EV-10). This result further suggests that groundwater in this area is undergoing selenium reduction, which is not observed in surface water at either the Goddard Sedimentation Ponds (i.e., at EV_GC2) or the Goddard Marsh (i.e., at EV_GCMARSH01A [Ecofish Research inc., 2019]). There is also the potential that water in the seep is being influenced by mixing of seepage water from nearby and upgradient CCR.

Lagoon D, a tailings storage facility, is located in Study Area 8 and is inferred to be losing water to ground via infiltration (SNC-Lavalin, 2021a). Although surface water from the lagoon (EV_LAGD) may be influencing the seasonal potentiometric elevations measured at EV_OCgw, concentrations of OC in groundwater remain less than the applicable screening criteria and the major ion distribution at EV_LAGD is distinct from groundwater at EV_OCgw (Figure EV-12). In addition, Se:SO4 (S) ratios and the major ion distribution at EV_OCgw and nearby surface water station EV_OC1 are not reflective of mine influence (Figures EV-10 to -12). Monitoring well EV_OCgw is located at the base of the unconfined aquifer immediately over bedrock (screened approximately 10 m below the water table), and shallow groundwater quality and vertical gradients in this area are not known (Drawing EV-07). The major ion distribution between Otto Creek (EV_OC1) and groundwater from EV_OCgw were distinct from one another, indicative that surface water – groundwater interaction between the creek and deeper groundwater (above bedrock) in this area may be limited (Figures EV-11 and -12).

There is some residual uncertainty regarding groundwater flow direction in the vicinity of inactive lagoons A, B and C. However, the installation of additional monitoring wells are being installed in the vicinity of Lagoon D and the inactive lagoons are anticipated. The need for any additional monitoring wells in this area will be evaluated once the Lagoon D monitoring well installation program is complete.

Groundwater concentrations at RG_DW-03-10 (Sparwood Municipal Supply Well 4), the new municipal well drilled in 2018 to replace Sparwood Well 3 (RG_DW-03-04 in Study Area 12), were less than the primary screening criteria for all OC in 2021 samples (Figures EV-07 to -09). This well is on the opposite (west) side of the Elk River from EVO, which is expected to act as a groundwater divide. This groundwater divide acts as a natural barrier to groundwater transport from potential sources identified on the western slope of EVO and the Elk River valley bottom aquifer based on the current RGMP monitoring well results. Nonetheless continued monitoring of groundwater quality in RG_DW-03-10 is warranted to improve understanding given their importance as a DW supply for the District of Sparwood.

Review of available groundwater data from monitoring locations in the Elk Valley watershed indicate there does not appear to be a confirmed direct groundwater transport pathway between the surface water sources identified on the western slope of EVO and Elk River valley bottom (SNC-Lavalin, 2019a).

1.6 Sparwood Area (Study Areas 9a and 12)

This section has been structured along the following geographical areas with rationale:

- Baldy Ridge: Assess an identified potential groundwater flow path from EVO to the Sparwood Area;
- Sparwood Ridge: Assess upland groundwater and surface water on the northern slopes of Sparwood Ridge flowing into Michel Creek valley-bottom sediments;
- Sparwood Area East - Michel Creek Valley Bottom (Study Area 9a): Assess recharge to groundwater from infiltration of Michel Creek and the Elk River, and
- Elk River valley bottom downstream of Teck Operations (Study Area 12): Assess surface water-groundwater interactions (specifically with Elk River and Michel Creek), along with groundwater flow paths from upgradient areas. This area receives groundwater flow from Study Area 8 (Elk River Proximal to EVO) and Study Area 9a (Sparwood Area East-Michel Creek Valley Bottom).

A summary of 2021 groundwater monitoring and sampling results for the Sparwood Area is presented in Table I with references to supporting information (Drawings, Figures, Tables, and Appendices).

Table I: Summary of 2021 Groundwater Monitoring and Sampling Results in the Sparwood Area (Study Areas 9a and 12)

Hydrogeological Information		Description	Reference
Monitoring Locations	Relevant EVO SSGMP/RGMP Wells (Study Areas 9a and 12)	**Baldy Ridge:** EV_MW_AQ1, EV_MW_AQ2, EV_MW_MC4 **Sparwood Ridge:** EV_MW_MC3 **Sparwood Area East – Michel Creek (Study Area 9a):** EV_MW_SPR1A/B/C, EV_MCgwS/D, EV_MW_MCgwA/B **Elk River (Study Area 12):** RG_DW-03-04 (Sparwood Well 3), RG_MW-03-04, EV_ER1gwS/D	Drawing EV-01 Table EV-01 SRK, 2022
	Relevant Monitoring Wells from Other Programs[a]	None	
	Relevant Surface Water Monitoring Stations[b]	EV_ER2, EV_MC2, EV_ER1, EV_SPR2, EV_AQ6	
	Relevant Seep Monitoring Locations[b]	EV_SPR1B (SEEP1B), EV_SEEP_TURCON1	
Physical Hydrogeology	Groundwater Elevation Trends	› **Baldy Ridge:** Groundwater elevations at EV_MW_AQ1 are highest in the spring (May); however, the seasonality appears to be muted compared to fluctuations at EV_MW_MC3. At EV_MW_MC4, the seasonal response is also muted and delayed; the maximum annual elevations usually occur in August. Groundwater elevations at EV_MW_AQ2 do not appear to fluctuate significantly throughout the year. › **Sparwood Ridge:** EV_MW_MC3 exhibits groundwater elevations similar to stage elevations observed in Michel Creek (EV_MC2), with higher elevations in the spring/summer, consistent with a freshet dominated regime. › **Sparwood Area East – Michel Creek:** Groundwater elevations at all wells exhibit similar seasonal trends with the highest levels measured in spring/early summer and the lowest measured in mid-fall (October), similar to seasonal fluctuations in Michel Creek (EV_MC2). › **Elk River:** RG_DW-03-04 (Sparwood Well 3) is no longer in use for drinking water supply and typically only operated for maintenance/emergency purposes. A pressure transducer cannot be installed, and manual groundwater elevations are not available. Groundwater elevations at EV_ER1gwS/D follow similar seasonal elevation trends as surface water levels measured in Elk River (EMS Station ID 08NK016), and manual measurements at RG_MW-03-04 also appear similar. The cessation of pumping at RG_DW-03-04 does not appear to have affected groundwater elevations at EV_ER1gwS/D.	Drawing EV-03 Table EV-02 Figures EV-13 to -15
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – EV_MCgwS/D (Study Area 9a): 0.05 m/m downwards; – EV_MW_SPR1A/B, EV_MW_SPR1B/C, EV_MW_MCgwA/B (Study Area 9a): 0.003 to 0.03 m/m upwards; and – EV_ER1gwS/D (Study Area 12): 0.02 m/m upwards. › **Lateral Hydraulic Gradient:** – The lateral hydraulic gradient ranged from 0.007 m/m in Study Area 12 to 0.01 m/m upgradient along Michel Creek in Q4 2021. East of the Elk River, groundwater flow along the Michel Creek valley is westward, parallel or sub-parallel to Michel Creek. Locally, groundwater flow is likely governed by the presence of preferential pathways formed by channels of coarser-grained sediments and therefore localized groundwater flow directions may vary. – Upland groundwater and surface water originating on Sparwood Ridge flows downgradient to the Elk River and Michel Creek in the Sparwood Area. Shallow groundwater flow is influenced by bedrock topography where bedrock is shallow.	
Chemistry	2021 SSGMP/RGMP OC Results	› **Sparwood Ridge:** – Dissolved selenium concentrations at EV_MW_MC3 in Q2, Q3 and Q4, however, only concentrations in Q2 and Q4 exceeded the secondary screening criteria. › **Sparwood Area East – Michel Creek:** – Dissolved selenium – EV_MW_SPR1C (Q1). – Concentrations were less than the secondary screening criteria. › **Elk River:** – Dissolved selenium – EV_ER1gwS (Q1), RG_DW-03-04 (Q1) and RG_MW-03-04 (Q1); and – Concentrations were less than the secondary screening criteria. › All other OC concentrations were less than the primary screening criteria in 2021.	Table J Drawings EV-18 to -21 Tables EV-03 to -05 Figures EV-16 to -24

Table I (Cont'd): Summary of 2021 Groundwater Monitoring and Sampling Results in the Sparwood Area (Study Areas 9a and 12)

Hydrogeological Information		Description	Reference
Chemistry (Cont'd)	Non-Order Mine-Related and Naturally Occurring Constituents	› **Concentrations above primary screening criteria:** – Fluoride: EV_MW_MC3 (Q1), EV_MCgwD (Q1 and Q2), EV_MW_SPR1B (Q2 to Q4); – Lithium: All wells, with concentrations above primary screening criteria in two to four quarters; – Manganese: EV_MCgwD (Q1 to Q4), EV_MW_SPR1A (Q1 to Q4); and – Molybdenum: EV_MCgwD (Q1 to Q4), EV_MW_SPR1B (Q1to Q4). › Based on the BGA completed for the 2020 RGMP Update, all parameters were identified as unrelated to mining. › All other constituents were less than primary screening criteria.	Tables EV-03 to -04 SNC-Lavalin, 2020
	Mann-Kendall Trend Analysis	› Increasing or probably increasing trends: EV_MW_MC3 (nitrate-N, sulphate, dissolved selenium), EV_MCgwS (nitrate-N), EV_MCgwD (nitrate-N and dissolved cadmium) and EV_ER1gwS (dissolved cadmium), EV_MW_MCgwB (sulphate). With the exception of dissolved selenium at EV_MW_MC3 (Q2, Q3 and Q4), concentrations remained less than the primary screening criteria by at least one order of magnitude. › All other parameters in select wells were either decreasing, stable or no trend. › Insufficient data was available to complete trend analysis at RG_MW-03-04.	Table K Attachment III

Notes:

[a] - Relevant Monitoring Wells from Other Programs are those in the area that are under evaluation for potential inclusion in the SSGMP and/or RGMP.
[b] - Relevant Surface Water Stations and Seep Monitoring Stations represent a sub-set of the surface water and seepage monitoring stations present in EVO and Study Areas 9a and 12.

A summary of results for OC compared to primary screening criteria is presented in Table J.

Table J: Summary of OC Compared to Primary Screening Criteria in the Sparwood Area (Study Areas 9a and 12)

Parameter[1,2,3] / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Baldy Ridge																
EV_MW_AQ1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_AQ2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_MC4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sparwood Ridge																
EV_MW_MC3	-	-	-	-	-	-	-	-	-	-	-	-	-	***23.2***	13	***24.2***
Sparwood Area East - Michel Creek																
EV_MW_SPR1A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_SPR1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_SPR1C	-	-	-	-	-	-	-	-	-	-	-	-	14.8	-	-	-
EV_MCgwS	NS	-	-	-	NS	-	-	-	NS	-	-	-	NS	-	-	-
EV_MCgwD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_MCgwA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_MCgwB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elk River Downstream of Teck Operations																
EV_ER1gwS	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-
EV_ER1gwD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DW-03-04	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-
RG_MW-03-04	-	-	-	-	-	-	-	-	-	-	-	-	10.1	-	-	-
CSR AW	400				1,280 – 4,290[4]				0.5 – 4[4]				20			
CSR IW	n/a				n/a				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			

Notes:
[1] Primary screening criteria are CSR standards for **Aquatic Life (AW),** Drinking Water (DW), Livestock (LW), and *Irrigation (IW).*
[2] '–' denotes result less than primary screening criteria for given constituents.
[3] Where a duplicate was collected, the higher concentration is provided in table.
[4] Standard varies with hardness.
'NS' denotes no sample.

Mann-Kendall trend analysis was completed for OC where more than seven data points have been measured. A summary of the trend analysis results is provided in Table K.

Table K: Summary of Mann-Kendall Trend Analysis for OC of the Sparwood Area (Study Areas 9a and 12)

Parameter[1,2] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
Baldy Ridge				
EV_MW_AQ1	No Trend	No Trend	Decreasing	No Trend
EV_MW_AQ2	Decreasing	Decreasing	-	-
EV_MW_MC4	Stable	Stable	-	-
Sparwood Ridge				
EV_MW_MC3	Probably Increasing	Probably Increasing	-	***Increasing***
Sparwood Area East - Michel Creek				
EV_MW_SPR1A	-	Stable	-	-
EV_MW_SPR1B	Stable	Decreasing	-	No Trend
EV_MW_SPR1C	***Stable***	No Trend	No Trend	Stable
EV_MCgwS	Probably Increasing	No Trend	-	-
EV_MCgwD	Increasing	Decreasing	Probably Increasing	Stable
EV_MW_MCgwA	Stable	No Trend	Stable	Decreasing
EV_MW_MCgwB	No Trend	Increasing	No Trend	No Trend
Elk River Downstream of Teck Operations				
EV_ER1gwS	Stable	No Trend	Increasing	***Stable***
EV_ER1gwD	Decreasing	Decreasing	-	Decreasing
RG_DW-03-04	Decreasing	Stable	Probably Decreasing	***Stable***
RG_MW-03-04	-	-	-	-

Notes:

[1] Where OC were measured greater than the primary screening criteria in 2021, the trend result is ***italics***. Where the OC were measured greater than the secondary screening criteria for selenium during at least one event in 2021, the result is ***shaded and italics***. Where increasing trends are noted, the cell is shaded yellow.

[2] "-" denotes insufficient data to complete trend analysis, including where concentrations were consistently less than or within five times the MDL.

1.6.1 Discussion

1.6.1.1 Baldy Ridge

In 2021, groundwater samples from Baldy Ridge (EV_MW_AQ1, EV_MW_AQ2 and EV_MW_MC4) had concentrations of OCs less than the primary screening criteria (Figures EV-16 to -18 and Drawings EV-18 to -21). Concentrations and trends of OCs were generally consistent with historical data.

Groundwater at the base of Baldy Ridge is inferred to primarily originate upslope from Baldy Ridge; therefore, down-valley flow along Michel Creek is not believed to be a dominant process in this area. The

water levels show a muted seasonal influence at EV_MW_MC4 and EV_MW_AQ1 and little seasonal influence at EV_MW_AQ2 compared to wells installed in the Michel Creek aquifer, further supporting the hypothesis that flow from Baldy Ridge is the dominant process as opposed to surface water infiltration (Figure EV-13).

Concentrations of OC at wells EV_MW_MC4, EV_MW_AQ1 and EV_MW_AQ2 and seep EV_SEEP_TURCON1 did not contain OC concentrations greater than primary screening criteria in 2021 or in prior years. In 2021, dissolved selenium concentrations at EV_MW_AQ1 (2.02 to 8.17 µg/L) were of the same order of magnitude measured in surface water at EV_AQ6 (3.83 to 15 µg/L) in Aqueduct and Qualtieri creeks (note that Qualtieri Creek is diverted to Aqueduct Creek; Figure EV-16). Concentrations of dissolved selenium at EV_MW_MC4 and EV_MW_AQ2 remained at least one order of magnitude lower than surface water at EV_AQ6. Well EV_MW_AQ1 is located near Aqueduct Creek, which suggests that the source of selenium is related to infiltration at Aqueduct Creek. In addition, concentrations of dissolved selenium at EV_MW_AQ1 fluctuate seasonally, similar to what is observed at Aqueduct Creek. The Se:SO_4 (S) ratios also suggest mixing by mine-influenced water (Figure EV-25). Other wells at the base of Baldy Ridge are not near any streams and have much lower dissolved selenium concentrations.

Although infiltration of mine-influenced water may be occurring near Aqueduct Creek, dissolved selenium concentrations at EV_MW_AQ1 are usually lower than observed in surface water at EV_AQ6 (i.e., selenium concentrations do not exceed the screening criteria; Figure EV-16). Therefore, a groundwater transport pathway from Baldy Ridge is not currently considered a major contributor of mining-related constituents to the Michel Creek aquifer or groundwater in the Sparwood Area. The main transport pathway of OC from sources on Baldy Ridge to groundwater in the Sparwood Area valley bottom aquifer is inferred to be through surface water infiltration associated with Aqueduct Creek.

1.6.1.2 Sparwood Ridge

In 2021, groundwater samples from Sparwood Ridge (EV_MW_MC3) contained concentrations of dissolved selenium greater than the primary screening criteria (Figure EV-16 and Drawing EV-21), and concentrations of OCs (nitrate-N, sulphate and dissolved selenium) have been increasing over time (Figures EV-16 to -18).

Downgradient from Sparwood Ridge, continuous groundwater elevation data in well EV_MW_MC3 indicates a seasonal response (Figure EV-13). The highest groundwater levels are observed in the spring, approximately following the same response as Michel Creek (EV_MC2), which suggests a hydraulic connection between groundwater and Michel Creek surface water.

The OC concentrations in EV_MW_MC3 were relatively low (less than the primary criteria) in 2021, with the exception of dissolved selenium, which was greater than the primary screening criteria in Q2 through Q4 (Figure EV-16). Concentrations of dissolved selenium, nitrate and sulphate all increased to historical highs in 2021 (Figures EV-16 to -18), with concentrations marginally higher than those observed in surface water at EV_MC2.

Prior to Q4 2020, groundwater at EV_MW_MC3 was classified as sodium bicarbonate type water, consistent with the evolution of water through cation exchange with bedrock and reducing conditions, and indicative that groundwater-surface water interaction had likely occurred (Figure EV-26). Since Q4 2020, with the exception of Q1 2021, the major ion distribution in groundwater at this well has shifted to calcium bicarbonate-sulphate and increases in field measured dissolved oxygen (DO) and oxidation-reduction potential (ORP) have also been documented (Table EV-03). This shift in major ion distribution along with the Se:SO_4 (S) ratios for these samples in 2021 (Figure EV-25) indicate that mixing may be occurring with another mine-influenced water source in addition to Michel Creek.

Seep EV_SPR1B (also referred to as Seep 1B) is located in the general vicinity of EV_MW_MC3 and also had concentrations of dissolved selenium greater than the primary screening criteria in Q2 of 2019, 2020 and 2021. This seep is interpreted to be representative of melt water that has flowed through the historical mine workings on Sparwood Ridge, located to the south of Michel Creek, and is not considered representative of the groundwater in the valley bottom of the Sparwood Area. However, the major ion distribution at EV_SPR1B is dissimilar to that of EV_MW_MC3, indicative that another source of mine-influence water is inferred to be mixing with EV_MW_MC3 (Figure EV-26).

1.6.1.3 Sparwood Area East – Michel Creek (Study Area 9a)

In 2021, groundwater samples from Sparwood Area east along Michel Creek (EV_MCgwS/D, EV_MW_SPR1A/B and EV_MW_MCgwA/B) had concentrations of OC less than the primary screening criteria (Figures EV-19 to -21 and Drawings EV-18 to -21). Concentrations of dissolved selenium were greater than the primary screening criteria in shallow well EV_MW_SPR1C in Q1 2021, which was also observed in March 2019 and February 2020.

At the triple nested well EV_MW_SPR1A/B/C, an upward groundwater gradient was present between the shallow and deeper aquifers through most of the year, which suggests groundwater in this area may be recharging surface water, including Spring Creek (i.e., at EV_SPR2; Table EV-02), which has similar dissolved selenium concentrations, ranging from 5.6 µg/L to 12.3 µg/L in 2021 (Figure EV-19). Isotope and general geochemistry data indicated that groundwater sources to Spring Creek are from the relatively shallow fluvial/alluvial aquifer, while contributions from deeper sources originating from the Mist Mountain Formation on Baldy Ridge appear to be relatively insignificant (SNC-Lavalin, 2009).

The Se:SO_4 (S) ratio plot indicates that mine-influenced groundwater is present at EV_MW_SPR1C and not in other wells along the Michel Creek valley bottom further downgradient (Figure EV-27). The ratio at EV_MW_SPR1C in 2021 was very similar to that at EV_MW_MC3 (Figure EV-25), located to the southwest. This may be indicative that groundwater at both locations is mixing with mine-influenced water. Groundwater quality in the triple nested wells EV_MW_SPR1A/B/C should continue to be assessed to confirm trends.

The presence of a relatively thick and continuous fine-grained unit in this area is interpreted to locally affect groundwater flow, resulting in two distinct aquifers separated by an aquitard in the valley bottom in the Sparwood Area (Drawings EV-09 and -10). The aquitard extends to EV_MW_MCgwA/B (Drawing EV-09), where there is little or no mine-influence in either the shallow or deep aquifers. However, this location is inferred to be downgradient of Baldy Ridge; influence from Michel Creek on the deeper well may be minimal due to the presence of the aquitard. The fine-grained unit is also inferred to contribute to the following naturally occurring constituents: fluoride, lithium, and manganese and molybdenum.

1.6.1.4 Elk River Downstream of Teck Operations (Study Area 12)

In 2021, groundwater samples near the Elk River downstream of Teck Operations in Study Area 12 (RG_DW-03-04, RG_MW-03-04, and EV_ER1gwS/D) had concentrations of dissolved selenium that were generally lower in 2021 in comparison to previous years with the exception of Q1 at EV_ER1gwS/D (Figure EV-22 and Drawing EV-21). Concentrations of nitrate-N and sulphate were within historical ranges (Figures EV-23 and -24 and Drawings EV-18 and -19).

Seasonal trends in OC concentrations have been observed in surface water from the Elk River and Michel Creek (EV_ER1 and EV_MC2, respectively; Figures EV-22 to -24). Similar seasonal fluctuations

have been observed in groundwater at RG_DW-03-04, RG_MW-03-04 and EV_ER1gwS, with lower concentrations measured in the late spring and summer which increase through the fall and winter, consistent with the effect of dilution in a freshet dominated regime. Prior to July 2019, concentrations of OC at deep well EV_ER1gwD also exhibited seasonal fluctuations; however, since then, fluctuations have become more muted and concentrations of OC have generally decreased (with the exception of Q1 2021) (Figures EV-22 to -24). This may be the result of the cessation of pumping at municipal groundwater supply well RG_DW-03-04. Municipal groundwater extraction has now shifted to RG_DW-03-10 (Sparwood Well #4).

The confining layer (identified as clay at RG_DW-03-04 and silt and clay at RG_MW-03-04) is not fully continuous and the confined/semi-confined aquifer unit may interact with the shallow unconfined aquifer as well as infiltrating surface water (Drawings EV-12 and -13). Neither the extent of the confined aquifer, the confining layer, or the groundwater flow direction at the confluence of Michel Creek and Elk River are well constrained. The RG_DW-03-04 capture zone was inferred to extend in a generally north to northeast direction and draw water from both Elk River and Michel Creek (UMA, 2008), where flow is likely governed by coarser-grained materials formed by historical fluvial or glaciofluvial channels. From 2016 to 2020, selenium and nitrate-N concentrations in the deeper confined aquifer at RG_DW-03-04 appeared to generally reflect Elk River surface water quality, with some influence from Michel Creek. However, in 2021 concentrations overall more closely resemble those observed in Michel Creek.

The Se:SO4 (S) plot shows that groundwater quality in Study Area 12 show mine-influenced water (Figure EV-28). Groundwater at RG_MW-03-04 and RG_DW-03-04 plot more closely to that of Michel Creek surface water (i.e., EV_MC2), indicating that Michel Creek is influencing this water. Groundwater at EV_ER1gwS/D plot more closely with Elk River water (i.e., EV_ER1), which indicate that the Elk River is a stronger influence.

Surface water concentrations of selenium and nitrate-N at Michel Creek have decreased since 2019 at EV_MC2 (Figures EV-22 and -24). Some slight decline in selenium and nitrate-N concentrations were observed in 2021 at RG_DW-03-04, however the declines were much greater at EV_ER1gwD. Continued monitoring should occur to understand post-pumping conditions in the aquifer.

Although concentrations of OC have generally decreased in deep well EV_ER1gwD (Figures EV-22 to -24), water levels in the deep aquifer do not appear to have changed in 2021 compared to previous years and the upward vertical gradient at this location has also remained similar (Table EV-02 and Figure EV-15). Due to the wellhead configuration, instrumentation cannot be installed inside the well casing to collect water level data from RG_DW-03-04 to assess changes after pumping.

1.7 Michel Creek Downstream of Gate Creek and Bodie Creek (Study Area 9b)

This section has been structured along the following geographical areas with rationale:

- Gate Creek and Bodie Creek: a potential groundwater flow path from EVO mining activities upstream from Bodie and Gate Creek drainages.
- Michel Creek Valley Bottom: understanding of the major sources of -mining-related groundwater.

A summary of 2021 groundwater monitoring and sampling results for the Michael Creek downstream of Gate and Bodie creeks and Study Area 9b is presented in Table L with references to supporting information (Drawings, Figures, Tables, and Appendices).

Table L: Summary of 2021 Groundwater Monitoring and Sampling Results for Michel Creek Downstream of Gate Creek and Bodie Creek (Study Area 9b)

Hydrogeological Information		Description	Reference
Monitoring Locations	Relevant EVO SSGMP/RGMP Wells (Study Area 9b)	**Gate and Bodie Creek:** EV_MW_GT1A/B, EV_MW_BC1A/B, EV_RCSgw, EV_BCgw, EV_WH50gw **Michel Creek Valley Bottom:** EV_HW1 (EV_HM1), EV_BRgw, EV_MW_MC1A/B, EV_MW_MC2A/B	Drawing EV-01 Table EV-01
	Relevant Monitoring Wells from Other Programs[a]	**Other Wells:** EV_MW_BC2, EV_MW_BC3	
	Relevant Surface Water Monitoring Stations[b]	EV_BC1, EV_GT1, EV_MC2	
	Relevant Seep Monitoring Stations[b]	EV_SPR2B, EV_SPR5, EV_SPR14: Discharge from creek flowing near or through suspected mine workings, underground mine discharge from adit openings from No. 1 Rock Tunnel, and from No. 3 Rock Tunnel, BODIE_SEEP.	
Physical Hydrogeology	Groundwater Elevation Trends	› **Gate and Bodie Creek:** – Groundwater elevations have exhibited seasonal trends generally consistent with surface water station EV_MC2 (approximately 2 km downstream) in Michel Creek, with water levels increasing during freshet and decreasing in the fall and winter. In addition, in 2021, a secondary seasonal increase in water levels was noted in November, during which an extreme rainfall event had occurred in southern British Columbia. A lag is inferred between the peaks in the hydrograph suggesting a hydraulic influence of the creek on the valley bottom aquifer – Pumping rates at EV_RCSgw were low in 2021, with a maximum daily rate of 4.0 m^3/day, and typical pumping rates less than 0.3 m^3/day. Pumping rates at EV_WH50gw ranged from 0.1 to 100 m^3/day. Groundwater from EV_WH50gw was pumped year-round at an average rate of 0.45 m^3/day. Between February and the end of November, the flow meter at EV_WH50gw had malfunctioned and pumping rates could not be recorded. Flow rates prior to February are inferred to be indicative of pumping rates at this well throughout the year. – At EV_BRgw, pumping rates were generally less that 1 m^3/day with peak rates reaching close to 5 m^3/day. – No obvious groundwater elevation effects are apparent on the hydrograph for any of the monitoring wells in this area due to groundwater pumping. › **Michel Creek Valley Bottom:** – Groundwater elevation data at EV_MW_MC1A/B and EV_MW_MC2A/B indicated a seasonal response with highest groundwater levels in the spring, approximately following the surface water level of Michel Creek (EV_MC2, approximately 0.5 km downstream). – Pumping rates at EV_BRgw were usually less that 1 m^3/day with peak rates reaching close to 5 m^3/day. Pumping rates at EV_HW1 were the highest year-round for the wells in Study Area 9a and were typically less than 75 m^3/day (with a peak rate of 142 m^3/day in August 2021). Between March and the end of May, pumping rates at EV_HW1 were the lowest, with an average rate of 11 m^3/day. – Wells EV_MW_MC2A/B are located closest to EV_HW1, however no obvious pumping effects are apparent on groundwater elevations at these wells or EV_MW_MC1A/B.	Drawing EV-03 Table EV-02 Figures EV-29 to -31
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – EV_MW_GT1A/B:0.01 m/m downwards and EV_MW_BC1A/B: 0.03 to 0.04 m/m downwards; – EV_MW_MC1A/B: 0.02 to 0.03 m/m downwards; and – EV_MW_MC2A: 0.01 m/m upwards. › **Lateral Hydraulic Gradient:** – The lateral hydraulic gradient along Michel Creek was 0.007 m/m in Q4 2021. Groundwater flow is towards the northwest following Michel Creek.	
Chemistry	2021 SSGMP/RGMP OC Results	› **Gate and Bodie Creek:** – Dissolved selenium – all wells, except for EV_MW_GT1A (Q1 to Q4) and EC_WH50gw (Q2 to Q4); all concentrations that were greater than the primary screening criteria also exceeded the secondary screening criteria, except at EV_MW_GT1B (Q1), EV_BCgw (Q1 and Q2) and EV_WH50gw (Q1); and – Sulphate and nitrate – EV_MW_BC1A/B, EV_RCSgw (Q1 to Q4), EV_MW_GT1B (Q2 to Q4). › **Michel Creek Valley Bottom:** – Dissolved selenium – EV_BRgw, EV_HW1, EV_MW_MC2B; all concentrations were greater than the secondary screening criteria, except EV_BRgw (Q1, Q2 and Q4). › All other OC concentrations were less than the primary screening criteria in 2021.	Table M Drawings EV-18 to -21 Tables EV-03 to -05 Figures EV-32 to -37

Table L: Cont'd): Summary of 2021 Groundwater Monitoring and Sampling Results for Michel Creek Downstream of Gate Creek and Bodie Creek (Study Area 9b)

Hydrogeological Information		Description	Reference
Chemistry (Cont'd)	Non-Order Mine-Related and Naturally Occurring Constituents	› **Concentrations above primary screening criteria:** – Lithium: All wells except for EV_WH50gw during all quarterly sampling events; – Manganese and iron: EV_MW_MC1B (Q1 to Q4); – Copper: EV_RCSgw (Q1, Q3 and Q4), EV_HW1 (Q4); – Uranium: EV_MW_BC1B (Q1, Q2, Q4); and – Chloride: EV_MW_MC1B (Q1 to Q4). › Based on the BGA completed for the 2020 RGMP Update, concentrations of lithium and manganese are inferred to be unrelated to mining. Elevated concentrations of manganese and iron are indicative of reducing conditions at EV_MW_MC1B, as evidenced by low dissolved oxygen (0.1 to 0.5 mg/L) and ORP values ranging between -68.3 to -102.8 mV. › The source of dissolved copper at EV_RCSgw and EV_HW1 is not clear; however, may be related to copper tubing used in the construction of the sampling port. › Dissolved uranium at EV_MC_BC1B is inferred to be related to surface water infiltration from Bodie Creek. › The source of chloride is not known but it may be related to road salt (the well is located adjacent to a parking area). › All other constituents were less than primary screening criteria.	Tables EV-04 to -05 Figure EV-38 SNC-Lavalin, 2020
	Mann-Kendall Trend Analysis	› Increasing trends were calculated at EV_MW_BC1A/B for nitrate-N, sulphate and dissolved selenium, and at EV_RCSgw for sulphate and selenium. Concentrations of these OC have been greater than the applicable primary criteria since sampling began in 2019, with the exception of EV_MW_MC1B which has a sulphate concentration that remains well below the primary screening criteria. › All other parameters were either decreasing, stable or no trend for all other wells. › Concentrations of OC at EV_MW_MC2A were all less than five times the detection limit; therefore, trend analysis was not completed.	Table N Attachment III

Notes:
[a] - Relevant Monitoring Wells from Other Programs are those in the area that are under evaluation for potential inclusion in the SSGMP and/or RGMP.
[b]: Relevant Surface Water Stations and Seep Monitoring Stations represent a sub-set of the surface water and seepage monitoring stations present in EVO and Study Area 9b.

A summary of results for OC compared to primary screening criteria is presented in Table M.

Table M: Summary of OC Compared to Primary Screening Criteria at Michel Creek Downstream of Gate Creek and Bodie Creek (Study Area 9b)

Parameter[1,2,3] / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Gate Creek and Bodie Creek																
EV_MW_GT1A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_GT1B	-	16.0	22.2	16.1	-	747	722	703	-	-	-	-	***22.6***	***207***	***173***	***194***
EV_MW_BC1A	35.0	32.5	30.2	31.4	1,070	940	920	858	-	-	-	-	***274***	***283***	***226***	***196***
EV_MW_BC1B	50.8	34.7	31.6	32.0	1,340	1,110	973	1,010	-	-	-	-	***384***	***286***	***236***	***265***
EV_RCSgw	31.7	30.1	28.0	28.2	1,260	1,210	1,220	1,240	-	-	-	-	***272***	***232***	***232***	***222***
EV_BCgw	-	-	-	-	-	-	-	-	-	-	-	-	13.5	14.3	***20.4***	***20.2***
EV_WH50gw	-	-	-	-	-	-	-	-	-	-	-	-	11.2	-	-	-
Michel Creek Valley Bottom																
EV_BRgw	-	-	-	-	-	-	-	-	-	-	-	-	19	12.9	***46.3***	***21.6***
EV_HW1	-	-	-	-	-	-	-	-	-	-	-	-	***54***	***42.9***	***57.5***	***58.5***
EV_MW_MC1A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_MC1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_MC2A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_MC2B	-	-	-	-	-	-	-	-	-	-	-	-	***53.9***	***47.1***	***54.2***	***67.8***
CSR AW	400				1,280 – 4,290[4]				0.5 – 4[4]				20			
CSR IW	n/a				n/a				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			

Notes:
[1] Primary screening criteria are CSR standards for **Aquatic Life (AW),** Drinking Water (DW), Livestock (LW), and *Irrigation (IW).*
[2] '–' denotes result less than primary screening criteria for given constituents.
[3] Where a duplicate was collected, the higher concentration is provided in table.
[4] Standard varies with hardness.
'NS' denotes no sample.

Mann-Kendall trend analysis was completed for OC where more than seven data points have been measured. A summary of the trend analysis results is provided in Table N.

Table N: Summary of Mann-Kendall Trend Analysis for OC at Michel Creek Downstream of Gate Creek and Bodie Creek (Study Area 9b)

Parameter[1,2] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
Gate Creek and Bodie Creek				
EV_MW_GT1A	-	Stable	-	*No Trend*
EV_MW_GT1B	***No Trend***	***Stable***	Stable	***No Trend***
EV_MW_BC1A	***Increasing***	***Increasing***	No Trend	***Increasing***
EV_MW_BC1B	***Increasing***	***Probably Increasing***	No Trend	***Increasing***
EV_RCSgw	***Decreasing***	***Increasing***	Stable	***Increasing***
EV_BCgw	Decreasing	Decreasing	Decreasing	***Decreasing***
EV_WH50gw	Decreasing	Stable	No Trend	***Probably Decreasing***
Michel Creek Valley Bottom				
EV_BRgw	Decreasing	Decreasing	Decreasing	***Decreasing***
EV_HW1	Stable	Probably Decreasing	Stable	***No Trend***
EV_MW_MC1A	No Trend	No Trend	-	-
EV_MW_MC1B	Probably Decreasing	Increasing	-	No Trend
EV_MW_MC2A	-	-	-	-
EV_MW_MC2B	Decreasing	Decreasing	Decreasing	***No Trend***

Notes:

[1] Where OC were measured greater than the primary screening criteria in 2021, the trend result is ***italics***. Where the OC were measured greater than the secondary screening criteria for selenium during at least one event in 2021, the result is ***shaded and italics***. Where increasing trends are noted, the cell is shaded yellow.

[2] "-" denotes insufficient data to complete trend analysis, including where concentrations were consistently less than or within five times the MDL.

1.7.1 Discussion

1.7.1.1 Gate Creek and Bodie Creek

In 2021, most of the groundwater samples from Gate Creek and Bodie Creek (EV_MW_GT1B, EV_MW_BC1A/B, EV_RCSgw, and EV_BCgw) had concentrations of nitrate-N, sulphate and dissolved selenium greater than the primary screening criteria, with the exception of EV_MW_GT1A and EV_WH50gw (Figures EV-32 to -34 and Drawings EV-18 to -21). Concentrations of OCs and trends were generally consistent with historical data.

Source of Order Constituents in Shallow Groundwater at EV_RCSgw

Some of the highest concentrations of sulphate, nitrate-N and dissolved selenium in groundwater in the Gate and Bodie Creek areas have been measured at EV_RCSgw, which has a well depth of 6.1 mbgs. The preliminary flow accretion data from July 2021 indicates that Michel Creek is a gaining reach from South

Gate Creek to Bodie Creek, which suggests that shallow groundwater may be a source of OC concentrations to EV_RCSgw. Although groundwater at EV_RCSgw appears to originate from a groundwater pathway of mine-influenced water (Figure EV-38), the source of the elevated concentrations remains uncertain.

Prior to 2019, OC concentrations at EV_RCSgw were higher than those in surface water at nearby Gate and Bodie creeks (EV_GT1 and EV_BC1, respectively) and in groundwater at EV_MW_GT1B and EV_MW_BC1A/B, which suggested that the source may be related to a local groundwater pathway. Since 2019, OC concentrations in surface water at Bodie and Gate creeks and groundwater at EV_MW_BC1A/B and EV_MW_GT1B have increased, and are now similar or greater than those measured at EV_RCSgw where OC concentrations have remained relatively stable or increased more gradually (and nitrate-N decreased; Figures EV-32 to -34).

The observed decreases in nitrate-N and increases in dissolved selenium and sulphate at EV_RCSgw are consistent with observations at a well installed in spoils at Fording River Operations (FRO) (specifically, FR_HMW2), which further suggests the upgradient spoil is influencing groundwater in this area (SNC-Lavalin, 2021b). A similar range of OC concentrations has previously been measured in shallow groundwater (i.e., < 6 meters below ground surface [mbgs]) approximately 70 m up-valley as part of Phase 2 of the Sparwood Area Groundwater Supporting Study (SNC-Lavalin, 2019b). The lack of seasonality in dissolved selenium and nitrate-N concentrations further suggest that OC concentrations at EV_RCSgw originate from a shallow groundwater transport pathway (total well depth is 6.1 mbgs) instead of a surface water infiltration pathway. However, mixing with infiltration from a surface water source also influenced by upgradient spoil (such as Bodie or Gate Creeks, where seasonal effects in groundwater elevations and OC concentrations also appear to be muted) may also be occurring.

Monitoring wells EV_MW-BC2 and EV_MW-BC3 have since been installed in this area. Concentrations of dissolved selenium greater than the primary screening criteria have previously been measured in both of the wells, which are screened in shale bedrock (EV_MW_BC2) and the unconsolidated aquifer above bedrock (EV_MW_BC3).

As indicated in the 2020 Annual Report, the source of dissolved copper at EV_RCSgw is not clear. However, water at this location travels through copper tubing prior to being collected at the sampling port(SNC-Lavalin, 2021b). Concentrations of dissolved copper remained greater than the applicable primary screening criteria in 2021, with concentrations ranging from 79.7 to 412 µg/L. The presence of detectable dissolved lead at concentrations higher than observed elsewhere at EVO (up to 2.4 µg/L) further suggests that the source is the piping. Concentrations of dissolved copper have been measured greater than the primary screening criteria since 2016, with the highest concentration measured May 2018 (575 µg/L). The extent of dissolved copper at EV_RCSgw is interpreted to be localized to this well (SNC-Lavalin, 2021b).

Groundwater-Surface Water Interaction near Gate Creek Pond

Downgradient of Gate Creek Pond (EV_GT1) are nested wells EV_MW_GT1A/B. Groundwater elevation data indicated the vertical gradient between well pair EV_MW_GT1A/B was consistently downward, further supporting surface water recharge to the valley bottom aquifer. Groundwater elevations at EV_MW_GT1A/B also closely follow water levels in Michel Creek (EV_MC2), indicating a potential hydraulic connection (Figure EV-29).

Compared to Michel Creek, it is more difficult to discern from water level data alone if there is an influence from Gate Creek Pond on groundwater at EV_MW_GT1A/B since surface water levels remain relatively

consistent. However, there appears to be a connection between Gate Creek and shallow groundwater at EV_MW_GT1B. Concentrations of OC in shallow groundwater at EV_MW_GT1B (screened between 2.7 and 4.3 mbgs) more strongly reflect those measured in Michel Creek (EV_MC2) in Q1 2021 but appear to reflect OC concentrations measured at Gate Creek Pond from Q2 to Q4 2021 (Figures EV-32 to -34). This is consistent with a review of the distribution of major ions during each quarter in 2021. Specifically, major ions in shallow groundwater in Q1 reflect that of Michel Creek; however, between Q2 and Q4 the major ion distribution appears to reflect those of Gate Creek (Figure EV-39). These results indicate that there is hydraulic communication between Gate Creek Pond and the shallow aquifer, but the amount of influence varies as mixing with surface water from Michel Creek also appears to be influencing groundwater quality. Concentrations of OC in deep groundwater at EV_MW_GT1A (screened between 62.2 and 63.7 mbgs) are consistent or less than concentrations measured in Michel Creek; the major ion distribution in groundwater is also consistent with Michel Creek year-round (Figures EV-32 to -34). The Se:SO_4 (S) plot indicates that deep groundwater in this area is not mine influenced (Figure EV-38).

Flow accretion data was collected in the summer and fall of 2021 by SNC-Lavalin. The preliminary flow accretion data indicate that within Study Area 9b, Michel Creek is a gaining reach from South Gate Creek to Bodie Creek, extending close to EV_BCgw (Drawing EV-03). These results suggest that groundwater may be recharging Michel Creek in this area, at least during July. Since Gate Creek Pond is located near Michel Creek, it also may be receiving groundwater. In October 2018, Gate Creek was identified as a losing stream or stable, except for a small upgradient portion where a gaining reach was indicated. South Gate Creek was identified as a losing reach in the valley floor bottom but is a gaining reach further upgradient (Drawing EV-03; Golder, 2019a). These results further indicate active groundwater-surface water interaction in this area, with groundwater both discharging to and receiving infiltration from surface water on the valley flank. Overall, infiltration of surface water to groundwater is considered the primary pathway for OC.

Groundwater-Surface Water Interaction near Bodie Creek Pond

Adjacent to Bodie Creek are nested wells EV_MW_BC1A/B. Groundwater elevation data indicated the vertical gradient between well pair EV_MW_BC1A/B was consistently downward, further supporting surface water recharge to the valley bottom aquifer (Table EV-02; Figure EV-29). EV_MW_BC1A/B, located adjacent to the Bodie Creek Pond, closely follows stage elevations at Michel Creek (at EV_MC2), and any influence from Bodie Creek is not obvious due to relatively stable water level elevations at the pond (Figure EV-29). Increasing OC concentrations at EV_MW_BC1A/B, however, correlates with an increase in surface water OC concentrations in Bodie Creek. The concentrations in the nested well pair are also similar to concentrations in Bodie Creek, which suggests hydraulic communication and surface water infiltration during all seasons. In addition, the major ion distribution of groundwater from EV_MW_BC1A/B is consistent with Bodie Creek year-round (Figure EV-39). Note that OC concentrations are lower in the deeper aquifer than in the shallow aquifer, and unlike the Gate Creek well nest (EV_MW_GT1A/B), mine-influenced groundwater extends to just above bedrock (which is located at 65 m in the Gate Creek wells and 26 m at the Bodie Creek wells; Figure EV-38). The preliminary July 2021 flow accretion study indicated that Bodie Creek upgradient of the Bodie Pond is neither a gaining nor losing stream (Drawing EV-03), although further to the west, Michel Creek is a gaining reach in this area.

The source of dissolved uranium at EV_MW_BC1B is not clear but is potentially mine influenced as concentrations of OC have been measured greater than the primary screening criteria at this location in 2021 ranging from 9.53 µg/L to 15.2 µg/L. Dissolved uranium concentrations in 2021 at surface water monitoring stations EV_BC1 and EV_GT1 were higher than concentrations measured in groundwater at EV_MW_BC1B and EV_MW_GT1B, which suggests that the probable sources are infiltrating surface water

from Bodie and Gate Creek. Elevated concentrations of dissolved uranium have only been measured in shallow groundwater at EV_MW_BC1B (and EV_MW_GT1B in the past) and do not extend to the deep monitoring wells or EV_BCgw; therefore, the extent is inferred to be localized.

1.7.1.2 Michel Creek Valley Bottom

In 2021, concentrations of OC in groundwater samples near Michel Creek, downstream of Gate and Bodie creeks (EV_MW_MC1A/B, EV_MW_MC2A/B, EV_BRgw, and EV_HW1) were generally consistent with historical data (Figures EV-35 to -37 and Drawings EV-18 to -21).

Of the nested well pairs EV_MW_MC1A/B and EV_MW_MC2A/B, only the shallow well EV_MW_MC2B (screened between 4.8 m and 6.9 mbgs) had dissolved selenium concentrations that were greater than the primary screening criteria (47.1 to 67.8 µg/L). Supply wells EV_HW1 and EV_BRgw (all quarters) also contained dissolved selenium greater than the primary screening criteria. These concentrations were higher compared to concentrations in Michel Creek downstream of the supply wells (EV_MC2; Figure EV-35). Concentrations of dissolved selenium to less than concentrations measured in Bodie and Gate creeks, indicative that there is a potential groundwater pathway of OC in this location, inferred to extend from the Bodie and Gate Creek areas.

Selenium and nitrate-N concentrations at EV_BRgw appear to have a strong seasonal influence. The highest concentrations are observed in late summer, with selenium concentrations above Michel Creek, and similar to groundwater concentrations measured at EV_HW1 and EV_MW_MC2B. Concentrations then decline until reaching a minimum the following spring, with concentrations similar to Michel Creek, before again rising by the subsequent summer. This suggests that the well may be more strongly influenced by groundwater in the late summer, with the influence of Michel Creek increasing through the fall, winter and spring. Wells EV_MW_MC2B and EV_HW1 also show a similar trend, however the concentration decline is much less relative to EV_BRgw. The trend at EV_BRgw may be stronger since the well is pumped for groundwater supply.

Several discharge points of concern have also been documented along the eastern edge of Sparwood Ridge to Michel Creek in Study Area 9b (SNC-Lavalin, 2021c), including:

- EV_SPR14, which is representative of a creek flowing through or near suspected mine workings with dissolved selenium concentrations that occasionally exceed the BCWQG for AW, which usually flows overland to Michel Creek;
- EV_SPR2B, representative of underground mine discharge from adit openings flowing from the No. 1 Rock Tunnel overland and discharging to Michel Creek. Nitrite was observed greater than the BCWQG AW guideline in a 2013 sample, and
- EV_SPR5, representative of discharge from No.3 rock tunnel. Concentrations of chromium, ammonia and dissolved copper exceeded the BCWQG AW guideline in one sample, and the discharge flows overland to Michel Creek.

The above listed discharge points are all located downstream of Bodie and Gate creeks but upstream of EV_BRgw and other Michel Creek wells further downgradient. Since 2018, concentrations of OC at the discharge points have generally been less than concentrations measured in Michel Creek, except for sulphate at EV_SPR2B, which is generally consistent with concentrations in Michel Creek, and dissolved selenium at EV_SPR5 in January 2021 (Figures EV-35 to -37). Concentrations of dissolved selenium at EV_SPR5 have increased since 2018. Surface water at EV_SPR5 should continue to be sampled to assess trends.

In general, the OC concentrations measured at these discharge points are lower than those measured downstream. Based on the available data, these sources of OC to Michel Creek are considered to be minor in comparison to those sourced from Bodie Creek and Gate Creek, due to low OC concentrations and low, previously documented, flow rates (SNC-Lavalin, 2021c). However, concentrations should continue to be measured at EV_SPR5 in order to assess potential trends.

Overall, concentrations of OC in groundwater from Bodie/Gate creeks to EV_SPR1C are higher in shallow wells than those screened deeper in the aquifer. These results suggest that loading of mine-influenced constituents to groundwater in the valley bottom of Michel Creek in the vicinity of EVO are primarily sourced from infiltration of surface water and upland groundwater flow from Bodie and Gate creeks followed by down-valley groundwater flow along Michel Creek.

1.8 Erickson Creek and Michel Creek Downgradient of Erickson Creek (Study Area 10)

This section has been structured along the following geographical areas with rationale:

- Erickson Creek: a potential groundwater flow path from Erickson waste rock spoils and other potential sources in the Erickson Creek drainage.
- Michel Creek Downgradient of Erickson Creek: understanding of the major sources of mining-related groundwater to Michel Creek valley bottom.

A summary of 2021 groundwater monitoring and sampling results upgradient of Erickson Creek Watershed is presented in Table O with references to supporting information (Drawings, Figures, Tables, and Appendices).

Table O: Summary of 2021 Groundwater Monitoring and Sampling Results at Erickson Creek and Michel Creek Downgradient of Erickson Creek (Study Area 10)

Hydrogeological Information		Description	Reference
Monitoring Locations	Relevant EVO SSGMP/RGMP Wells (Study Area 10)	EV_WF_SW, EV_ECgw, EV_MW_SP1A/B/C	Drawing EV-01 Table EV-01
	Relevant Monitoring Wells from Other Programs[a]	**Upper Erikson Creek:** EV_MW_EC3A/B	
	Relevant Surface Water Monitoring Stations[b]	EV_EC1, EV_MC3, EV_MG1, EV_SP1, EV_TC1	
	Relevant Seep Monitoring Stations[b]	EV_SEEP_ERICKSON1, EV_SEEP_ERICKSON2, EV_SEEP_SOUTHPIT6, EV_SEEP_SOUTHPIT3, EV_SEEP_SOUTHPIT4	
Physical Hydrogeology	Groundwater Elevation Trends	› Groundwater elevations at well EV_ECgw, within the Erickson Creek Watershed, exhibited seasonal trends with the highest groundwater levels measured in the spring/summer and lower levels in the fall/winter, which is generally consistent to EV_EC1 in Erickson Creek. › Well EV_WF_SW is installed in spoils and groundwater elevations are likely influenced by surface water management in the West Fork Tailings Facility (WFTF). › Groundwater elevations at monitoring wells EV_MC_SP1A/B/C, in the Michel Creek valley bottom, appear to seasonally fluctuate similar to surface water at EV_MC2, indicative of groundwater-surface water interaction in this area.	Drawing EV-02 Table EV-02 Figure EV-41
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – EV_MW_SP1A/B (deep to intermediate groundwater): 0.02 to 0.03 m/m upwards; and – EV_MW_SP1B/C: 0.17 to 0.18 m/m downwards. › **Lateral Hydraulic Gradient:** – The lateral hydraulic gradient could not be calculated; however, groundwater flow along Erickson Creek is inferred to be southwards to southwestwards towards Michel Creek, following topography, and northwest along Michel Creek.	
Chemistry	2021 SSGMP/RGMP OC Results	› All OC groundwater concentrations were less than the primary screening criteria in 2021.	Table P Drawings EV-18 to -21 Tables EV-03 to -05 Figures EV-42 to -44
	Non-Order Mine-Related and Naturally Occurring Constituents	› **Concentrations above primary screening criteria:** – Lithium: All wells from three to all four quarters in 2021, except at EV_MW_SP1B; – Manganese: EV_WF_SW (Q1 to Q4); and – Molybdenum: EV_ECgw (Q2 to Q4, no sample collected in Q1). › Based on the BGA completed for the 2020 RGMP Update, concentrations of lithium and manganese and molybdenum are inferred to be unrelated to mining. Elevated concentrations of manganese and iron are indicative of reducing conditions at EV_WF_SW. › All other constituents were less than primary screening criteria.	Tables EV-03 to -04 SNC-Lavalin, 2020
	Mann-Kendall Trend Analysis	› All Mann-Kendall trend analysis results indicate stable, decreasing or no trend.	Table Q Attachment III

Notes:
[a] - Relevant Monitoring Wells from Other Programs are those in the area that are under evaluation for potential inclusion in the SSGMP and/or RGMP.
[b]: Relevant Surface Water Stations and Seep Monitoring Stations represent a sub-set of the surface water and seepage monitoring stations present in EVO and Study Area 10.

A summary of results for OC compared to primary screening criteria is presented in Table P below.

Table P: Summary of OC Compared to Primary Screening Criteria at Erickson Creek and Michel Creek Downgradient of Erickson Creek (Study Area 10)

Parameter[1,2,3] / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Erickson Creek																
EV_WF_SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_ECgw	NS	-	-	-	NS	-	-	-	NS	-	-	-	NS	-	-	-
Michel Creek Downgradient of Erickson Creek																
EV_MW_SP1A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_SP1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_SP1C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSR AW	400				1,280 – 4,290[4]				0.5 – 4[4]				20			
CSR IW	n/a				n/a				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			

Notes:
1 Primary screening criteria are CSR standards for **Aquatic Life (AW),** Drinking Water (DW), Livestock (LW), and *Irrigation (IW)*.
2 '–' denotes result less than primary screening criteria for given constituents.
3. Where a duplicate was collected, the higher concentration is provided in table.
4. Standard varies with hardness.
'NS' denotes no sample.

Mann-Kendall trend analysis were completed where more than seven data points have been measured. A summary of the trend analysis results is provided in Table Q.

Table Q: Summary of Mann-Kendall Trend Analysis for OC at Erickson Creek and Michel Creek Downgradient of Erickson Creek (Study Area 10)

Parameter[1,2] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
Erickson Creek				
EV_WF_SW	-	Stable	-	No Trend
EV_ECgw	No Trend	Decreasing	Stable	No Trend
Michel Creek Downgradient of Erickson Creek				
EV_MW_SP1A	-	Stable	-	No Trend
EV_MW_SP1B	Stable	No Trend	-	Stable
EV_MW_SP1C	Stable	No Trend	Stable	Stable

1 Where OC were measured greater than the primary screening criteria in 2021, the trend result is ***italics***. Where the OC were measured greater than the secondary screening criteria for selenium during at least one event in 2021, the result is ***shaded and italics***. Where increasing trends are noted, the cell is shaded yellow.
2 "-" denotes insufficient data to complete trend analysis, including where concentrations were consistently less than or within five times the MDL.

1.8.1 Discussion

1.8.1.1 Erickson Creek

In 2021, groundwater samples from Erickson Creek (EV_WF_SW and EV_ECgw) remain less than the primary screening criteria for all OC, and trends (where available) and concentrations are consistent with historical data (Figures EV-42 to -44 and Drawings EV-18 to -21).

A portion of the upper Erickson drainage is overlain by waste rock spoils, which starts near the confluence of Erickson Creek and West Fork, which is also overlain by waste rock. Infiltration through the spoils is inferred to cause elevated OC concentrations in shallow groundwater which daylights as Erickson Creek surface flow approximately 2.3 km south of the Erickson Dam. Surface water at EV_EC_BRIDGE (Drawing EV-01) had OC concentrations greater than primary screening criteria (Golder, 2019a).

Well EV_WF_SW, screened within spoils, is located along the West Fork drainage prior to its discharge at Erickson Creek. OC concentrations in this well have historically been at least two magnitudes lower than the applicable primary screening criteria, with the exception of sulphate. Sulphate concentrations at EV_WF_SW have historically been greater than concentrations in other groundwater samples collected from this area (ranging from 174 to 211 mg/L in 2021). The Se:SO_4 (S) plot shows that groundwater at this well has likely been affected by microbial reduction (Figure EV-45).

Along Erickson Creek upgradient of its daylight location, concentrations of OC in shallow groundwater at EV_ECgw are substantially lower than those in the Erickson Creek surface water (EV_EC1), and the Se:SO_4 (S) plot shows that groundwater from EV_ECgw falls within the natural non-contact groundwater range, while surface water from Erickson Creek appears to be mine influenced (Figure EV-45). Two deep flowing artesian boreholes (EV_MW-EC1/2) advanced in the valley bottom, show that groundwater quality in deeper Erickson Creek valley sediments is consistent with non-mine contact groundwater (SNC-Lavalin, 2021a). New wells EV_MW_EC3A/B were installed in 2021 along Erickson Creek approximately 160 m north of EV_MW_EC1/2, whose analytical groundwater results will be reviewed for potential inclusion in the EVO SSGMP once a minimum of a year of data is available for review.

Water quality at groundwater seep EV_SEEP_ERICKSON2, located near the southern tip of the EVO permit boundary and near spoils, is consistent with mine-influenced water (Figure EV-45). Water chemistry observed at this seep suggests that groundwater in this upland area is mine influenced and likely reports to Erickson Creek. Groundwater seepage at EV_SEEP_ERICKSON1, located at a lower elevation, is inferred to be indicative of the shallow groundwater in lower Erickson Creek drainage before the confluence, which has dissolved selenium and nitrate-N concentrations less than the primary screening criteria, but sulphate concentrations near primary screening criteria (Figure EV-42 to -44). Water at EV_SEEP_ERICKSON1 is inferred to have undergone microbial reduction (Figure EV-45).

In May 2019, Erickson Creek was consistently gaining downgradient of EV_ECgw to Michel Creek, suggesting an upward hydraulic gradient from groundwater in the valley bottom (Golder, 2019c). The presence of the underlying aquitards and artesian flow conditions would further limit downward migration of surface water. The April 2019 flow accretion study indicated that dissolved selenium concentrations in Erickson Creek slightly decreased, from 178 µg/L upstream of EV_ECgw to 163 µg/L at Michel Creek (at EV_EC1); no analytical surface water data was available for the May 2019 flow accretion study (Golder, 2019b; 2019c). The decrease in concentrations and increase in flow indicate that no additional inputs of mine-influenced groundwater is discharging to the stream.

Based on available data, the main transport pathway of OC along the Erickson Creek drainage to Michel Creek is inferred to occur through surface water rather than groundwater migration. Concentrations of dissolved selenium and nitrate-N at surface water location EV_EC1 become more variable and generally decrease starting in March 2021. In addition, the Se:SO_4 (S) ratio for surface water from EV_EC1 appears to be mine influenced, with microbial reduction noted to be occurring as of March, 2021. These concentration variations and changes in ratios may be related to construction of the surface water intake structures on Erickson Creek, which was commissioned in Q1 2021 as part of the Active Water Treatment Facility (AWTF) and Saturated Rock Fill (SRF) project.

1.8.1.2 Michel Creek Downstream of Erickson Creek

In 2021, groundwater samples from Michel Creek downstream of Erickson Creek and in Study Area 10 (EV_MW_SP1A, EV_MW_SP1B and EV_MW_SP1C) remain less than the primary screening criteria for all OC (Figures EV-42 to -44 and Drawings EV-18 to -21). Overall, concentrations of OC at the triple nested wells were generally consistent with 2020 data. The Se:SO_4 (S) plot suggests that groundwater at EV_SP1B in Q1 may have some mine influence as evidenced by an increase in selenium to 9.82 µg/L in Q1 2021 (Figures EV-42 to -45).

Waste rock spoils are present in the upper region of the South Pit Creek drainage, from where mine-influenced surface water flows downstream (EV_SP1) into the valley bottom. Water quality results of the groundwater seep EV_SEEP_SOUTHPIT6, located near EV_SP1, is consistent with mine-influenced water (Figure EV-45).

Seep data from EV_SEEP_SOUTHPIT3, located near the outflow of Thresher Creek to Michel Creek, has elevated dissolved selenium concentrations, although the average concentration in 2021 was less than the primary screening criteria. The Se:SO_4 (S) plot suggests that there is some mine influence in one of these samples (Figure EV-45). Further downstream near the outflow of Hotel Creek, EV_SEEP_SOUTHPIT4 OC concentrations were low and the water does not appear to be mine-affected (Figures EV-42 to -45).

The extent of groundwater-surface water interaction at the Milligan Creek drainage is not well understood. Similar to South Pit, the pond is inferred to be hydraulically connected to the Michel Creek valley bottom aquifer. It is unknown whether there is potential transport of OC from the pond to groundwater via infiltration.

2 Recommendations

New recommendations for the EVO SSGMP and RGMP are presented in Table R below… Appendix II of the main report provides recommendations related to EVO from the 2020 RGMP Update (SNC-Lavalin, 2020) and the 2020 Annual Report (SNC-Lavalin, 2021b). The ongoing recommendations for the 2020 RGMP Update and the 2020 Annual Report are presented in

Table S.

Table R: Summary of New Recommendations - EVO SSGMP and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs	
EVO SSGMP	Complete hydraulic conductivity tests at EV_GV3gwS, EV_GV3gw, RG_MW_GCA, EV_BALgw, EV_MW_MCgwA/B, and EV_MW_BC1B.
	Re-develop monitoring well RG_MW_GCA to attempt to reduce turbidity in the water column.
	Review cross section EA-EA' to include borehole log data from the Harmer Dam Removal Project, where appropriate. Review data to confirm whether a secondary cross section should be included in the area.
	Conduct a site visit to determine the feasibility of installing additional wells north of Sparwood Ridge and south of Michel Creek to further investigate groundwater flow and the source of selenium at EV_MW_MC3.
	Collect water quality from seep EV_SPR1B quarterly for at least one year to investigate possible selenium sources at EV_MW_MC3.
	Collect quarterly water samples from discharge point EV_SPR5 for at least one year to confirm trends.
Regional Groundwater Monitoring Program	
Study Area 9b	Survey wellhead elevations at EH_WH50 and EV_HW1 so that pressure transducer groundwater level data can be correlated to groundwater elevations.
Study Area 10	Consider re-establishing surface water monitoring station EV_MC3A to evaluate surface water quality in Michel Creek immediately downgradient of Erickson Creek, and consider establishing a new station in Michel Creek downgradient of Mulligan Creek. These additional locations will help in the understanding of OC inputs to Michel Creek.
Study Area 12	Install pressure transducer at RG_MW-03-04.

Table S: Summary of Existing Recommendations - EVO SSGMP and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs	
EVO SSGMP	Sample monitoring wells near the Dry Creek Sedimentation Pond (EV_MW_DC1 through EV_MW_DC7 and EV_PW_DC1) as well as near the Harmer Reservoir (EV_MW_HC1 through EV_MW_HC5) per recommendations in the 2021 SSGMP Update. Assess analytical results from the Harmer Dam Removal Project in 2022 for potential inclusion in the SSGMP. Assess analytical results from the Dry Creek Sedimentation Pond in 2023 for potential inclusion in the SSGMP.
	Survey surface water stations at Harmer Creek (EV_HC1) and Goddard Creek (EV_GC2) to a local datum.
	Add monitoring well EV_GV3gwS to the SSGMP.
	Results from the groundwater investigation planned for Lagoon D decommissioning should be reviewed to evaluate whether additional wells (including near EV_OCgw) are recommended for this area and for inactive Lagoons A-C to evaluate shallow groundwater.
	Review results from investigation activities planned west of Cedar North Pit to Elk River (Permit 107517 Condition 8.2.4) to assess possible transport pathways of mine-influenced groundwater within faults and fractures.
	Review the findings of the Goddard Marsh load balance study as well as the existing monitoring network to assess whether additional groundwater monitoring is warranted.
	Complete a hydraulic conductivity test at EV_OCgw.
	Decommission nested well pair EV_MCgwS/D since both of these wells are installed in the aquitard.
	Continue monitoring chemistry at EV_MW_MC3 and at nearby SEEP_1B and review isotope results.
	Survey surface water stations at Bodie Creek (EV_BC1) and Gate Creek (EV_GC1) to a local datum.
	Investigate the condition of monitoring wells EV_MW_BC2 and EV_MW_BC3 and if appropriate, add to SSGMP to obtain a better understanding of shallow groundwater and to monitor the bedrock pathway.
	Review contaminant load study related to condition 4C3.4ii in Permit 107517 to understand whether a load imbalance along Michel Creek exists. Add additional wells screened through middle portion of sand and gravel aquifer, near EV_RCSgw, and further downstream, at EV_MW_MC1A/B, to identify heterogeneities within the aquifer that may be affecting groundwater flow and transport of dissolved selenium.
	Complete a site reconnaissance of the Balmer North mine area (in progress).
	Complete a site reconnaissance near Milligan Creek Sedimentation Pond to assess the feasibility of installing a well nest.
	Sample newly installed monitoring wells in Erickson Creek (EV_MW_EC3A/B) for at least two years. Assess analytical results in 2023 for potential inclusion in the SSGMP.
	Complete hydraulic conductivity test at EV_ECgw.

Table S (Cont'd): Summary of Existing Recommendations - EVO SSGMP and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Programs (Cont'd)	
EVO SSGMP (Cont'd)	Sampling frequency at EV_BALgw, EV_LSgw, EV_OCgw, EV_GCgw, EV_MW_MC1A, EV_MW_MC2A, EV_MW_AQ1, EV_MW_AQ2, EV_MW_MC4, EV_MW_SPR1A, EV_MW_GT1A, and EV_BCgw should be reduced to semi-annual based on low and/or stable OC concentrations.
	Remove monitoring well EV_WF_SW from the SSGMP as the well is located upland along Erickson Creek and has significant groundwater variations. The well is screened below 159 m of waste rock and concentrations of OC are less than the primary screening criteria.
Regional Groundwater Monitoring Program	
Study Area 7	Establish a new surface water monitoring location at Grave Creek near RG_MW_GCA to replace former EV_GV1 location which is very difficult to access.
Study Area 9a/b	Install multilevel well nest adjacent to EV_RCSgw and EV_BRgw. Install dataloggers at these new locations. Dataloggers cannot be installed at EV_RCSgw and EV_BRgw as the downhole pumps cannot be removed to facilitate installation. Also, these two wells do not have a borehole log, construction details are unknown and there is uncertainty as to the source of dissolved copper from these wells. Nested monitoring wells will aid in the understand the surface water/groundwater relationship and any potential effects of pumping of these wells.

3 References

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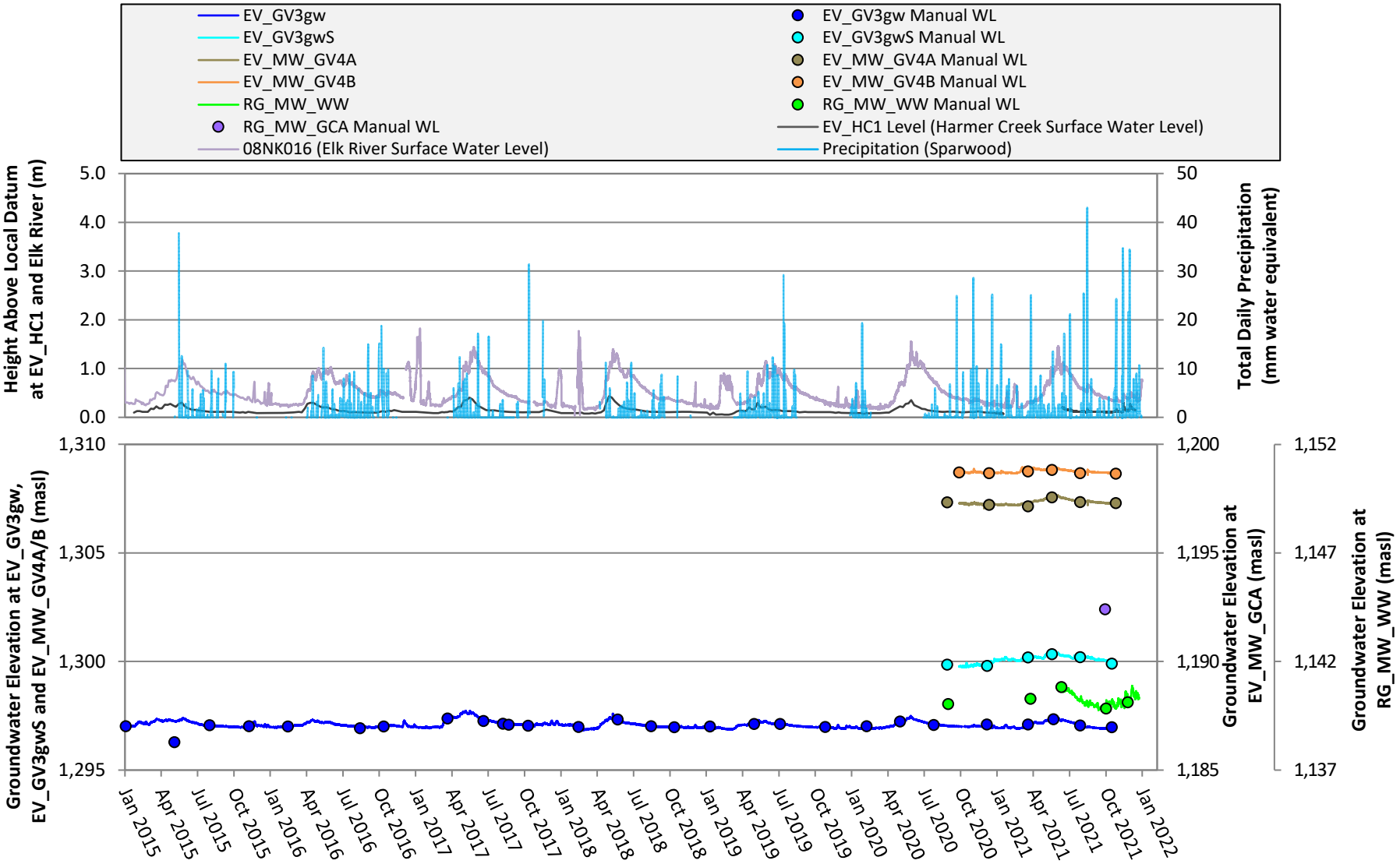
Figures

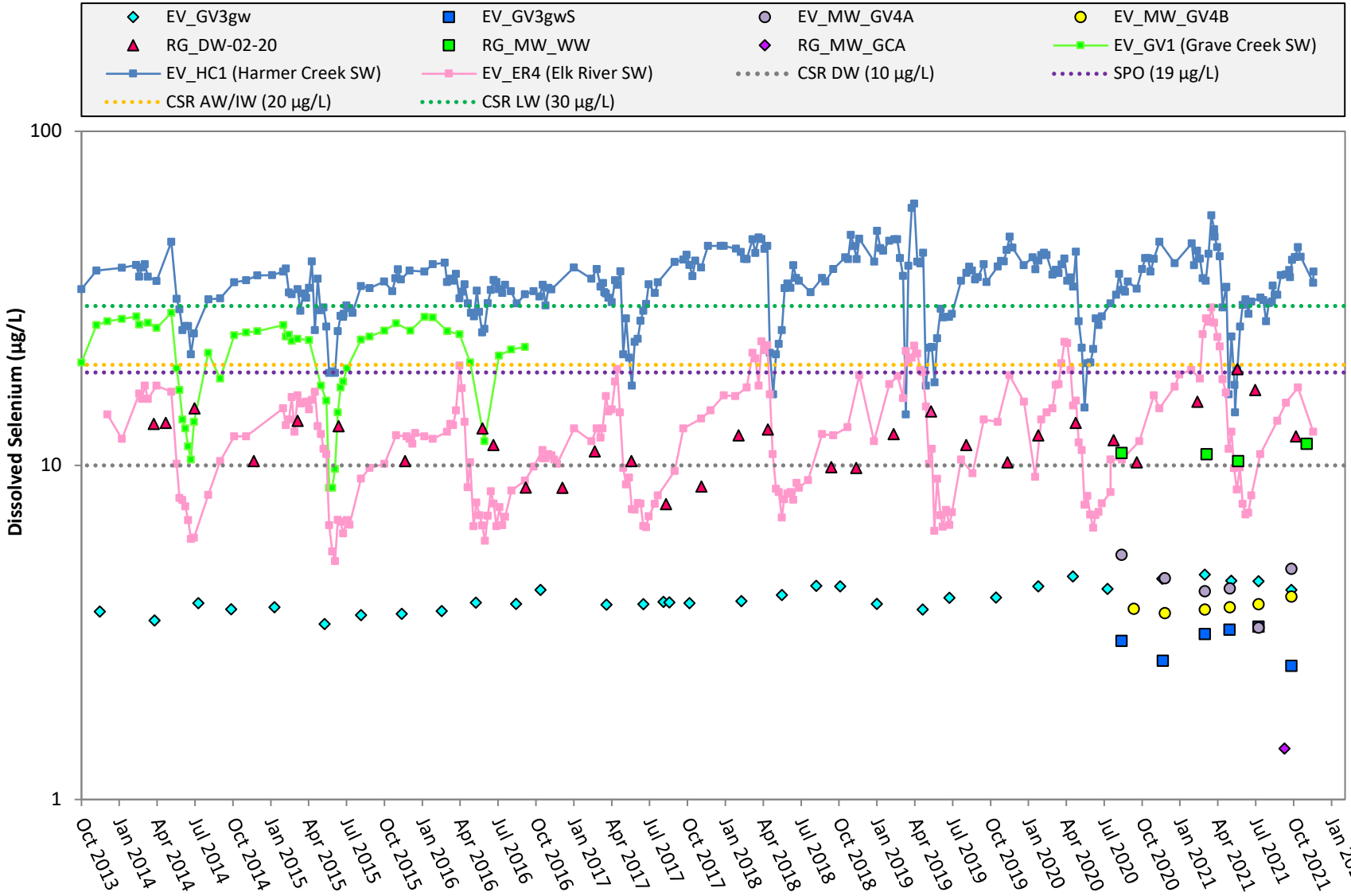
Figures (Cont'd):

Figure EV-01: Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek (Study Area 7) - Hydrograph



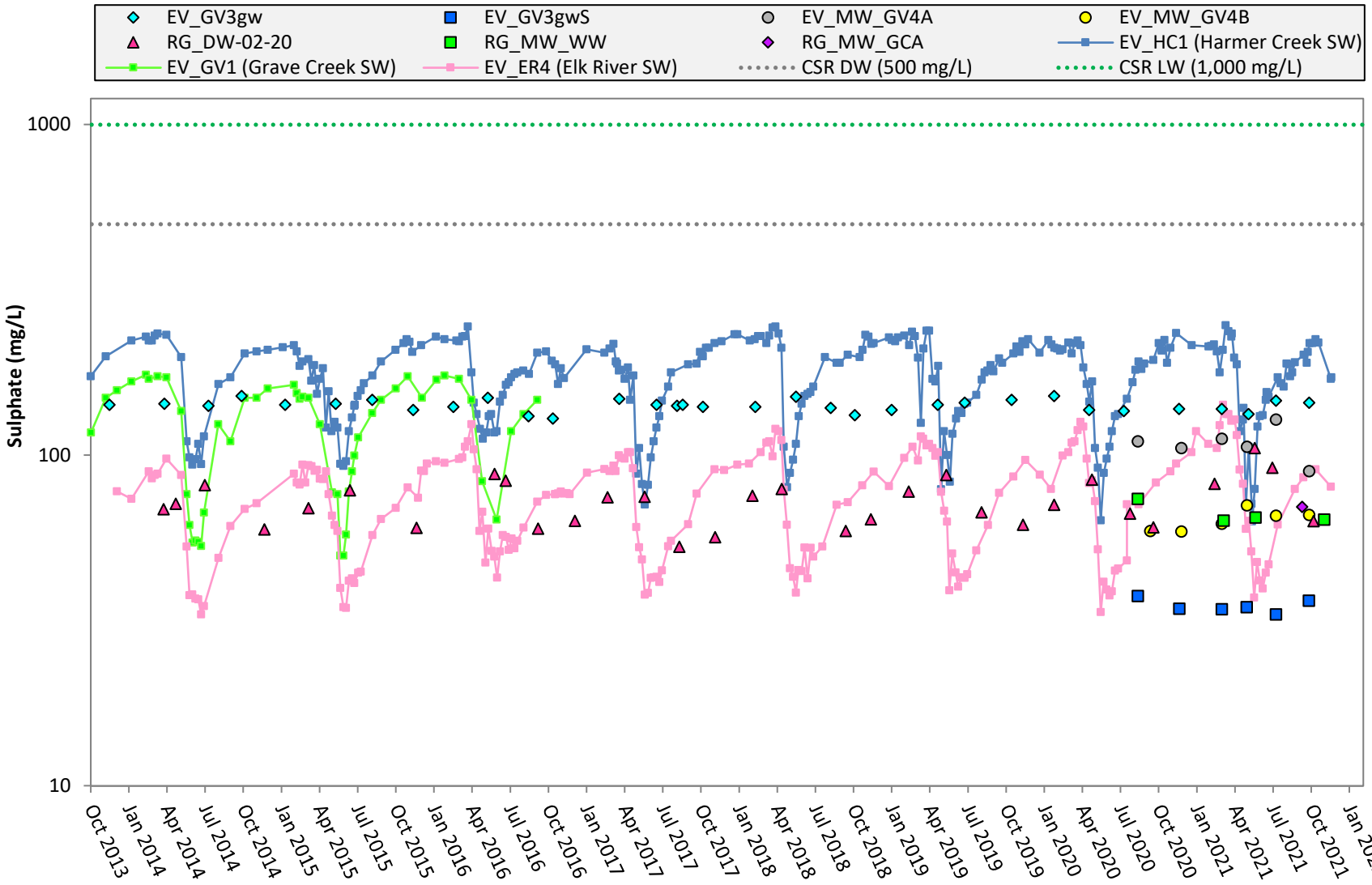
Notes: Data was removed where suspected datalogger removal occured. EV_HC1 Level is plotted as height above location datum. Continuous water level water has been compensated using barologger at EV_MW_SPR1B.

Figure EV-02: Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek (Study Area 7) - Dissolved Selenium



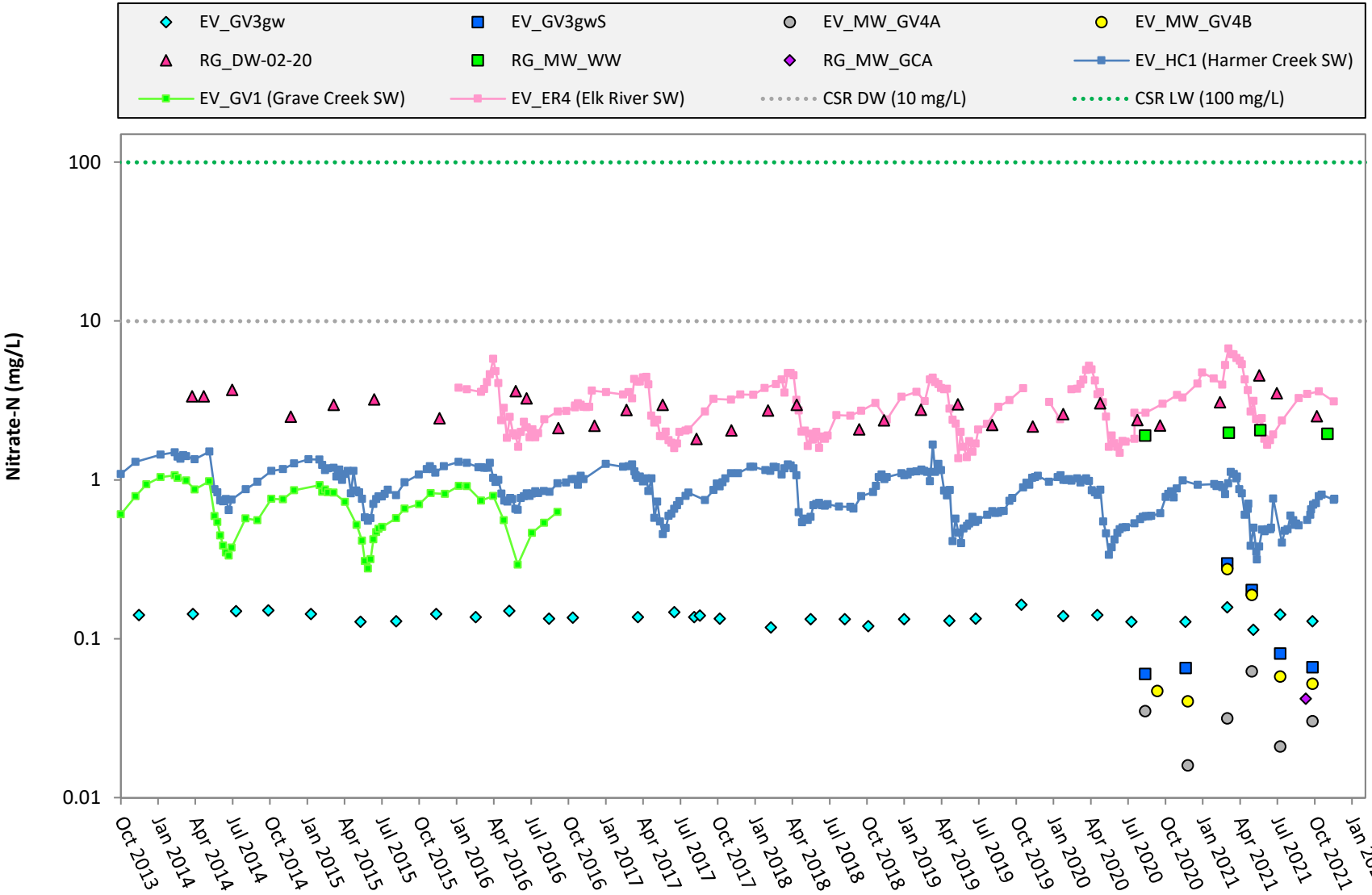
Notes: Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-03: Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek (Study Area 7) - Sulphate



Notes: Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-04: Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek (Study Area 7) - Nitrate-N



Notes: Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-05: Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek (Study Area 7) - Se:SO4 (S)

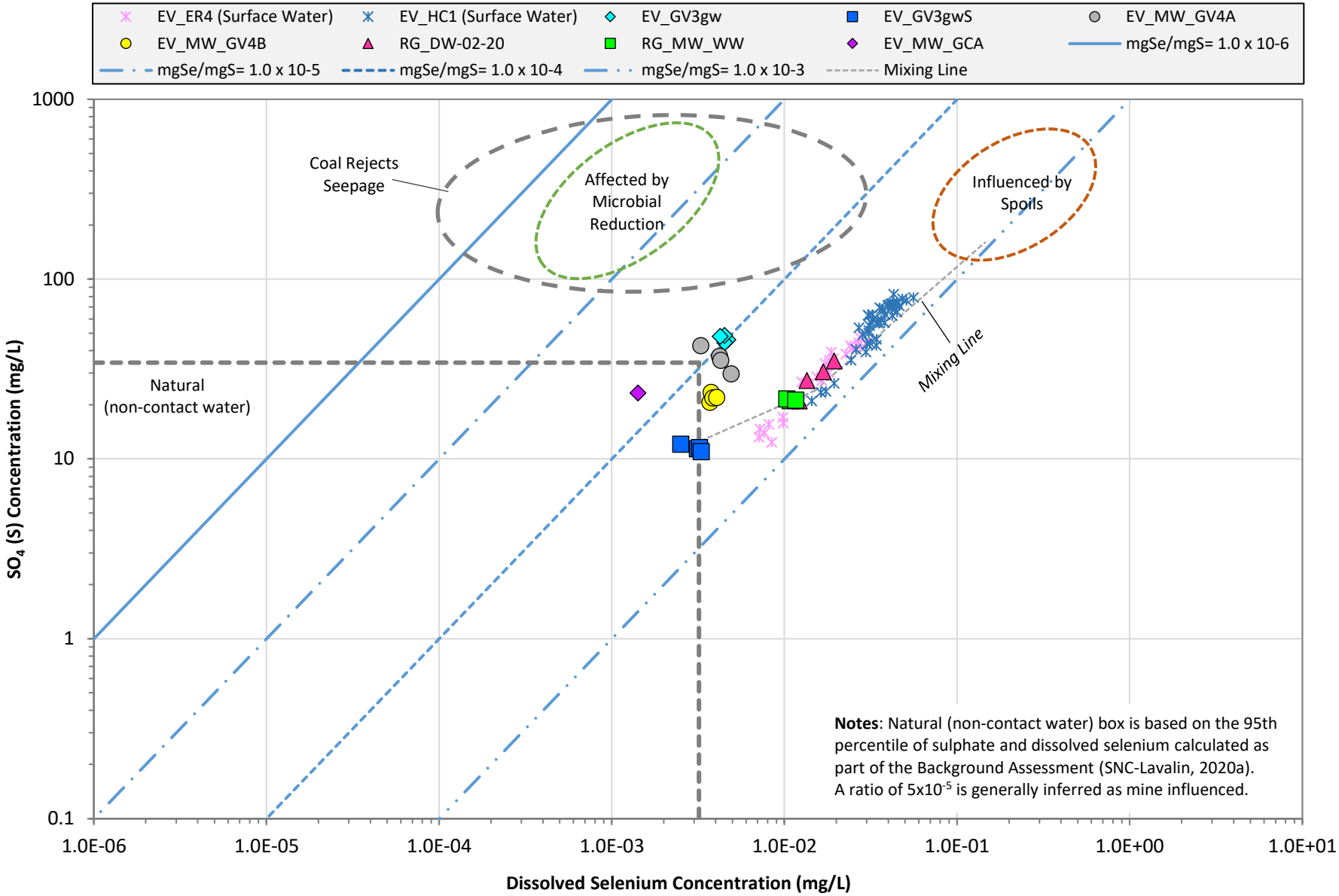
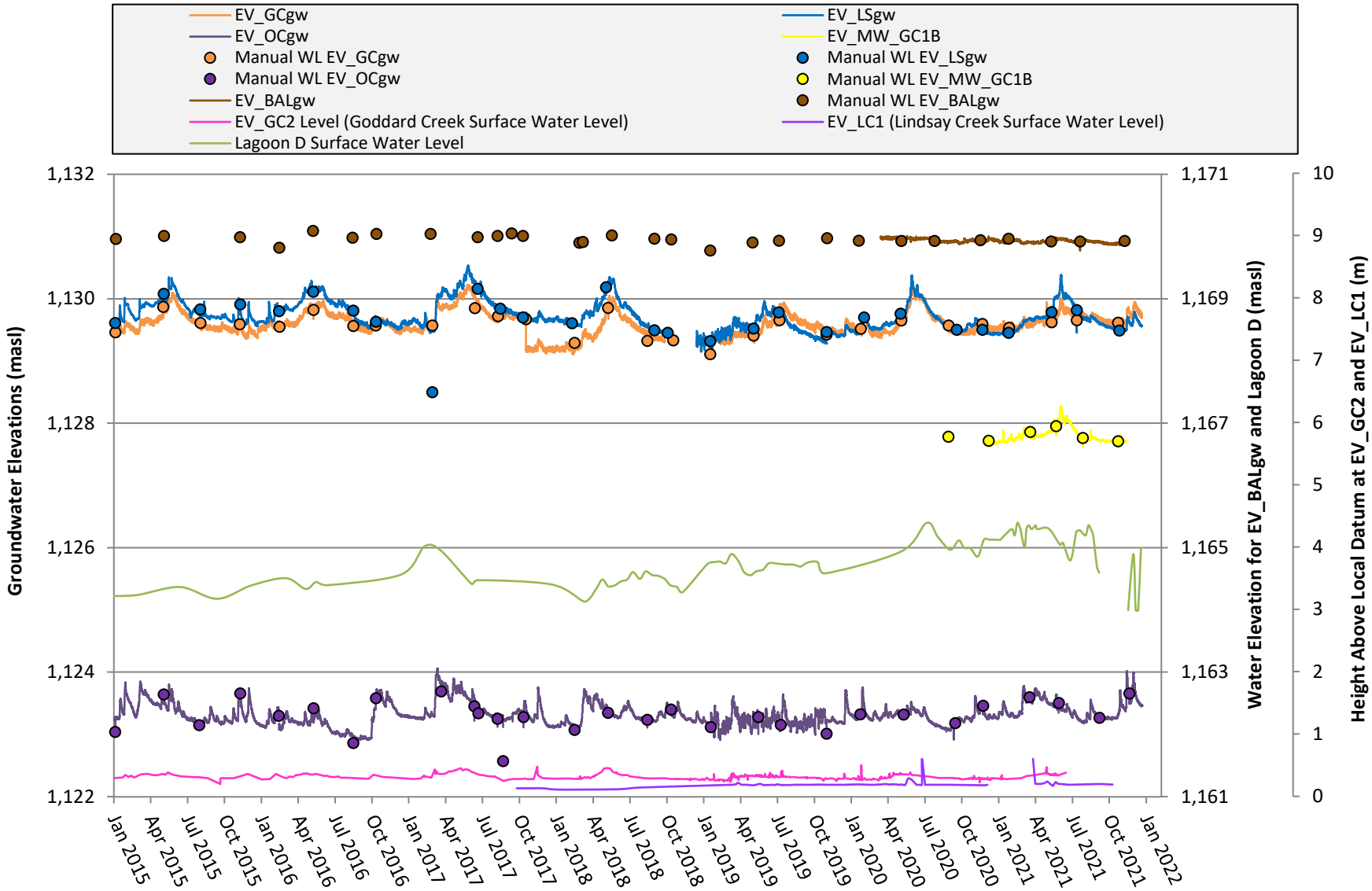
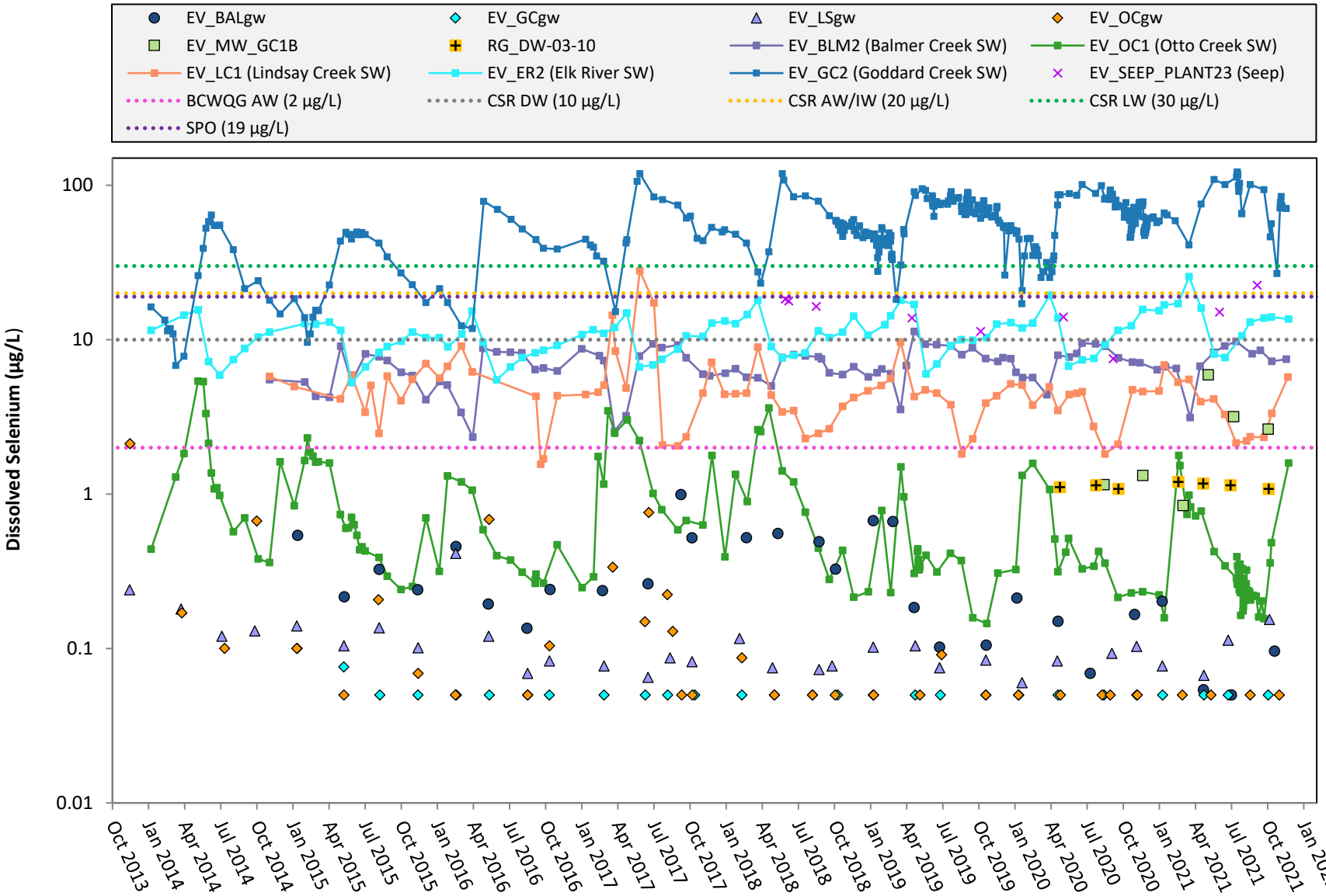


Figure EV-06: Elk River Proximal to EVO (Study Area 8) - Hydrograph



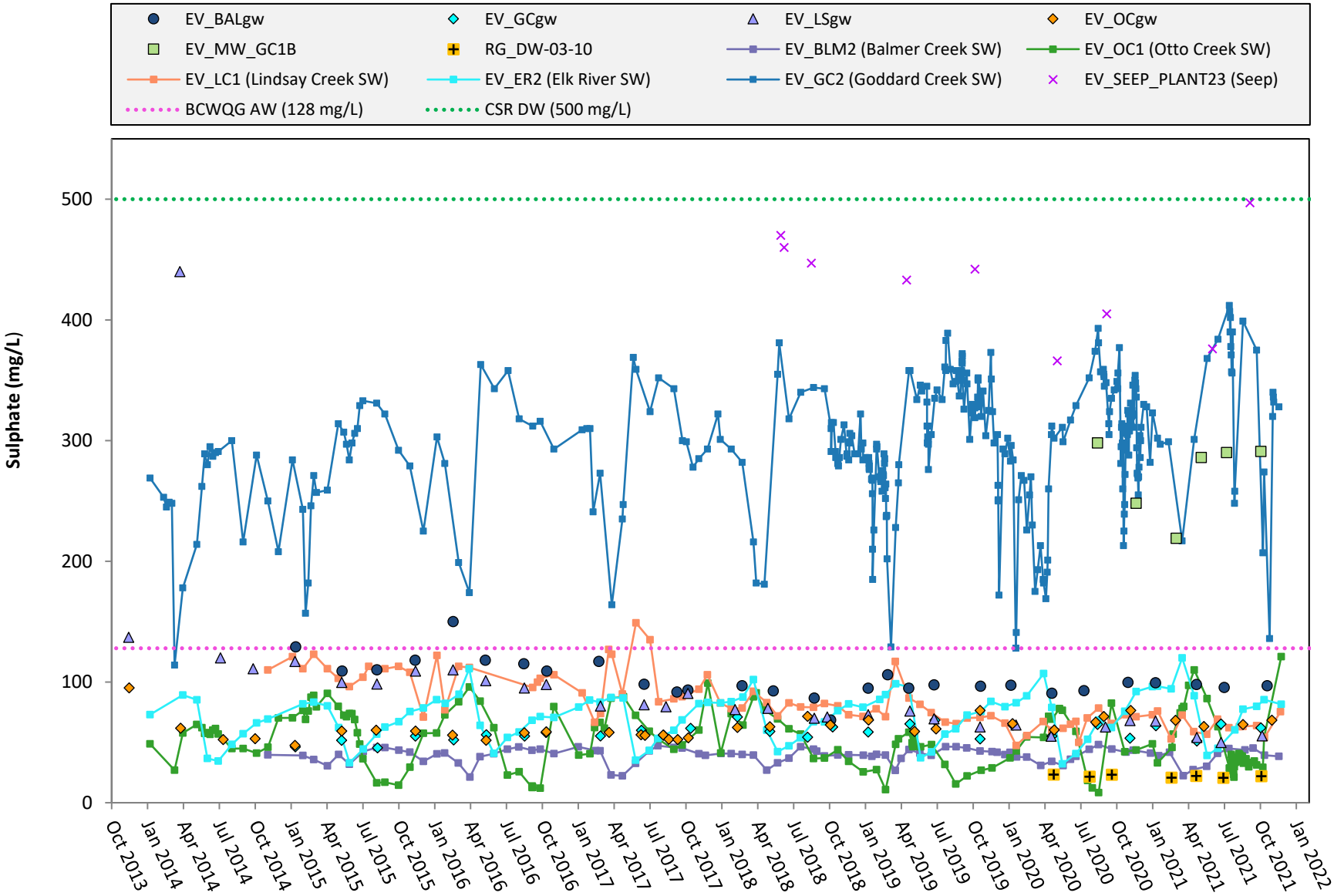
Note: data was removed where suspected datalogger removal occured. Continuous water level data has been compensated using barologger at EV_MW_SPR1B.

Figure EV-07: Elk River Proximal to EVO (Study Area 8) - Dissolved Selenium



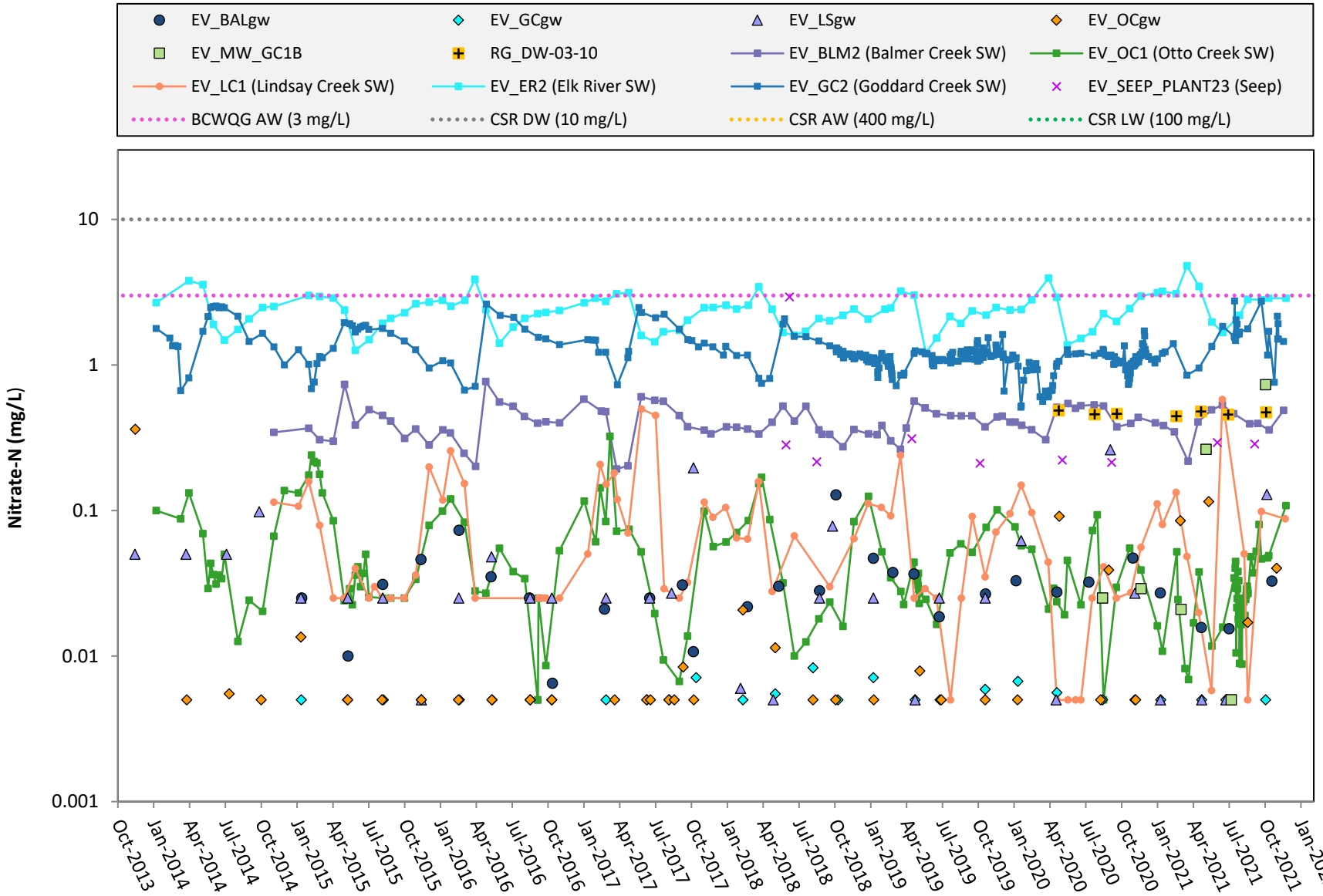
Note: For concentrations measured below the analytical detection limit, the detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria. BCWQG AW was applied to EV_OCgw only as the well is within 10 m of the high water mark.

Figure EV-08: Elk River Proximal to EVO (Study Area 8) - Sulphate



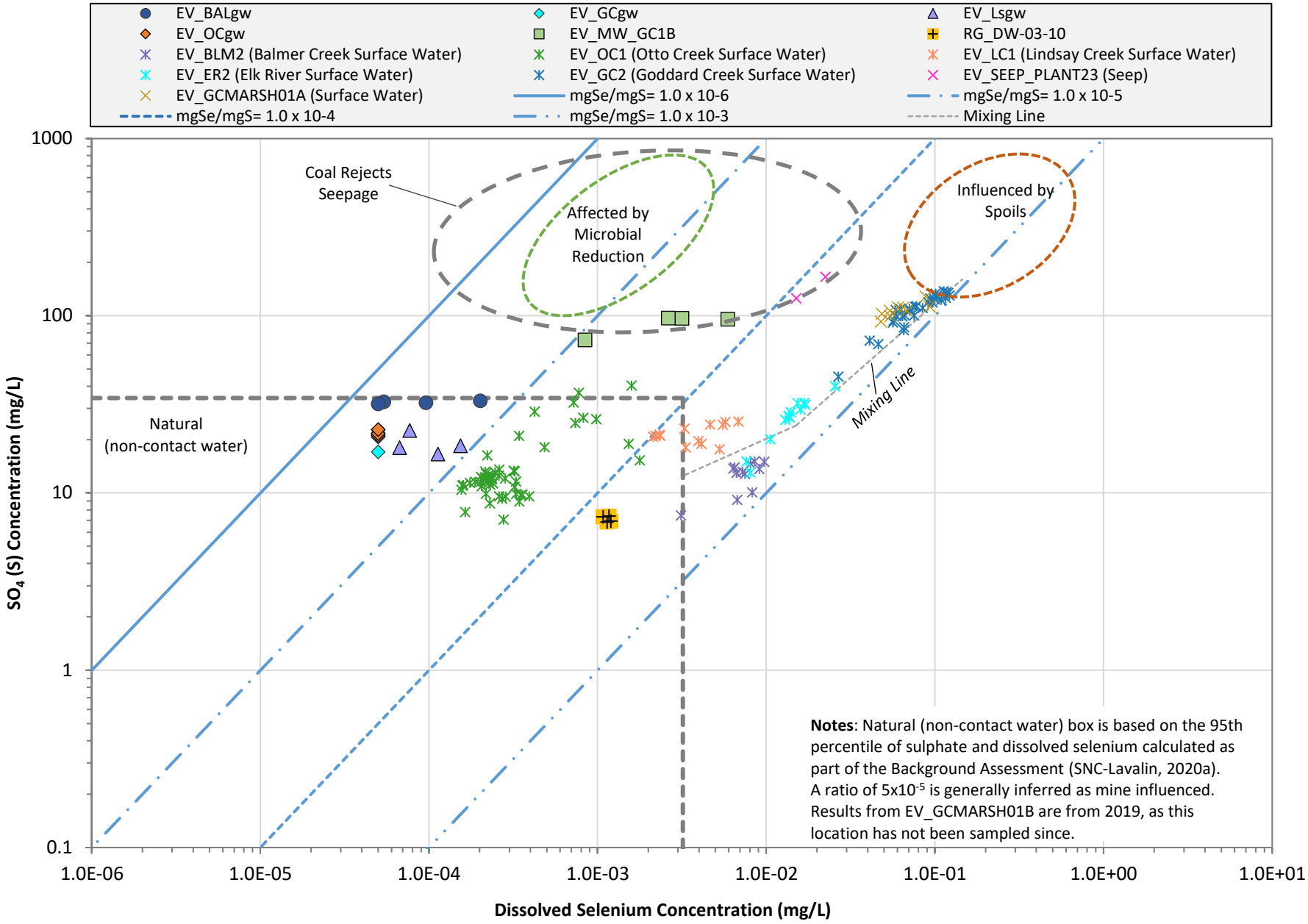
Note: BCWQG AW was applied to EV_OCgw only as the well is within 10 m of the high water mark.

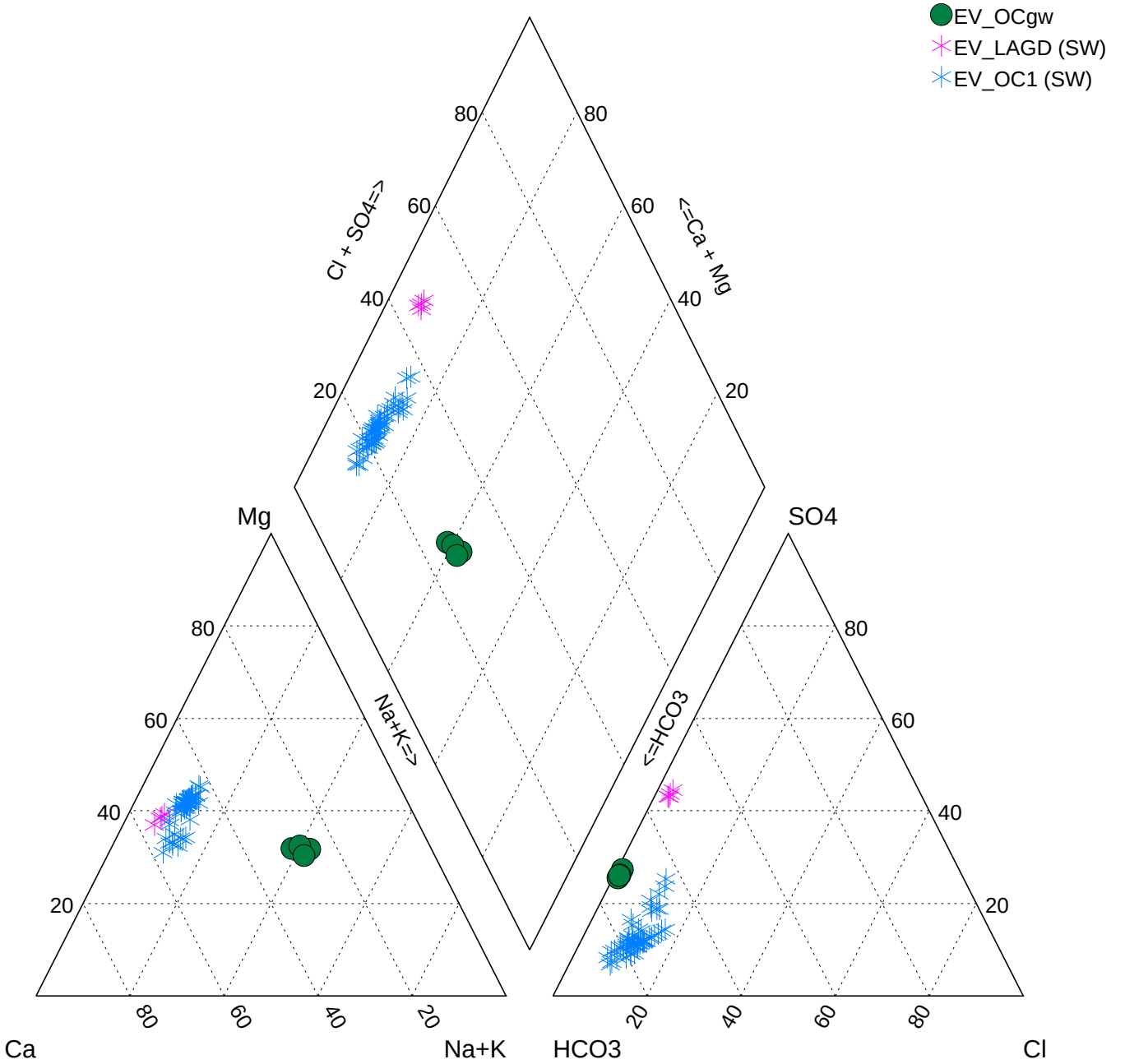
Figure EV-09: Elk River Proximal to EVO (Study Area 8) - Nitrate-N



Note: For concentrations measured below the analytical detection limit, the detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria. BCWQG AW was applied to EV_OCgw only as the well is within 10 m of the high water mark.

Figure EV-10: Elk River Proximal to EVO (Study Area 8) - Se:SO4 (S)





DESCRIPTION: Figure EV-11: Elk River Proximal to EVO (Study Area 8) - Piper Diagram

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	CLIENT: Teck Coal Limited	DATE: 2022-02-01

Figure EV-12: Elk River Proximal to EVO (Study Area 8) - Schoeller Plot

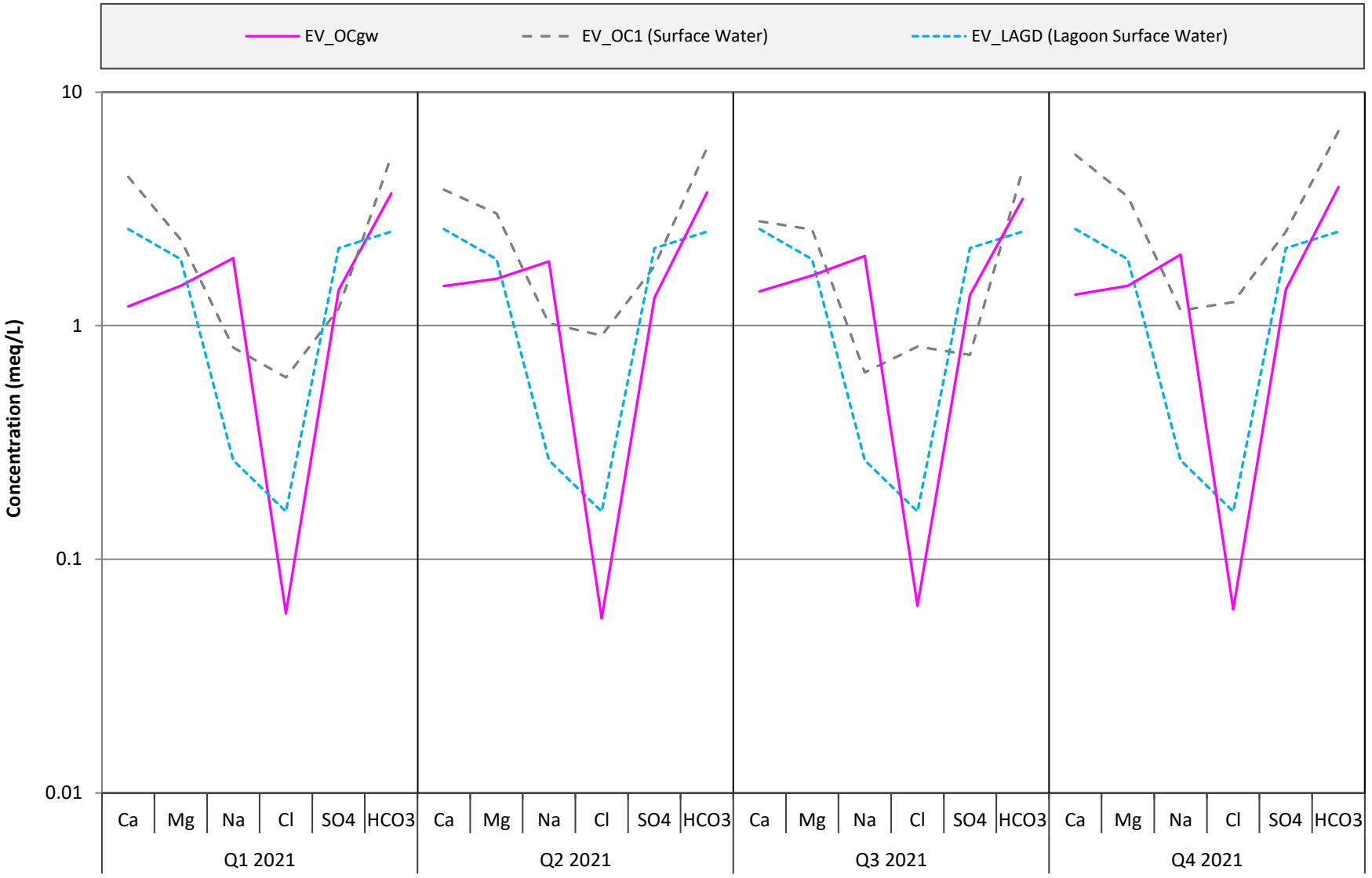
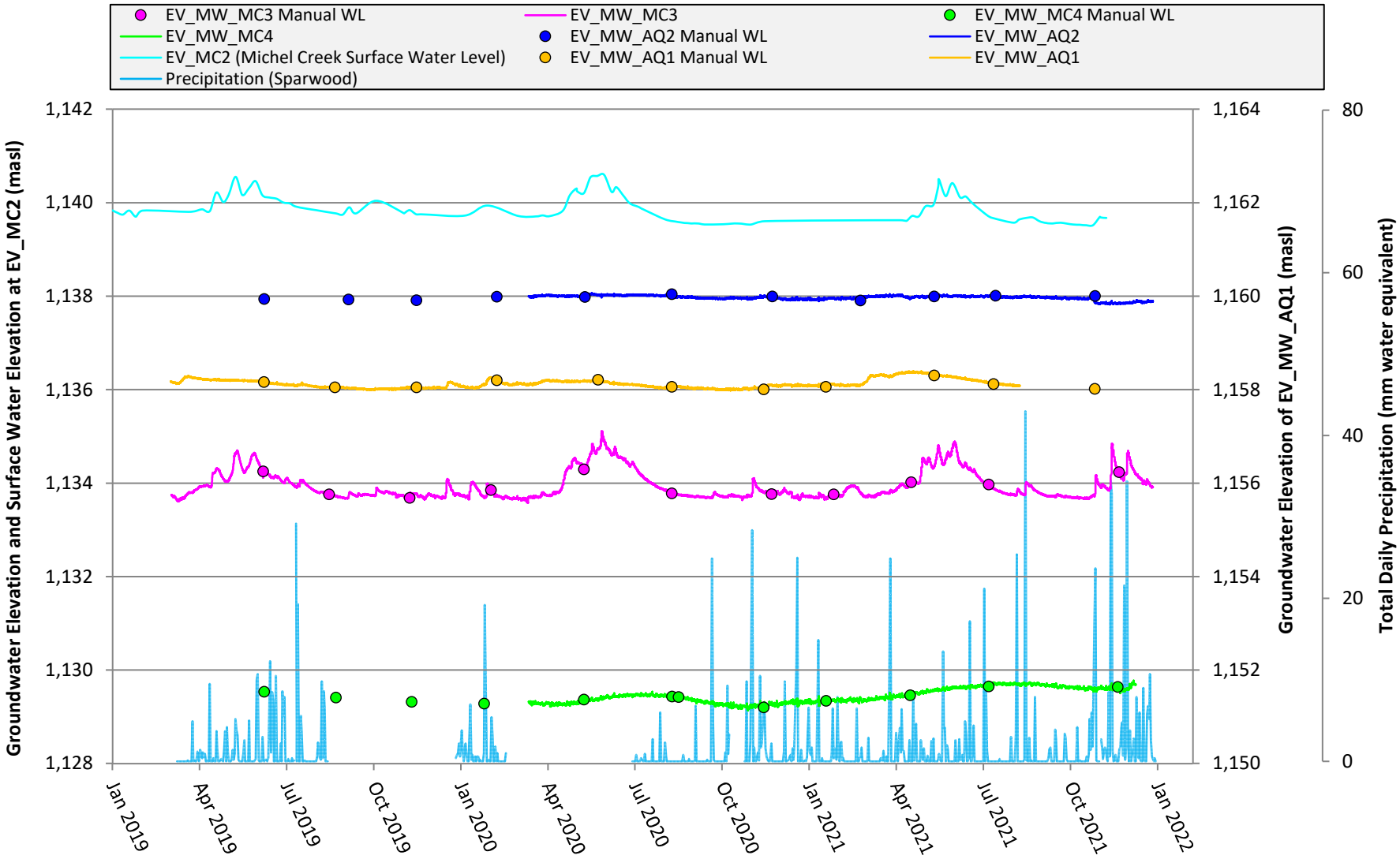
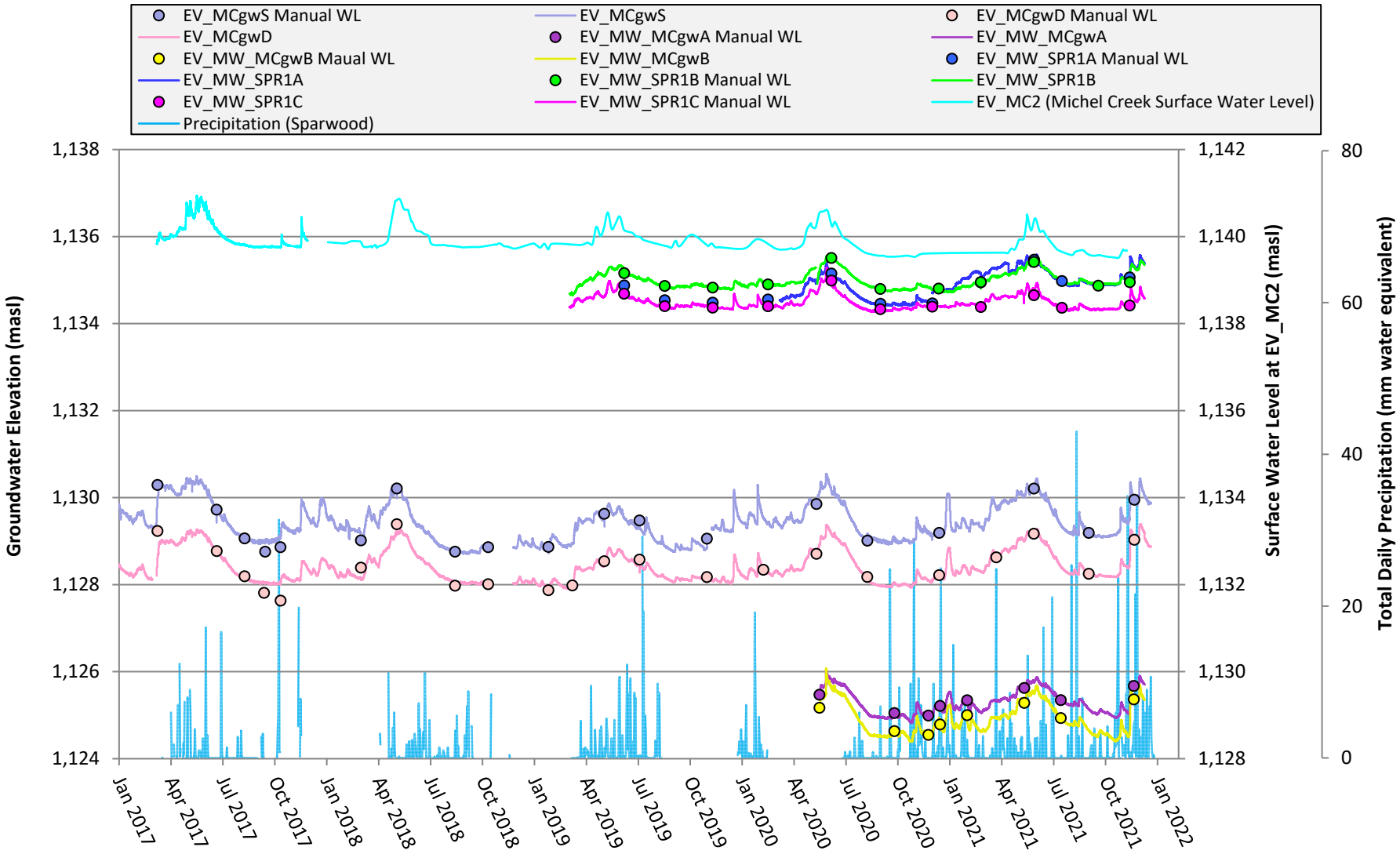


Figure EV-13: Sparwood Area
Baldy and Sparwood Ridges - Hydrograph



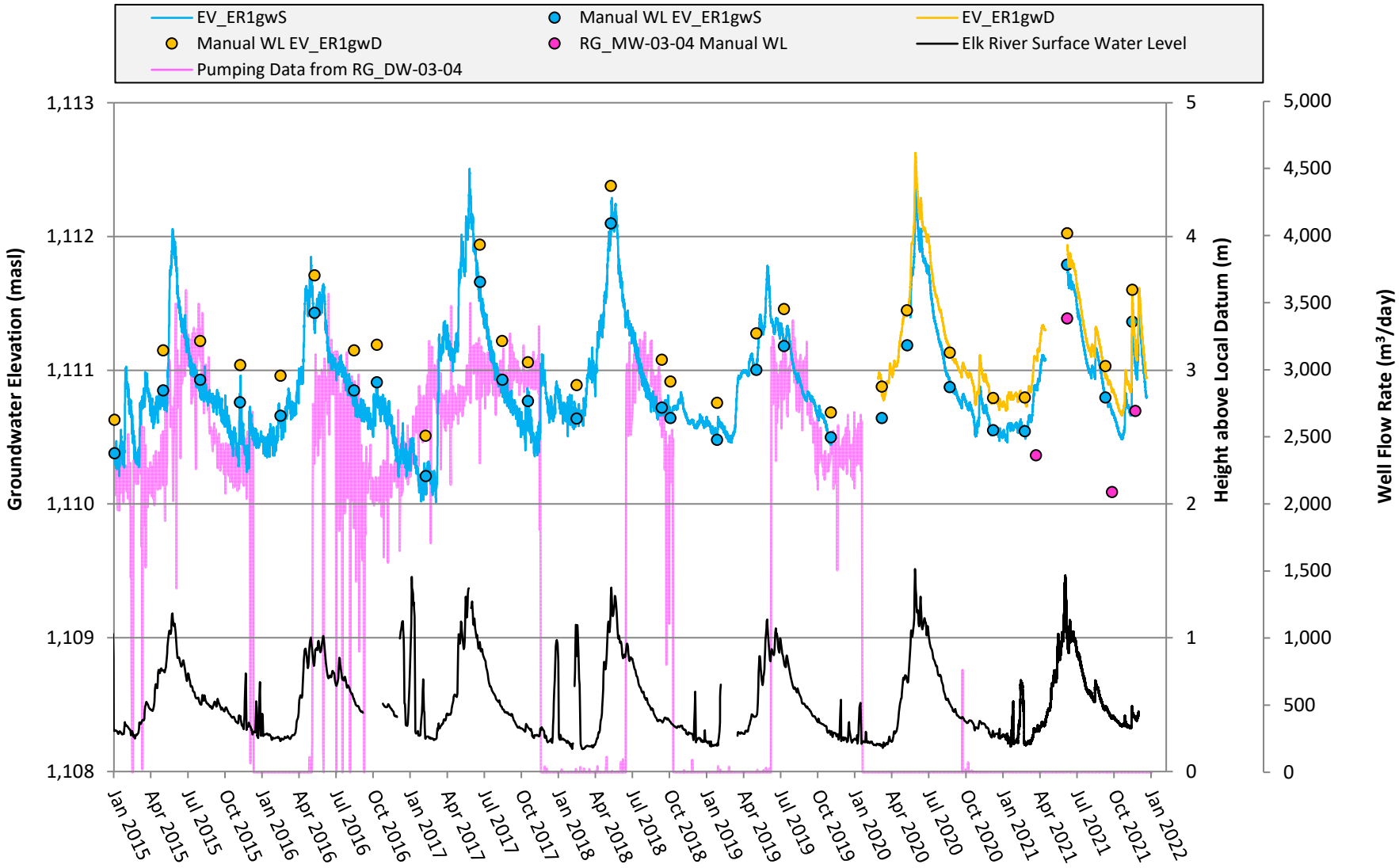
Note: Continuous water level data has been compensated using barologger at EV_MW_SPR1B.

Figure EV-14: Sparwood Area East
Michel Creek (Study Area 9a) - Hydrograph



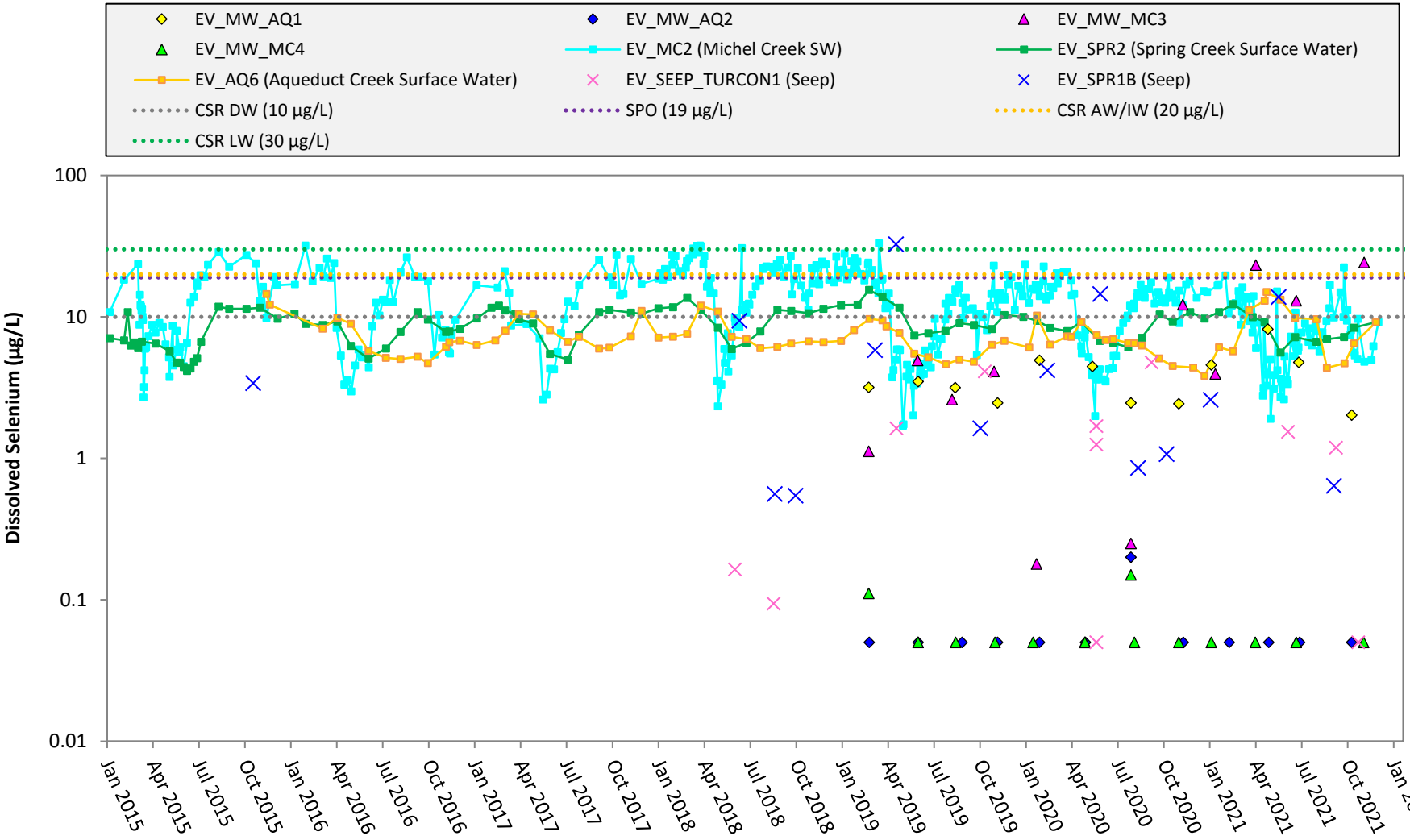
Note: data was removed where suspected datalogger removal occured, dataloggers MCgwD and MCgwS were switched on November 17, 2015. Continuous water level data has been compensated using barologger at EV_MW_SPR1B.

Figure EV-15: Sparwood Area
Elk River (Study Area 12) - Hydrograph and Pumping Rates



Note: data was removed where suspected datalogger removal occured. Continuous water level data has been compensated using barologger at EM_MW_SPR1B.

Figure EV-16: Sparwood Area
Baldy and Sparwood Ridges - Dissolved Selenium



Note: For concentrations measured below the analytical detection limit, the detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

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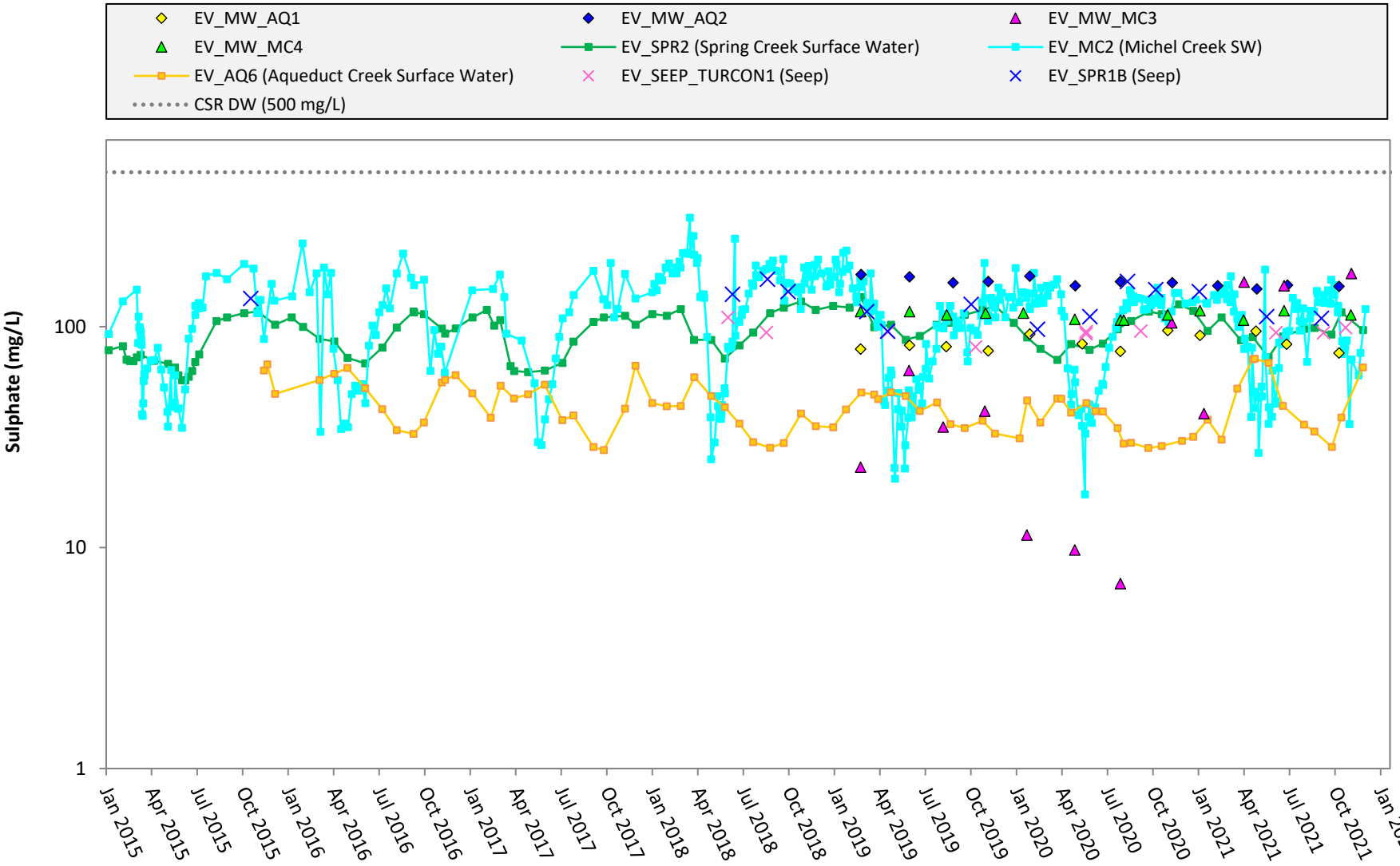
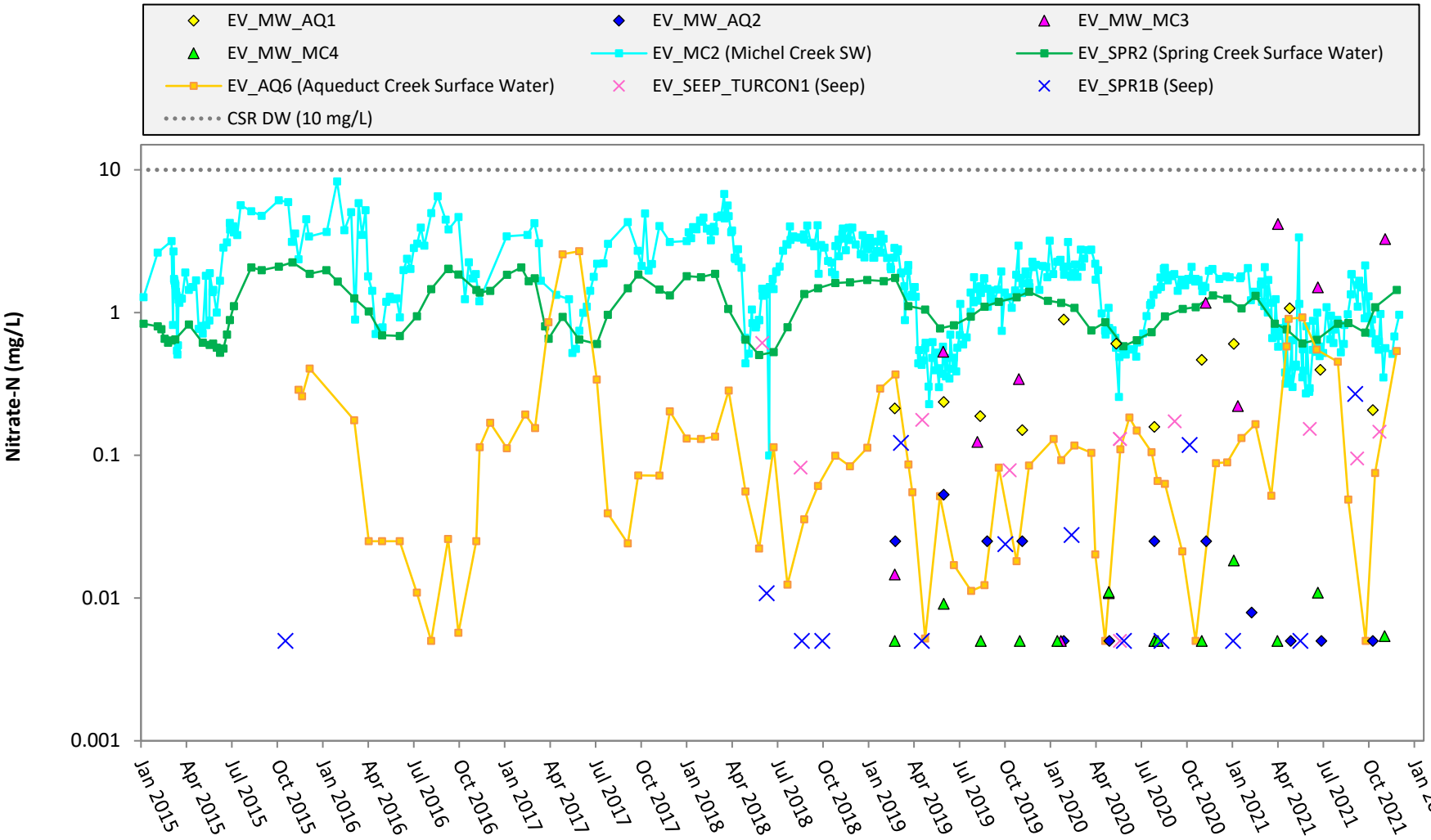
Figure EV-17: Sparwood Area
Baldy and Sparwood Ridges - Sulphate



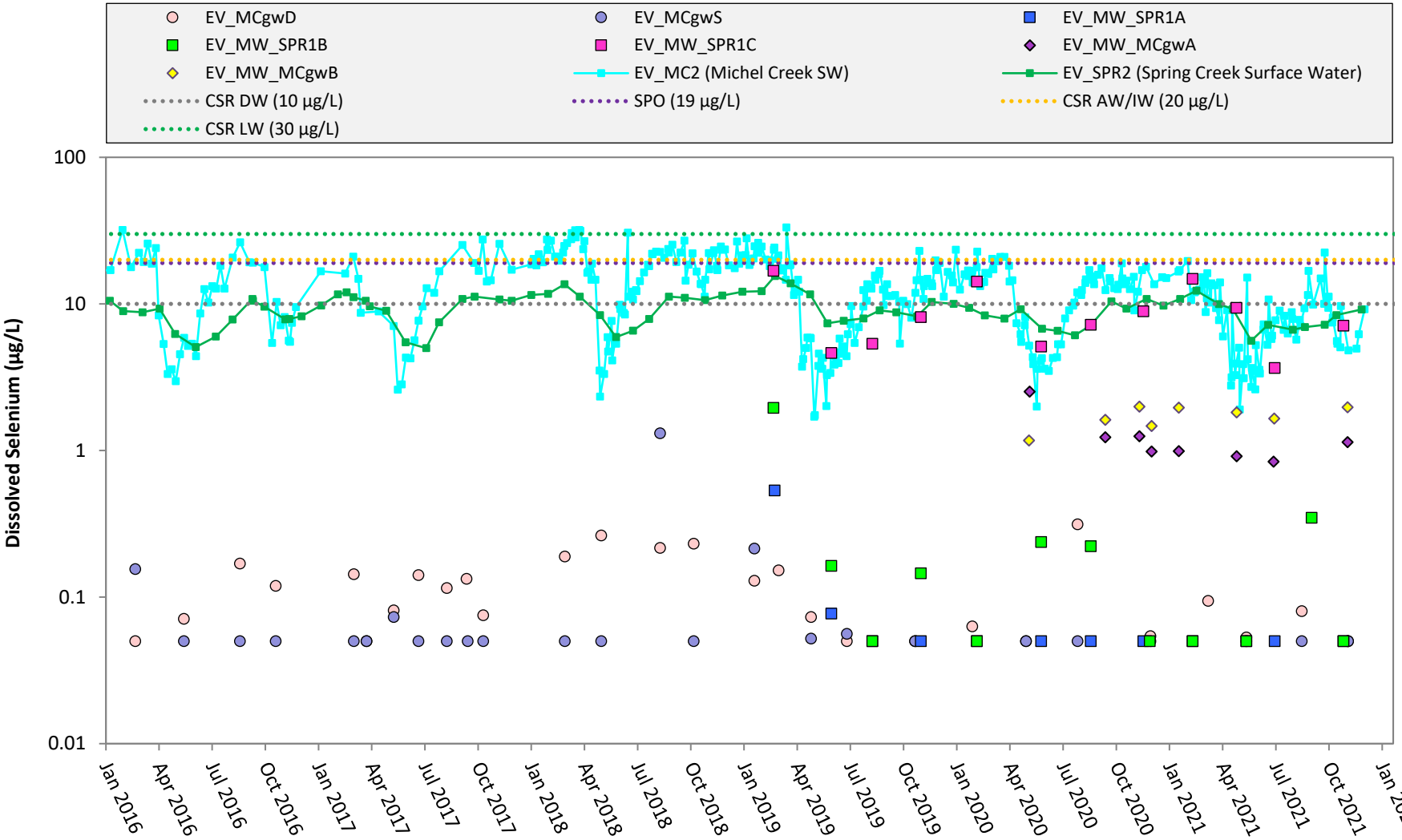
Note: Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-18: Sparwood Area
Baldy and Sparwood Ridges - Nitrate-N



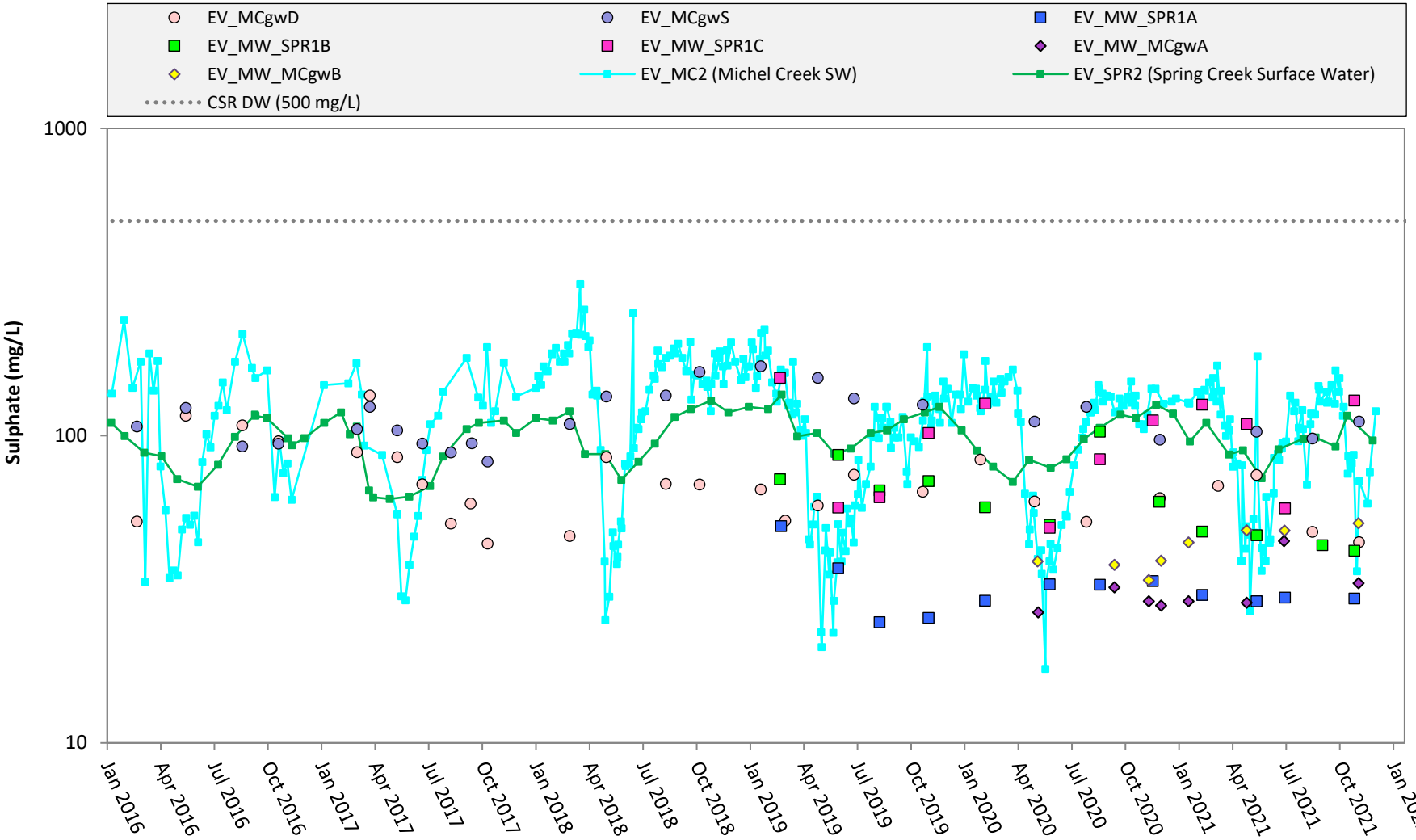
Note: For concentrations measured below the analytical detection limit, the detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-19: Sparwood Area East - Michel Creek (Study Area 9a) - Dissolved Selenium



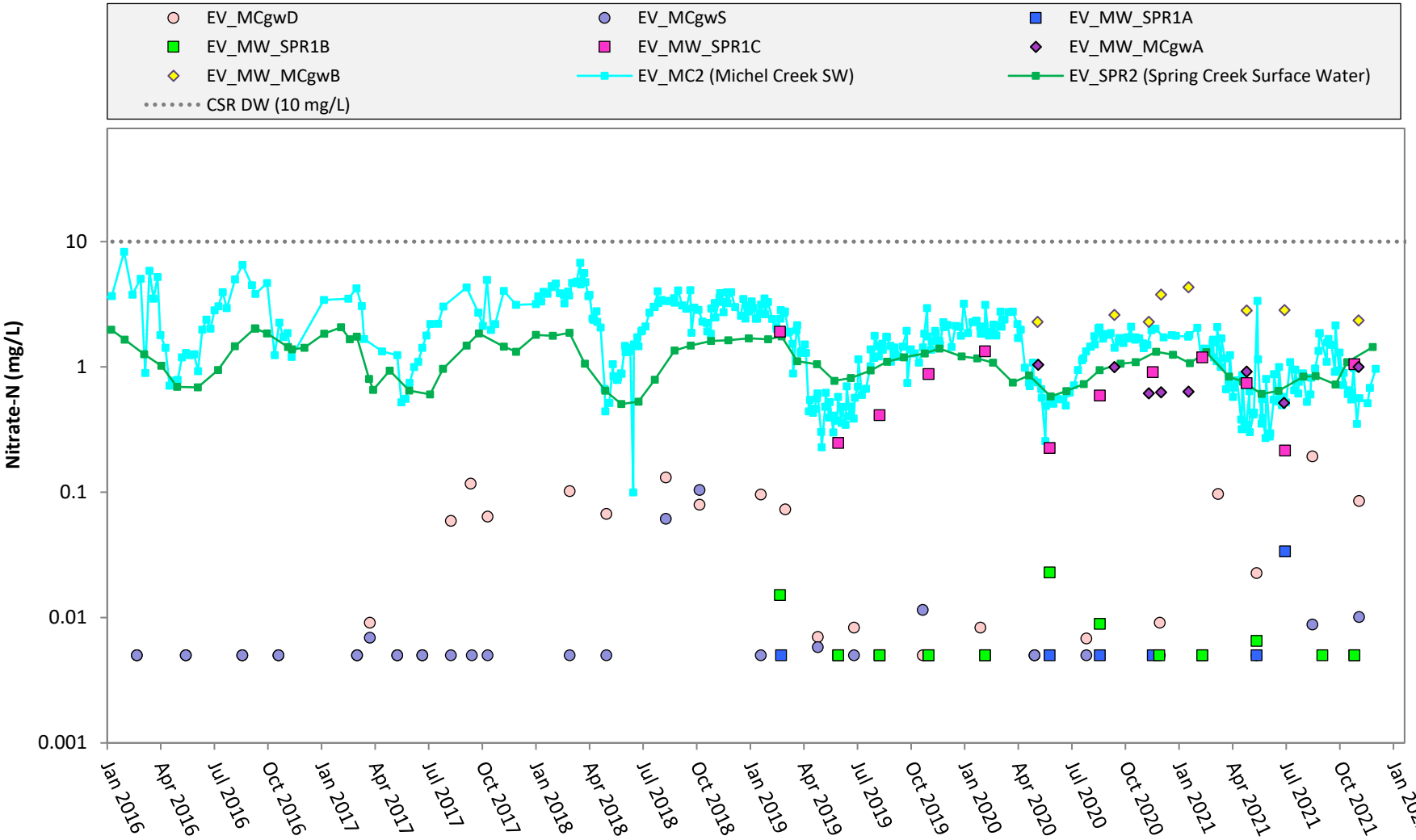
Note: For concentrations measured below the analytical detection limit, the detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-20: Sparwood Area East - Michel Creek (Study Area 9a) - Sulphate



Note: Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-21: Sparwood Area East - Michel Creek (Study Area 9a) - Nitrate-N



Note: For concentrations measured below the analytical detection limit, the detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-22: Sparwood Area - Elk River (Study Area 12) - Dissolved Selenium

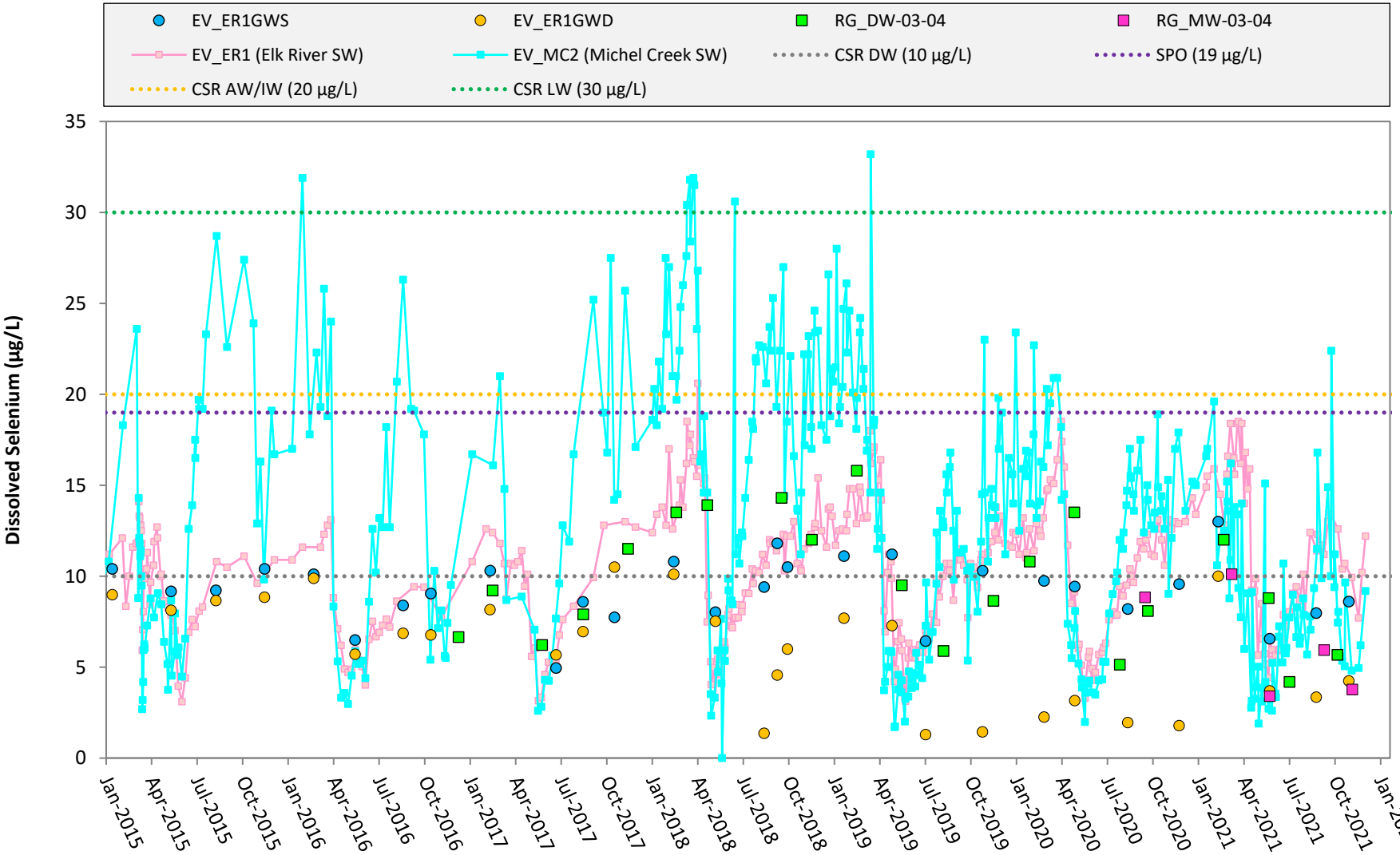
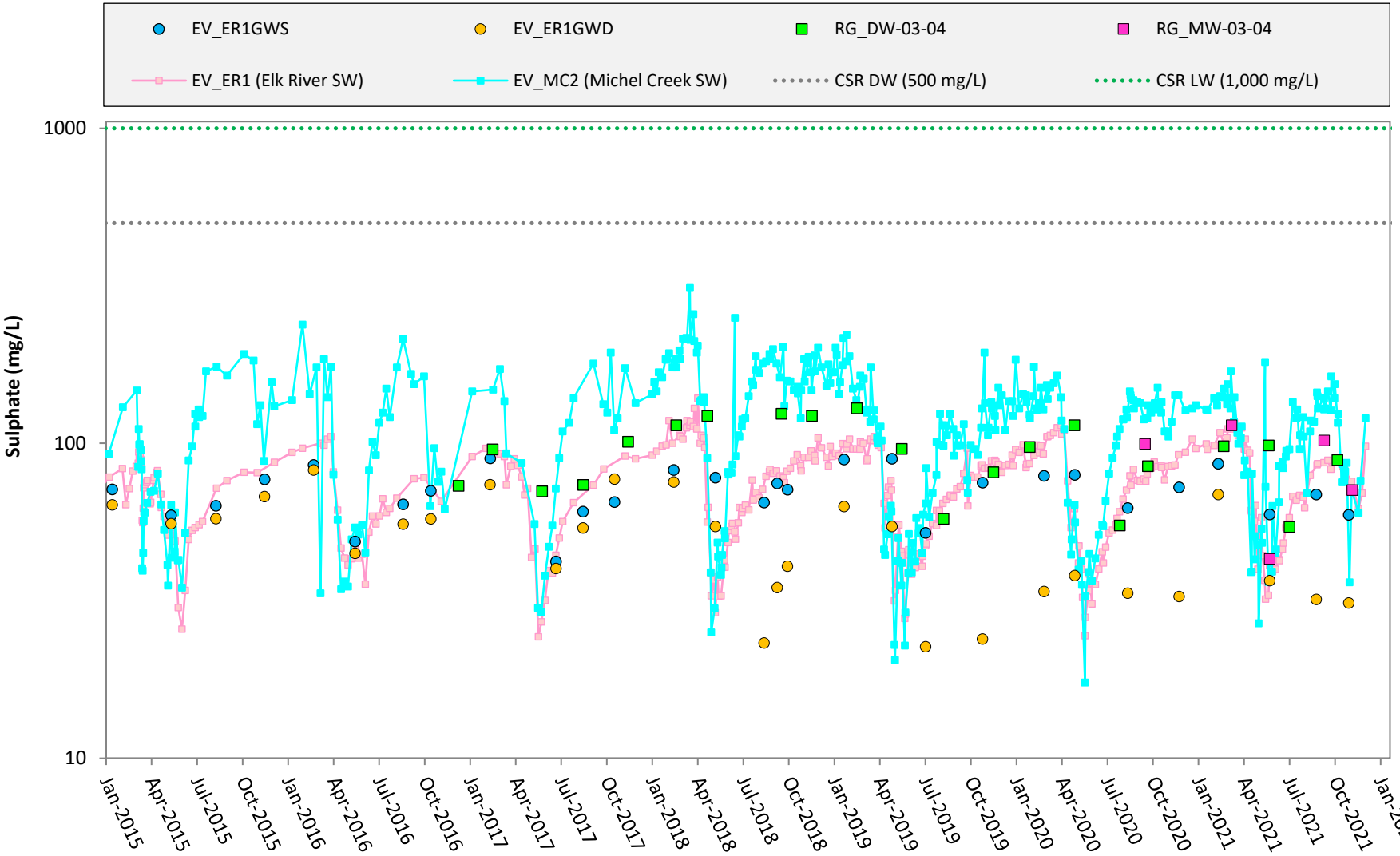


Figure EV-23: Sparwood Area - Elk River (Study Area 12) - Sulphate



Note: Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-24: Sparwood Area - Elk River (Study Area 12) - Nitrate-N

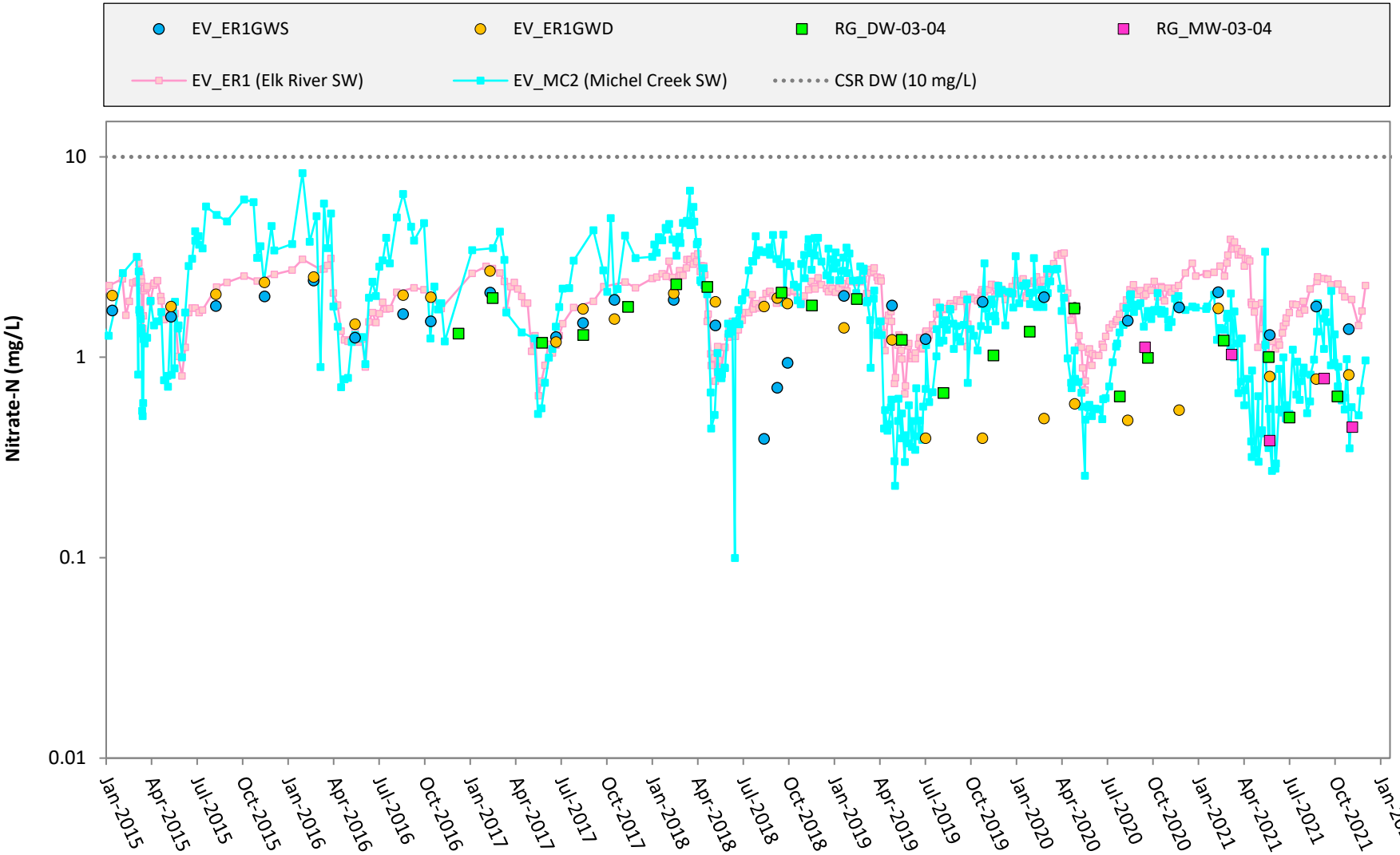


Figure EV-25: Sparwood Area
Baldy and Sparwood Ridges - Se:SO4 (S)

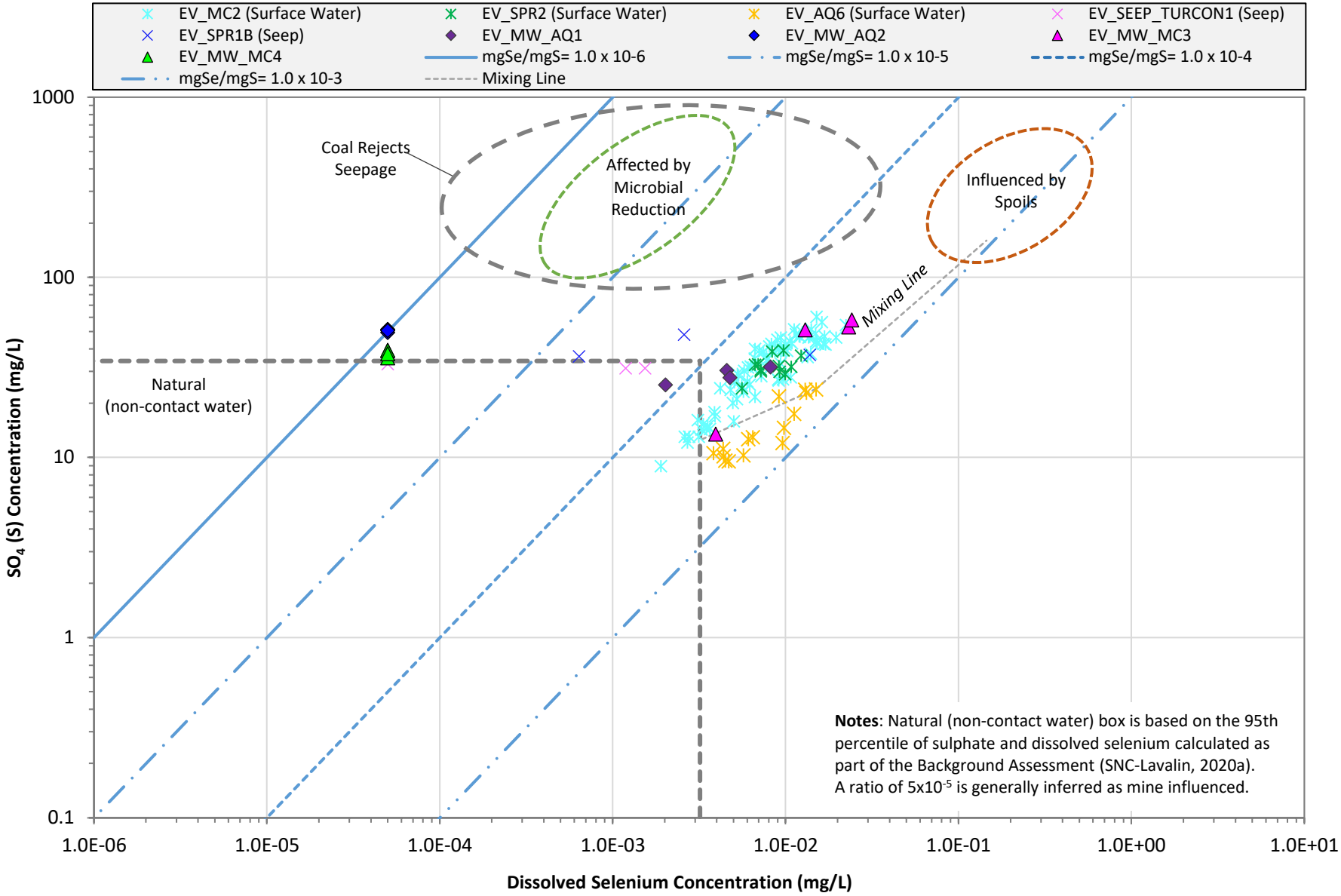
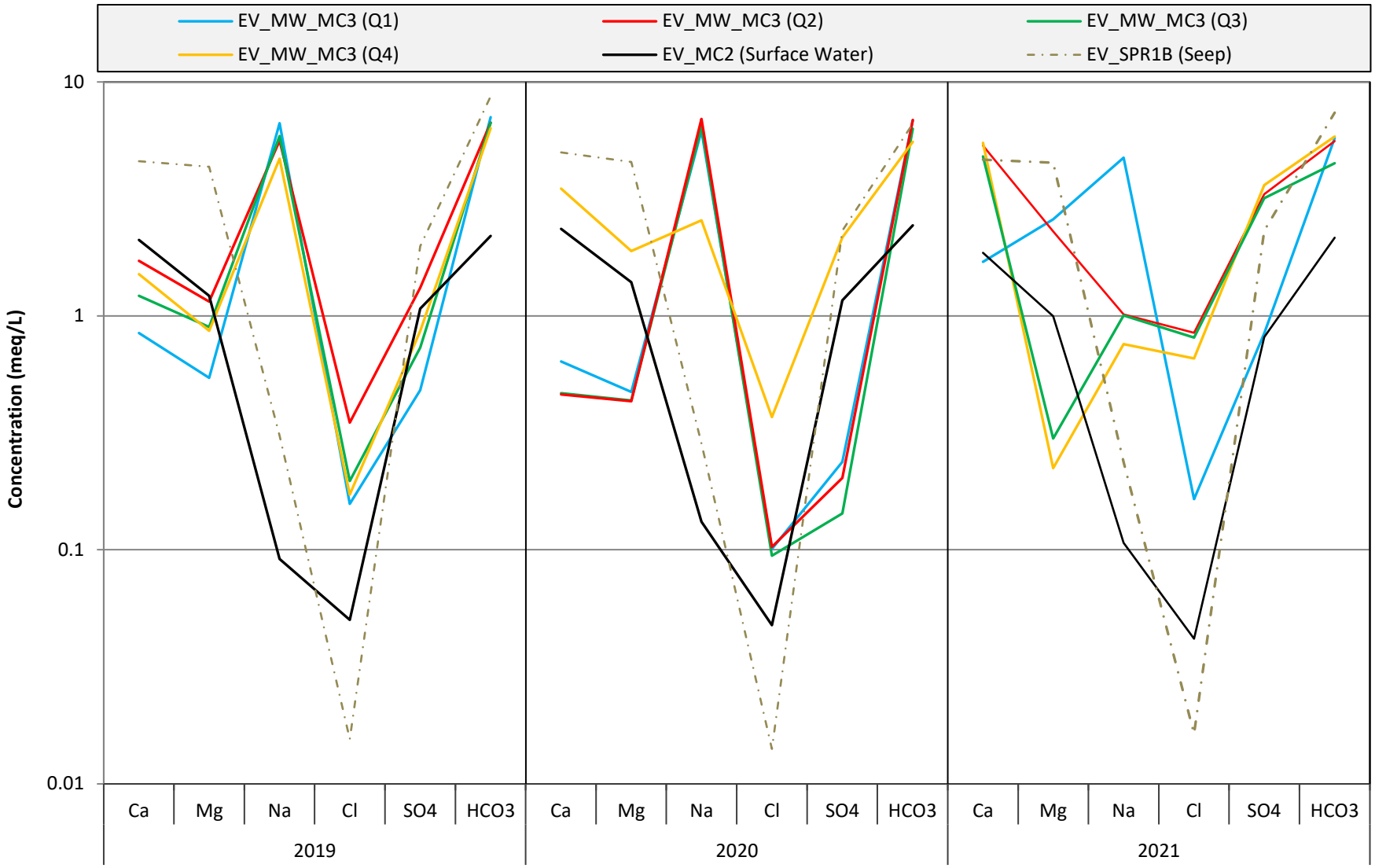


Figure EV-26: Sparwood Area - Sparwood Ridge - Schoeller Plot



Note: Analytical data presented for surface water and seeps are from Q2 in each year.

Figure EV-27: Sparwood Area East
Michel Creek (Study Area 9a) - Se:SO4 (S)

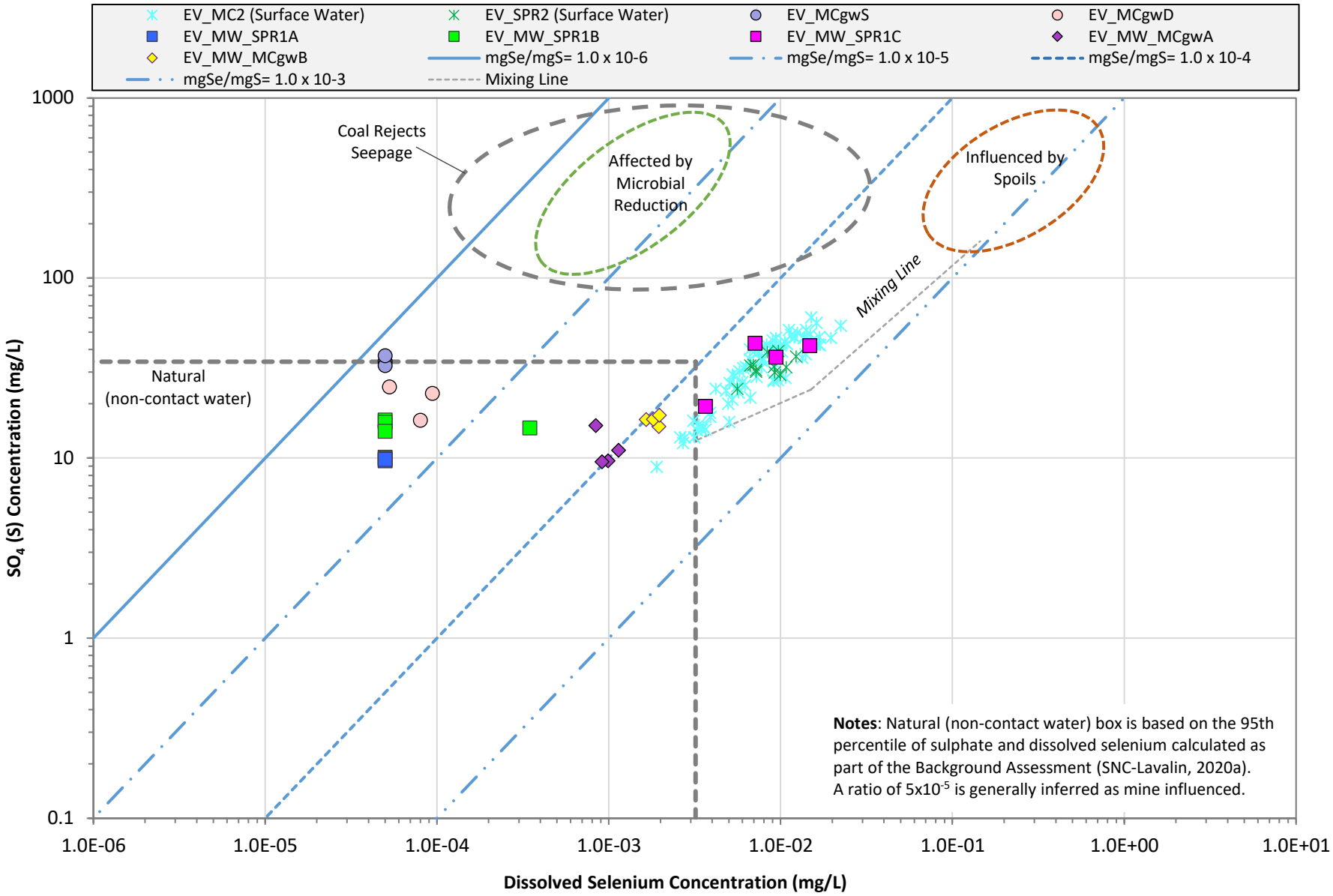


Figure EV-28: Sparwood Area
Elk River (Study Area 12) - Se:SO4 (S)

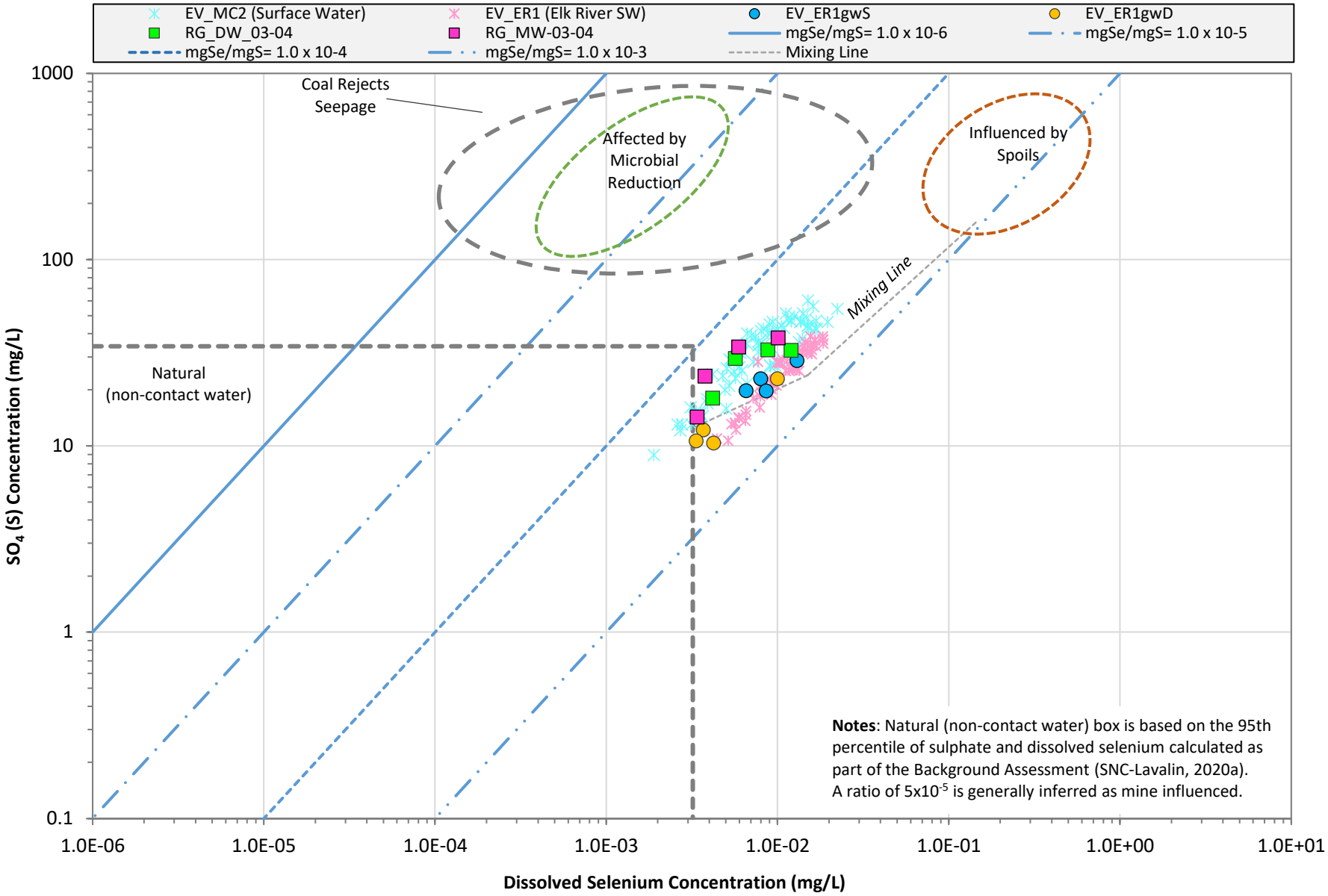
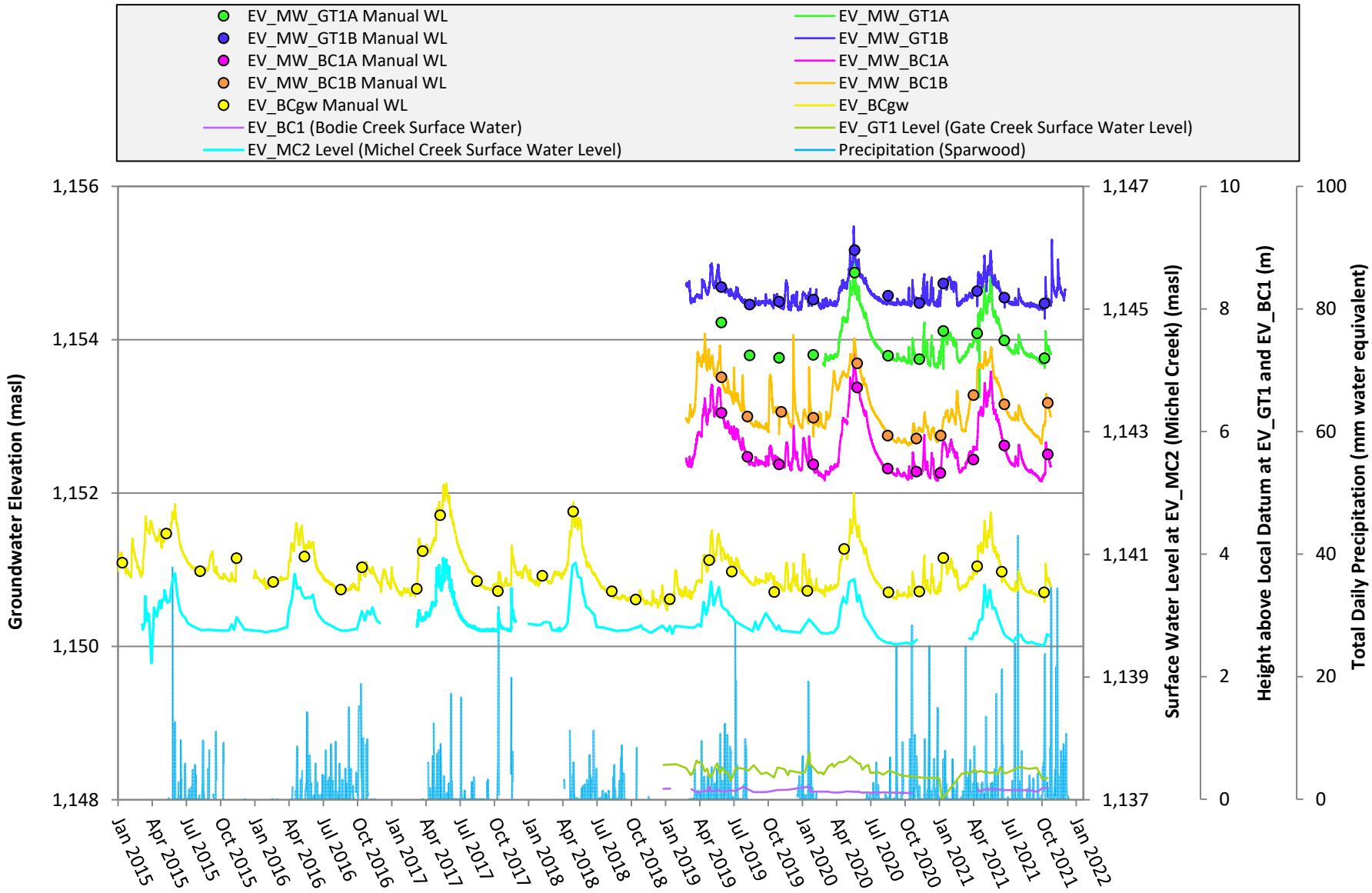
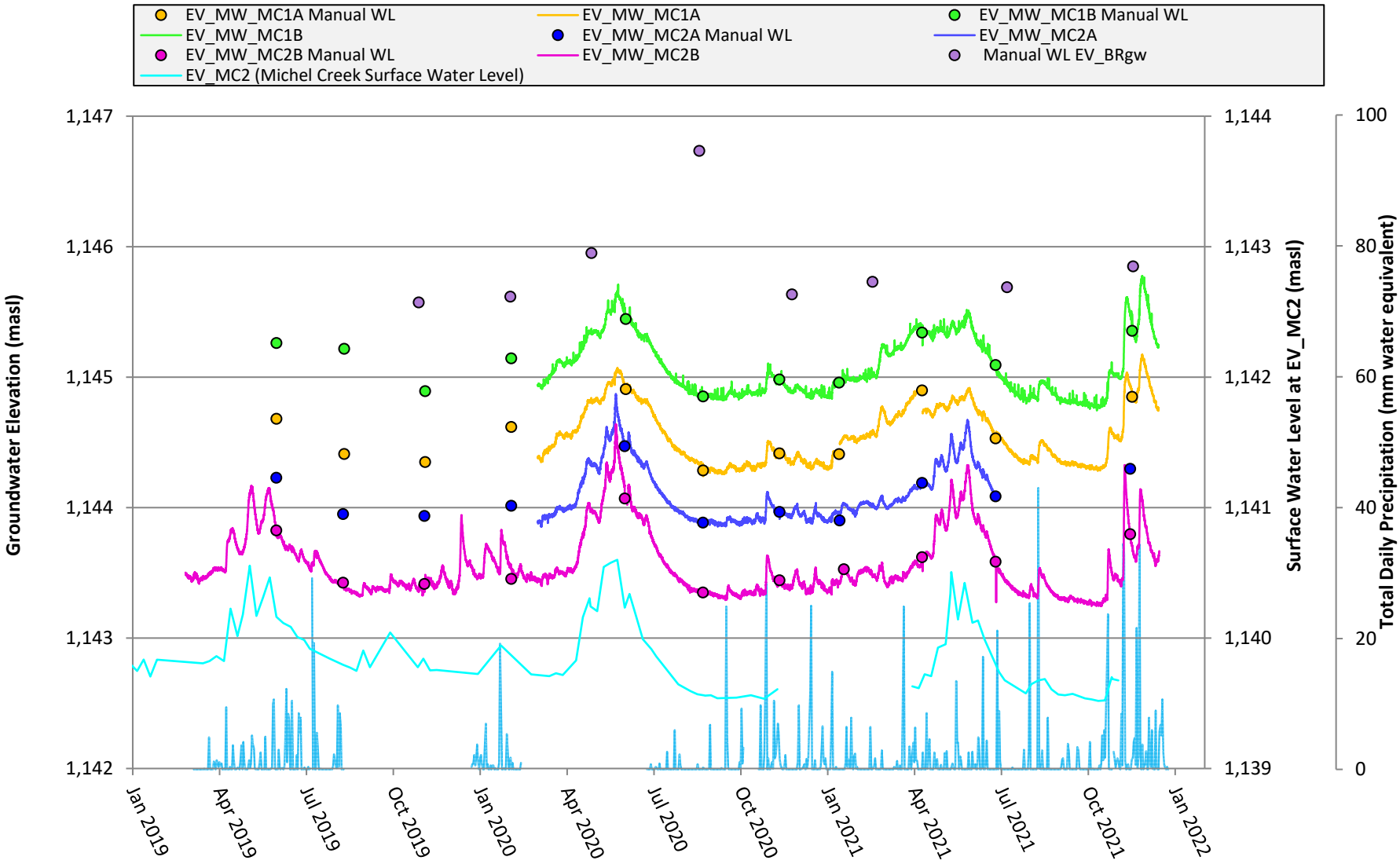


Figure EV-29: Gate Creek and Bodie Creek (Study Area 9b) - Hydrograph



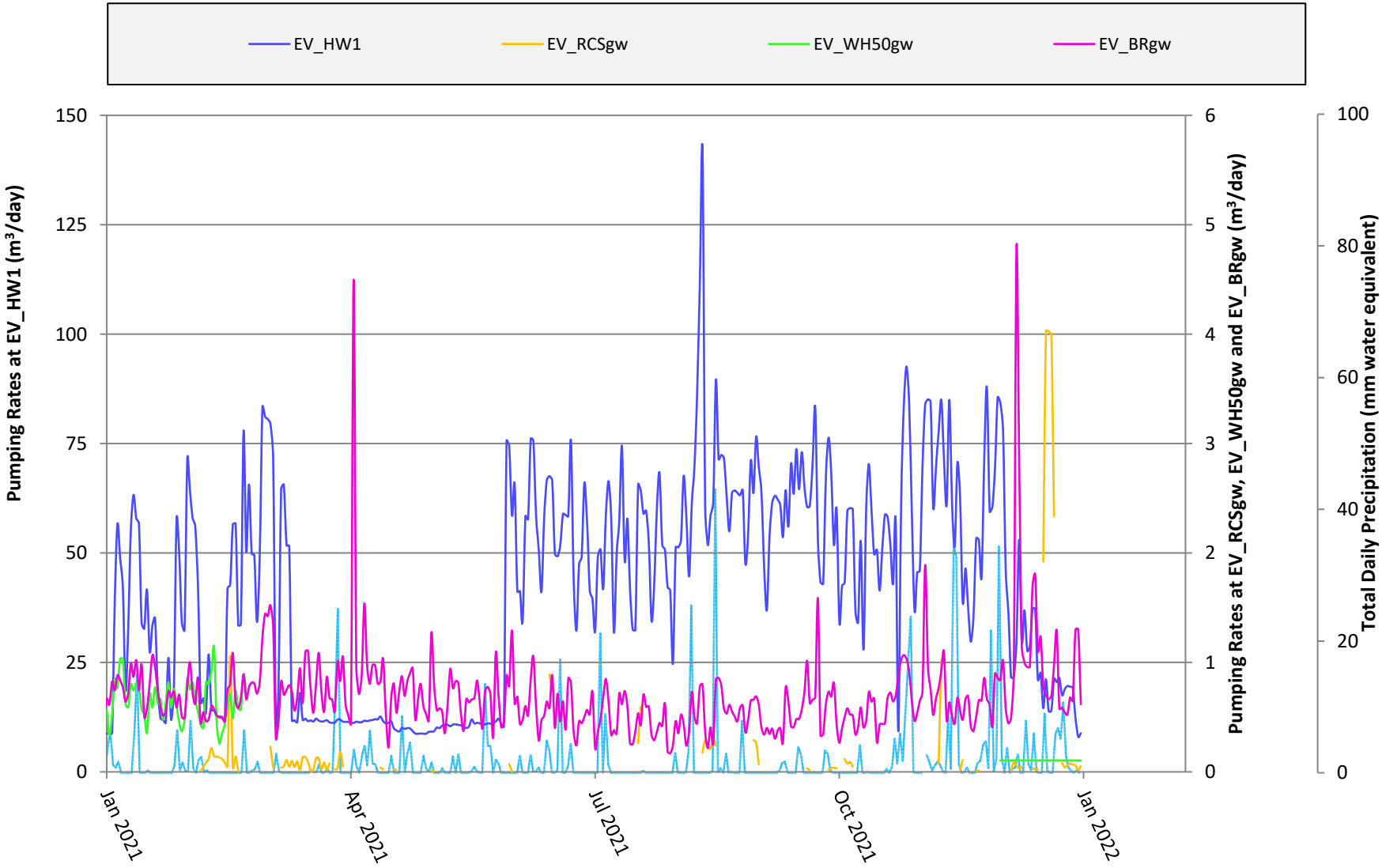
Note: Continuous water level data has been compensated using barologger at EV_MW_SPR1B.

Figure EV-30: Michel Creek Valley Bottom (Study Area 9b) - Hydrograph



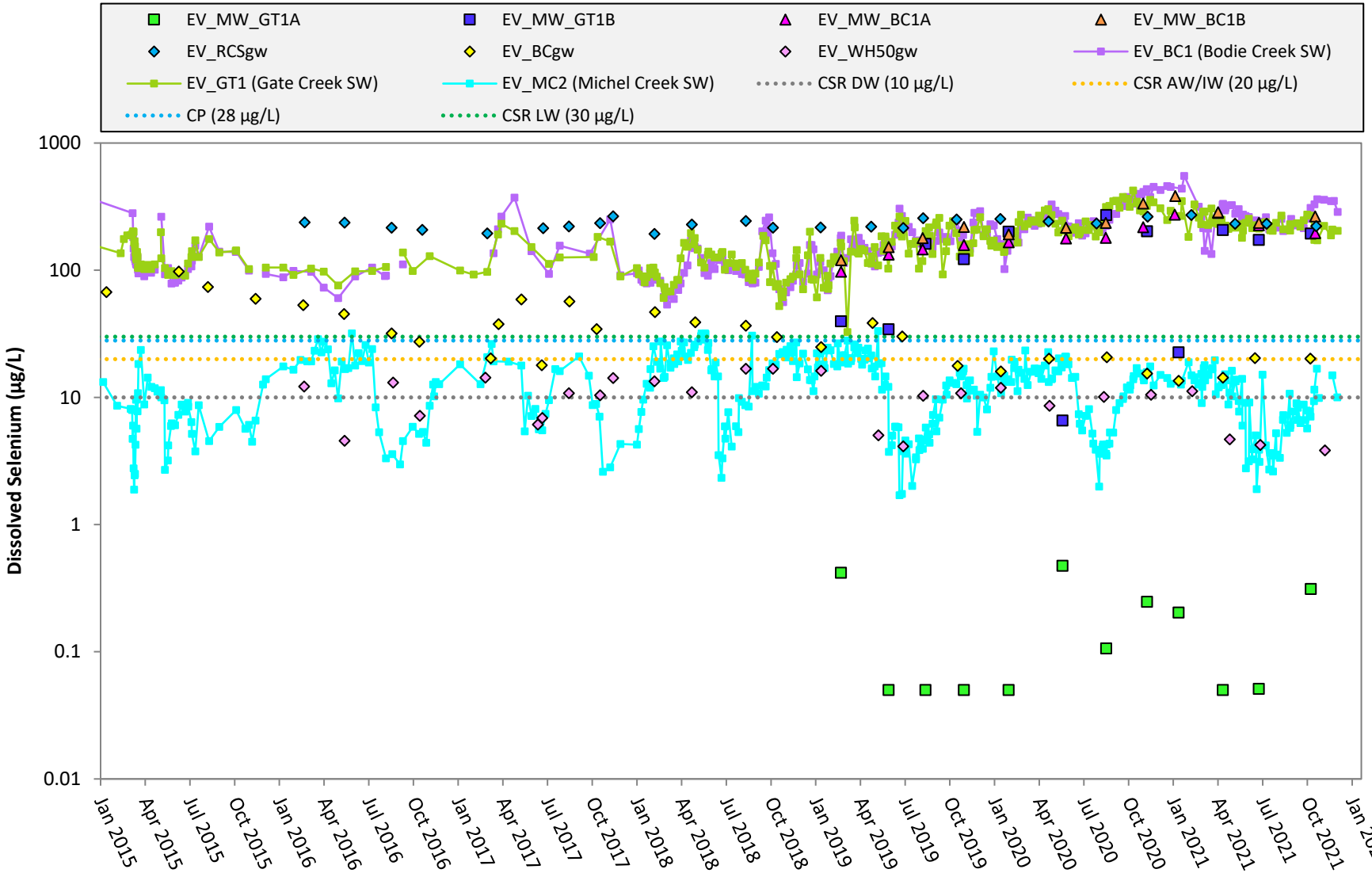
Note: Continuous water level data has been compensated using barologger at EV_MW_SPR1B.

Figure EV-31: Study Area 9b Supply Wells - Pumping Rates



Note: Flow meter at EV_WH50gw malfunctioned between February and November 2021; therefore, erroneous data has been removed from the graph.

Figure EV-32: Gate Creek and Bodie Creek (Study Area 9b) - Dissolved Selenium



Note: For concentrations measured below the analytical detection limit, the detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-33: Gate Creek and Bodie Creek (Study Area 9b) - Sulphate

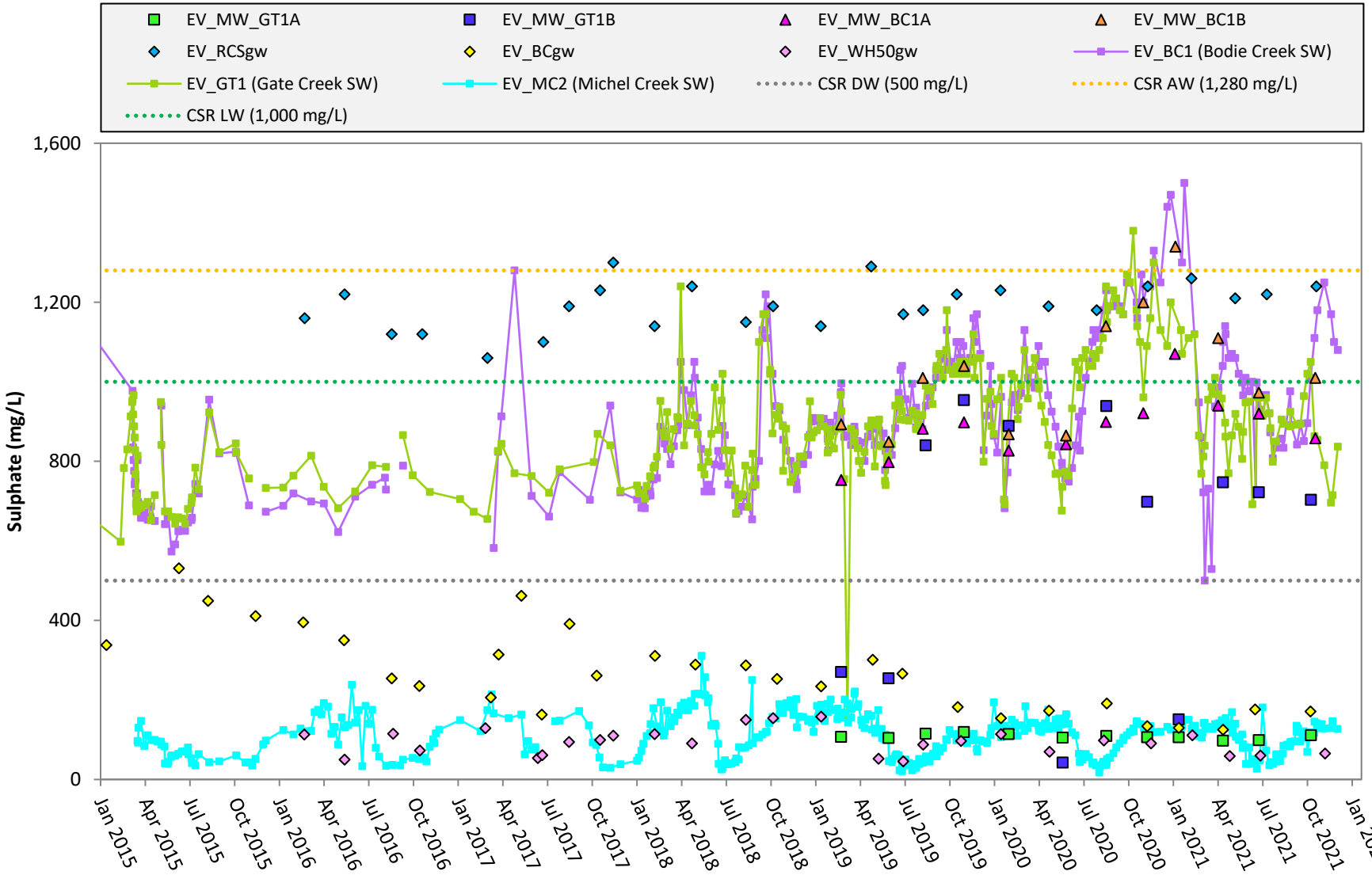
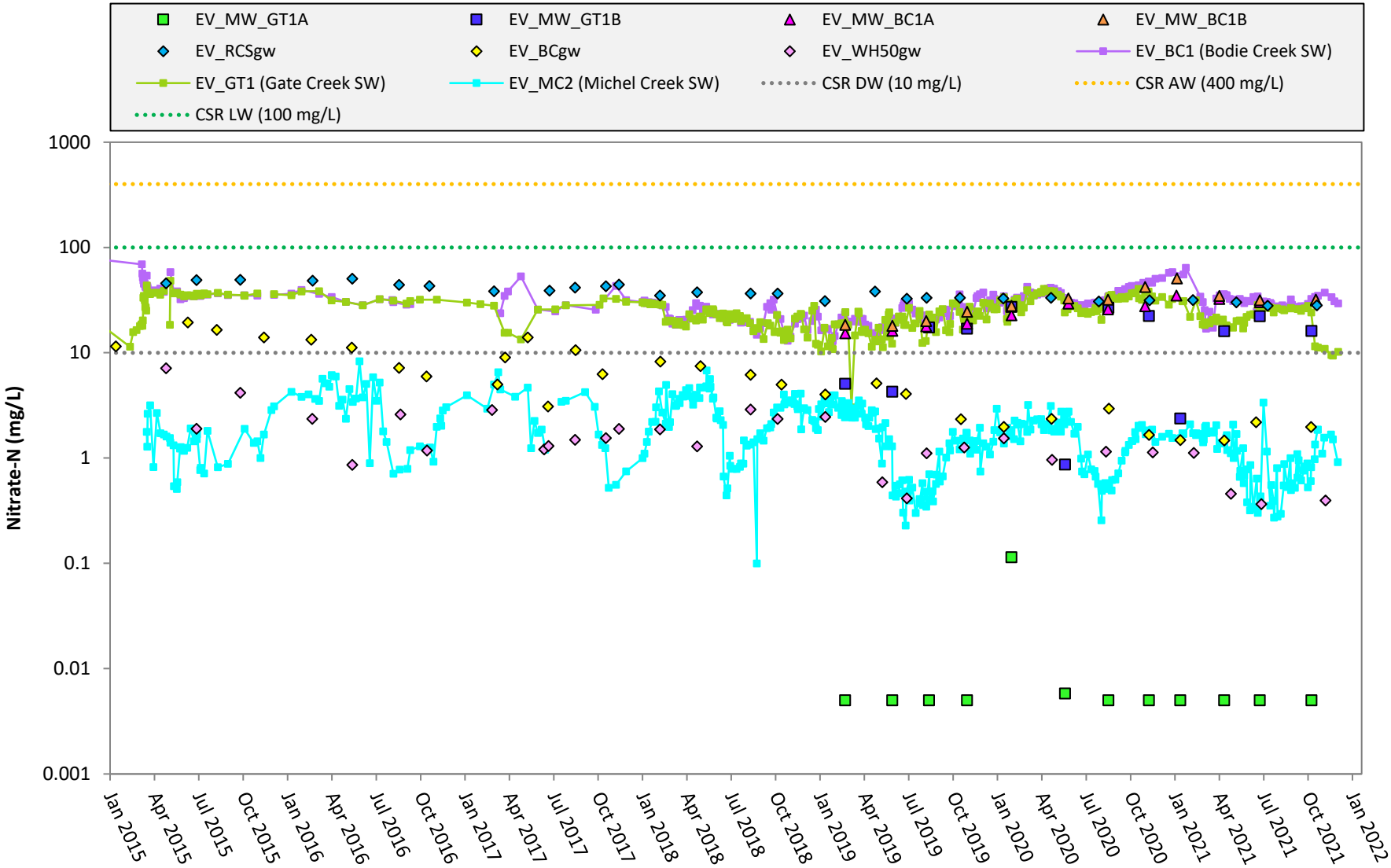
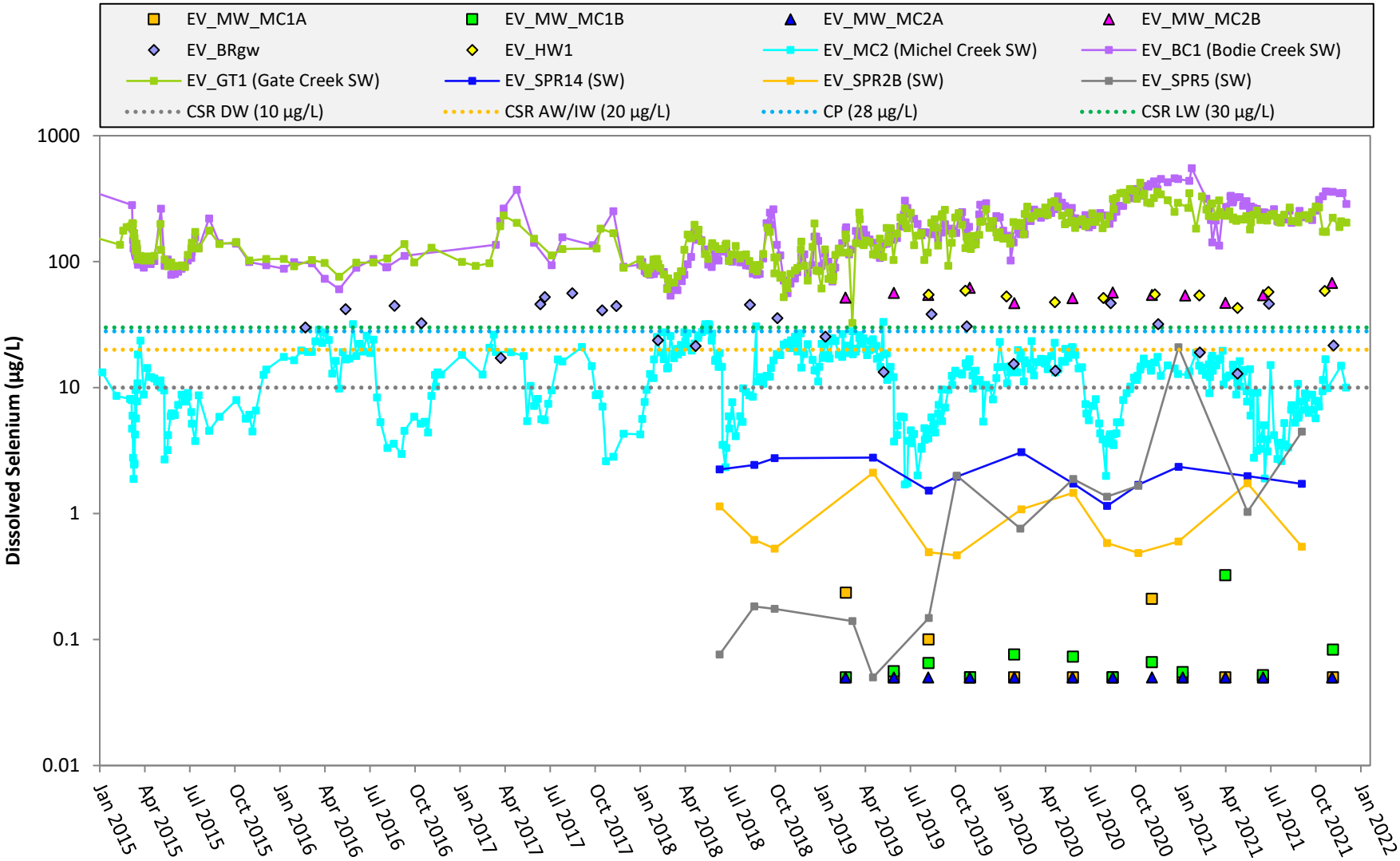


Figure EV-34: Gate Creek and Bodie Creek (Study Area 9b) - Nitrate-N



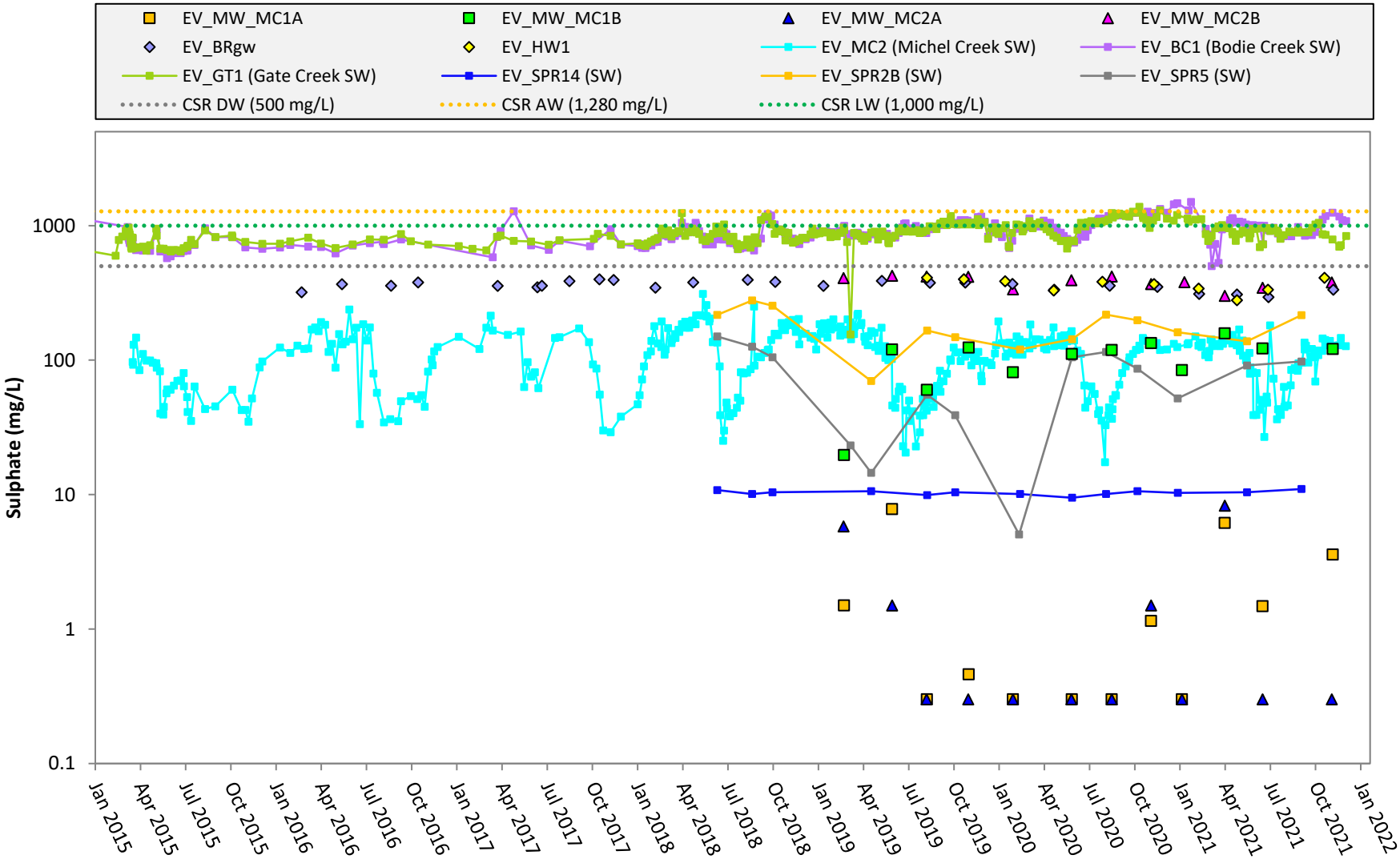
Note: For concentrations measured below the analytical detection limit, the detection limit (0.005 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-35: Michel Creek Valley Bottom (Study Area 9b) - Dissolved Selenium



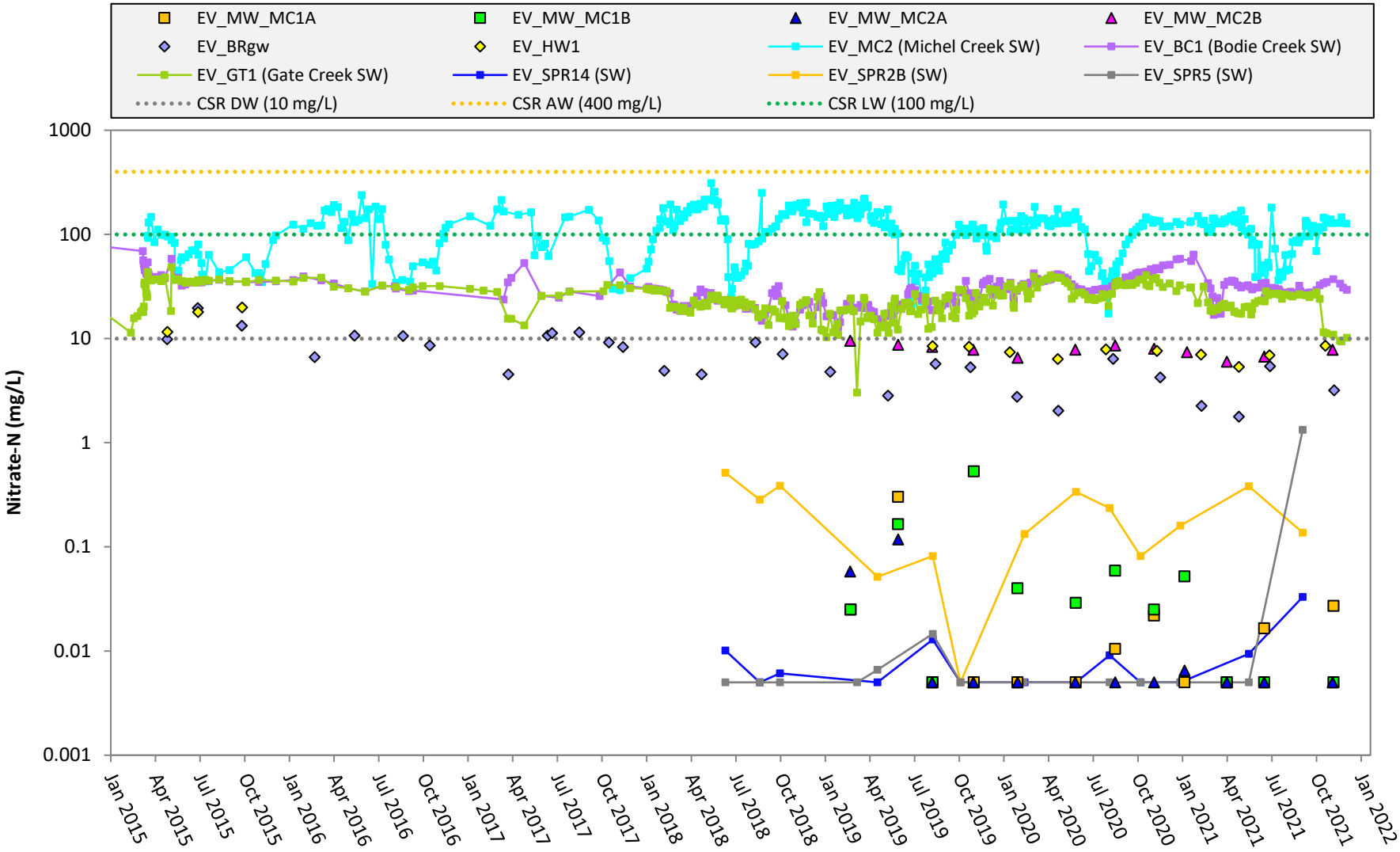
Note: For concentrations measured below the analytical detection limit, the detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-36: Michel Creek Valley Bottom (Study Area 9b) - Sulphate



Note: For concentrations measured below the analytical detection limit, the detection limit (0.3 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-37: Michel Creek Valley Bottom (Study Area 9b) - Nitrate-N



Note: For concentrations measured below the analytical detection limit, the detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-38: Gate Creek and Bodie Creek (Study Area 9b) - Se:SO4 (S)

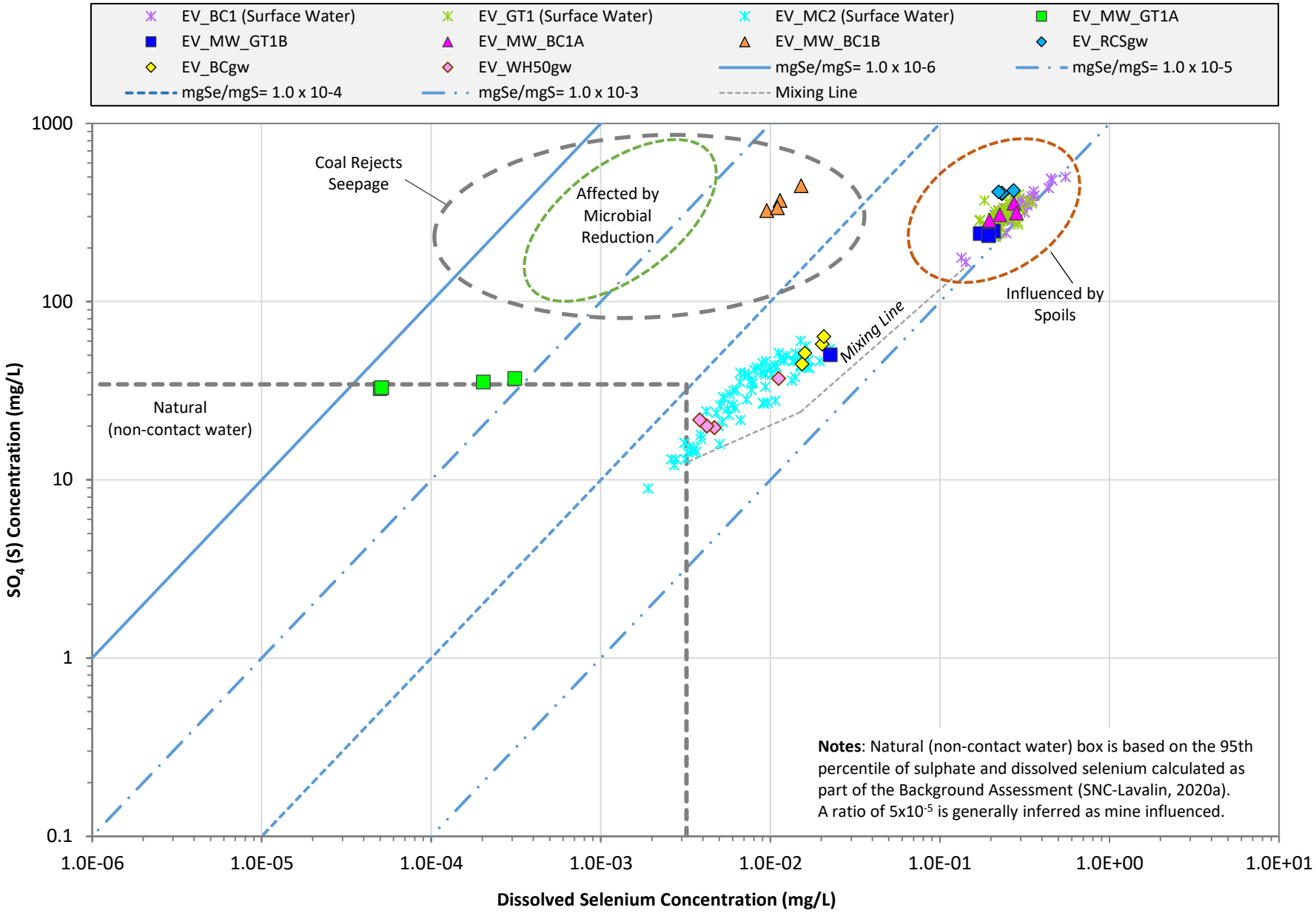


Figure EV-39: Gate Creek and Bodie Creek (Study Area 9b) - Schoeller Plot

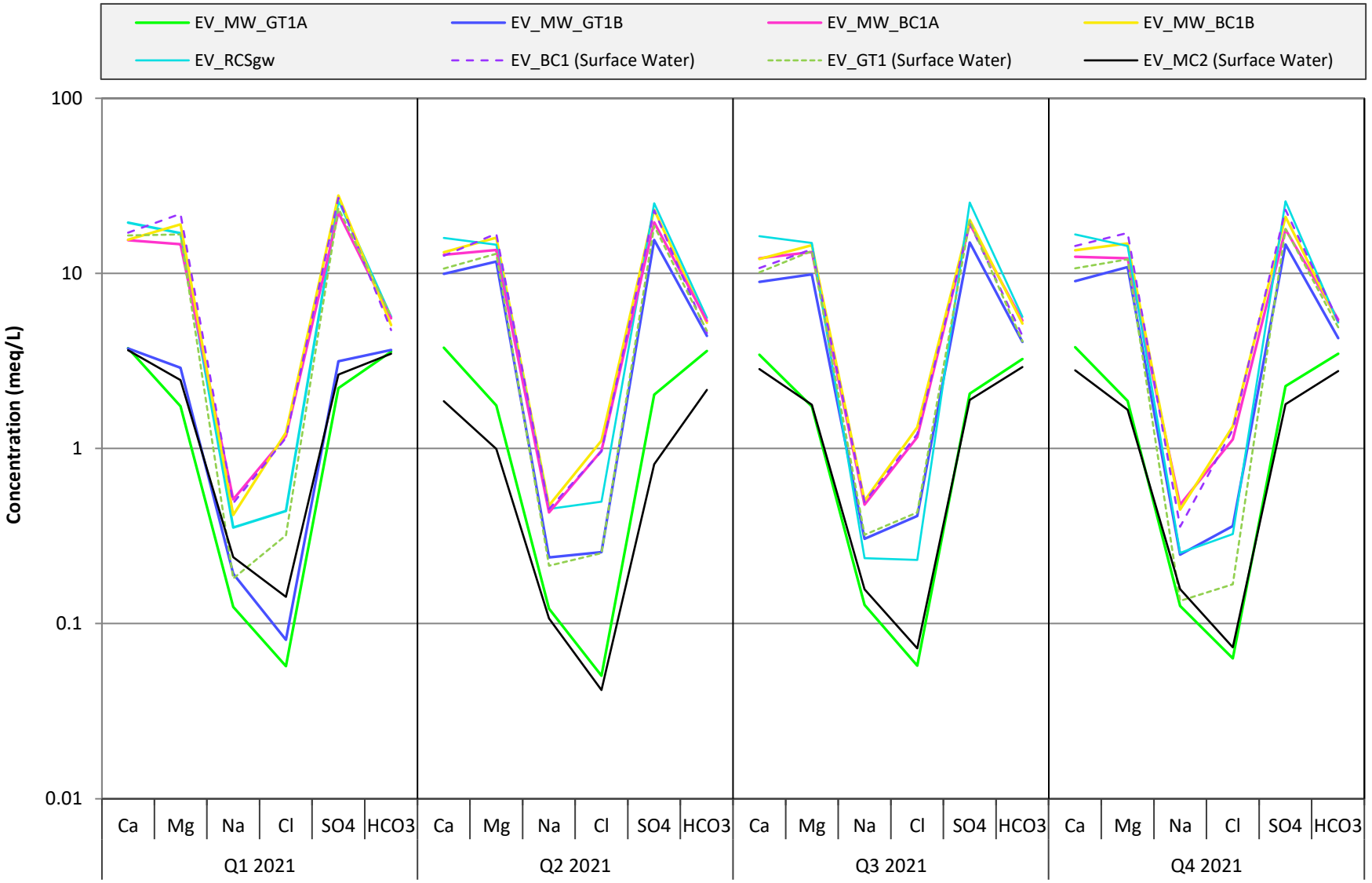


Figure EV-40: Michel Creek Valley Bottom (Study Area 9b) - Se:SO4 (S)

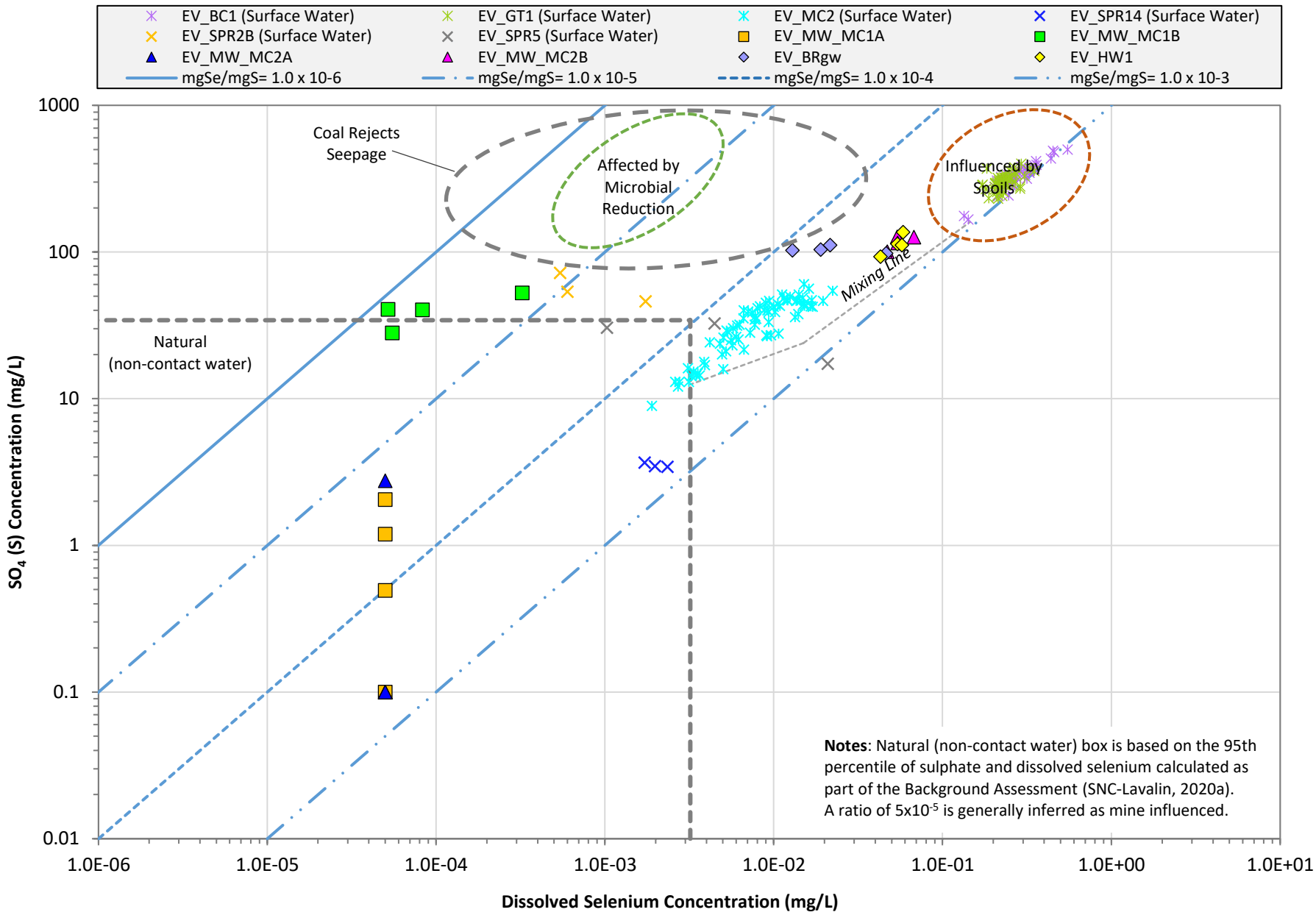
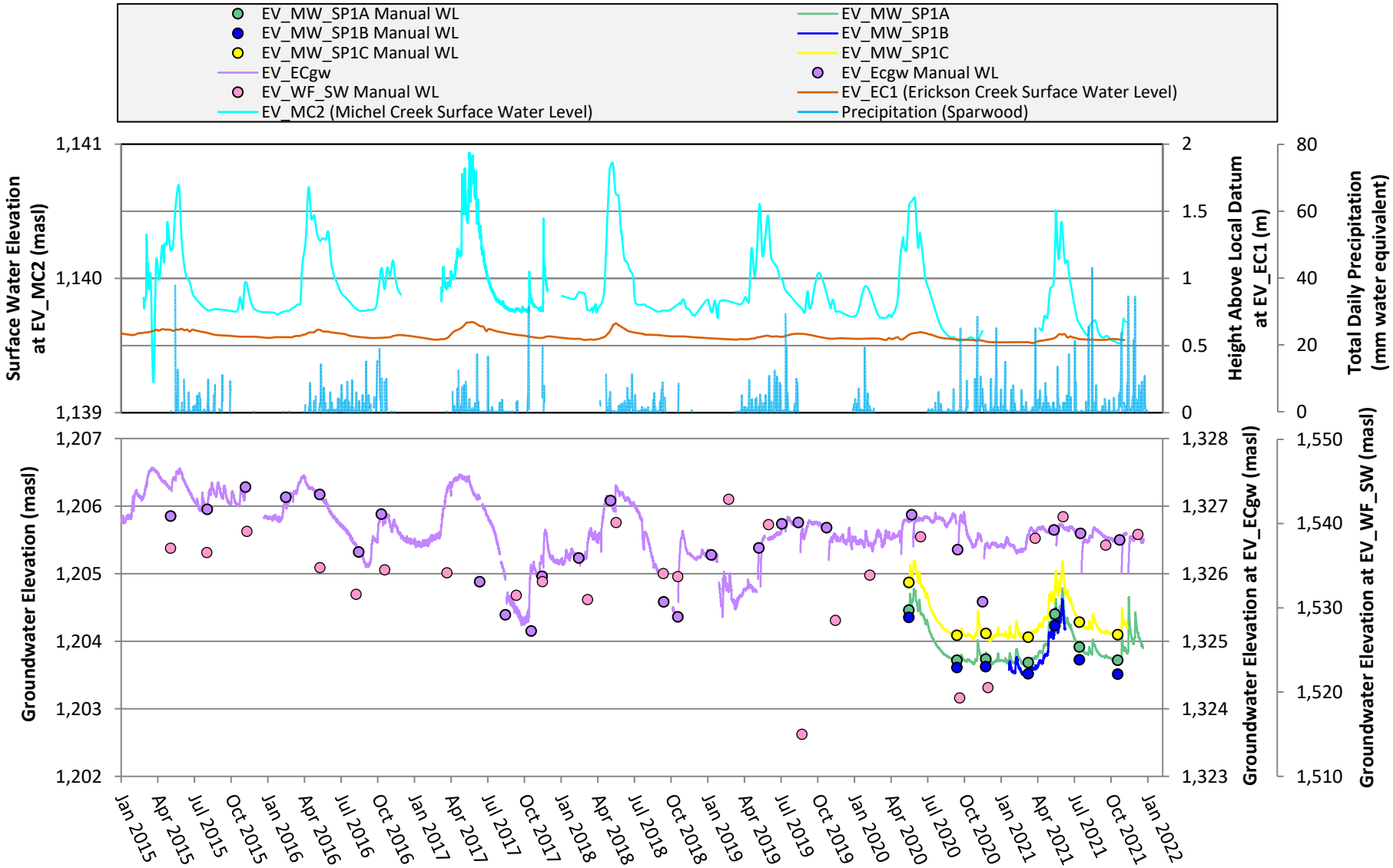
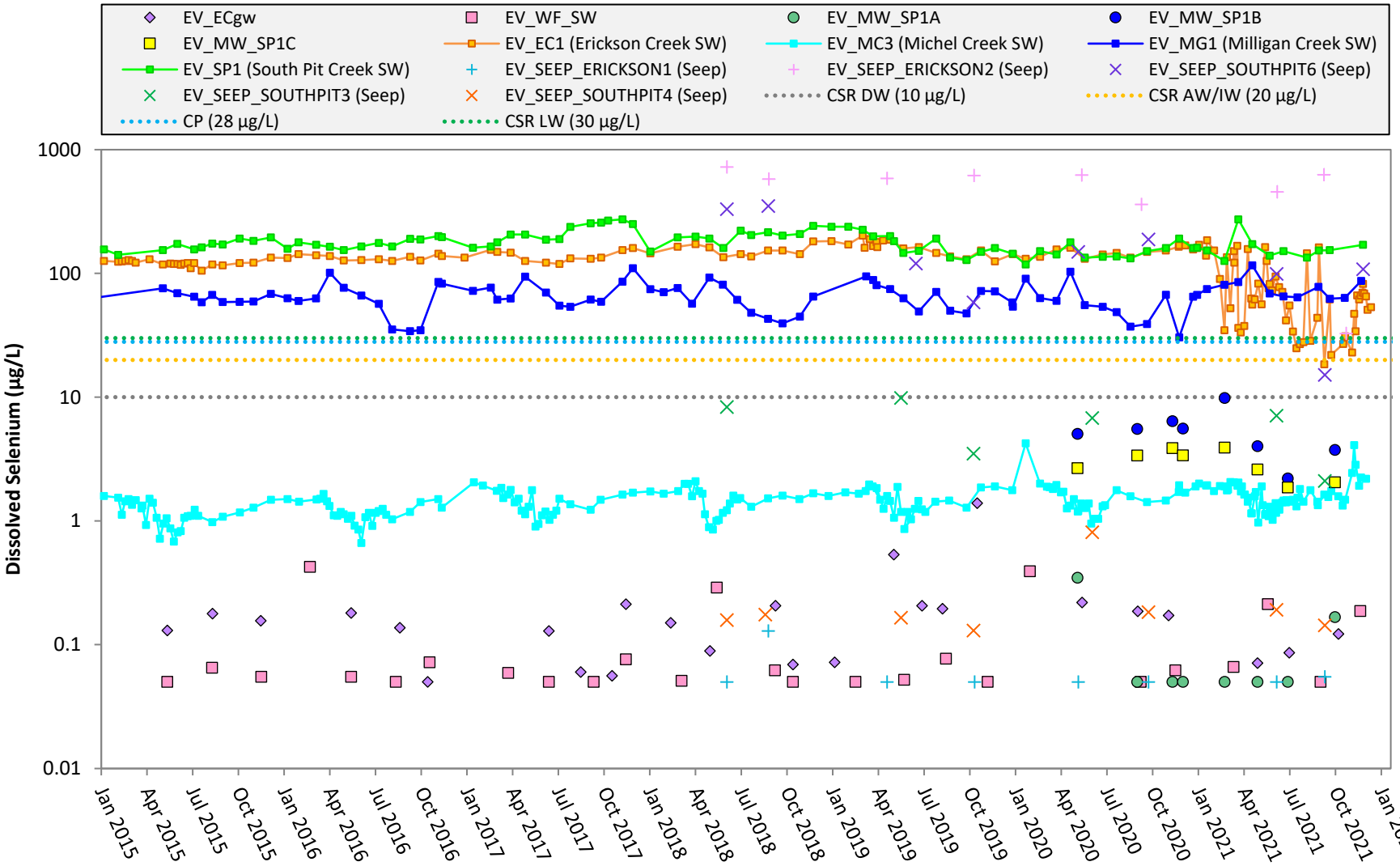


Figure EV-41: Erickson Creek and Michel Creek Downstream of Erickson Creek (Study Area 10) - Hydrograph



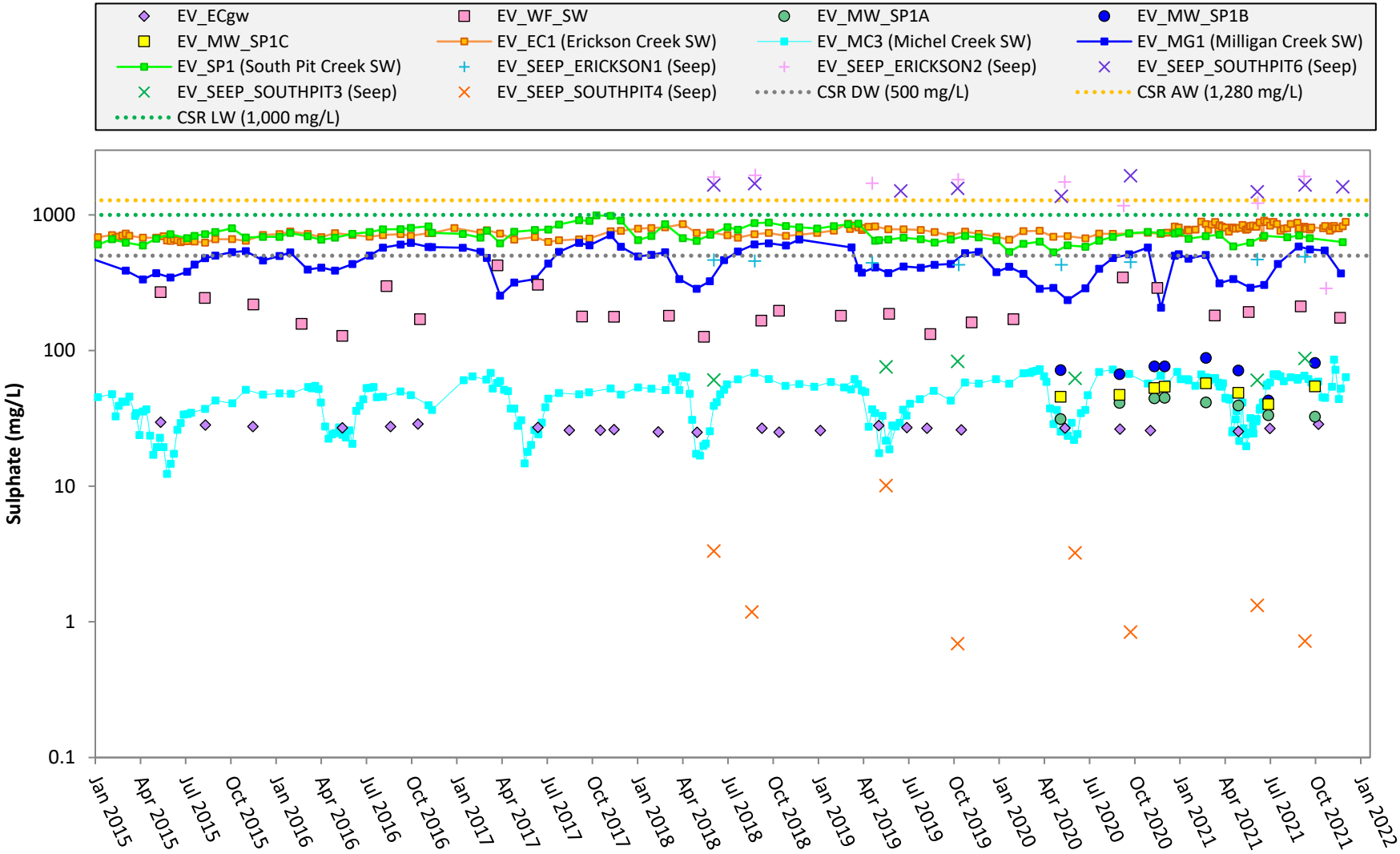
Note: Manual water level at EV_MW_SP1C in Q2 2021 was considered anomalous and has been removed from the hydrograph. Data was also removed where suspected datalogger removal occured. EV_EC1 Level data prior to 2016-06-07 was corrected to account for a change in datalogger elevation. Continuous water level data has been compensated using barologger at EM_MW_SPR1B.

Figure EV-42: Erickson Creek and Michel Creek Downgradient of Erickson Creek (Study Area 10) - Dissolved Selenium



Note: For concentrations measured below the analytical detection limit, the detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-43: Erickson Creek and Michel Creek Downgradient of Erickson Creek (Study Area 10) - Sulphate



Note: Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

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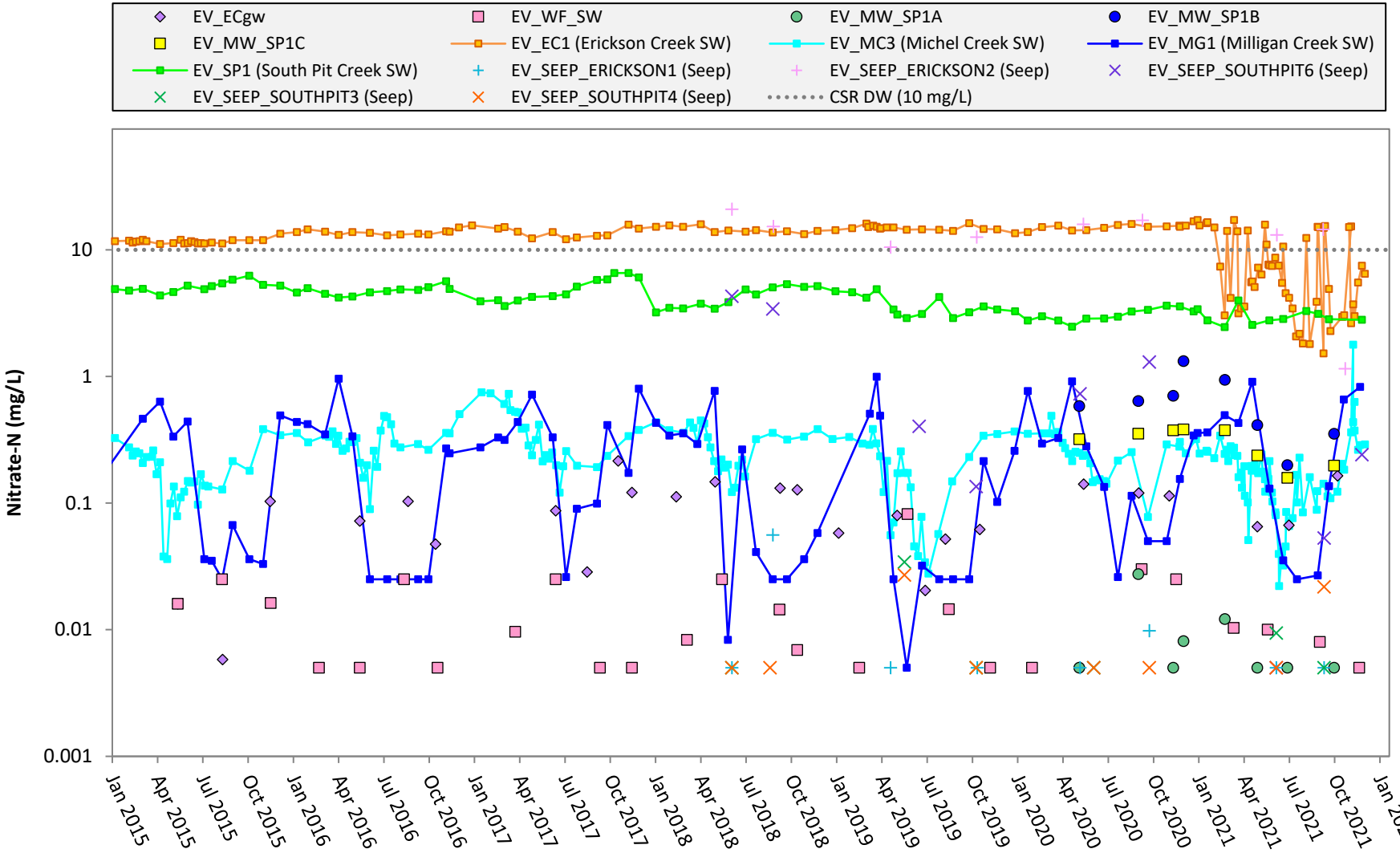
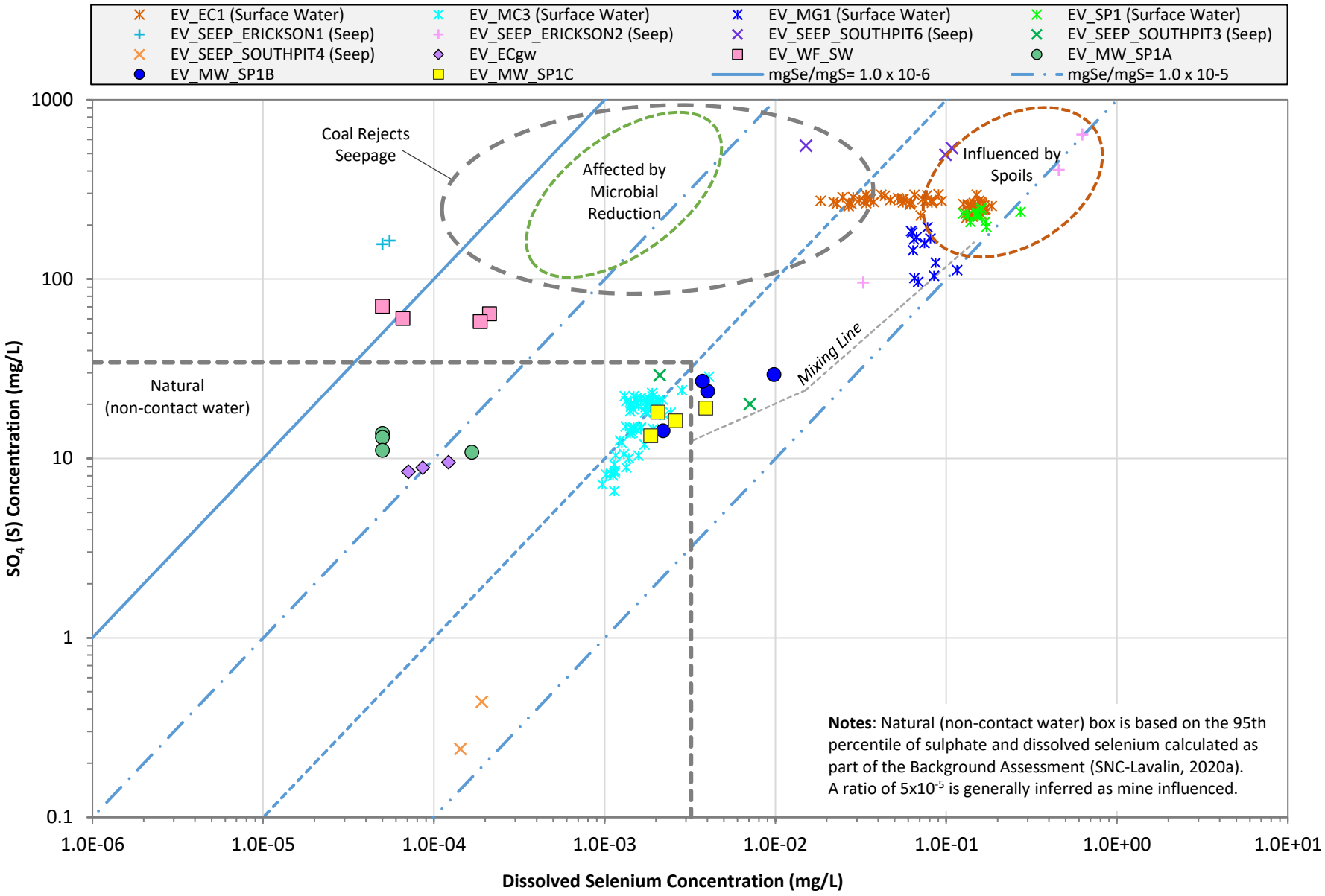
Figure EV-44: Erickson Creek and Michel Creek Downgradient of Erickson Creek (Study Area 10) - Nitrate-N



Note: For concentrations measured below the analytical detection limit, the detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure EV-45: Erickson Creek and Michel Creek Downgradient of Erickson Creek (Study Area 10) - Se:SO4 (S)



Tables:

TABLE EV-01: Summary of Well Installation Details and Hydrogeological Information (EVO)

Area	Well ID	Monitoring Program[a]	Well Type	Logs (Y/N)	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation	Stick Up Height	Drilled Depth	Well Diameter	Top of Screen Depth	Bottom of Screen Depth	Screened Formation	Depth to Bedrock	Hydraulic Conductivity
					Easting	Northing	masl	masl	m	mbgs	mm	mbgs	mbgs		mbgs	m/s
Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence (Study Area 7)	EV_GV3gw	SSGMP, RGMP	Monitoring	Y	656556	5522255	1307.09[e]	1308.00	0.91	25.0	60	22.9	24.4	Silty Gravel	-	-
	EV_GV3gwS[f]	SSGMP	Monitoring	Y	656580	5522259	1307.01	1307.88	0.87	12.2	50	7.7	9.2	Silty sand	-	-
	EV_MW_GV4A	SSGMP, RGMP[c]	Monitoring	Y	656665	5522317	1310.66	1311.53	0.87	16.5	50	14.1	15.7	Bedrock	13.4	7.5E-06
	EV_MW_GV4B	SSGMP, RGMP[c]	Monitoring	Y	656662	5522318	1310.64	1311.66	1.02	6.8	50	4.3	5.8	Silty Gravel and Silt	-	5.3E-06
	RG_MW_GCA[b,f]	SSGMP, RGMP	Monitoring	Y	653613	5523406	1196.35	1197.24	0.88	14.5	50	10.7	13.7	Shale Bedrock	1.5	-
	RG_DW-02-20	RGMP	Domestic	Y	652327	5522263	-	-	-	18.3	-	-	-	Gravel with Clay	-	-
	RG_MW_WW	RGMP	Monitoring	Y	652201	5518080	1151.25	1152.12	0.87	24.4	50	22.5	24.0	Sand with Gravel	-	8.1E-04
Elk River Proximal to EVO (Study Area 8)	EV_BALgw	SSGMP	Monitoring	Y	653121	5517271	1181.00	1182.00	1.00	12.7	60	10.5	12.7	Bedrock	10.4	-
	EV_GCgw	SSGMP	Monitoring	Y	653061	5513870	1131.24	1131.96	0.72	15.6	60	12.6	15.6	Silty Clay	-	4.0E-06
	EV_LSgw	SSGMP, RGMP	Monitoring	Y	653274	5514731	1133.00	1133.93	0.93	10.7	60	5.2	6.7	Sand and Gravel	-	1.0E-03
	EV_OCgw	SSGMP, RGMP	Monitoring	Y	652480	5512671	1126.00	1126.89	0.89	15.5	60	11.6	14.6	Sand	14.5	7.0E-07
	EV_MW_GC1B	SSGMP, RGMP	Monitoring	Y	653147	5514184	1128.87	1129.70	0.83	67.2	50	2.0	3.7	Sandy Gravel	-	6.6E-05
	RG_DW-03-10	RGMP	Supply	Y	652027	5514569	1157.93	1159.50	1.57	73.2	304	64.0	73.2	Sand and Gravel	-	6.6E-05
Sparwood Area - Baldy and Sparwood Ridges	EV_MW_AQ1	SSGMP	Monitoring	Y	654573	5511292	1173.96	1174.86	0.91	22.3	50	16.2	17.7	Gravel, some sand	19.8	2.2E-04
	EV_MW_AQ2	SSGMP	Monitoring	Y	653854	5511872	1150.69	1151.67	0.98	18.6	50	13.4	14.9	Sand and gravel	15.9	1.7E-05
	EV_MW_MC4	SSGMP	Monitoring	Y	653309	5512280	1144.35	1145.31	0.96	26.2	50	23.1	24.7	Silty sand	25.0	3.2E0-4
	EV_MW_MC3	SSGMP	Monitoring	Y	653667	5510983	1137.93	1138.82	0.89	21.0	50	16.2	17.7	Gravel, some silt	17.7	6.4E-06
Sparwood Area - Michel Creek (Study Area 9a)	EV_MCgwS	SSGMP, RGMP	Monitoring	Y	653476	5511624	1131.00	1131.96	0.96	10.7	60	5.8	7.3	Clayey Silt	-	7.0E-08
	EV_MCgwD	SSGMP, RGMP	Monitoring	Y	653476	5511624	1131.00	1131.84	0.84	47.6	60	24.5	27.6	Sand and Clay	-	3.0E-06
	EV_MW_SPR1A	SSGMP	Monitoring	Y	653947	5511277	1137.38	1138.25	0.87	53.3	50	41.2	42.7	Silty sand	50.3	2.6E-05
	EV_MW_SPR1B	SSGMP	Monitoring	Y	653947	5511277	1137.38	1138.25	0.87	53.3	50	25.3	26.5	Gravel, sand and silt	50.3	4.1E-06
	EV_MW_SPR1C[e]	SSGMP, RGMP	Monitoring	Y	653946	5511278	1137.27	1138.19	0.92	5.2	50	3.7	5.2	Sand and gravel	-	2.4E-04
	EV_MW_MCgwA[e]	RGMP	Monitoring	Y	652962	5511969	1126.63	1127.62	0.99	22.9	50	20.7	21.6	Sandy Gravel	21.6	-
	EV_MW_MCgwB[e]	RGMP	Monitoring	Y	652963	5511970	1126.64	1127.60	0.96	3.8	50	1.6	2.7	Sand and Gravel	21.6	-

Notes:
a: SSGMP denotes EVO Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.
b: Monitoring wells installed in 2021 to support the SSGMP and/or RGMP.
c: Monitoring wells are assessed as part of the Regional Background Assessment as per the 2020 RGMP Update.
d: EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.
e: Monitoring wells added to the RGMP Program as per the 2020 RGMP Update.
f: Monitoring wells added to the SSGMP Program as per the 2021 SSGMP Update.
g: Monitoring well EV_RCSgw was formerly referred to as EV_RCgw.
h: AMEC (2011) reported waste rock in the screened interval which is not clear in the borehole log (provided in Appendix I).
masl denotes metres above sea level.
mbgs denotes metres below ground surface.
TOC denotes top of pipe casing.
"-" denotes data not available.

TABLE EV-01: Summary of Well Installation Details and Hydrogeological Information (EVO)

Area	Well ID	Monitoring Program[a]	Well Type	Logs (Y/N)	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation	Stick Up Height	Drilled Depth	Well Diameter	Top of Screen Depth	Bottom of Screen Depth	Screened Formation	Depth to Bedrock	Hydraulic Conductivity
					Easting	Northing	masl	masl	m	mbgs	mm	mbgs	mbgs		mbgs	m/s
Sparwood Area - Elk River (Study Area 12)	EV_ER1gwS	RGMP	Monitoring	Y	651374	5510955	1115.25	1115.96	0.71	17.6	60	14.6	17.6	Sand and Gravel	-	7.0E-04
	EV_ER1gwD	RGMP	Monitoring	Y	651379	5510952	1115.20	1115.91	0.71	30.8	60	25.8	28.9	Sand/Silty Sand	27.9	9.0E-04
	RG_DW-03-04 (WTN 77913; TH99-2, Sparwood Well 3)	RGMP	Supply	Y	651839	5510619	1113.20	1114.15	0.95	41.5	254	24.2	32.4	Sandy Gravel	-	2.0E-03
	RG_MW-03-04[f]	RGMP	Monitoring	Y	651853	5511208	1115.99	1115.86	-0.13	25.5	51	24.1	25.6	Sandy Gravel	-	2.6E-03
Michel Creek Downstream of Gate Creek and Bodie Creek - Gate Creek and Bodie Creek (Study Area 9b)	EV_MW_GT1A[e]	SSGMP, RGMP	Monitoring	Y	655651	5509291	1156.52	1157.44	0.93	64.6	50	62.2	63.7	Gravel, some sand	64.9	5.90E-04
	EV_MW_GT1B[e]	SSGMP, RGMP	Monitoring	Y	655651	5509290	1156.52	1157.46	0.94	5.1	50	2.7	4.3	Sand and gravel, silty sand	-	6.6E-05
	EV_MW_BC1A	SSGMP, RGMP	Monitoring	Y	655665	5509503	1156.27	1157.09	0.81	27.9	50	22.9	24.4	Sand and gravel, some silt	25.6	8.4E-04
	EV_MW_BC1B	SSGMP, RGMP	Monitoring	Y	655665	5509503	1156.27	1157.09	0.82	27.9	50	3.4	4.9	Fill, sand and gravel	25.6	-
	EV_RCSgw[g]	SSGMP, RGMP	Supply	N	655902	5509299	-	-	-	6.1	-	-	-	Sand and Gravel	-	-
	EV_BCgw	SSGMP, RGMP	Monitoring	Y	655381	5509659	1153.00	1153.86	0.86	23.2	60	17.8	20.8	Gravel	-	1.0E-04
	EV_WH50gw	RGMP	Supply	N	655705	5509196	-	-	-	-	-	-	-	-	-	-
Michel Creek Downstream of Gate Creek and Bodie Creek - Michel Creek Valley Bottom (Study Area 9b)	EV_BRgw	RGMP	Supply	N	654961	5510221	-	-	-	-	-	-	-	-	-	-
	EV_HW1 (EV_HM1)[d,e]	RGMP	Supply	N	654772	5510583	-	-	-	6.1	152	-	-	-	-	-
	EV_MW_MC1A	SSGMP	Monitoring	Y	654903	5510593	1147.63	1148.59	0.96	32.0	50	25.0	26.5	Sand and gravel	30.2	5.7E-04
	EV_MW_MC1B	SSGMP	Monitoring	Y	654903	5510593	1147.63	1148.59	0.95	32.0	50	3.4	4.9	Sand and gravel	30.2	1.4E-04
	EV_MW_MC2A[e]	SSGMP, RGMP	Monitoring	Y	654758	5510530	1146.99	1147.95	0.96	55.8	50	51.7	53.2	Sand and gravel	54.3	9.8E-04
	EV_MW_MC2B[e]	SSGMP, RGMP	Monitoring	Y	654758	5510530	1146.99	1147.97	0.98	55.8	50	4.9	6.4	Gravel	54.3	2.0E-04
Erickson Creek and Michel Creek Downstream of Erickson Creek (Study Area 10)	EV_WF_SW	SSGMP	Monitoring	Y	659208	5513023	1679.25	1678.57	0.68	163	152	151.5	159.4	Waste Rock[h]	-	-
	EV_ECgw	SSGMP/RGMP	Monitoring	Y	660795	5506384	1327.00	1327.74	0.74	11.0	60	2.6	4.1	Sand/Clay and Sand	-	1.0E-08
	EV_MW_SP1A[e]	RGMP	Monitoring	Y	659315	5505644	1207.38	1208.32	0.94	31.1	50	28.6	30.1	Sand	-	5.4E-04
	EV_MW_SP1B[e]	RGMP	Monitoring	Y	659316	5505644	1207.36	1208.35	0.99	15.0	50	12.5	14.1	Sand and Gravel	-	1.1E-03
	EV_MW_SP1C[e]	RGMP	Monitoring	Y	659316	5505642	1207.37	1208.39	1.02	5.4	50	2.9	4.4	Sand and Gravel	-	4.3E-04

Notes:
a: SSGMP denotes EVO Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.
b: Monitoring wells installed in 2021 to support the SSGMP and/or RGMP.
c: Monitoring wells are assessed as part of the Regional Background Assessment as per the 2020 RGMP Update.
d: EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.
e: Monitoring wells added to the RGMP Program as per the 2020 RGMP Update.
f: Monitoring wells added to the SSGMP Program as per the 2021 SSGMP Update.
g: Monitoring well EV_RCSgw was formerly referred to as EV_RCgw.
h: AMEC (2011) reported waste rock in the screened interval which is not clear in the borehole log (provided in Appendix I).
masl denotes metres above sea level.
mbgs denotes metres below ground surface.
TOC denotes top of pipe casing.
"-" denotes data not available.

TABLE EV-02: Summary of Groundwater Levels and Sampling Information (EVO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		yyyy-mm-dd	m/m	Direction	Quarter	
Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence (Study Area 7)	EV_GV3gw	1307.09	1308.00	0.91	2021-03-21	10.85	1297.15	EV_GV3gw and EV_GV3gwS	2021-03-21	-0.202	Downward	Q1, Q2, Q3, Q4	Bladder
					2021-05-24	10.61	1297.39		2021-05-24	-	-		
					2021-07-30	10.89	1297.11		2021-07-30	-0.206	Downward		
					2021-10-17	10.97	1297.03		2021-10-17	-0.191	Downward		
	EV_GV3gwS	1307.01	1307.88	0.87	2021-03-21	7.68	1300.20	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-05-20	7.54	1300.35						
					2021-07-30	7.67	1300.21						
					2021-10-17	7.98	1299.91						
	EV_MW_GV4A	1310.66	1311.53	0.87	2021-03-21	4.38	1307.15	EV_GV4A and EV_GV4B	2021-03-21	-0.164	Downward	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-20	3.97	1307.56		2021-05-20	-0.129	Downward		
					2021-07-30	4.18	1307.35		2021-07-30	-0.136	Downward		
					2021-10-27	4.23	1307.30		2021-10-27	-0.138	Downward		
	EV_MW_GV4B	1310.64	1311.66	1.02	2021-03-21	2.90	1308.77	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-20	2.83	1308.83						
					2021-07-30	2.98	1308.68						
					2021-10-27	3.00	1308.66						
	RG_MW_GCA	1196.35	1197.24	0.88	-	-	-	-	-	-	-	-	Peristaltic
					-	-	-						
					-	-	-						
					2021-10-01	4.82	1192.42						
	RG_DW-02-20	-	-	-	2021-03-03	-	-	-	-	-	-	-	Tap
					2021-06-08	-	-						
					2021-07-21	-	-						
					2021-10-28	-	-						
	RG_MW_WW	1151.25	1152.12	0.87	2021-03-25	11.83	1140.29	-	-	-	-	Q3, Q4	Bladder
					2021-06-10	11.28	1140.83						
					2021-09-30	12.27	1139.85						
					2021-11-23	11.99	1140.13						
Elk River Proximal to EVO (Study Area 8)	EV_BALgw	1181.00	1182.00	1.00	2021-01-27	12.04	1169.97	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-05-12	12.08	1169.92						
					2021-07-22	12.08	1169.92						
					2021-11-09	12.07	1169.93						
	EV_GCgw	1131.24	1131.96	0.72	2021-01-28	2.43	1129.53	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-13	2.34	1129.62						
					2021-07-14	2.31	1129.66						
					2021-10-24	2.35	1129.62						
	EV_LSgw	1133.00	1133.93	0.93	2021-01-27	4.48	1129.45	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-13	4.15	1129.78						
					2021-07-14	4.11	1129.82						
					2021-10-27	4.44	1129.49						
	EV_OCgw	1126.00	1126.89	0.89	2021-03-19	3.29	1123.60	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-31	3.38	1123.51						
					2021-09-08	3.62	1123.27						
					2021-11-21	3.23	1123.66						

Notes:
a: monitoring well not sampled in Q1 as the location has historically been frozen at this time.
TOC denotes top of casing.
masl denotes meters above sea level.
mbtoc denotes meters below top of casing.
"-" denotes data not available.
"*" TOC elevation estimated based on LiDAR ground surface elevation of 1149.34 and an estimated stick up of 0.5 m.
Quarter is represented as Q1, Q2, Q3, Q4.

TABLE EV-02: Summary of Groundwater Levels and Sampling Information (EVO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		yyyy-mm-dd	m/m	Direction	Quarter	
Elk River Proximal to EVO (Study Area 8)	EV_MW_GC1B	1128.87	1129.70	0.83	2021-03-21	1.96	1127.74	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-24	1.87	1127.83						
					2021-07-29	2.06	1127.64						
					2021-10-24	2.11	1127.59						
	RG_DW-03-10	1157.93	1159.50	1.57	2021-03-09	-	-	-	-	-	-	-	Tap
					2021-05-11	-	-						
					2021-07-20	-	-						
					2021-10-25	-	-						
Sparwood Area - Baldy and Sparwood Ridges	EV_MW_AQ1	1173.96	1174.86	0.91	2021-01-20	16.80	1158.06	-	-	-	-	Q1, Q2, Q3	Bladder
					2021-05-13	16.56	1158.31						
					2021-07-14	16.74	1158.12						
					2021-10-28	16.84	1158.02						
	EV_MW_AQ2	1150.69	1151.67	0.98	2021-02-25	13.77	1137.91	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-05-13	13.68	1137.99						
					2021-07-16	13.66	1138.01						
					2021-10-28	13.67	1138.01						
	EV_MW_MC4	1144.35	1145.31	0.96	2021-01-20	15.97	1129.34	-	-	-	-	Q1, Q2, Q3, Q4	Bladder
					2021-04-18	15.85	1129.46						
					2021-07-09	15.66	1129.65						
					2021-11-21	15.67	1129.64						
	EV_MW_MC3	1137.93	1138.82	0.89	2021-01-28	5.06	1133.76	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-19	4.79	1134.02						
					2021-07-09	4.85	1133.97						
					2021-11-22	4.58	1134.23						
Sparwood Area - Michel Creek (Study Area 9a)	EV_MCgwS	1131.00	1131.96	0.96	-[a]	-	-	EV_MCgwS and EV_MCgwD	-	-	-	Q2, Q3, Q4	Peristaltic
					2021-05-30	1.75	1130.21		2021-05-30	-0.053	Downward		
					2021-09-03	2.77	1129.19		2021-09-03	-0.048	Downward		
					2021-11-22	2.01	1129.95		2021-11-22	-0.047	Downward		
	EV_MCgwD	1131.00	1131.84	0.84	2021-03-25	3.22	1128.63	-	-	-	-	Q2, Q3, Q4	Bladder
					2021-05-30	2.67	1129.17						
					2021-09-03	3.59	1128.25						
					2021-11-22	2.81	1129.03						
	EV_MW_SPR1A	1137.38	1138.25	0.87	2021-02-26	3.30	1134.95	EV_MW_SPR1A and EV_MW_SPR1B	2021-02-26	0.006	Upward	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-30	2.78	1135.47		2021-05-30	0.003	Upward		
					2021-07-18	3.27	1134.98		2021-07-18	-	-		
					2021-11-14	3.19	1135.06		2021-11-14	0.007	Upward		
	EV_MW_SPR1B	1137.38	1138.25	0.87	2021-02-26	3.40	1134.85	EV_MW_SPR1B and EV_MW_SPR1C	2021-02-26	0.022	Upward	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-30	2.83	1135.41		2021-05-30	-	-		
					2021-09-20	3.38	1134.87		2021-09-20	-	-		
					2021-11-14	3.30	1134.95		2021-11-14	0.025	Upward		
	EV_MW_SPR1C	1137.27	1138.19	0.92	2021-02-26	3.81	1134.38	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-13	3.54	1134.65						
					2021-07-18	3.83	1134.36						
					2021-11-14	3.78	1134.41						
	EV_MW_MCgwA	1126.63	1127.62	0.99	2021-02-02	2.28	1125.34	EV_MW_MCgwA and EV_MW_MCgwB	2021-02-02	0.018	Upward	Q1, Q2	Peristaltic
					2021-05-13	2.00	1125.62		2021-05-13	0.018	Upward		
					2021-07-16	2.28	1125.34		2021-07-16	0.022	Upward		
					2021-11-21	1.96	1125.67		2021-11-21	0.016	Upward		
	EV_MW_MCgwB	1126.64	1127.60	0.96	2021-02-02	2.60	1125.00	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-13	2.32	1125.28						
					2021-07-16	2.67	1124.93						
					2021-11-21	2.24	1125.36						

Notes:
a: monitoring well not sampled in Q1 as the location has historically been frozen at this time.
TOC denotes top of casing.
masl denotes meters above sea level.
mbtoc denotes meters below top of casing.
"-" denotes data not available.
"*" TOC elevation estimated based on LiDAR ground surface elevation of 1149.34 and an estimated stick up of 0.5 m.
Quarter is represented as Q1, Q2, Q3, Q4.

TABLE EV-02: Summary of Groundwater Levels and Sampling Information (EVO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		yyyy-mm-dd	m/m	Direction	Quarter	
Sparwood Area - Elk River (Study Area 12)	EV_ER1gwS	1115.25	1115.96	0.71	2021-02-26	5.42	1110.55	EV_ER1gwS and EV_ER1gwD	2021-02-26	0.022	Upward	Q1, Q2, Q3, Q4	Peristaltic
					2021-06-10	4.17	1111.79		2021-06-10	0.021	Upward		
					2021-09-12	5.16	1110.80		2021-09-12	0.021	Upward		
					2021-11-17	4.60	1111.36		2021-11-17	0.021	Upward		
	EV_ER1gwD	1115.20	1115.91	0.71	2021-02-26	5.11	1110.80	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic / Bladder
					2021-06-10	3.89	1112.03						
					2021-09-12	4.88	1111.03						
					2021-11-17	4.31	1111.60						
	RG_DW-03-04	1113.20	1114.15	0.95	2021-03-09	-	-	-	-	-	-	-	Tap
					2021-05-11	-	-						
					2021-07-20	-	-						
					2021-10-25	-	-						
	RG_MW-03-04	1115.99	1115.86	-0.13	2021-03-25	5.50	1110.37	-	-	-	-	-	Peristaltic
					2021-06-10	4.47	1111.39						
					2021-09-28	5.77	1110.09						
					2021-11-24	5.16	1110.70						
Michel Creek Downstream of Gate Creek and Bodie Creek - Gate Creek and Bodie Creek (Study Area 9b)	EV_MW_GT1A	1156.52	1157.44	0.93	2021-01-28	3.33	1154.11	EV_MW_GT1A and EV_MW_GT1B	2021-01-28	-0.010	Downward	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-29	3.36	1154.08		2021-04-29	-0.009	Downward		
					2021-07-11	3.45	1153.99		2021-07-11	-0.009	Downward		
					2021-10-27	3.68	1153.76		2021-10-27	-0.012	Downward		
	EV_MW_GT1B	1156.52	1157.46	0.94	2021-01-28	2.73	1154.73	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-29	2.83	1154.63						
					2021-07-11	2.91	1154.55						
					2021-10-27	2.99	1154.47						
	EV_MW_BC1A	1156.27	1157.09	0.81	2021-01-20	4.83	1152.26	EV_MW_BC1A and EV_MW_BC1B	2021-01-20	-0.025	Downward	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-19	4.65	1152.44		2021-04-19	-0.043	Downward		
					2021-07-11	4.47	1152.62		2021-07-11	-0.027	Downward		
					2021-11-05	4.58	1152.50		2021-11-05	-0.034	Downward		
	EV_MW_BC1B	1156.27	1157.09	0.82	2021-01-21	4.34	1152.75	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-19	3.81	1153.28						
					2021-07-12	3.94	1153.16						
					2021-11-05	3.92	1153.17						
	EV_RCSgw	-	-	-	2021-02-23	-	-	-	-	-	-	-	Distribution System
					2021-05-24	-	-						
					2021-07-28	-	-						
					2021-11-07	-	-						
	EV_BCgw	1153.00	1153.86	0.86	2021-01-28	2.71	1151.15	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-29	2.82	1151.04						
					2021-07-04	2.89	1150.97						
					2021-10-26	3.16	1150.70						
	EV_WH50gw	-	-	-	2021-02-25	4.69	-	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-13	4.13	-						
					2021-07-15	4.69	-						
					2021-11-25	4.51	-						

Notes:
a: monitoring well not sampled in Q1 as the location has historically been frozen at this time.
TOC denotes top of casing.
masl denotes meters above sea level.
mbtoc denotes meters below top of casing.
"-" denotes data not available.
"*" TOC elevation estimated based on LiDAR ground surface elevation of 1149.34 and an estimated stick up of 0.5 m.
Quarter is represented as Q1, Q2, Q3, Q4.

TABLE EV-02: Summary of Groundwater Levels and Sampling Information (EVO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		yyyy-mm-dd	m/m	Direction	Quarter	
Michel Creek Downstream of Gate Creek and Bodie Creek - Michel Creek Valley Bottom (Study Area 9b)	EV_BRgw	1149.34*	1149.84*	0.5*	2021-02-25	4.11	1145.73	-	-	-	-	-	Peristaltic
					2021-05-13	-	-						
					2021-07-16	4.15	1145.69						
					2021-11-25	3.99	1145.85						
	EV_HW1	-	-	-	2021-02-24	-	-	-	-	-	-	-	Tap
					2021-05-13	-	-						
					2021-07-15	-	-						
					2021-11-07	-	-						
	EV_MW_MC1A	1147.63	1148.59	0.96	2021-01-21	4.18	1144.41	EV_MW_MC1A and EV_MW_MC1B	2021-01-21	-0.025	Downward	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-18	3.69	1144.90		2021-04-18	-0.021	Downward		
					2021-07-04	4.06	1144.53		2021-07-04	-0.026	Downward		
					2021-11-24	3.74	1144.85		2021-11-24	-0.023	Downward		
	EV_MW_MC1B	1147.63	1148.59	0.95	2021-01-21	3.63	1144.96	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-18	3.24	1145.34						
					2021-07-04	3.49	1145.09						
					2021-11-24	3.23	1145.35						
	EV_MW_MC2A	1146.99	1147.95	0.96	2021-01-21	4.05	1143.90	EV_MW_MC2A and EV_MW_MC2B	2021-01-21	-	Upward	Q1, Q2, Q3	Peristaltic
					2021-04-18	3.76	1144.19		2021-04-18	0.012	Upward		
					2021-07-04	3.87	1144.09		2021-07-04	0.011	Upward		
					2021-11-22	3.65	1144.30		2021-11-22	0.011	Upward		
	EV_MW_MC2B	1146.99	1147.97	0.98	2021-01-26	4.44	1143.53	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-04-18	4.35	1143.62						
					2021-07-04	4.39	1143.58						
					2021-11-22	4.17	1143.80						
Erickson Creek and Michel Creek Downstream of Erickson Creek (Study Area 10)	EV_WF_SW	1679.25	1678.57	0.68	2021-03-02	140.31	1538.26	-	-	-	-	-	Hydrasleeve
					2021-06-06	137.76	1540.81						
					2021-09-20	141.13	1537.44						
					2021-12-09	139.87	1538.70						
	EV_ECgw	1327.00	1327.74	0.74	-[a]	-	-	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-14	1.10	1326.64						
					2021-07-19	1.15	1326.59						
					2021-10-26	1.24	1326.50						
	EV_MW_SP1A	1207.38	1208.32	0.94	2021-03-11	4.64	1203.68	EV_MW_SP1A and EV_MW_SP1B	2021-03-11	0.020	Upward	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-16	3.92	1204.40		2021-05-16	0.020	Upward		
					2021-07-16	4.41	1203.91		2021-07-16	0.023	Upward		
					2021-10-19	4.61	1203.72		2021-10-19	0.025	Upward		
	EV_MW_SP1B	1207.36	1208.35	0.99	2021-03-11	4.83	1203.52	EV_MW_SP1B and EV_MW_SP1C	2021-03-11	-0.168	Downward	Q1. Q2	Peristaltic
					2021-05-16	4.12	1204.23		2021-05-16	-	-		
					2021-07-16	4.62	1203.73		2021-07-16	-0.167	Downward		
					2021-10-19	4.84	1203.52		2021-10-19	-0.180	Downward		
	EV_MW_SP1C	1207.37	1208.39	1.02	2021-03-11	4.33	1204.06	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
					2021-05-16	5.59[b]	-						
					2021-07-16	4.11	1204.28						
					2021-10-19	4.30	1204.10						

Notes:
a: monitoring well not sampled in Q1 as the location has historically been frozen at this time.
b: Manual water level measurement appears to be anomalous and has not been included in the assessment.
TOC denotes top of casing.
masl denotes meters above sea level.
mbtoc denotes meters below top of casing.
"-" denotes data not available.
"*" TOC elevation estimated based on LiDAR ground surface elevation of 1149.34 and an estimated stick up of 0.5 m.
Quarter is represented as Q1, Q2, Q3, Q4.

TABLE EV-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Organics, Nutrient and Organics in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
			Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																													
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	1,500	2-3[e]	1,280-4,290[e]	1.31-18.5[f]	400	0.2-2[g]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
BC Guideline																													
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	150	n/a	309-429[e]	1.07-1.77[f]	3	0.04[g]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	600	1.45-1.87[e]	n/a	0.7-19.7[f]	32.8	0.12[g]	n/a	n/a	n/a	n/a	n/a
Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence (^ denotes well part of Study Area 7)																													
EV_GV3gw^	EV_GV3GW_WG_2021_Q1_NP	2021 03 21	4.2	6.75	1.86	626	136.9	7.97	332	559	< 1.0	380	< 0.10	201	245	< 1.0	< 1.0	< 0.050	1.48	0.362	138	0.0343	0.158	< 0.0010	< 0.050	0.0017	< 0.0020	0.57	0.81
	EV_GV3GW_WG_2021_Q2_NP	2021 05 24	8.4	7.58	2.18	639	55.1	7.93	336	615	< 1.0	417	0.37	209	255	< 2.0	< 2.0	< 0.050	1.47	0.466	133	0.0172	0.114	< 0.0010	< 0.050	< 0.0010	< 0.0020	0.90	1.55
	EV_MW_GV3GW_WG_2021_Q3_NP	2021 07 30	9.1	7.56	1.96	634	96.3	8.22	337	597	< 1.0	412	0.17	206	251	< 2.0	< 2.0	< 0.050	1.36	0.390	146	< 0.0050	0.142	< 0.0010	0.323	0.0016	< 0.0020	0.59	1.17
	EV_GV3GW_WG_2021_Q4_NP	2021 10 17	7.7	7.48	2.07	627	85.9	8.22	361	611	< 1.0	404	< 0.10	217	265	< 2.0	< 2.0	< 0.050	1.68	0.442	144	< 0.0050	0.129	< 0.0010	< 0.050	0.0024	< 0.0020	< 0.50	0.73
EV_GV3gwS	EV_GV3GWS_WG_2021_Q1_NP	2021 03 21	3.4	6.32	5.32	500	264.9	8.12	271	468	< 1.0	260	0.38	238	291	< 1.0	< 1.0	< 0.050	0.71	0.215	34.2	< 0.0050	0.298	< 0.0010	< 0.050	0.0020	< 0.0020	0.84	0.80
	EV_GV3GWS_WG_2021_Q2_NP	2021 05 20	4.7	7.2	6.02	504	172.6	7.93	267	436	< 1.0	307	0.35	267	326	< 2.0	< 2.0	< 0.050	0.99	0.280	34.7	< 0.0050	0.203	< 0.0010	0.109	< 0.0010	0.0021	1.25	1.78
	EV_MW_GV3GWS_WG_2021_Q3_NP	2021 07 30	8.1	7.4	4.69	525	164.9	8.03	279	477	< 1.0	291	0.84	247	301	< 2.0	< 2.0	< 0.050	0.40	0.241	33.0	< 0.0050	0.0809	< 0.0010	< 0.050	0.0023	0.0081	1.12	1.18
	EV_GV3GWS_WG_2021_Q4_NP	2021 10 17	8.5	7.29	3.79	521	178.6	8.08	297	486	1.2	298	1.65	247	301	< 2.0	< 2.0	< 0.050	0.59	0.288	36.3	< 0.0050	0.0663	< 0.0010	< 0.050	0.0169	0.0150	0.68	1.39
EV_MW_GV4A^	EV_MW_GV4A_WG_2021_Q1_NP	2021 03 21	4.2	6.68	2.3	715	42.9	7.79	312	638	4.7	400	1.54	278	339	< 1.0	< 1.0	< 0.050	2.34	0.585	112	0.0087	0.0316	0.0016	< 0.050	< 0.0010	0.0027	4.96	4.21
	EV_MW_GV4A_WG_2021_Q2_NP	2021 05 20	4.6	7.17	2.57	703	-125	7.91	329	613	9.0	406	2.60	291	355	< 2.0	< 2.0	< 0.050	2.32	0.706	106	0.0082	0.0624	0.0019	0.105	< 0.0010	0.0070	3.77	4.12
	EV_MW_GV4A_WG_2021_Q3_NP	2021 07 30	8.6	7.34	1.27	751	178.4	8.20	304	565	5.0	474	1.97	278	340	< 2.0	< 2.0	0.068	1.96	0.641	128	0.0073	0.0210	< 0.0010	0.163	< 0.0010	0.0382	8.37	9.05
	EV_MW_GV4A_WG_2021_Q4_NP	2021 10 17	7.7	7.34	2.06	654	-105.3	8.32	334	637	< 1.0	398	1.18	300	357	4.4	< 2.0	< 0.050	1.45	0.604	89.4	0.0058	0.0303	< 0.0010	0.074	0.0020	0.0066	3.30	3.16
EV_MW_GV4B^	EV_MW_GV4B_WG_2021_Q1_NP	2021 03 21	3	6.77	5.4	573	314.8	7.94	303	503	< 1.0	302	0.17	260	317	< 1.0	< 1.0	< 0.050	0.82	0.452	62.0	0.0142	0.275	< 0.0010	< 0.050	0.0024	< 0.0020	0.75	0.82
	EV_MW_GV4B_WG_2021_Q2_NP	2021 05 20	4.2	7.3	5.47	580	127.3	7.97	314	519	27.5	343	26.1	274	334	< 2.0	< 2.0	< 0.050	2.96	0.604	70.5	< 0.0050	0.189	0.0033	0.166	< 0.0010	0.0256	1.43	1.46
	EV_MW_GV4B_WG_2021_Q3_NP	2021 07 30	9.8	7.42	5.27	582	177	8.14	312	539	< 1.0	341	0.47	254	310	< 2.0	< 2.0	< 0.050	0.79	0.519	65.6	< 0.0050	0.0579	< 0.0010	< 0.050	0.0021	< 0.0020	< 0.50	0.61
	EV_MW_MC10A_WG_2021_Q3_NP	Duplicate	-	-	-	-	-	8.17	309	534	1.0	338	0.39	247	301	< 2.0	< 2.0	< 0.050	0.84	0.518	65.8	< 0.0050	0.0629	< 0.0010	< 0.050	0.0016	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	1	*	1	*	3	3	*	*	*	6	0	0	*	8	*	*	*	*	*	*
	EV_MW_GV4B_WG_2021_Q4_NP	2021 10 17	8.4	7.38	5.25	574	167.5	8.35	331	562	1.8	345	0.46	264	308	6.6	< 2.0	< 0.050	0.95	0.528	65.9	< 0.0050	0.0521	< 0.0010	< 0.050	0.0023	0.0038	< 0.50	0.80
RG_MW_GCA^	RG_MW_GCA_WG_2021_10_01_NP	2021 10 01	14.2	8.43	4.24	1,276	176.8	8.77	14.0	1,180	10.7	1,290	556	657	732	34.6	< 5.0	< 0.25	8.42	***2.90***	69.7	0.493	0.042	0.0085	0.631	0.0362	0.0578	3.31	1.21
RG_DW-02-20^	RG_DW-02-20_WP_Q1-2021_NP	2021 03 03	6.00	7.58	9.20	503.80	219.90	8.31	275	464	< 1.0	282	0.61	167	197	< 5.0	< 5.0	< 0.050	2.95	0.151	81.8	0.146	3.08	< 0.0010	0.549	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_DW-02-40_WP_Q1-2021_1	Duplicate	-	-	-	-	-	8.32	273	472	< 1.0	279	0.73	168	-	-	-	< 0.050	2.81	0.155	81.6	< 0.0050	3.07	0.0010	0.288	< 0.0010	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	2	*	1	18	1	-	-	-	*	5	3	0	*	0	*	62	*	*	*	*
	RG_DW-02-20_WP_Q2-2021_NP	2021 06 08	13.30	7.35	8.16	560.00	90.60	8.20	295	527	< 1.0	344	0.63	176	215	< 1.0	< 1.0	< 0.050	3.74	0.143	105	0.0482	4.55	< 0.0010	< 0.050	< 0.0010	< 0.0020	0.72	0.66
	RG_DW-02-40_WP_Q2-2021_1	Duplicate	-	-	-	-	-	8.19	288	522	< 1.0	301	0.64	171	-	-	-	< 0.050	3.74	0.144	105	0.0075	4.55	< 0.0010	0.075	< 0.0010	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	2	1	*	13	2	3	-	-	-	*	0	1	0	*	0	*	*	*	*	*	*
	RG_DW-02-20_WP_Q3-2021_NP	2021 07 21	10.30	7.55	10.23	521.60	277.70	8.12	262	498	< 1.0	347	0.18	176	214	< 1.0	< 1.0	< 0.050	2.58	0.149	91.6	0.0052	3.51	< 0.0010	0.309	< 0.0010	< 0.0020	1.42	0.87
	RG_DW-02-40_WP_Q3-2021_3	Duplicate	-	-	-	-	-	8.06	263	501	< 1.0	350	0.19	180	219	< 1.0	< 1.0	< 0.050	2.43	0.147	91.5	< 0.0050	3.51	< 0.0010	0.300	< 0.0010	< 0.0020	0.83	0.97
	QA/QC RPD%		-	-	-	-	-	1	0	1	*	1	*	2	2	*	*	*	6	1	0	*	0	*	3	*	*	*	*
	RG_DW-02-20_WP_2021_10_28_NP	2021 10 28	9.20	7.67	8.10	453.00	132.80	7.99	236	457	< 1.0	268	0.48	182	222	< 1.0	< 1.0	< 0.050	1.80	0.142	63.1	< 0.0050	2.52	< 0.0010	0.191	0.0017	0.0024	< 0.50	< 0.50
RG_MW_WW^	RG_MW_WW_WP_Q1-2021_NP	2021 03 25	5.60	7.37	7.14	476.80	173.10	8.12	248	449	< 1.0	250	0.19	187	228	< 1.0	< 1.0	< 0.050	2.28	0.156	63.4	< 0.0050	1.98	< 0.0010	0.411	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_MW_WW_WG_2021_Q2_NP	2021 06 10	7.60	7.25	7.15	485.60	121.80	7.94	226	436	3.5	302	2.47	167	204	< 1.0	< 1.0	< 0.050	2.59	0.186	64.7	< 0.0050	2.06	< 0.0010	0.226	0.0010	< 0.0020	0.55	< 0.50
	RG_MW_WW_WG_2021_Q3_NP	2021 09 30	12.4	7.53	7.14	482.6	192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	RG_MW_WW_WG_2021_Q4_NP	2021 11 23	5.5	7.67	6.78	481.2	112	7.74	240	463	7.7	282	3.12	195	238	< 2.0	< 2.0	< 0.050	2.49	0.145	63.8	< 0.0050	1.95	< 0.0010	0.222	0.0015	0.0037	< 0.50	< 0.50

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.

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BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Guideline varies with background concentration.

[e] Standard/guideline varies with Hardness.

[f] Standard/guideline varies with pH and Temperature. Temperature assumed 10C CSR, 15C BCWQG.

[g] Standard/guideline varies with Chloride.

[h] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Organics, Nutrient and Organics in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
			Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																													
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	1,500	2-3[e]	1,280-4,290[e]	1.31-18.5[f]	400	0.2-2[g]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
BC Guideline																													
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	150	n/a	309-429[e]	1.07-1.77[f]	3	0.04[g]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	600	1.45-1.87[e]	n/a	0.7-19.7[f]	32.8	0.12[g]	n/a	n/a	n/a	n/a	n/a
Elk River Proximal to EVO (+ denotes well part of Study Area 8)																													
EV_BALgw	EV_BALGW_WG_2021_Q1_N	2021 01 27	2.5	6.97	0.87	804	108	7.58	418	661	44.3	478	29.0	370	451	< 5.0	< 5.0	< 0.050	1.67	0.221	99.3	0.0094	0.0271	< 0.0010	< 0.050	0.0016	0.0255	0.83	0.81
	EV_BALGW_WG_2021_Q2_NP	2021 05 12	10.3	7.16	1.17	776	-82.2	8.07	358	714	4.4	478	3.76	321	392	< 2.0	< 2.0	< 0.050	1.80	0.171	97.9	0.0571	0.0157	< 0.0010	0.378	< 0.0010	0.0079	2.16	1.98
	EV_BALGW_WG_2021_Q3_NP	2021 07 22	21.6	7.21	0.53	795	-90.4	7.98	346	728	18.2	488	3.84	341	416	< 2.0	< 2.0	< 0.050	1.63	0.189	95.4	0.0476	0.0154	0.0019	0.207	< 0.0010	0.0356	3.08	3.71
	EV_BALGW_WG_2021_Q4_NP	2021 11 09	2.7	7.11	2.86	790	-55.9	7.40	381	788	20.8	480	7.78	390	390	< 2.0	< 2.0	< 0.050	1.76	0.263	96.9	0.0129	0.0327	0.0011	0.051	0.0021	0.0089	< 0.50	< 0.50
EV_GCgw	EV_GCGW_WG_2021_Q1_NP	2021 01 28	3.7	7.21	0.13	446	-75.8	8.28	240	421	1.6	267	4.62	178	217	< 5.0	< 5.0	< 0.050	4.07	0.453	63.7	0.0304	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_GCGW_WG_2021_Q2_NP	2021 05 13	12	7.65	0.65	429.1	-130.5	7.98	247	395	4.9	253	4.66	162	197	< 2.0	< 2.0	< 0.050	3.66	0.594	51.1	0.0299	< 0.0050	< 0.0010	0.278	< 0.0010	0.0036	0.64	0.94
	EV_GCGW_WG_2021_Q3_NP	2021 07 14	15.9	7.54	0.25	445	101.4	8.08	236	448	3.6	280	2.70	163	199	< 2.0	< 2.0	< 0.050	4.72	0.550	65.2	0.0175	< 0.0050	0.0010	0.185	< 0.0010	< 0.0020	1.14	1.11
	EV_GCGW_WG_2021_Q4_NP	2021 10 24	9.3	7.61	0.57	433.2	-138.4	8.22	232	437	1.3	260	3.66	174	212	< 2.0	< 2.0	< 0.050	4.08	0.475	62.0	0.0193	< 0.0050	< 0.0010	0.126	< 0.0010	0.0042	< 0.50	1.09
	EV_MC10A_WG_2021_Q4_NP	Duplicate	-	-	-	-	-	8.20	226	431	2.1	257	3.91	172	209	< 2.0	< 2.0	< 0.050	4.00	0.500	60.1	0.0226	< 0.0050	< 0.0010	0.065	0.0013	0.0046	0.66	0.85
	QA/QC RPD%		-	-	-	-	-	0	3	1	*	1	7	1	1	*	*	*	2	5	3	*	*	*	*	*	*	*	*
EV_LSgw+	EV_LSGW_WG_2021_Q1_N	2021 01 27	7.6	7.12	0.65	1,015	-66.9	8.10	644	936	5.4	549	31.4	513	626	< 5.0	< 5.0	< 0.050	7.99	0.237	67.6	0.163	< 0.0050	< 0.0010	0.130	< 0.0010	0.0124	1.76	1.96
	EV_LSGW_WG_2021_Q2_NP	2021 05 13	9.6	7.2	0.6	991	-70.8	7.66	626	934	6.1	530	20.6	530	647	< 2.0	< 2.0	< 0.050	6.82	0.258	54.0	0.152	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0094	2.08	2.33
	EV_LSGW_WG_2021_Q3_NP	2021 07 14	11.9	7.12	0.36	1,043	-55	7.63	594	958	7.1	582	21.6	526	642	< 2.0	< 2.0	< 0.250	7.59	0.118	48.4	0.188	< 0.0250	< 0.0050	0.329	< 0.0010	0.0190	2.65	2.66
	EV_MW_BC10A_WG_2021_Q3_NP_FD	Duplicate	-	-	-	-	-	7.62	584	962	6.8	582	26.8	541	660	< 2.0	< 2.0	< 0.250	7.75	0.122	49.8	0.180	< 0.0250	0.0068	0.408	< 0.0010	0.0190	2.69	2.34
	QA/QC RPD%		-	-	-	-	-	0	2	0	4	0	21	3	3	*	*	*	2	3	3	4	*	*	21	*	0	1	*
	EV_LSGW_WG_2021_Q4_NP	2021 10 27	11.7	7.19	0.63	1,044	109.2	7.83	614	1,040	7.0	562	33.2	543	663	< 2.0	< 2.0	< 0.250	8.06	0.279	55.4	0.182	0.129	< 0.0050	0.271	< 0.0010	0.0179	2.45	2.24
EV_OCgw+,h	EV_OCGW_WG_2021_Q1_NP	2021 03 19	6.9	7.33	0.43	479.2	-88.1	8.10	134	441	< 1.0	257	1.69	185	225	< 1.0	< 1.0	< 0.050	2.08	*1.12*	68.2	0.0844	0.0851	0.0012	0.065	0.0102	0.0101	< 0.50	0.98
	EV_MC5GW_WG_2021_Q1_NP	Duplicate	-	-	-	-	-	8.07	133	445	< 1.0	258	1.02	185	226	< 1.0	< 1.0	< 0.050	2.06	*1.14*	67.7	0.0737	0.0063	0.0012	0.063	0.0107	0.0100	< 0.50	0.93
	QA/QC RPD%		-	-	-	-	-	0	1	1	*	0	49	0	0	*	*	*	1	2	1	14	*	*	*	5	1	*	*
	EV_OCGW_WG_2021_Q2_NP	2021 05 31	10.2	7.52	1.13	463.7	117	8.26	153	450	< 1.0	282	0.38	186	227	< 2.0	< 2.0	< 0.050	1.98	*1.19*	63.1	< 0.0050	0.115	< 0.0010	0.066	0.0082	0.0100	< 0.50	< 0.50
	EV_MC5GW_WG_2021_Q2_NP	Duplicate	-	-	-	-	-	8.24	156	450	< 1.0	253	0.38	183	223	< 2.0	< 2.0	< 0.050	2.00	*1.19*	63.0	0.0148	0.105	< 0.0010	0.051	0.0085	0.0086	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	2	0	*	11	*	2	2	*	*	*	1	0	0	*	9	*	*	4	*	*	*
	EV_OCGW_WG_2021_Q3_NP	2021 09 08	11.1	7.98	0.51	435.7	-119.7	8.42	152	457	15.1	286	4.56	187	213	7.8	< 2.0	< 0.050	2.24	*1.17*	64.8	0.0602	0.0170	0.0100	0.058	0.0072	0.0110	< 0.50	< 0.50
	EV_MC5GW_WG_2021_Q3_NP	Duplicate	-	-	-	-	-	8.42	152	456	7.8	296	2.82	184	212	6.5	< 2.0	< 0.050	2.20	*1.16*	64.6	< 0.0050	0.0200	0.0069	0.056	0.0091	0.0278	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	0	0	64	3	47	2	0	*	*	*	2	1	0	*	*	37	*	23	87	*	*
	EV_OCGW_WG_2021_Q4_NP	2021 11 21	6.8	8	1.42	472.5	-110.7	8.09	142	469	1.7	303	1.82	196	239	< 2.0	< 2.0	< 0.050	2.16	*1.22*	68.3	0.0592	0.0401	0.0013	0.110	0.0094	0.0172	0.64	0.87
	EV_MC5GW_WG_2021_Q4_NP	Duplicate	-	-	-	-	-	8.09	140	466	1.7	290	1.35	201	246	< 2.0	< 2.0	< 0.050	2.15	*1.22*	68.6	0.0606	0.0307	< 0.0010	0.098	0.0098	0.0183	0.77	0.88
	QA/QC RPD%		-	-	-	-	-	0	1	1	*	4	30	3	3	*	*	*	0	0	0	2	27	*	*	4	6	*	*
EV_MW_GC1B+	EV_MW_GC1B_WG_2021_Q1_NP	2021 03 21	6.4	7.02	1.24	1,032	58.4	7.83	543	925	< 1.0	634	0.53	334	408	< 1.0	< 1.0	0.137	24.0	0.144	218	0.0716	0.0209	0.0011	< 0.050	0.0013	< 0.0020	1.21	1.37
	EV_MW_BC10A_WG_2021_Q1_NP	Duplicate	-	-	-	-	-	7.84	534	937	< 1.0	657	0.53	334	408	< 1.0	< 1.0	0.142	24.1	0.132	219	0.0765	< 0.0050	0.0017	0.088	0.0016	< 0.0020	1.43	1.60
	QA/QC RPD%		-	-	-	-	-	0	2	1	*	4	0	0	0	*	*	*	0	9	0	7	*	*	*	*	*	*	*
	EV_MW_GC1B_WG_2021_Q2_NP	2021 05 24	8.4	7.14	0.52	1,145	18.9	7.71	617	1,100	< 1.0	771	0.24	346	423	< 2.0	< 2.0	< 0.250	23.1	0.220	286	0.0689	0.263	< 0.0050	0.096	< 0.0010	< 0.0020	1.89	2.02
	EV_MW_GC1B_WG_2021_Q3_NP	2021 07 28	14.1	7.1	0.46	1,123	5.7	8.14	610	1,070	< 1.0	810	0.31	360	439	< 2.0	< 2.0	< 0.250	23.2	0.169	290	0.0611	< 0.0250	< 0.0050	0.328	< 0.0010	< 0.0020	1.55	1.83
	EV_MW_GC1B_WG_2021_Q4_NP	2021 10 24	10.6	7.15	0.46	1,129	-32.5	8.12	622	1,110	< 1.0	727	0.64	355	433	< 2.0	< 2.0	< 0.250	24.2	0.153	291	0.0656	0.731	0.102	0.127	0.0021	0.0034	1.60	1.76

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SHADED	Concentration greater than CSR Drinking Water (DW) standard

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[d] Guideline varies with background concentration.

[e] Standard/guideline varies with Hardness.

[f] Standard/guideline varies with pH and Temperature. Temperature assumed 10C CSR, 15C BCWQG.

[g] Standard/guideline varies with Chloride.

[h] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Organics, Nutrient and Organics in Groundwater (EVO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																													
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	1,500	2-3[e]	1,280-4,290[e]	1.31-18.5[f]	400	0.2-2[g]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
BC Guideline																													
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	150	n/a	309-429[e]	1.07-1.77[f]	3	0.04[g]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	600	1.45-1.87[e]	n/a	0.7-19.7[f]	32.8	0.12[g]	n/a	n/a	n/a	n/a	n/a
Elk River Proximal to EVO (+ denotes well part of Study Area 8)																													
RG_DW-03-10[+]	RG_DW-03-10_WP_Q1-2021_NP	2021 03 09	5.20	7.54	7.86	485.50	400.20	7.67	266	462	< 1.0	278	< 0.10	236	288	< 5.0	< 5.0	< 0.050	9.02	0.142	20.8	< 0.0050	0.445	< 0.0010	0.391	0.0018	< 0.0020	< 0.50	< 0.50
	RG_DW-03-10_WP_Q2-2021_NP	2021 05 11	6.00	7.32	7.67	503.90	274.40	8.20	242	448	< 1.0	283	< 0.10	228	278	< 1.0	< 1.0	< 0.050	10.2	0.164	22.2	0.0102	0.479	< 0.0010	0.190	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_DW-03-10_WP_Q3-2021_NP	2021 07 20	8.60	4.43	7.31	498.90	242.40	8.29	228	466	< 1.0	272	0.17	224	273	< 1.0	< 1.0	< 0.050	9.72	0.201	20.6	0.0267	0.456	< 0.0010	< 0.050	0.0014	< 0.0020	< 0.50	< 0.50
	RG_DW-03-10_WP_2021-10-25_NP	2021 10 25	6.30	7.61	7.87	483.40	107.80	7.95	253	471	< 1.0	268	< 0.10	232	283	< 1.0	< 1.0	< 0.050	10.0	0.131	22.0	< 0.0050	0.472	< 0.0010	< 0.050	0.0016	0.0024	< 0.50	< 0.50
Sparwood Area - Baldy and Sparwood Ridges																													
EV_MW_AQ1	EV_MW_AQ1_WG_2021_Q1_NP	2021 01 20	6.2	6.71	4.44	881	245.8	7.40	551	854	4.1	490	6.08	370	451	< 5.0	< 5.0	0.170	33.2	0.198	91.3	< 0.0050	0.603	0.0010	0.159	0.0161	0.0240	1.60	1.33
	EV_MW_AQ1_WG_2021_Q2_NP	2021 05 13	9.1	6.96	5.17	891	206.4	7.48	509	863	2.7	547	2.13	359	437	< 2.0	< 2.0	0.195	37.1	0.163	95.4	< 0.0050	1.07	< 0.0010	0.094	0.0155	0.0130	1.19	1.24
	EV_MW_AQ1_WG_2021_Q3_NP	2021 07 14	16.2	6.9	3.76	908	168.8	7.42	492	859	7.6	553	5.90	352	429	< 2.0	< 2.0	0.113	41.5	0.102	83.3	< 0.0050	0.397	< 0.0010	0.243	0.0122	0.0245	1.21	1.65
	EV_MW_AQ1_WG_2021_Q4_NP	2021 10 28	7	6.96	4.15	881	160.8	7.58	486	890	4.0	527	5.32	399	486	< 2.0	< 2.0	< 0.250	42.8	0.218	75.9	0.0103	0.207	0.0089	0.070	0.0150	0.0201	0.87	1.32
EV_MW_AQ2	EV_MW_AQ2_WG_2021_Q1_NP	2021 02 25	5.6	6.58	0.19	1,109	21.3	7.69	676	1,050	4.3	668	5.01	482	588	< 5.0	< 5.0	< 0.050	14.4	0.121	153	0.0571	0.0079	< 0.0010	0.068	< 0.0010	0.0023	1.34	1.08
	EV_MW_AQ2_WG_2021_Q2_NP	2021 05 13	7.3	6.97	0.16	1,115	12.4	7.37	684	1,010	1.9	694	5.85	480	586	< 2.0	< 2.0	< 0.050	14.6	0.168	148	0.0575	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	1.22	1.35
	EV_MW_AQ2_WG_2021_Q3_NP	2021 07 16	10.3	6.99	0.25	1,097	-16.2	7.78	597	1,070	5.5	777	6.26	456	556	< 2.0	< 2.0	< 0.250	16.2	< 0.100	154	0.0643	< 0.0250	< 0.0050	0.191	< 0.0010	0.0072	1.29	1.39
	EV_MW_AQ2_WG_2021_Q4_NP	2021 10 28	7.1	6.99	0.95	1,099	-21.2	7.79	588	1,110	10.3	708	6.65	516	630	< 2.0	< 2.0	< 0.250	16.2	0.169	152	0.0574	< 0.0250	< 0.0050	0.129	< 0.0010	0.0073	0.73	0.64
EV_MW_MC4	EV_MW_MC4_WG_2021_Q1_NP	2021 01 20	6.2	6.85	0.36	890	36.2	7.48	541	865	< 1.0	516	2.22	352	430	< 5.0	< 5.0	0.162	31.0	0.176	118	0.0077	0.0183	< 0.0010	0.100	< 0.0010	< 0.0020	2.10	2.10
	EV_MW_MC4_WG_2021_Q2_NP	2021 04 18	6.3	6.39	0.7	897	-2.5	8.00	448	872	1.4	520	4.33	340	415	< 2.0	< 2.0	0.137	30.8	0.099	107	0.0070	< 0.0050	0.0068	< 0.050	< 0.0010	< 0.0020	1.24	1.86
	EV_MW_MC4_WG_2021_Q3_NP	2021 07 09	12.4	7.14	0.69	896	-30.1	8.26	469	803	< 1.0	588	4.27	313	382	< 2.0	< 2.0	0.168	31.3	0.160	118	0.0202	0.0109	< 0.0010	0.203	< 0.0010	0.0027	1.89	2.29
	EV_MW_MC4_WG_2021_Q4_NP	2021 11 21	6.4	7.05	0.83	895	-11.4	7.51	454	870	1.9	592	3.48	379	462	< 2.0	< 2.0	0.130	31.2	0.202	113	0.0418	0.0054	< 0.0010	0.097	0.0010	0.0037	1.41	1.67
EV_MW_MC3	EV_MW_MC3_WG_2021_Q1_NP	2021 01 28	4.8	746	0.24	665	188.5	8.52	128	613	< 1.0	386	3.46	302	351	8.3	< 5.0	0.103	5.84	*1.62*	40.4	0.0226	0.221	0.0097	< 0.050	< 0.0010	0.0205	1.18	1.06
	EV_MW_MC3_WG_2021_Q2_NP	2021 04 19	4.2	6.48	4.11	926	277.8	8.05	412	893	1.4	564	0.88	279	341	< 2.0	< 2.0	0.135	30.0	0.180	159	< 0.0050	4.17	0.0131	0.312	< 0.0010	< 0.0020	0.95	0.64
	EV_MW_MC3_WG_2021_Q3_NP	2021 07 09	14.7	7.25	1.79	816	162.7	8.34	374	777	1.3	540	0.19	232	274	4.1	< 2.0	0.175	28.6	0.162	153	< 0.0050	1.50	0.0092	0.434	< 0.0010	0.0038	1.42	1.57
	EV_MW_MC3_WG_2021_Q4_NP	2021 11 22	7.7	7.16	4.22	894	107.8	7.77	428	860	< 1.0	570	0.16	293	357	< 2.0	< 2.0	0.130	23.3	0.199	174	0.0125	3.27	0.0058	0.347	0.0021	0.0030	1.11	1.39
	EV_EC5GW_WG_2021_Q4_NP	Duplicate	-	-	-	-	-	7.78	420	862	1.2	586	0.14	293	358	< 2.0	< 2.0	0.130	23.1	0.204	173	0.0120	3.20	0.0063	0.246	0.0022	0.0029	1.17	1.23
	QA/QC RPD%		-	-	-	-	-	0	2	0	*	3	*	0	0	*	*	*	1	2	1	*	2	8	*	*	*	*	*
Sparwood Area - Michel Creek (denotes well part of Study Area 9a)**																													
EV_MCgwS**	EV_MCGWS_WG_2021_Q2_NP	2021 05 30	9.4	7.21	0.68	819	-117.6	7.96	421	766	4.4	509	31.0	276	337	< 2.0	< 2.0	0.295	46.7	0.276	103	0.126	< 0.0050	< 0.0010	0.330	< 0.0010	< 0.0020	0.90	0.65
	EV_EC5GW_WG_2021_Q2_NP	Duplicate	-	-	-	-	-	7.97	421	764	3.8	464	31.3	274	335	< 2.0	< 2.0	0.302	47.1	0.269	101	0.127	< 0.0050	< 0.0010	0.214	< 0.0010	0.0026	0.61	0.61
	QA/QC RPD%		-	-	-	-	-	0	0	0	*	9	1	1	1	*	*	2	1	3	2	1	*	*	*	*	*	*	*
	EV_MCgwS_WG_2021_Q3_NP	2021 09 03	11.3	7.35	0.63	816	-115.8	8.16	376	748	5.2	509	30.1	238	291	< 2.0	< 2.0	0.285	45.2	0.308	97.8	0.138	0.0088	< 0.0010	0.190	< 0.0010	0.0038	2.14	2.50
	EV_MCGWS_WG_2021_Q4_NP	2021 11 22	6.3	7.35	0.83	817	-99.1	7.93	364	788	6.7	502	27.3	290	354	< 2.0	< 2.0	0.220	43.6	0.401	111	0.125	0.0101	< 0.0010	0.204	< 0.0010	0.0061	1.88	2.22
EV_MCgwD**	EV_MCGWD_WG_2021_Q1_NP	2021 03 25	6.3	7.41	4.79	570	68.2	7.72	230	527	377	320	121	241	294	< 2.0	< 2.0	< 0.050	1.17	*1.15*	68.6	0.213	0.0510	0.0157	0.551	0.0061	0.209	1.91	1.45
	EV_MW_MC10A_WG_2021_Q1_NP	Duplicate	-	-	-	-	-	7.70	231	503	23.4	290	8.78	245	298	< 2.0	< 2.0	< 0.050	2.65	1.00	56.0	0.130	0.0967	0.0046	0.231	0.0066	0.0250	0.95	1.08
	QA/QC RPD%		-	-	-	-	-	0	0	5	177	10	173	2	1	*	*	*	77	14	20	48	62	*	*	8	157	*	*
	EV_MCGWD_WG_2021_Q2_NP	2021 05 30	14.5	7.48	0.71	615	-79	8.14	222	567	47.6	348	37.5	254	310	< 2.0	< 2.0	< 0.050	1.02	*1.14*	74.4	0.250	0.0226	0.0087	0.501	0.0054	0.0452	0.85	2.04
	EV_MCgwD_WG_2021_Q3_NP	2021 09 03	13.1	7.46	0.54	537	-36.4	8.40	226	525	6.3	318	5.80	237	277	6.0	< 2.0	< 0.050	4.19	0.912	48.6	0.100	0.193	0.0058	0.138	0.0055	0.0147	1.06	1.89
	EV_MCGWD_WG_2021_Q4_NP	2021 11 22	5.7	7.51	0.75	525	-49.2	8.05	221	503	25.4	312	22.6	253	308	< 2.0	< 2.0	< 0.050	3.33	0.990	45.0	0.151	0.0850	0.0039	0.216	0.0085	0.0384	1.66	2.01

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Guideline varies with background concentration.

[e] Standard/guideline varies with Hardness.

[f] Standard/guideline varies with pH and Temperature. Temperature assumed 10C CSR, 15C BCWQG.

[g] Standard/guideline varies with Chloride.

[h] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Organics, Nutrient and Organics in Groundwater (EVO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																														
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	1,500	2-3[e]	1,280-4,290[e]	1.31-18.5[f]	400	0.2-2[g]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
BC Guideline																														
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	150	n/a	309-429[e]	1.07-1.77[f]	3	0.04[g]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	600	1.45-1.87[e]	n/a	0.7-19.7[f]	32.8	0.12[g]	n/a	n/a	n/a	n/a	n/a
Sparwood Area - Michel Creek (denotes well part of Study Area 9a)**																														
EV_MW_SPR1A	EV_MW_SPR1A_WG_2021_Q1_NP	2021 02 26	4.5	7.2	0.15	624	-138.4	7.98	362	576	1.7	338	3.13	290	354	< 5.0	< 5.0	< 0.050	14.0	0.195	30.3	0.0544	< 0.0050	< 0.0010	0.057	< 0.0010	0.0046	1.03	1.12
	EV_MW_SPR1A_WG_2021_Q2_NP	2021 05 30	12	7.1	0.43	646	-162	8.05	353	603	1.2	347	1.64	298	363	< 2.0	< 2.0	< 0.050	18.9	0.252	28.8	0.0559	< 0.0050	< 0.0010	0.240	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_MW_BC10A_WG_2021_Q2_NP	Duplicate	-	-	-	-	-	8.07	356	602	< 1.0	363	1.56	298	363	< 2.0	< 2.0	< 0.050	19.0	0.248	28.9	0.0582	< 0.0050	< 0.0010	0.078	< 0.0010	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	0	*	5	5	0	0	*	*	*	1	2	0	4	*	*	*	*	*	*	*
	EV_MW_SPR1A_WG_2021_Q3_NP	2021 07 18	12.4	7.3	0.47	625	-169.6	8.18	330	599	2.2	414	2.71	277	338	< 2.0	< 2.0	< 0.050	16.6	0.220	29.7	0.0572	0.0337	< 0.0010	< 0.050	< 0.0010	0.0785	1.59	2.93
	EV_MW_SPR1A_WG_2021_Q4_NP	2021 11 14	6.1	7.29	0.58	621	-179.9	7.79	306	611	< 1.0	350	4.25	298	364	< 2.0	< 2.0	< 0.050	17.5	0.304	29.5	0.0557	< 0.0050	< 0.0010	0.090	0.0015	0.0050	0.76	1.07
EV_MW_SPR1B	EV_MW_SPR1B_WG_2021_Q1_NP	2021 02 26	5.63	7.3	0.06	439.6	-126.7	8.17	153	419	10.7	247	6.87	189	231	< 5.0	< 5.0	< 0.050	0.74	0.961	48.7	0.161	< 0.0050	0.0013	< 0.050	< 0.0010	0.0091	1.66	1.54
	EV_MW_SPR1B_WG_2021_Q2_NP	2021 05 30	26.2	7.62	0.3	454.7	-218.9	8.15	152	428	188	258	121	200	244	< 2.0	< 2.0	< 0.050	0.57	*1.27*	47.4	0.160	0.0065	< 0.0010	0.257	< 0.0010	0.0940	2.34	2.68
	EV_MW_SPR1B_WG_2021_Q3_NP	2021 09 20	12.6	7.97	2.84	443.9	-143.1	8.14	133	387	203	285	292	206	252	< 2.0	< 2.0	< 0.050	0.78	*1.20*	44.0	0.150	< 0.0050	< 0.0010	0.230	< 0.0010	0.151	4.89	4.47
	EV_MW_SPR1B_WG_2021_Q4_NP	2021 11 14	5.7	7.84	0.78	434.9	-207.1	8.10	125	428	15.8	266	10.3	200	243	< 2.0	< 2.0	< 0.050	0.69	*1.28*	42.2	0.162	< 0.0050	< 0.0010	0.223	0.0012	0.0184	2.88	2.60
EV_MW_SPR1C**	EV_MW_SPR1C_WG_2021_Q1_NP	2021 02 26	4.6	7.18	4.01	747	132.6	7.99	411	692	< 1.0	437	< 0.10	236	288	< 5.0	< 5.0	0.265	25.8	0.100	126	< 0.0050	1.19	< 0.0010	0.364	0.0024	< 0.0020	1.06	1.12
	EV_MW_SPR1C_WG_2021_Q2_NP	2021 05 13	5.5	7.05	4.72	803	188.8	8.15	435	743	< 1.0	486	0.11	220	268	< 2.0	< 2.0	0.591	55.1	0.103	109	< 0.0050	0.741	< 0.0010	0.112	0.0013	< 0.0020	1.37	1.47
	EV_MW_SPR1C_WG_2021_Q3_NP	2021 07 18	8.9	7.36	2.48	563	187.9	8.23	281	555	1.3	338	0.38	201	246	< 2.0	< 2.0	0.311	27.2	0.142	58.0	0.0051	0.215	< 0.0010	0.052	0.0033	0.0036	1.58	2.55
	EV_MW_SPR1C_WG_2021_Q4_NP	2021 11 14	6.8	7.14	1.96	924	159.2	7.73	430	923	< 1.0	566	0.15	299	365	< 2.0	< 2.0	0.691	70.8	0.133	130	0.0072	1.05	< 0.0050	0.166	0.0044	0.0043	1.13	1.46
EV_MW_MCgwA**	EV_MW_MCGWA_WG_2021_Q1_NP	2021 02 02	6.1	6.88	0.67	762	-152.5	7.78	391	725	< 1.0	401	1.01	346	422	< 5.0	< 5.0	0.241	41.7	0.218	28.9	0.0105	0.635	0.0015	0.160	0.0016	< 0.0020	< 0.50	< 0.50
	EV_MW_MCGWA_WG_2021_Q2_NP	2021 05 13	7.9	7.18	0.1	791	-110.4	7.53	434	715	1.0	455	0.68	345	421	< 2.0	< 2.0	0.169	40.1	0.208	28.6	0.0279	0.918	0.0051	0.082	< 0.0010	< 0.0020	1.17	1.41
	EV_MW_MCGWA_GW_2021_Q3_NP	2021 07 16	15.2	7.17	0.4	799	-85.6	8.04	395	778	< 1.0	482	1.35	317	387	< 2.0	< 2.0	0.094	38.3	0.080	45.4	0.0150	0.517	0.0042	0.151	0.0020	< 0.0020	0.93	1.02
	EV_MW_MCGWA_WG_2021_Q4_NP	2021 11 21	6.5	7.2	0.55	784	-65.4	7.58	376	764	1.1	482	1.01	377	460	< 2.0	< 2.0	0.191	38.9	0.215	33.1	0.0143	1.00	0.0084	0.187	0.0014	0.0023	0.80	1.22
EV_MW_MCgwB**	EV_MW_MCGWB_WG_2021_Q1_NP	2021 02 02	4.4	6.75	3.61	804	262.7	7.86	409	755	< 1.0	448	0.16	345	421	< 5.0	< 5.0	0.114	36.0	0.211	44.9	< 0.0050	4.32	< 0.0010	0.178	0.0052	0.0043	0.63	0.57
	EV_MW_MCGWB_WG_2021_Q2_NP	2021 05 13	7.6	7.13	2.71	783	203.6	7.50	456	703	< 1.0	421	< 0.10	326	397	< 2.0	< 2.0	< 0.050	29.9	0.186	49.2	< 0.0050	2.82	< 0.0010	0.244	0.0027	< 0.0020	1.41	1.65
	EV_MW_MCGWB_GW_2021_Q3_NP	2021 07 17	13.1	7.11	1.99	797	148.9	7.99	373	761	3.3	450	0.15	311	379	< 2.0	< 2.0	< 0.050	30.4	0.076	49.1	0.0057	2.84	0.0017	0.180	0.0024	0.0027	1.07	1.10
	EV_MW_MCGWB_WG_2021_Q4_NP	2021 11 21	5.9	7.14	5.36	762	110.1	7.58	365	748	< 1.0	464	< 0.10	334	407	< 2.0	< 2.0	0.095	30.2	0.207	51.9	0.0071	2.35	< 0.0010	0.264	0.0055	0.0046	0.94	1.43
Sparwood Area - Elk River (Study Area 12)																														
EV_ER1gwS	EV_ER1GWS_WG_2021_Q1_N	2021 02 26	2.3	7.11	9.45	557	256.2	8.03	312	520	< 1.0	323	0.11	193	235	< 5.0	< 5.0	< 0.050	8.65	0.134	86.0	< 0.0050	2.11	< 0.0010	0.433	0.0023	< 0.0020	< 0.50	< 0.50
	EV_ER1GWS_WG_Q2-2021_NP	2021 06 10	6.4	7.12	8	548	163.3	8.15	280	502	< 1.0	292	0.42	190	231	< 1.0	< 1.0	< 0.050	20.0	0.184	59.4	< 0.0050	1.29	< 0.0010	0.342	0.0030	0.0043	1.01	1.20
	EV_ER1gwS_WG_2021_Q3_NP	2021 09 12	10.5	7.47	6.79	512	124.3	8.25	236	502	< 1.0	286	0.22	200	243	< 2.0	< 2.0	< 0.050	9.16	0.147	68.7	0.0253	1.79	< 0.0010	0.183	0.0029	0.0030	1.31	1.55
	EV_ER1gwS_WG_2021_Q4_NP	2021 11 17	6.3	7.59	7.88	524	250.1	8.08	257	527	< 1.0	301	< 0.10	223	272	< 2.0	< 2.0	< 0.050	7.23	0.131	59.2	0.0081	1.38	0.0012	0.398	0.0039	0.0042	0.89	0.56
EV_ER1gwD	EV_ER1GWD_WG_2021_Q1_N	2021 02 26	1.7	7.73	8.9	508	117.9	8.16	285	468	13.0	287	5.44	190	231	< 5.0	< 5.0	< 0.050	4.95	0.149	68.7	0.0233	1.75	< 0.0010	1.08	0.0028	0.0076	< 0.50	< 0.50
	EV_ER1GWD_WG_2021_Q2_NP	2021 06 10	6.5	7.03	3.76	436.8	180.7	8.20	251	425	1.2	235	0.22	197	240	< 1.0	< 1.0	0.130	5.46	0.245	36.6	< 0.0050	0.800	< 0.0010	0.278	0.0021	< 0.0020	1.09	0.93
	EV_ER1gwD_WG_2021_Q3_NP	2021 09 12	11.7	7.46	1.48	445.4	48.5	8.30	215	434	< 1.0	240	0.64	210	250	2.5	< 2.0	< 0.050	5.19	0.195	31.9	< 0.0050	0.777	< 0.0010	0.051	0.0016	0.0028	0.88	1.30
	EV_MW_MC10A_WG_2021_Q3_NP	Duplicate	-	-	-	-	-	8.29	214	430	< 1.0	225	0.17	203	248	< 2.0	< 2.0	< 0.050	5.17	0.196	31.7	< 0.0050	0.759	< 0.0010	0.091	0.0022	0.0023	1.31	0.65
	QA/QC RPD%		-	-	-	-	-	0	0	1	*	6	*	3	1	*	*	*	0	1	1	*	2	*	*	*	*	*	*
	EV_ER1gwD_WG_2021_Q4_NP	2021 11 17	5.9	7.43	0.47	451.4	184.7	8.04	230	446	1.2	247	0.30	224	273	< 2.0	< 2.0	0.074	4.15	0.191	31.1	0.0307	0.816	0.0014	0.283	< 0.0010	0.0034	< 0.50	0.57

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Guideline varies with background concentration.

[e] Standard/guideline varies with Hardness.

[f] Standard/guideline varies with pH and Temperature. Temperature assumed 10C CSR, 15C BCWQG.

[g] Standard/guideline varies with Chloride.

[h] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Organics, Nutrient and Organics in Groundwater (EVO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																													
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	1,500	2-3[e]	1,280-4,290[e]	1.31-18.5[f]	400	0.2-2[g]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
BC Guideline																													
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	150	n/a	309-429[e]	1.07-1.77[f]	3	0.04[g]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	600	1.45-1.87[e]	n/a	0.7-19.7[f]	32.8	0.12[g]	n/a	n/a	n/a	n/a	n/a
Sparwood Area - Elk River (Study Area 12)																													
RG_DW-03-04	RG_DW-03-04_WP_Q1-2021_NP	2021 03 09	7.50	7.70	8.96	563.20	240.70	7.77	291	532	< 1.0	339	< 0.10	184	224	< 5.0	< 5.0	< 0.050	9.26	0.074	97.8	0.203	1.21	< 0.0010	0.933	0.0023	0.0021	< 0.50	< 0.50
	RG_DW-03-04_WP_Q2-2021_NP	2021 06 08	6.60	7.48	8.78	597.80	170.30	8.24	271	554	< 1.0	361	< 0.10	197	240	< 1.0	< 1.0	< 0.050	17.9	0.114	98.3	0.0315	1.00	< 0.0010	0.233	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_DW-03-04_WP_Q3-2021_NP	2021 07 20	5.50	4.97	8.16	452.80	496.00	8.33	205	429	< 1.0	251	< 0.10	155	187	1.1	< 1.0	< 0.050	11.5	0.158	54.2	< 0.0050	0.500	< 0.0010	0.055	0.0023	< 0.0020	0.65	0.60
	RG_DW-03-04_WP_2021-10-25_NP	2021 10 25	5.80	7.80	6.57	521.00	127.00	8.02	269	511	< 1.0	307	< 0.10	185	226	< 1.0	< 1.0	< 0.050	8.97	0.091	88.4	< 0.0050	0.637	< 0.0010	0.077	0.0027	0.0029	0.52	< 0.50
RG_MW-03-04	RG_MW-03-04_WP_Q1-2021_NP	2021 03 25	5.00	7.51	9.54	614.00	196.00	8.14	324	578	< 1.0	316	< 0.10	204	248	< 1.0	< 1.0	0.092	9.22	0.088	114	< 0.0050	1.03	0.0012	0.326	0.0048	0.0368	0.74	< 0.50
	RG_MW-03-04_WG_2021_Q2_NP	2021 06 10	5.20	7.37	7.62	371.2	148.1	8.28	201	351	< 1.0	195	0.10	143	175	< 1.0	< 1.0	< 0.050	6.05	0.175	42.9	< 0.0050	0.383	< 0.0010	0.140	0.0045	0.0032	3.61	3.73
	RG_MW-03-04_WG_2021_Q3_NP	2021 09 28	9.1	7.61	4.9	549	124.9	8.07	264	538	< 1.0	341	0.20	188	230	< 2.0	< 2.0	< 0.050	8.06	0.121	102	< 0.0050	0.782	< 0.0010	< 0.050	0.0037	0.0066	< 0.50	0.69
	RG_MW-03-04_WG_2021_Q4_NP	2021 11 24	7.5	7.7	7.23	457.6	145	7.79	220	429	< 1.0	266	0.23	173	211	< 2.0	< 2.0	< 0.050	6.54	0.118	71.0	0.0053	0.448	< 0.0010	0.062	0.0051	0.0056	1.27	1.50
Michel Creek Downstream of Gate Creek and Bodie Creek - Gate Creek and Bodie Creek (+ denotes well part of Study Area 9b)																													
EV_MW_GT1A+	EV_MW_GT1A_WG_2021_Q1_NP	2021 01 28	4.2	7.36	0.15	529	-80.6	8.29	275	490	< 1.0	326	1.11	180	218	< 5.0	< 5.0	< 0.050	2.03	0.123	106	0.0916	< 0.0050	< 0.0010	< 0.050	0.0052	0.0068	0.62	0.73
	EV_MW_GT1A_WG_2021_Q2_NP	2021 04 29	6.5	7.67	0.53	513	179.9	8.21	277	493	< 1.0	300	0.84	180	220	< 2.0	< 2.0	< 0.050	1.79	0.113	97.3	0.0979	< 0.0050	0.0014	< 0.050	< 0.0010	0.0047	< 0.50	< 0.50
	EV_MW_GT1A_WG_2021_Q3_NP	2021 07 12	8.6	7.66	0.56	513	-159.9	8.33	259	480	< 1.0	356	0.85	167	198	2.9	< 2.0	< 0.050	2.04	0.158	98.6	0.0911	< 0.0050	< 0.0010	< 0.050	0.0028	0.0079	0.76	1.10
	EV_MW_GT1A_WG_2021_Q4_NP	2021 10 27	6.8	7.76	0.69	518	-122.1	8.08	284	517	< 1.0	318	0.79	174	212	< 2.0	< 2.0	< 0.050	2.25	0.153	109	0.0777	< 0.0050	< 0.0010	0.113	0.0042	0.0094	< 0.50	< 0.50
	EV_MW_BC10A_WG_2021_Q4_NP	Duplicate	-	-	-	-	-	8.09	275	516	1.4	319	0.92	176	214	< 2.0	< 2.0	< 0.050	2.34	0.153	111	0.110	< 0.0050	< 0.0010	0.102	0.0046	0.0088	0.71	0.76
	QA/QC RPD%		-	-	-	-	-	0	3	0	*	0	15	1	1	*	*	*	4	0	2	34	*	*	*	*	*	*	*
EV_MW_GT1B+	EV_MW_GT1B_WG_2021_Q1_NP	2021 01 28	0.8	7.63	10.88	646	197.3	8.32	331	597	< 1.0	394	0.27	186	223	< 5.0	< 5.0	< 0.050	2.87	0.149	151	0.0060	2.37	< 0.0010	0.348	0.0084	0.0071	0.94	0.97
	EV_MW_GT1B_WG_2021_Q2_NP	2021 04 29	5.2	7.58	7.89	1,789	241.3	8.29	1,080	1,730	1.5	1,420	0.27	225	268	3.0	< 2.0	< 0.250	9.07	0.144	747	0.0116	16.0	< 0.0050	< 0.050	0.0067	0.0071	1.17	1.09
	EV_MW_GT1B_WG_2021_Q3_NP	2021 07 12	13.7	7.45	4.59	1,662	145.6	8.22	941	1,530	< 1.0	1,390	0.41	203	248	< 2.0	< 2.0	< 0.250	14.6	0.181	722	0.0571	22.2	0.0083	< 0.050	0.0085	0.0105	1.18	1.58
	EV_MW_GT1B_WG_2021_Q4_NP	2021 10 27	7.9	7.55	7.25	1,612	113.5	7.99	996	1,600	3.3	1,300	1.20	213	260	< 2.0	< 2.0	< 0.250	12.8	0.255	703	< 0.0050	16.1	< 0.0050	0.479	0.0092	0.0078	1.16	1.22
EV_MW_BC1A+	EV_MW_BC1A_WG_2021_Q1_NP	2021 01 20	6	6.9	1.92	2,206	152.9	7.52	1,510	2,070	24.7	1,660	19.4	277	338	< 5.0	< 5.0	0.49	41.7	0.19	1,070	< 0.0050	35.0	0.0113	< 0.050	0.0134	0.0229	1.30	< 0.50
	EV_MW_BC1A_WG_2021_Q2_NP	2021 04 19	6.8	6.55	3.04	2,254	177.2	8.04	1,320	2,170	3.9	1,730	2.19	268	327	< 2.0	< 2.0	< 0.250	34.4	< 0.100	940	< 0.0050	32.5	0.0057	< 0.050	0.0210	0.0239	0.88	0.98
	EV_MW_BC1A_WG_2021_Q3_NP	2021 07 12	10.9	7.19	3.25	2,141	114.9	8.11	1,270	1,960	1.3	1,720	0.61	269	328	< 2.0	< 2.0	< 0.250	41.1	0.217	920	< 0.0050	30.2	0.0160	< 0.050	0.0201	0.0205	0.70	0.90
	EV_MW_BC1A_WG_2021_Q4_NP	2021 11 05	8.7	7.15	2.19	1,980	113.9	7.70	1,230	1,950	< 1.0	1,630	0.60	272	332	< 2.0	< 2.0	< 0.250	40.0	0.260	858	0.0069	31.4	< 0.0050	< 0.050	0.0207	0.0208	0.88	0.82
EV_MW_BC1B+	EV_MW_BC1B_WG_2021_Q1_NP	2021 01 21	4.7	6.97	8.13	2,716	236.5	7.76	1,730	2,520	< 1.0	2,350	0.71	253	309	< 5.0	< 5.0	< 0.25	43.6	0.27	1,340	< 0.0050	50.8	< 0.0050	< 0.25	0.0291	0.049	1.38	1.50
	EV_MW_BC1B_WG_2021_Q2_NP	2021 04 19	4.7	6.45	7.15	2,508	285	7.97	1,460	2,420	1.5	1,730	0.24	261	318	< 2.0	< 2.0	< 0.250	39.3	0.120	1,110	< 0.0050	34.7	0.0055	< 0.050	0.0268	0.0245	1.27	2.46
	EV_MW_BC1B_WG_2021_Q3_NP	2021 07 12	11.8	7.03	6.21	2,243	202	8.07	1,330	2,060	1.3	1,980	0.69	258	315	< 2.0	< 2.0	< 0.250	46.8	0.246	973	< 0.0050	31.6	< 0.0050	< 0.050	0.0228	0.0221	0.68	1.22
	EV_MW_BC1B_WG_2021_Q4_NP	2021 11 05	10.6	7.06	6.2	2,212	160.8	7.60	1,420	2,190	< 1.0	1,870	0.12	263	321	< 2.0	< 2.0	0.262	47.5	0.327	1,010	0.0169	32.0	< 0.0050	< 0.050	0.0260	0.0257	0.58	2.01
EV_RCSgw+	EV_RCSGW_WG_2021_Q1_NP	2021 02 23	24.5	7.02	5.73	2,534	272.9	7.60	1,820	2,400	3.1	2,410	2.35	281	343	< 5.0	< 5.0	< 0.25	15.6	0.13	1,260	< 0.0050	31.7	< 0.0050	0.236	0.0020	< 0.0020	0.80	0.93
	EV_RCSGW_WG_2021_Q2_NP	2021 05 24	21.4	7.08	5.19	2,424	111.8	7.47	1,520	2,370	3.3	2,170	0.83	278	340	< 2.0	< 2.0	< 0.250	17.6	0.139	1,210	0.0058	30.1	< 0.0050	< 0.050	< 0.0010	0.0025	1.74	1.77
	EV_RCSGW_WG_2021_Q3_NP	2021 07 28	20.1	6.99	5.77	2,385	146.6	7.67	1,560	2,260	1.1	2,160	0.94	282	344	< 2.0	< 2.0	< 0.250	8.20	0.136	1,220	0.0164	28.0	< 0.0050	< 0.050	0.0026	0.0070	1.72	1.76
	EV_RCSgw_WG_2021_Q4_NP	2021 11 07	21	7.34	2.96	2,412	90.7	7.00	1,550	2,360	3.6	2,130	1.06	319	319	< 2.0	< 2.0	< 0.250	11.5	0.173	1,240	0.0196	28.2	0.107	0.464	0.0011	0.0039	1.49	1.73

All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit.
- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).
[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).
[d] Guideline varies with background concentration.
[e] Standard/guideline varies with Hardness.
[f] Standard/guideline varies with pH and Temperature. Temperature assumed 10C CSR, 15C BCWQG.
[g] Standard/guideline varies with Chloride.
[h] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Organics, Nutrient and Organics in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
			Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																														
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	1,500	2-3[e]	1,280-4,290[e]	1.31-18.5[f]	400	0.2-2[g]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
BC Guideline																														
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	150	n/a	309-429[e]	1.07-1.77[f]	3	0.04[g]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	600	1.45-1.87[e]	n/a	0.7-19.7[f]	32.8	0.12[g]	n/a	n/a	n/a	n/a	n/a
Michel Creek Downstream of Gate Creek and Bodie Creek - Gate Creek and Bodie Creek (+ denotes well part of Study Area 9b)																														
EV_BCgw+	EV_BCGW_WG_2021_Q1_NP	2021 01 28	5.4	7.26	5.19	584	182.3	8.26	300	539	< 1.0	346	0.19	173	211	< 5.0	< 5.0	< 0.050	2.69	0.138	130	< 0.0050	1.48	< 0.0010	0.425	0.0033	0.0038	0.58	0.70
	EV_BCGW_WG_2021_Q2_NP	2021 04 29	6.4	7.37	4.88	579	225.4	8.24	302	567	< 1.0	336	< 0.10	176	214	< 2.0	< 2.0	< 0.050	2.76	0.136	125	0.0091	1.47	< 0.0010	0.204	0.0014	0.0038	< 0.50	< 0.50
	EV_BCGW_WG_2021_Q3_NP	2021 07 04	9.2	7.49	4.54	695	170.4	8.30	355	649	2.6	441	0.47	182	222	< 2.0	< 2.0	0.073	4.84	0.145	176	< 0.0050	2.19	< 0.0010	0.303	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_BCGW_WG_2021_Q4_NP	2021 10 26	6	7.54	3.03	658	173.6	8.06	344	652	< 1.0	433	< 0.10	186	226	< 2.0	< 2.0	0.053	4.51	0.159	171	0.0094	1.97	< 0.0010	0.232	0.0041	0.0043	< 0.50	< 0.50
EV_WH50gw+	EV_WH50_WG_2021_Q1_NP	2021 02 25	4	7.11	10.56	559	186.8	8.06	323	528	1.2	333	1.22	179	218	< 5.0	< 5.0	0.063	2.89	0.091	111	0.0053	1.12	< 0.0010	0.333	0.0034	0.0060	0.60	0.57
	EV_WH50GW_WG_2021_Q2_NP	2021 05 13	4.3	7.8	8.87	389.2	149.6	8.04	224	376	11.3	240	5.70	147	179	< 2.0	< 2.0	< 0.050	1.97	0.115	58.8	0.0158	0.458	< 0.0010	< 0.050	0.0030	0.0047	1.96	1.98
	EV_WH50GW_WG_2021_Q3_NP	2021 07 15	10.4	7.71	5.87	392.8	123.9	8.26	200	376	< 1.0	237	1.28	138	169	< 2.0	< 2.0	< 0.050	1.21	0.060	60.0	0.0132	0.365	< 0.0010	< 0.050	0.0020	0.0048	1.10	1.19
	EV_WH50GW_WG_2021_Q4_NP	2021 11 25	8.3	7.83	7.16	423.2	176.3	7.93	201	391	3.4	225	3.98	150	150	< 2.0	< 2.0	< 0.050	1.67	0.155	65.1	0.0106	0.396	< 0.0010	< 0.050	0.0033	0.0102	1.16	1.33
Michel Creek Downstream of Gate Creek and Bodie Creek - Michel Creek Valley Bottom (+ denotes well part of Study Area 9b)																														
EV_BRgw+	EV_BRGW_WG_2021_Q1_NP	2021 02 25	6.5	6.71	0.32	1,132	101.4	7.78	694	1,070	1.0	786	0.57	274	334	< 5.0	< 5.0	0.454	24.4	0.086	311	0.0054	2.26	0.0016	1.02	0.0017	0.0089	< 0.50	< 0.50
	EV_BRGW_WG_2021_Q2_NP	2021 05 13	7.6	7.14	0.62	1,123	117.4	7.49	688	1,040	1.3	763	0.18	267	326	< 2.0	< 2.0	0.417	29.7	0.110	308	< 0.0050	1.78	< 0.0010	0.161	< 0.0010	< 0.0020	1.00	1.34
	EV_BRGW_GW_2021_Q3_NP	2021 07 16	9.9	7.14	3.37	1,074	77.2	8.05	563	866	< 1.0	442	0.31	237	289	< 2.0	< 2.0	0.382	23.0	< 0.100	294	0.0115	5.42	< 0.0050	0.167	0.0026	< 0.0020	1.10	1.22
	EV_BRGW_WG_2021_Q4_NP	2021 11 25	7.8	7.13	3.43	1,080	122.3	7.67	599	1,060	< 1.0	780	0.58	276	276	< 2.0	< 2.0	< 0.250	16.2	0.135	334	0.0290	3.19	< 0.0050	0.226	0.0020	0.0022	< 0.50	0.89
EV_HW1+	EV_HW1_WG_2021_Q1_NP	2021 02 24	6.9	6.88	4.81	1,131	271.9	7.98	658	1,060	1.0	757	< 0.10	232	282	< 5.0	< 5.0	0.37	23.4	< 0.10	341	< 0.0050	7.02	< 0.0050	0.147	0.0024	< 0.0020	< 0.50	< 0.50
	EV_HW1_WG_2021_Q2_NP	2021 05 13	15.2	7.14	3.27	1,115	226.9	7.58	656	1,020	< 1.0	772	0.24	250	305	< 2.0	< 2.0	0.276	37.2	0.120	279	0.0185	5.35	< 0.0010	0.147	0.0018	< 0.0020	1.15	1.16
	EV_HW1_WG_2021_Q3_NP	2021 07 15	16.8	7.26	4.75	1,152	137	8.10	632	1,060	< 1.0	789	0.46	231	282	< 2.0	< 2.0	0.390	34.7	< 0.100	334	< 0.0050	6.92	< 0.0050	0.344	0.0041	< 0.0020	0.59	0.61
	EV_HW1_WG_2021_Q4_NP	2021 11 07	17.4	7.42	6.08	1,176	235.6	7.62	614	1,140	< 1.0	869	< 0.10	259	259	< 2.0	< 2.0	0.294	28.8	0.145	410	0.0077	8.53	0.0056	0.376	0.0026	0.0022	1.05	0.92
EV_MW_MC1A	EV_MW_MC1A_WG_2021_Q1_NP	2021 01 21	6.4	6.96	0.07	869	-38.1	7.82	417	829	1.3	458	12.1	348	424	< 5.0	< 5.0	0.582	82.3	0.352	< 0.30	1.59	< 0.0050	< 0.0010	1.32	0.0279	0.029	1.85	2.12
	EV_MW_MC1A_WG_2021_Q2_NP	2021 04 18	7	6.34	0.13	865	-26.2	8.07	372	846	2.5	426	13.5	348	424	< 2.0	< 2.0	0.503	76.9	0.174	6.15	1.56	< 0.0050	0.0021	1.37	< 0.0010	0.0071	1.38	1.79
	EV_MW_MC1A_WG_2021_Q3_NP	2021 07 04	10	7.13	0.49	872	-51.8	8.16	386	819	2.8	517	12.9	360	440	< 2.0	< 2.0	0.570	82.6	0.358	1.48	1.45	0.0165	< 0.0010	1.66	0.0070	0.0100	1.67	1.78
	EV_MW_MC1A_WG_2021_Q4_NP	2021 11 24	6.6	7.21	0.87	896	-79.4	7.94	393	859	1.0	530	15.6	375	457	< 2.0	< 2.0	0.641	88.9	0.266	3.58	1.40	0.0271	< 0.0050	1.37	0.0058	0.0114	1.88	2.21
EV_MW_MC1B	EV_MW_MC1B_WG_2021_Q1_NP	2021 01 21	6.6	6.9	0.09	1,185	-96.8	7.69	579	1,110	22.5	657	142	382	466	< 5.0	< 5.0	0.92	*126*	0.21	84.2	0.285	0.052	< 0.0010	0.256	< 0.0010	0.037	2.02	2.36
	EV_MW_MC1B_WG_2021_Q2_NP	2021 04 18	5.6	6.18	0.16	1,461	-68.3	7.73	645	1,380	29.1	860	127	389	475	< 2.0	< 2.0	1.08	*150*	0.105	158	0.267	< 0.0250	< 0.0050	0.257	< 0.0010	0.0072	2.02	2.19
	EV_MW_MC1B_WG_2021_Q3_NP	2021 07 04	10.1	7.08	0.5	1,260	-102.8	8.04	598	1,160	26.7	798	167	376	459	< 2.0	< 2.0	1.14	*131*	0.204	122	0.255	< 0.0250	< 0.0050	0.423	< 0.0010	0.0140	2.36	2.56
	EV_MW_MC1B_WG_2021_Q4_NP	2021 11 24	7	6.82	0.4	1,280	-97.8	7.15	573	1,170	27.2	802	156	394	480	< 2.0	< 2.0	1.44	*134*	0.176	121	0.300	< 0.0250	< 0.0050	0.381	< 0.0010	0.0176	2.63	2.82
EV_MW_MC2A+	EV_MW_MC2A_WG_2021_Q1_NP	2021 01 21	4	6.96	0	918	-58.4	7.92	424	882	2.3	476	20.2	410	500	< 5.0	< 5.0	< 0.050	77.9	0.307	< 0.30	0.942	0.0065	< 0.0010	0.776	< 0.0010	0.033	1.01	0.88
	EV_MW_MC2A_WG_2021_Q2_NP	2021 04 18	6.2	6.49	0.14	953	-57.4	8.05	390	926	2.1	463	17.5	391	477	< 2.0	< 2.0	0.068	85.6	0.221	8.28	0.889	< 0.0050	0.0013	0.717	< 0.0010	0.0049	< 0.50	0.91
	EV_MW_MC2A_WG_2021_Q3_NP	2021 07 04	11.6	7.24	0.39	958	-97.2	8.17	406	865	2.1	496	15.9	378	462	< 2.0	< 2.0	< 0.050	84.8	0.249	< 0.30	0.838	< 0.0050	< 0.0010	0.951	< 0.0010	0.0107	< 0.50	< 0.50
	EV_MW_MC2A_WG_2021_Q4_NP	2021 11 22	6.8	7.25	0.63	946	-77.1	7.83	396	918	4.8	514	21.6	417	509	< 2.0	< 2.0	0.053	83.3	0.303	< 0.30	0.893	< 0.0050	< 0.0010	0.921	0.0011	0.0149	0.80	0.94
EV_MW_MC2B+	EV_MW_MC2B_WG_2021_Q1_NP	2021 01 26	3.4	6.92	1.8	1,166	240.9	7.56	705	1,080	< 1.0	757	< 0.10	244	298	< 5.0	< 5.0	< 0.25	23.8	0.10	380	< 0.0050	7.41	< 0.0050	< 0.050	0.0035	0.0107	0.99	0.65
	EV_MW_MC2B_WG_2021_Q2_NP	2021 04 18	5.7	6.41	1.76	1,123	192.3	7.97	577	1,090	< 1.0	773	< 0.10	247	301	< 2.0	< 2.0	< 0.250	32.7	0.104	301	< 0.0050	6.00	0.0087	< 0.050	< 0.0010	< 0.0020	0.58	0.85
	EV_MW_MC2B_WG_2021_Q3_NP	2021 07 04	11.1	7.15	2.02	1,127	154.4	8.14	600	1,080	< 1.0	816	0.16	249	303	< 2.0	< 2.0	0.290	32.9	0.137	345	< 0.0050	6.71	< 0.0050	0.192	0.0038	0.0030	0.67	0.73
	EV_MW_MC2B_WG_2021_Q4_NP	2021 11 22	6.9	7.13	2.51	1,183	103.9	7.78	625	1,150	< 1.0	842	< 0.10	259	316	< 2.0	< 2.0	< 0.250	26.5	0.183	379	0.0154	7.82	< 0.0050	0.239	0.0042	0.0038	1.10	1.12

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Guideline varies with background concentration.

[e] Standard/guideline varies with Hardness.

[f] Standard/guideline varies with pH and Temperature. Temperature assumed 10C CSR, 15C BCWQG.

[g] Standard/guideline varies with Chloride.

[h] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Organics, Nutrient and Organics in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
			Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																													
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	1,500	2-3[e]	1,280-4,290[e]	1.31-18.5[f]	400	0.2-2[g]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
BC Guideline																													
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	150	n/a	309-429[e]	1.07-1.77[f]	3	0.04[g]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	600	1.45-1.87[e]	n/a	0.7-19.7[f]	32.8	0.12[g]	n/a	n/a	n/a	n/a	n/a
Erickson Creek and Michel Creek Downstream of Erickson Creek (~ denotes well part of Study Area 10)																													
EV_WF_SW[h]	EV_WF_SW_WG_2021_Q1_NP	2021 03 29	3.6	8.77	4.36	468.5	120	8.20	222	482	57.2	260	50.4	87.9	107	< 2.0	< 2.0	< 0.050	3.05	0.134	181	0.166	0.0103	< 0.0010	0.977	< 0.0010	0.0421	17.0	5.40
	EV_WF_SW_WG_2021_Q2_NP	2021 06 06	9.1	8.81	3.2	635	-64.3	8.40	340	598	5.6	444	10.6	127	151	< 2.0	< 2.0	< 0.050	2.80	0.022	192	0.0667	0.0100	< 0.0010	0.111	< 0.0010	0.0045	1.55	1.08
	EV_WF_SW_WG_2021_Q3_NP	2021 09 20	8.2	8.84	3.39	234.5	-43	8.13	422	648	47.0	415	46.9	141	172	< 2.0	< 2.0	< 0.050	3.08	0.141	211	0.124	0.0080	0.0020	0.299	< 0.0010	0.0103	4.52	2.95
	EV_WF_SW_WG_2021_Q4_NP	2021 12 09	0.1	8.75	12.64	440.5	-102.1	8.07	256	512	19.4	310	13.5	105	128	< 2.0	< 2.0	< 0.050	2.88	0.123	174	0.117	< 0.0050	< 0.0010	0.200	< 0.0010	0.0103	2.59	2.76
EV_ECgw~	EV_ECGW_WG_2021_Q2_NP	2021 05 16	8.1	7.63	1.17	419.2	174.5	8.21	162	402	26.0	259	40.0	206	251	< 2.0	< 2.0	< 0.050	0.50	0.675	25.3	0.133	0.0651	0.0110	0.216	0.0051	0.0361	1.50	1.88
	EV_ECGW_WG_2021_Q3_NP	2021 07 19	10.9	7.79	0.98	412.1	73.1	8.40	153	406	37.3	277	46.6	192	230	2.2	< 2.0	< 0.050	0.56	0.737	26.6	0.144	0.0667	0.0141	0.202	0.0128	0.0691	1.73	1.38
	EV_ECGW_WG_2021_Q4_NP	2021 10 26	8.6	7.9	2.62	418	168.3	8.15	156	416	59.8	268	68.7	214	261	< 2.0	< 2.0	< 0.050	0.69	0.834	28.6	0.0537	0.164	0.0199	0.140	0.0115	0.0691	0.55	0.56
EV_MW_SP1A~	EV_MW_SP1A_WG_2021_Q1_NP	2021 03 11	4.1	7.48	0.16	602	-112.9	8.22	301	551	< 1.0	306	5.87	293	357	< 1.0	< 1.0	< 0.050	4.23	0.327	41.4	0.824	0.0121	< 0.0010	0.804	< 0.0010	0.0103	< 0.50	< 0.50
	EV_MW_SP1A_WG_2021_Q2_NP	2021 05 16	7.5	6.92	0.46	588	-140.4	8.09	300	562	3.1	314	5.96	291	355	< 2.0	< 2.0	< 0.050	3.96	0.252	39.3	0.608	< 0.0050	< 0.0010	0.741	< 0.0010	0.0053	< 0.50	< 0.50
	EV_MW_SP1A_GW_2021_Q3_NP	2021 07 16	8.2	7.42	0.48	581	-136.2	8.18	279	552	< 1.0	723	4.13	270	329	< 2.0	< 2.0	< 0.050	4.45	0.132	33.3	0.652	< 0.0050	< 0.0010	0.926	0.0018	0.0089	0.65	0.88
	EV_MW_SP1A_WG_2021_Q4_NP	2021 10 19	7.1	7.46	0.49	573	-142	8.22	299	566	3.1	321	5.45	289	353	< 2.0	< 2.0	< 0.050	4.22	0.302	32.5	0.718	< 0.0050	< 0.0010	0.820	0.0013	0.0099	0.71	0.66
EV_MW_SP1B~	EV_MW_SP1B_WG_2021_Q1_NP	2021 03 11	4.5	7	8.03	504	260.4	8.25	255	471	< 1.0	292	< 0.10	174	212	< 1.0	< 1.0	< 0.050	3.92	0.121	88.1	< 0.0050	0.939	0.0018	0.164	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_MW_SP1B_WG_2021_Q2_NP	2021 05 16	7.5	7.34	7.27	475	139.6	8.17	243	459	1.5	268	0.18	166	202	< 2.0	< 2.0	< 0.050	6.51	0.087	71.2	< 0.0050	0.412	< 0.0010	0.154	< 0.0010	< 0.0020	0.55	0.69
	EV_MW_SP1B_GW_2021_Q3_NP	2021 07 16	6.8	7.74	5.76	396.6	127.7	8.24	194	392	< 1.0	233	0.20	150	183	< 2.0	< 2.0	< 0.050	8.82	0.049	42.8	0.0055	0.199	< 0.0010	0.136	0.0029	< 0.0020	0.68	0.72
	EV_EC5GW_WG_2021_Q3_NP	Duplicate	-	-	-	-	-	8.22	197	393	< 1.0	229	0.26	147	179	< 2.0	< 2.0	< 0.050	8.82	0.051	42.8	0.0064	0.212	< 0.0010	0.130	0.0028	< 0.0020	0.87	0.90
	QA/QC RPD%		-	-	-	-	-	0	2	0	*	2	*	2	2	*	*	*	0	*	0	*	6	*	*	*	*	*	*
	EV_MW_SP1B_WG_2021_Q4_NP	2021 10 19	8.2	7.66	4.73	462.3	132.2	8.16	238	462	< 1.0	289	< 0.10	172	210	< 2.0	< 2.0	< 0.050	3.77	0.109	80.8	< 0.0050	0.352	< 0.0010	< 0.050	0.0028	< 0.0020	0.55	0.76
EV_MW_SP1C~	EV_MW_SP1C_WG_2021_Q1_NP	2021 03 11	3.9	7.05	6.08	483.7	284.4	8.26	242	452	1.4	258	0.26	188	230	< 1.0	< 1.0	0.051	9.89	0.126	57.2	< 0.0050	0.376	0.0011	0.052	0.0015	0.0094	< 0.50	< 0.50
	EV_MW_SP1C_WG_2021_Q2_NP	2021 05 16	9.6	7.29	7.37	472.8	159	8.14	234	454	2.5	276	0.23	179	218	< 2.0	< 2.0	< 0.050	13.7	0.095	48.7	0.0061	0.237	< 0.0010	0.108	< 0.0010	0.980	0.69	0.94
	EV_MW_SP1C_GW_2021_Q3_NP	2021 07 16	8.3	7.56	5.72	429.1	145.2	8.26	200	413	1.4	245	0.56	165	202	< 2.0	< 2.0	< 0.050	9.19	0.051	40.1	< 0.0050	0.158	< 0.0010	0.066	0.0010	< 0.0020	0.81	0.90
	EV_MW_SP1C_WG_2021_Q4_NP	2021 10 19	7.3	7.57	4.97	450.3	118	8.19	234	447	< 1.0	271	0.17	185	226	< 2.0	< 2.0	< 0.050	6.78	0.108	54.3	0.0088	0.197	< 0.0010	< 0.050	0.0033	0.0066	1.18	1.20
Blanks																													
Field Blanks																													
RG_DW-02-20	RG_DW-F_WP_Q1-2021_1	2021 03 03	-	-	-	-	-	5.67	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_OCgw	EV_MC6GW_WG_2021_Q1_NP	2021 03 19	-	-	-	-	-	5.50	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_GC1B	EV_MW_BC10B_WG_2021_Q1_NP	2021 03 21	-	-	-	-	-	5.65	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	0.120	< 0.0050	< 0.0010	0.109	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MCGWD	EV_MW_MC10B_WG_2021_Q1_NP	2021 03 25	-	-	-	-	-	5.00	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0103	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MW_SPR1A	EV_MW_BC10B_WG_2021_Q2_NP	2021 05 30	-	-	-	-	-	5.49	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MCgwS	EV_EC6GW_WG_2021_Q2_NP	2021 05 30	-	-	-	-	-	5.46	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_OCgw	EV_MC6GW_WG_2021_Q2_NP	2021 05 31	-	-	-	-	-	5.38	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
RG_DW-02-20	RG_DW-F_WP_Q2-2021_1	2021 06 08	-	-	-	-	-	5.06	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_LSgw	EV_MW_BC10B_WG_2021_Q3_NP_FB	2021 07 14	-	-	-	-	-	5.53	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0149	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MW_SP1B	EV_EC6GW_WG_2021_Q3_NP	2021 07 16	-	-	-	-	-	5.59	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0074	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Guideline varies with background concentration.

[e] Standard/guideline varies with Hardness.

[f] Standard/guideline varies with pH and Temperature. Temperature assumed 10C CSR, 15C BCWQG.

[g] Standard/guideline varies with Chloride.

[h] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Organics, Nutrient and Organics in Groundwater (EVO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																													
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	1,500	2-3[e]	1,280-4,290[e]	1.31-18.5[f]	400	0.2-2[g]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
BC Guideline																													
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	150	n/a	309-429[e]	1.07-1.77[f]	3	0.04[g]	n/a	n/a	n/a	n/a	n/a
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	6.5-9.0	n/a	n/a	n/a	6.5-9.0	n/a	n/a	n/a[d]	n/a	n/a[d]	n/a	n/a	n/a	n/a	n/a	600	1.45-1.87[e]	n/a	0.7-19.7[f]	32.8	0.12[g]	n/a	n/a	n/a	n/a	n/a
Blanks																													
Field Blanks																													
RG_DW-02-20	RG_DW-F_WP_Q3-2021_3	2021 07 21	-	-	-	-	-	5.25	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MW_GV4B	EV_MW_MC10B_WG_2021_Q3_NP	2021 07 30	-	-	-	-	-	5.51	< 0.50	< 2.0	< 1.0	< 10	0.20	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_OCgw	EV_MC6GW_WG_2021_Q3_NP	2021 09 08	-	-	-	-	-	5.02	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	0.65	< 0.50
EV_ER1gwD	EV_MW_MC10B_WG_2021_Q3_NP	2021 09 12	-	-	-	-	-	5.12	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_GCGW	EV_MC10B_WG_2021_Q4_NP	2021 10 24	-	-	-	-	-	5.67	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MW_GT1A	EV_MW_BC10B_WG_2021_Q4_NP	2021 10 27	-	-	-	-	-	5.58	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_OCgw	EV_MC6GW_WG_2021_Q4_NP	2021 11 21	-	-	-	-	-	5.73	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0104	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MW_MC3	EV_EC6GW_WG_2021_Q4_NP	2021 11 22	-	-	-	-	-	5.52	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
Trip Blanks																													
	RG_DW-T_WP_Q1-2021_1	2021 03 03	-	-	-	-	-	5.49	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	EV_MC7GW_WG_2021_Q1_NP	2021 03 19	-	-	-	-	-	5.52	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_MW_BC10C_WG_2021_Q1_NP	2021 03 21	-	-	-	-	-	5.49	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_MW_MC10C_WG_2021_Q1_NP	2021 03 25	-	-	-	-	-	4.94	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0191	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_EC7GW_WG_2021_Q2_NP	2021 05 30	-	-	-	-	-	5.24	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_MW_BC10C_WG_2021_Q2_NP	2021 05 30	-	-	-	-	-	5.15	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_MC7GW_WG_2021_Q2_NP	2021 05 31	-	-	-	-	-	5.20	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_DW-T_WP_Q2-2021_1	2021 06 08	-	-	-	-	-	5.40	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	EV_MW_BC10C_WG_2021_Q3_NP_TB	2021 07 14	-	-	-	-	-	5.31	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0303	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_DW-T_WP_Q3-2021_3	2021 07 21	-	-	-	-	-	5.45	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	EV_MW_MC10C_WG_2021_Q3_NP	2021 09 12	-	-	-	-	-	4.98	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.112	< 0.0050	< 0.0010	0.113	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_MW_MC10C_WG_2021_10_01_NP	2021 10 01	-	-	-	-	-	4.71	< 0.50	< 2.0	< 1.0	22	< 0.10	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_MC10C_WG_2021_Q4_NP	2021 10 24	-	-	-	-	-	5.54	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0107	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_MW_BC10C_WG_2021_Q4_NP	2021 10 27	-	-	-	-	-	5.51	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0068	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_MC7GW_WG_2021_Q4_NP	2021 11 21	-	-	-	-	-	5.70	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0373	< 0.0050	< 0.0010	0.070	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_EC7GW_WG_2021_Q4_NP	2021 11 22	-	-	-	-	-	5.38	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 2.0	< 2.0	< 2.0	< 2.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0201	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Guideline varies with background concentration.

[e] Standard/guideline varies with Hardness.

[f] Standard/guideline varies with pH and Temperature. Temperature assumed 10C CSR, 15C BCWQG.

[g] Standard/guideline varies with Chloride.

[h] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Metals																														
			mg/L	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 mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[l] µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[e]	n/a	10[f]	40	20-90[e]	n/a	40-160[e]	n/a	n/a	n/a	0.25	10,000	250-1,500[e]	n/a	20	0.5-15[e]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[e]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[d]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[k]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BC Guideline																																		
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	50[d]	9	n/a	1,000	0.13	n/a	1,200	0.261-0.457[e]	n/a	1	4	0.2-4.1[h]	n/a	7.89-19.6[e]	n/a	n/a	1,190 - 2,462[e]	0.02[j]	7,600	119-150[e]	n/a	2	1.5[e]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	39.8-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	100[d]	n/a	5	n/a	n/a	n/a	n/a	0.789-2.592[e]	n/a	n/a	110	0.2-25[h]	350	117-417[e]	n/a	n/a	2,006-3,390[e]	n/a	46,000	n/a	n/a	n/a	3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	62.3-282[e]
Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence (^ denotes well part of Study Area 7)																																		
EV_GV3gw^	EV_GV3GW_WG_2021_Q1_NP	2021 03 21	332	< 1.0	< 0.10	< 0.10	17.7	< 0.020	< 0.050	11	0.0058	80.8	0.23	< 0.10	< 0.20	< 10	< 0.050	14.7	31.6	< 0.10	< 0.0050	0.872	0.64	1.01	4.71	< 0.010	3.30	556	< 0.010	< 0.10	< 0.30	1.70	< 0.50	< 1.0
	EV_GV3GW_WG_2021_Q2_NP	2021 05 24	336	< 1.0	< 0.10	< 0.10	17.4	< 0.020	< 0.050	11	0.0065	82.1	0.21	< 0.10	0.22	< 10	< 0.050	15.4	31.8	< 0.10	< 0.0050	0.958	0.59	0.975	4.51	< 0.010	3.26	575	< 0.010	< 0.10	< 0.30	1.67	< 0.50	< 1.0
	EV_MW_GV3GW_WG_2021_Q3_NP	2021 07 30	337	< 1.0	< 0.10	< 0.10	18.3	< 0.020	< 0.050	12	0.0070	83.2	0.22	< 0.10	0.45	< 10	< 0.050	14.5	31.5	0.17	< 0.0050	0.937	1.39	1.04	4.50	< 0.010	3.13	577	< 0.010	< 0.10	< 0.30	1.64	< 0.50	1.4
	EV_GV3GW_WG_2021_Q4_NP	2021 10 17	361	1.5	< 0.10	< 0.10	19.1	< 0.020	< 0.050	11	0.0082	89.6	0.24	< 0.10	1.37	21	< 0.050	16.1	33.3	0.39	< 0.0050	0.917	0.55	1.08	4.24	< 0.010	3.48	609	< 0.010	< 0.10	< 0.30	1.80	< 0.50	1.0
EV_GV3gwS	EV_GV3GWS_WG_2021_Q1_NP	2021 03 21	271	4.4	< 0.10	< 0.10	64.6	< 0.020	< 0.050	< 10	0.0068	71.1	0.16	< 0.10	< 0.20	< 10	< 0.050	6.6	22.8	0.24	< 0.0050	1.08	< 0.50	0.948	3.13	< 0.010	2.18	194	< 0.010	0.10	< 0.30	1.24	< 0.50	< 1.0
	EV_GV3GWS_WG_2021_Q2_NP	2021 05 20	267	4.0	< 0.10	0.13	69.1	< 0.020	< 0.050	12	0.0063	70.5	0.17	< 0.10	2.50	< 10	0.074	6.5	22.2	0.30	< 0.0050	0.930	< 0.50	0.909	3.22	< 0.010	2.26	189	< 0.010	0.12	< 0.30	1.28	< 0.50	1.8
	EV_MW_GV3GWS_WG_2021_Q3_NP	2021 07 30	279	< 1.0	< 0.10	< 0.10	76.4	< 0.020	< 0.050	11	0.0058	74.0	0.17	< 0.10	< 0.20	< 10	< 0.050	6.9	22.9	0.11	< 0.0050	1.02	< 0.50	1.06	3.29	< 0.010	2.20	200	< 0.010	< 0.10	< 0.30	1.24	< 0.50	< 1.0
	EV_GV3GWS_WG_2021_Q4_NP	2021 10 17	297	1.2	< 0.10	0.12	88.3	< 0.020	< 0.050	13	0.0074	79.2	0.15	< 0.10	1.80	< 10	0.072	8.0	24.1	1.33	< 0.0050	1.09	< 0.50	1.28	2.51	< 0.010	2.54	215	< 0.010	< 0.10	< 0.30	1.41	< 0.50	2.0
EV_MW_GV4A^	EV_MW_GV4A_WG_2021_Q1_NP	2021 03 21	312	1.5	0.18	0.71	46.5	< 0.020	< 0.050	16	< 0.0050	75.4	< 0.10	0.91	< 0.20	127	< 0.050	10.8	30.0	*375*	< 0.0050	2.81	1.81	1.46	4.20	< 0.010	33.5	324	0.018	< 0.10	< 0.30	2.90	< 0.50	< 1.0
	EV_MW_GV4A_WG_2021_Q2_NP	2021 05 20	329	1.5	0.11	0.79	53.1	< 0.020	< 0.050	17	< 0.0050	79.1	< 0.10	0.80	0.98	94	0.069	10.8	32.0	*285*	< 0.0050	2.60	1.35	1.51	4.28	< 0.010	28.4	332	0.013	0.15	< 0.30	2.99	< 0.50	2.4
	EV_MW_GV4A_WG_2021_Q3_NP	2021 07 30	304	1.2	0.13	0.84	50.2	< 0.020	< 0.050	21	< 0.0050	74.5	< 0.10	0.69	< 0.20	170	< 0.050	10.9	28.6	*344*	< 0.0050	3.48	1.27	1.45	3.27	< 0.010	39.8	360	< 0.010	0.16	< 0.30	6.04	< 0.50	< 1.0
	EV_MW_GV4A_WG_2021_Q4_NP	2021 10 17	334	1.4	0.13	0.70	56.0	< 0.020	< 0.050	16	< 0.0050	79.6	< 0.10	0.27	< 0.20	168	< 0.050	10.9	32.8	153	< 0.0050	2.61	0.75	1.56	4.90	< 0.010	23.4	373	< 0.010	< 0.10	< 0.30	5.75	< 0.50	< 1.0
EV_MW_GV4B^	EV_MW_GV4B_WG_2021_Q1_NP	2021 03 21	303	< 1.0	< 0.10	< 0.10	60.3	< 0.020	< 0.050	< 10	0.0073	72.4	< 0.10	< 0.10	< 0.20	< 10	< 0.050	8.6	29.6	0.72	< 0.0050	1.51	< 0.50	1.10	3.70	< 0.010	3.27	276	< 0.010	< 0.10	< 0.30	1.38	< 0.50	< 1.0
	EV_MW_GV4B_WG_2021_Q2_NP	2021 05 20	314	< 1.0	< 0.10	< 0.10	63.8	< 0.020	< 0.050	< 10	0.0085	75.4	< 0.10	< 0.10	0.51	< 10	0.130	8.9	30.6	0.56	< 0.0050	1.59	< 0.50	1.11	3.76	< 0.010	3.25	271	< 0.010	0.13	< 0.30	1.43	< 0.50	< 1.0
	EV_MW_GV4B_WG_2021_Q3_NP	2021 07 30	312	< 1.0	< 0.10	< 0.10	66.7	< 0.020	< 0.050	< 10	0.0121	75.6	< 0.10	< 0.10	< 0.20	< 10	< 0.050	9.0	30.0	0.14	< 0.0050	1.72	< 0.50	1.19	3.84	< 0.010	2.87	285	< 0.010	< 0.10	< 0.30	1.31	< 0.50	< 1.0
	EV_MW_MC10A_WG_2021_Q3_NP	Duplicate	309	< 1.0	< 0.10	< 0.10	66.0	< 0.020	< 0.050	< 10	0.0086	74.3	< 0.10	< 0.10	< 0.20	< 10	< 0.050	9.0	30.0	0.16	< 0.0050	1.70	< 0.50	1.20	3.75	< 0.010	2.75	276	< 0.010	< 0.10	< 0.30	1.30	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	*	1	*	*	*	*	2	*	*	*	*	*	0	0	*	*	1	*	1	2	*	4	3	*	*	*	1	*	*
	EV_MW_GV4B_WG_2021_Q4_NP	2021 10 17	331	5.1	< 0.10	< 0.10	69.2	< 0.020	< 0.050	< 10	0.0119	80.0	< 0.10	< 0.10	0.26	< 10	0.077	9.9	31.9	0.85	< 0.0050	1.66	< 0.50	1.29	4.05	< 0.010	3.05	295	< 0.010	< 0.10	< 0.30	1.41	< 0.50	< 1.0
RG_MW_GCA^	RG_MW_GCA_WG_2021_10_01_NP	2021 10 01	14.0	4,500	2.18	4.54	100	0.163	< 0.050	*783*	0.0282	3.52	4.80	0.37	2.40	1,580	0.375	906	1.27	11.1	< 0.0050	7.03	2.26	3.07	1.42	0.014	313	213	0.068	0.40	150	2.05	9.66	3.8
RG_DW-02-20^	RG_DW-02-20_WP_Q1-2021_NP	2021 03 03	275	< 3.0	< 0.10	< 0.10	84.4	< 0.020	< 0.050	< 10	0.0117	74.5	0.20	< 0.10	5.03	< 10	0.178	7.4	21.5	1.29	-	1.06	0.83	0.557	13.5	< 0.010	2.32	258	< 0.010	< 0.10	< 10	1.13	< 0.50	17.5
	RG_DW-02-40_WP_Q1-2021_1	Duplicate	273	< 3.0	< 0.10	< 0.10	97.1	< 0.020	< 0.050	< 10	0.0092	73.1	0.22	< 0.10	4.53	< 10	0.105	7.5	22.0	1.56	-	1.07	0.61	0.643	15.5	< 0.010	2.66	245	< 0.010	< 0.10	< 10	1.09	< 0.50	15.6
	QA/QC RPD%		1	*	*	*	14	*	*	*	*	2	*	*	10	*	*	1	2	19	-	1	*	14	14	*	14	5	*	*	*	4	*	11
	RG_DW-02-20_WP_Q2-2021_NP	2021 06 08	295	< 1.0	< 0.10	< 0.10	110	< 0.020	< 0.050	< 10	0.0070	77.0	0.17	< 0.10	2.42	< 10	0.059	8.2	24.9	1.26	-	1.01	< 0.50	0.693	18.7	< 0.010	2.89	288	< 0.010	< 0.10	< 0.30	1.17	< 0.50	6.0
	RG_DW-02-40_WP_Q2-2021_1	Duplicate	288	< 1.0	< 0.10	< 0.10	106	< 0.020	< 0.050	< 10	0.0071	76.1	0.15	< 0.10	2.42	< 10	0.058	7.8	23.9	1.20	-	1.04	< 0.50	0.651	19.4	< 0.010	2.76	289	< 0.010	< 0.10	< 0.30	1.15	< 0.50	5.8
	QA/QC RPD%		2	*	*	*	4	*	*	*	*	1	*	*	0	*	*	5	4	5	-	3	*	6	4	*	5	0	*	*	*	2	*	3
	RG_DW-02-20_WP_Q3-2021_NP	2021 07 21	262	< 1.0	< 0.10	< 0.10	100	< 0.020	< 0.050	< 10	0.0062	70.5	0.20	< 0.10	1.32	< 10	< 0.050	8.0	20.8	0.65	-	1.10	< 0.50	0.672	16.6	< 0.010	2.78	266	< 0.010	< 0.10	< 0.30	1.06	< 0.50	3.5
	RG_DW-02-40_WP_Q3-2021_3	Duplicate	263	< 1.0	< 0.10	< 0.10	97.3	< 0.020	< 0.050	< 10	0.0071	70.7	0.22	< 0.10	1.42	< 10	< 0.050	7.8	21.0	0.63	-	1.09	< 0.50	0.670	16.8	< 0.010	2.85	261	< 0.010	< 0.10	< 0.30	1.08	< 0.50	3.5
	QA/QC RPD%		0	*	*	*	3	*	*	*	*	0	*	*	7	*	*	3	1	3	-	1	*	0	1	*	2	2	*	*	*	2	*	*
	RG_DW-02-20_WP_2021_10_28_NP	2021 10 28	236	< 1.0	< 0.10	< 0.10	88.9	< 0.020	< 0.050	< 10	0.0062	63.0	0.18	< 0.10	2.26	32	0.060	7.1	19.2	1.04	-	1.14	< 0.50	0.634	12.2	< 0.010	2.45	235	< 0.010	< 0.10	< 0.30	1.07	< 0.50	5.5
RG_MW_WW^	RG_MW_WW_WP_Q1-2021_NP	2021 03 25	248	1.2	< 0.10	0.12	119	< 0.020	< 0.050	< 10	0.0089	68.4	0.18	< 0.10	< 0.20	< 10	< 0.050	5.0	18.8	0.12	< 0.0050	1.51	< 0.50	0.638	10.8	< 0.010	2.41	224	< 0.010	< 0.10	< 0.30	0.855	< 0.50	< 1.0
	RG_MW_WW_WG_2021_Q2_NP	2021 06 10	226	< 1.0	< 0.10	0.12	130	< 0.020	< 0.050	< 10	0.0094	61.1	0.18	< 0.10	< 0.20	< 10	< 0.050	4.6	17.8	0.34	< 0.0050	1.35	< 0.50	0.655	10.3	< 0.010	2.39	217	< 0.010	< 0.10	< 0.30	0.877	< 0.50	< 1.0
	RG_MW_WW_WG_2021_Q3_NP	2021 09 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	RG_MW_WW_WG_2021_Q4_NP	2021 11 23	240	< 1.0	< 0.10	0.11	134	< 0.020	< 0.050	< 10	0.0097	66.3	0.19	< 0.10	< 0.20	< 10	< 0.050	5.0	18.1	0.15	< 0.0050	1.36	< 0.50	0.669	11.6	< 0.010	2.45	216	< 0.010	< 0.10	< 0.30	0.938	< 0.50	< 1.0

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Standard/guideline varies with pH.

[e] Standard/guideline varies with Hardness.

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

[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

[h] Guideline is temperature, pH, DOC and hardness dependent.

[i] 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.

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

[k] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

[l] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Metals																														
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[l]
				mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[e]	n/a	10[f]	40	20-90[e]	n/a	40-160[e]	n/a	n/a	n/a	0.25	10,000	250-1,500[e]	n/a	20	0.5-15[e]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[e]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[d]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[k]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BC Guideline																																		
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	50[d]	9	n/a	1,000	0.13	n/a	1,200	0.261-0.457[e]	n/a	1	4	0.2-4.1[h]	n/a	7.89-19.6[e]	n/a	n/a	1,190 - 2,462[e]	0.02[j]	7,600	119-150[e]	n/a	2	1.5[e]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	39.8-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	100[d]	n/a	5	n/a	n/a	n/a	n/a	0.789-2.592[e]	n/a	n/a	110	0.2-25[h]	350	117-417[e]	n/a	n/a	2,006-3,390[e]	n/a	46,000	n/a	n/a	n/a	3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	62.3-282[e]
Elk River Proximal to EVO (+ denotes well part of Study Area 8)																																		
EV_BALgw	EV_BALGW_WG_2021_Q1_N	2021 01 27	418	< 3.0	< 0.10	0.10	35.5	< 0.020	< 0.050	190	0.0082	108	< 0.10	0.10	0.93	< 10	< 0.050	130	35.8	19.9	< 0.0050	0.327	0.70	2.93	0.202	< 0.010	39.5	2,820	< 0.010	< 0.10	< 10	0.165	< 0.50	3.4
	EV_BALGW_WG_2021_Q2_NP	2021 05 12	358	23.5	< 0.10	0.18	34.2	< 0.020	< 0.050	180	< 0.0050	92.6	< 0.10	0.14	0.83	150	0.085	117	30.8	29.2	< 0.0050	0.228	0.67	2.83	0.054	0.019	35.3	2,350	< 0.010	< 0.10	0.40	0.134	< 0.50	2.9
	EV_BALGW_WG_2021_Q3_NP	2021 07 22	346	< 1.0	< 0.10	0.19	35.3	< 0.020	< 0.050	168	< 0.0050	89.0	< 0.10	0.12	0.56	47	< 0.050	116	30.2	28.2	< 0.0050	0.231	< 0.50	2.76	< 0.050	< 0.010	35.8	2,410	< 0.010	< 0.10	< 0.30	0.118	< 0.50	6.0
	EV_BALGW_WG_2021_Q4_NP	2021 11 09	381	1.1	< 0.10	0.16	37.5	< 0.020	< 0.050	171	< 0.0050	94.7	< 0.10	< 0.10	1.16	41	< 0.050	121	35.2	10.5	< 0.0050	0.306	1.82	3.09	0.096	< 0.010	41.5	2,640	< 0.010	< 0.10	< 0.30	0.122	< 0.50	6.1
EV_GCgw	EV_GCGW_WG_2021_Q1_NP	2021 01 28	240	< 3.0	< 0.10	2.28	67.9	< 0.020	< 0.050	14	< 0.0050	68.3	< 0.10	0.18	0.28	333	< 0.050	8.3	17.0	84.0	< 0.0050	2.42	0.53	0.674	< 0.050	< 0.010	3.87	269	0.020	< 0.10	< 10	1.16	< 0.50	1.2
	EV_GCGW_WG_2021_Q2_NP	2021 05 13	247	1.4	< 0.10	3.37	80.6	< 0.020	< 0.050	14	< 0.0050	68.2	< 0.10	0.19	< 0.20	327	< 0.050	8.0	18.7	75.6	< 0.0050	2.58	0.53	0.803	< 0.050	< 0.010	4.11	282	0.018	< 0.10	< 0.30	1.05	< 0.50	1.4
	EV_GCGW_WG_2021_Q3_NP	2021 07 14	236	< 1.0	< 0.10	2.37	69.1	< 0.020	< 0.050	14	< 0.0050	64.2	< 0.10	0.20	< 0.20	227	< 0.050	7.7	18.5	89.9	< 0.0050	2.38	0.61	0.795	< 0.050	< 0.010	4.27	271	0.019	< 0.10	< 0.30	1.18	< 0.50	1.8
	EV_GCGW_WG_2021_Q4_NP	2021 10 24	232	3.7	< 0.10	2.54	73.4	< 0.020	< 0.050	14	< 0.0050	62.7	< 0.10	0.19	0.46	373	< 0.050	8.2	18.2	81.0	< 0.0050	2.37	0.52	0.754	< 0.050	< 0.010	3.82	248	0.011	< 0.10	< 0.30	1.06	< 0.50	1.9
	EV_MC10A_WG_2021_Q4_NP	Duplicate	226	2.8	< 0.10	2.56	67.4	< 0.020	< 0.050	13	< 0.0050	60.8	< 0.10	0.18	< 0.20	372	< 0.050	7.6	18.0	80.8	< 0.0050	2.29	< 0.50	0.748	< 0.050	< 0.010	3.87	246	0.011	< 0.10	< 0.30	1.09	< 0.50	1.5
	QA/QC RPD%		3	*	*	1	9	*	*	*	*	3	*	*	*	0	*	8	1	0	*	3	*	1	*	*	1	1	*	*	*	3	*	*
EV_LSgw[+]	EV_LSGW_WG_2021_Q1_N	2021 01 27	644	< 3.0	< 0.10	1.56	272	< 0.020	< 0.050	45	< 0.0050	128	< 0.10	1.51	0.49	2,560	< 0.050	62.4	78.8	*1,220*	< 0.0050	2.54	4.26	4.13	0.077	< 0.010	10.8	546	0.042	< 0.10	< 10	2.30	< 0.50	1.5
	EV_LSGW_WG_2021_Q2_NP	2021 05 13	626	2.1	< 0.10	1.42	225	< 0.020	< 0.050	41	< 0.0050	128	< 0.10	1.16	< 0.20	1,950	< 0.050	73.8	74.3	*976*	< 0.0050	2.15	3.74	4.04	0.067	< 0.010	10.1	524	0.036	< 0.10	< 0.30	2.07	< 0.50	1.4
	EV_LSGW_WG_2021_Q3_NP	2021 07 14	594	2.7	< 0.10	1.80	227	< 0.020	< 0.050	48	< 0.0050	117	< 0.10	1.42	< 0.20	2,440	< 0.050	65.6	73.2	*1,080*	< 0.0050	2.47	4.23	4.39	0.090	< 0.010	9.73	515	0.040	< 0.10	< 0.30	1.85	< 0.50	1.4
	EV_MW_BC10A_WG_2021_Q3_NP_FD	Duplicate	584	2.4	< 0.10	1.85	223	< 0.020	< 0.050	49	< 0.0050	114	< 0.10	1.36	0.88	2,300	< 0.050	65.8	72.8	*1,050*	< 0.0050	2.46	4.20	4.31	0.113	< 0.010	9.72	496	0.037	< 0.10	< 0.30	1.81	< 0.50	1.9
	QA/QC RPD%		2	*	*	3	2	*	*	*	*	3	*	4	*	6	*	0	1	3	*	0	1	2	*	*	0	4	*	*	*	2	*	*
	EV_LSGW_WG_2021_Q4_NP	2021 10 27	614	1.9	< 0.10	2.02	260	< 0.020	< 0.050	47	< 0.0050	124	< 0.10	1.60	< 0.20	2,990	< 0.050	73.9	73.8	*1,200*	< 0.0050	2.37	4.64	4.45	0.154	< 0.010	9.73	492	0.036	< 0.10	< 0.30	1.71	< 0.50	1.4
EV_OCgw[+,l]	EV_OCGW_WG_2021_Q1_NP	2021 03 19	134	2.2	< 0.10	1.29	50.2	< 0.020	< 0.050	94	< 0.0050	24.2	< 0.10	< 0.10	< 0.20	119	< 0.050	21.4	18.0	80.7	< 0.00050	*12.4*	< 0.50	1.48	< 0.050	< 0.010	44.7	354	< 0.010	< 0.10	< 0.30	0.931	< 0.50	< 1.0
	EV_MC5GW_WG_2021_Q1_NP	Duplicate	133	1.5	< 0.10	1.38	49.8	< 0.020	< 0.050	94	< 0.0050	23.7	< 0.10	< 0.10	< 0.20	174	< 0.050	20.5	17.9	80.8	< 0.00050	*11.9*	< 0.50	1.50	< 0.050	< 0.010	44.5	342	< 0.010	< 0.10	< 0.30	0.917	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	7	1	*	*	0	*	2	*	*	*	38	*	4	1	0	*	4	*	1	*	*	0	3	*	*	*	2	*	*
	EV_OCGW_WG_2021_Q2_NP	2021 05 31	153	1.7	< 0.10	1.04	52.6	< 0.020	< 0.050	131	0.0060	29.6	< 0.10	< 0.10	< 0.20	< 10	< 0.050	25.9	19.3	23.2	< 0.00050	*14.5*	< 0.50	1.41	< 0.050	< 0.010	43.3	395	0.010	< 0.10	< 0.30	1.22	< 0.50	< 1.0
	EV_MC5GW_WG_2021_Q2_NP	Duplicate	156	1.8	< 0.10	0.98	52.6	< 0.020	< 0.050	132	0.0071	29.7	< 0.10	< 0.10	< 0.20	< 10	< 0.050	25.6	19.8	23.3	< 0.00050	*14.7*	< 0.50	1.43	< 0.050	< 0.010	43.2	396	0.012	< 0.10	< 0.30	1.22	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	6	0	*	*	1	*	0	*	*	*	*	*	1	3	0	*	1	*	1	*	*	0	0	*	*	*	0	*	*
	EV_OCGW_WG_2021_Q3_NP	2021 09 08	152	1.8	< 0.10	1.45	53.0	< 0.020	< 0.050	120	0.0086	28.1	0.32	0.16	< 0.20	188	< 0.050	24.0	19.9	85.6	< 0.00050	*15.5*	< 0.50	1.45	< 0.050	< 0.010	45.7	412	< 0.010	< 0.10	< 0.30	1.06	< 0.50	< 1.0
	EV_MC5GW_WG_2021_Q3_NP	Duplicate	152	1.3	< 0.10	1.51	52.6	< 0.020	< 0.050	121	0.0090	28.1	< 0.10	0.19	< 0.20	168	< 0.050	24.5	19.8	93.4	< 0.00050	*15.1*	< 0.50	1.44	< 0.050	< 0.010	45.0	409	< 0.010	< 0.10	< 0.30	1.06	< 0.50	1.0
	QA/QC RPD%		0	*	*	4	1	*	*	1	*	0	*	*	*	11	*	2	1	9	*	3	*	1	*	*	2	1	*	*	*	0	*	*
	EV_OCGW_WG_2021_Q4_NP	2021 11 21	142	1.2	< 0.10	1.45	50.3	< 0.020	< 0.050	112	< 0.0050	27.2	< 0.10	< 0.10	< 0.20	156	< 0.050	27.4	18.0	72.5	< 0.00050	*14.6*	< 0.50	1.57	< 0.050	< 0.010	46.2	384	< 0.010	< 0.10	< 0.30	1.13	< 0.50	< 1.0
	EV_MC5GW_WG_2021_Q4_NP	Duplicate	140	1.3	< 0.10	1.51	50.6	< 0.020	< 0.050	111	< 0.0050	27.0	< 0.10	0.10	< 0.20	193	< 0.050	26.6	17.7	73.1	< 0.00050	*14.5*	< 0.50	1.55	< 0.050	< 0.010	45.8	381	< 0.010	< 0.10	< 0.30	1.12	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	4	1	*	*	1	*	1	*	*	*	21	*	3	2	1	*	1	*	1	*	*	1	1	*	*	*	1	*	*
EV_MW_GC1B[+]	EV_MW_GC1B_WG_2021_Q1_NP	2021 03 21	543	< 1.0	< 0.10	0.14	90.4	< 0.020	< 0.050	50	0.116	119	< 0.10	0.48	0.21	101	< 0.050	36.7	59.8	*791*	< 0.0050	1.86	3.63	2.16	0.843	< 0.010	17.9	732	0.059	< 0.10	< 0.30	1.45	< 0.50	< 1.0
	EV_MW_BC10A_WG_2021_Q1_NP	Duplicate	534	< 1.0	< 0.10	0.13	89.5	< 0.020	< 0.050	50	0.113	117	< 0.10	0.47	< 0.20	101	< 0.050	35.9	58.7	*768*	< 0.0050	1.80	3.51	2.18	0.778	< 0.010	18.2	737	0.057	< 0.10	< 0.30	1.46	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	*	1	*	*	0	3	2	*	*	*	0	*	2	2	3	*	3	3	1	8	*	2	1	3	*	*	1	*	*
	EV_MW_GC1B_WG_2021_Q2_NP	2021 05 24	617	< 1.0	0.10	0.12	101	< 0.020	< 0.050	53	0.130	132	< 0.10	0.51	< 0.20	40	< 0.050	43.9	69.7	*789*	< 0.0050	2.08	3.92	2.16	5.92	< 0.010	18.8	861	0.058	< 0.10	< 0.30	1.61	< 0.50	2.0
	EV_MW_GC1B_WG_2021_Q3_NP	2021 07 28	610	1.7	0.14	0.20	107	< 0.020	< 0.050	68	0.118	130	< 0.10	0.50	2.11	54	0.075	45.6	69.3	*775*	< 0.0050	2.47	4.03	2.80	3.17	< 0.010	19.6	920	0.069	< 0.10	< 0.30	1.69	< 0.50	4.4
	EV_MW_GC1B_WG_2021_Q4_NP	2021 10 24	622	< 1.0	0.12	0.14	101	< 0.020	< 0.050	52	0.103	135	< 0.10	0.49	0.21	111	< 0.050	39.9	69.1	*789*	< 0.0050	2.24	3.86	2.41	2.63	< 0.010	18.3	833	0.061	< 0.10	< 0.30	1.64	< 0.50	1.9

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
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[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Standard/guideline varies with pH.

[e] Standard/guideline varies with Hardness.

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

[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

[h] Guideline is temperature, pH, DOC and hardness dependent.

[i] 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.

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

[k] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

[l] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Metals																																
			mg/L	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 mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[l] µg/L
BC Standard																																				
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[e]	n/a	10[f]	40	20-90[e]	n/a	40-160[e]	n/a	n/a	n/a	0.25	10,000	250-1,500[e]	n/a	20	0.5-15[e]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[e]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[d]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[k]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BC Guideline																																				
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	50[d]	9	n/a	1,000	0.13	n/a	1,200	0.261-0.457[e]	n/a	1	4	0.2-4.1[h]	n/a	7.89-19.6[e]	n/a	n/a	1,190 - 2,462[e]	0.02[i]	7,600	119-150[e]	n/a	2	1.5[e]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	39.8-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	100[d]	n/a	5	n/a	n/a	n/a	n/a	0.789-2.592[e]	n/a	n/a	110	0.2-25[h]	350	117-417[e]	n/a	n/a	2,006-3,390[e]	n/a	46,000	n/a	n/a	n/a	3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	62.3-282[e]
Elk River Proximal to EVO (+ denotes well part of Study Area 8)																																				
RG_DW-03-10[+]	RG_DW-03-10_WP_Q1-2021_NP	2021 03 09	266	< 3.0	< 0.10	< 0.10	151	< 0.020	< 0.050	< 10	< 0.0050	72.1	0.64	< 0.10	4.67	< 10	0.055	7.0	20.9	< 0.10	-	1.45	< 0.50	0.845	1.2	< 0.010	5.29	209	< 0.010	< 0.10	< 10	1.41	< 0.50	5.7
	RG_DW-03-10_WP_Q2-2021_NP	2021 05 11	242	< 1.0	< 0.10	< 0.10	145	< 0.020	< 0.050	< 10	< 0.0050	65.6	0.56	< 0.10	3.24	< 10	0.079	7.4	19.0	< 0.10	-	1.51	< 0.50	0.820	1.17	< 0.010	5.15	200	< 0.010	< 0.10	< 0.30	1.41	< 0.50	14.8
	RG_DW-03-10_WP_Q3-2021_NP	2021 07 20	228	< 1.0	< 0.10	< 0.10	154	< 0.020	< 0.050	< 10	< 0.0050	58.6	0.66	< 0.10	3.60	< 10	0.079	6.2	19.9	< 0.10	-	1.32	< 0.50	0.828	1.14	< 0.010	5.28	168	< 0.010	< 0.10	< 0.30	1.22	< 0.50	14.5
	RG_DW-03-10_WP_2021-10-25_NP	2021 10 25	253	< 1.0	< 0.10	< 0.10	145	< 0.020	< 0.050	< 10	0.0059	66.9	0.64	< 0.10	2.92	< 10	0.075	7.0	20.9	< 0.10	-	1.39	< 0.50	0.830	1.08	< 0.010	5.04	200	< 0.010	< 0.10	< 0.30	1.33	< 0.50	12.8
Sparwood Area - Baldy and Sparwood Ridges																																				
EV_MW_AQ1	EV_MW_AQ1_WG_2021_Q1_NP	2021 01 20	551	< 3.0	< 0.10	0.10	193	< 0.020	< 0.050	25	0.0419	137	< 0.10	< 0.10	0.33	< 10	< 0.050	22.6	50.7	0.17	< 0.0050	0.337	< 0.50	1.62	4.57	< 0.010	4.94	414	< 0.010	< 0.10	< 10	0.461	< 0.50	< 1.0
	EV_MW_AQ1_WG_2021_Q2_NP	2021 05 13	509	< 1.0	< 0.10	0.12	209	< 0.020	< 0.050	22	0.0394	123	< 0.10	< 0.10	0.81	< 10	< 0.050	23.0	49.1	0.10	< 0.0050	0.321	0.62	1.61	8.17	< 0.010	5.26	361	< 0.010	< 0.10	< 0.30	0.422	< 0.50	4.4
	EV_MW_AQ1_WG_2021_Q3_NP	2021 07 14	492	< 1.0	< 0.10	0.12	201	< 0.020	< 0.050	25	0.0402	117	< 0.10	< 0.10	1.32	< 10	0.052	20.5	48.6	0.14	< 0.0050	0.324	0.64	1.78	4.77	< 0.010	5.38	383	< 0.010	< 0.10	< 0.30	0.477	< 0.50	12.5
	EV_MW_AQ1_WG_2021_Q4_NP	2021 10 28	486	< 1.0	< 0.10	< 0.10	172	< 0.020	< 0.050	24	0.0352	113	< 0.10	< 0.10	0.39	< 10	< 0.050	22.4	49.6	0.19	< 0.0050	0.316	0.72	1.69	2.02	< 0.010	4.79	376	< 0.010	< 0.10	< 0.30	0.463	< 0.50	2.6
EV_MW_AQ2	EV_MW_AQ2_WG_2021_Q1_NP	2021 02 25	676	< 3.0	< 0.10	0.14	18.8	< 0.020	< 0.050	100	< 0.0050	165	< 0.10	< 0.10	0.31	489	< 0.050	61.3	64.3	76.2	< 0.0050	0.235	0.81	2.09	< 0.050	< 0.010	21.2	1,190	< 0.010	< 0.10	< 10	0.120	< 0.50	< 1.0
	EV_MW_AQ2_WG_2021_Q2_NP	2021 05 13	684	< 1.0	< 0.10	0.11	20.0	< 0.020	< 0.050	111	< 0.0050	170	< 0.10	0.10	< 0.20	477	< 0.050	63.4	63.0	76.0	< 0.0050	0.187	0.62	2.07	< 0.050	< 0.010	21.6	1,220	< 0.010	< 0.10	< 0.30	0.118	< 0.50	< 1.0
	EV_MW_AQ2_WG_2021_Q3_NP	2021 07 16	597	5.0	< 0.10	0.12	20.1	< 0.020	< 0.050	98	< 0.0050	140	< 0.10	0.10	< 0.20	484	< 0.050	54.7	60.1	74.4	< 0.0050	0.190	0.78	2.21	< 0.050	< 0.010	21.0	1,110	< 0.010	< 0.10	< 0.30	0.125	< 0.50	< 1.0
	EV_MW_AQ2_WG_2021_Q4_NP	2021 10 28	588	< 1.0	< 0.10	0.10	18.3	< 0.020	< 0.050	90	< 0.0050	141	0.12	< 0.10	< 0.20	450	< 0.050	56.3	57.4	71.9	< 0.0050	0.201	0.71	2.02	< 0.050	< 0.010	18.6	1,070	< 0.010	< 0.10	< 0.30	0.122	< 0.50	< 1.0
EV_MW_MC4	EV_MW_MC4_WG_2021_Q1_NP	2021 01 20	541	< 3.0	< 0.10	0.54	132	< 0.020	< 0.050	41	< 0.0050	149	< 0.10	0.53	0.30	443	< 0.050	22.9	41.0	71.9	< 0.0050	3.56	3.04	2.41	< 0.050	< 0.010	8.09	639	0.023	< 0.10	< 10	1.14	< 0.50	4.9
	EV_MW_MC4_WG_2021_Q2_NP	2021 04 18	448	1.2	< 0.10	0.55	130	< 0.020	< 0.050	36	< 0.0050	120	< 0.10	0.50	1.32	408	< 0.050	19.9	36.1	70.1	< 0.0050	3.61	2.80	2.44	< 0.050	< 0.010	7.63	588	0.021	< 0.10	< 0.30	1.14	< 0.50	4.8
	EV_MW_MC4_WG_2021_Q3_NP	2021 07 09	469	1.6	< 0.10	0.46	115	< 0.020	< 0.050	40	< 0.0050	124	< 0.10	0.51	0.59	370	< 0.050	20.7	38.7	69.9	< 0.0050	3.60	3.35	2.42	< 0.050	0.212	7.76	582	0.026	< 0.10	< 0.30	1.13	< 0.50	5.6
	EV_MW_MC4_WG_2021_Q4_NP	2021 11 21	454	< 1.0	0.11	0.56	121	< 0.020	< 0.050	36	< 0.0050	121	< 0.10	0.46	< 0.20	379	< 0.050	20.6	36.9	65.6	< 0.0050	3.81	2.61	2.43	< 0.050	< 0.010	7.73	601	0.022	< 0.10	< 0.30	1.16	< 0.50	4.6
EV_MW_MC3	EV_MW_MC3_WG_2021_Q1_NP	2021 01 28	128	< 3.0	< 0.10	0.95	123	< 0.020	< 0.050	69	< 0.020	34.1	< 0.10	< 0.10	< 0.20	< 10	< 0.050	88.6	10.5	31.4	< 0.0050	*31.9*	< 0.50	0.856	3.95	< 0.010	109	119	0.013	< 0.10	< 10	0.738	< 0.50	1.5
	EV_MW_MC3_WG_2021_Q2_NP	2021 04 19	412	< 1.0	0.11	0.17	142	< 0.020	< 0.050	18	0.0798	107	< 0.10	< 0.10	0.32	< 10	< 0.050	27.9	35.2	27.9	< 0.0050	3.56	0.67	1.38	***23.2***	< 0.010	23.3	267	< 0.010	< 0.10	< 0.30	1.23	< 0.50	1.5
	EV_MW_MC3_WG_2021_Q3_NP	2021 07 09	374	1.6	0.11	0.13	97.5	< 0.020	< 0.050	23	0.0565	96.3	< 0.10	< 0.10	1.06	< 10	< 0.050	29.5	32.4	3.64	< 0.0050	1.76	< 0.50	1.51	13.0	< 0.010	23.1	231	< 0.010	< 0.10	< 0.30	1.12	< 0.50	1.5
	EV_MW_MC3_WG_2021_Q4_NP	2021 11 22	428	< 1.0	0.12	0.12	126	< 0.020	< 0.050	24	0.0706	110	< 0.10	< 0.10	0.69	< 10	< 0.050	33.7	37.2	2.72	< 0.0050	1.24	< 0.50	1.76	***24.2***	< 0.010	17.4	262	< 0.010	< 0.10	< 0.30	1.23	< 0.50	1.2
	EV_EC5GW_WG_2021_Q4_NP	Duplicate	420	< 1.0	0.10	0.11	122	< 0.020	< 0.050	24	0.0625	109	< 0.10	< 0.10	0.28	< 10	< 0.050	34.1	35.9	2.80	< 0.0050	1.28	< 0.50	1.72	***22.1***	< 0.010	17.8	250	< 0.010	< 0.10	< 0.30	1.24	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	*	3	*	*	*	12	1	*	*	*	*	*	1	4	3	*	3	*	2	9	*	2	5	*	*	*	1	*	*
Sparwood Area - Michel Creek (denotes well part of Study Area 9a)**																																				
EV_MCgwS**	EV_MCGWS_WG_2021_Q2_NP	2021 05 30	421	< 1.0	< 0.10	1.49	26.4	< 0.020	< 0.050	27	< 0.0050	110	< 0.10	< 0.10	0.20	1,960	< 0.050	24.8	35.6	129	< 0.0050	2.86	< 0.50	1.47	< 0.050	< 0.010	16.9	348	< 0.010	< 0.10	< 0.30	1.84	< 0.50	< 1.0
	EV_EC5GW_WG_2021_Q2_NP	Duplicate	421	1.1	< 0.10	1.54	25.0	< 0.020	< 0.050	26	< 0.0050	110	< 0.10	< 0.10	< 0.20	1,970	< 0.050	24.4	35.6	130	< 0.0050	2.84	< 0.50	1.48	< 0.050	< 0.010	17.0	350	< 0.010	< 0.10	< 0.30	1.89	< 0.50	< 1.0
	QA/QC RPD%		0	*	*	3	5	*	*	*	*	0	*	*	*	1	*	2	0	1	*	1	*	1	*	*	1	1	*	*	*	3	*	*
	EV_MCgwS_WG_2021_Q3_NP	2021 09 03	376	7.4	< 0.10	1.64	26.7	< 0.020	< 0.050	25	0.0064	95.2	< 0.10	0.12	< 0.20	1,900	< 0.050	20.9	33.6	132	< 0.0050	3.09	0.52	1.54	< 0.050	< 0.010	20.3	302	< 0.010	< 0.10	< 0.30	1.83	< 0.50	< 1.0
	EV_MCGWS_WG_2021_Q4_NP	2021 11 22	364	< 1.0	< 0.10	1.75	27.1	< 0.020	< 0.050	28	< 0.0050	91.7	< 0.10	0.12	< 0.20	1,840	< 0.050	24.4	32.9	132	< 0.0050	3.35	< 0.50	1.59	< 0.050	< 0.010	24.2	303	< 0.010	< 0.10	< 0.30	2.09	< 0.50	< 1.0
EV_MCgwD**	EV_MCGWD_WG_2021_Q1_NP	2021 03 25	230	< 1.0	0.19	0.84	55.0	< 0.020	< 0.050	79	0.0494	50.6	< 0.10	0.54	0.47	216	< 0.050	8.8	25.3	*356*	< 0.0050	*16.4*	2.90	1.31	0.094	< 0.010	32.8	513	0.040	< 0.10	< 0.30	2.87	< 0.50	21.9
	EV_MW_MC10A_WG_2021_Q1_NP	Duplicate	231	1.1	0.20	0.71	57.0	< 0.020	< 0.050	81	0.0487	51.8	< 0.10	0.54	0.47	167	< 0.050	8.9	24.6	*350*	< 0.0050	*15.6*	3.06	1.32	0.080	< 0.010	31.4	502	0.046	< 0.10	< 0.30	2.84	< 0.50	24.3
	QA/QC RPD%		0	*	*	17	4	*	*	2	1	2	*	0	*	26	*	1	3	2	*	5	5	1	*	*	4	2	*	*	*	1	*	10
	EV_MCGWD_WG_2021_Q2_NP	2021 05 30	222	< 1.0	< 0.10	0.90	55.9	< 0.020	< 0.050	72	0.0253	48.2	< 0.10	0.79	0.78	66	< 0.050	10.6	24.6	*432*	< 0.0050	*18.3*	1.97	1.39	0.053	< 0.010	44.2	513	0.024	< 0.10	< 0.30	3.60	< 0.50	19.2
	EV_MCgwD_WG_2021_Q3_NP	2021 09 03	226	2.1	0.27	0.36	67.8	< 0.020	< 0.050	65	0.0510	48.5	< 0.10	0.42	3.02	23	< 0.050	7.9	25.6	*362*	< 0.0050	*12.1*	5.12	1.52	0.080	< 0.010	24.6	472	0.044	< 0.10	< 0.30	2.29	< 0.50	82.9
	EV_MCGWD_WG_2021_Q4_NP	2021 11 22	221	2.0	0.18	0.67	66.9	< 0.020	< 0.050	76	0.0425	48.7	< 0.10	0.47	0.92	59	< 0.050	8.9	24.1	*360*	< 0.0050	*12.6*	4.02	1.41	< 0.050	< 0.010	22.8	472	0.046	< 0.10	< 0.30	2.40	< 0.50	55.9

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Standard/guideline varies with pH.

[e] Standard/guideline varies with Hardness.

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

[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

[h] Guideline is temperature, pH, DOC and hardness dependent.

[i] 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.

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

[k] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

[l] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Metals																																
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[l]
BC Standard																																				
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[e]	n/a	10[f]	40	20-90[e]	n/a	40-160[e]	n/a	n/a	n/a	0.25	10,000	250-1,500[e]	n/a	20	0.5-15[e]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[e]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[d]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[k]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BC Guideline																																				
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	50[d]	9	n/a	1,000	0.13	n/a	1,200	0.261-0.457[e]	n/a	1	4	0.2-4.1[h]	n/a	7.89-19.6[e]	n/a	n/a	1,190 - 2,462[e]	0.02[i]	7,600	119-150[e]	n/a	2	1.5[e]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	39.8-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	100[d]	n/a	5	n/a	n/a	n/a	n/a	0.789-2.592[e]	n/a	n/a	110	0.2-25[h]	350	117-417[e]	n/a	n/a	2,006-3,390[e]	n/a	46,000	n/a	n/a	n/a	3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	62.3-282[e]
Sparwood Area - Michel Creek (denotes well part of Study Area 9a)**																																				
EV_MW_SPR1A	EV_MW_SPR1A_WG_2021_Q1_NP	2021 02 26	362	< 3.0	< 0.10	0.95	392	< 0.020	< 0.050	23	< 0.0050	93.0	< 0.10	0.63	< 0.20	319	< 0.050	15.2	31.6	*319*	< 0.0050	1.20	1.87	1.57	< 0.050	< 0.010	4.14	327	0.012	< 0.10	< 10	0.961	< 0.50	< 1.0
	EV_MW_SPR1A_WG_2021_Q2_NP	2021 05 30	353	< 1.0	< 0.10	0.93	379	< 0.020	< 0.050	24	< 0.0050	90.4	< 0.10	0.60	< 0.20	160	< 0.050	15.8	31.0	*302*	< 0.0050	1.35	1.64	1.52	< 0.050	< 0.010	4.30	335	0.011	< 0.10	< 0.30	1.01	< 0.50	< 1.0
	EV_MW_BC10A_WG_2021_Q2_NP	Duplicate	356	1.5	< 0.10	0.94	383	< 0.020	< 0.050	24	< 0.0050	91.9	< 0.10	0.61	< 0.20	165	< 0.050	16.2	30.8	*304*	< 0.0050	1.31	1.64	1.52	< 0.050	< 0.010	4.42	340	0.010	< 0.10	< 0.30	0.994	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	1	1	*	*	*	*	2	*	2	*	3	*	2	1	1	*	3	*	0	*	*	3	1	*	*	*	2	*	*
	EV_MW_SPR1A_WG_2021_Q3_NP	2021 07 18	330	1.4	< 0.10	0.98	386	< 0.020	< 0.050	23	< 0.0050	83.4	< 0.10	0.59	< 0.20	232	< 0.050	15.1	29.6	*289*	< 0.0050	1.21	1.64	1.60	< 0.050	< 0.010	4.10	315	0.012	< 0.10	< 0.30	0.977	< 0.50	< 1.0
	EV_MW_SPR1A_WG_2021_Q4_NP	2021 11 14	306	< 1.0	< 0.10	0.98	344	< 0.020	< 0.050	20	< 0.0050	77.7	< 0.10	0.42	< 0.20	297	< 0.050	14.6	27.2	*256*	< 0.0050	1.47	1.19	1.52	< 0.050	< 0.010	3.89	308	< 0.010	< 0.10	< 0.30	0.656	< 0.50	< 1.0
EV_MW_SPR1B	EV_MW_SPR1B_WG_2021_Q1_NP	2021 02 26	153	< 3.0	< 0.10	0.78	38.3	< 0.020	< 0.050	139	< 0.015	36.4	< 0.10	< 0.10	< 0.20	181	< 0.050	10.1	15.2	100	< 0.0050	*27.7*	< 0.50	1.20	< 0.050	< 0.010	46.8	708	< 0.010	< 0.10	< 10	1.47	< 0.50	< 1.0
	EV_MW_SPR1B_WG_2021_Q2_NP	2021 05 30	152	1.2	< 0.10	0.80	41.9	< 0.020	< 0.050	153	< 0.0050	38.1	< 0.10	< 0.10	< 0.20	96	< 0.050	12.1	13.9	111	< 0.0050	*29.4*	< 0.50	1.20	< 0.050	< 0.010	46.7	884	< 0.010	< 0.10	< 0.30	1.65	< 0.50	< 1.0
	EV_MW_SPR1B_WG_2021_Q3_NP	2021 09 20	133	91.2	< 0.10	0.71	43.2	< 0.020	< 0.050	142	< 0.0150	33.6	0.22	< 0.10	< 0.20	169	0.079	10.5	12.0	113	< 0.0050	*23.4*	< 0.50	1.17	0.347	< 0.010	45.3	914	< 0.010	0.21	2.13	1.47	< 0.50	1.3
	EV_MW_SPR1B_WG_2021_Q4_NP	2021 11 14	125	< 1.0	< 0.10	0.60	40.3	< 0.020	< 0.050	127	< 0.0050	31.1	< 0.10	< 0.10	< 0.20	183	< 0.050	10.6	11.5	97.1	< 0.0050	*25.3*	< 0.50	1.15	< 0.050	< 0.010	43.6	878	< 0.010	< 0.10	< 0.30	1.27	< 0.50	< 1.0
EV_MW_SPR1C**	EV_MW_SPR1C_WG_2021_Q1_NP	2021 02 26	411	< 3.0	< 0.10	< 0.10	163	< 0.020	< 0.050	16	0.0538	110	0.12	< 0.10	0.34	< 10	< 0.050	15.2	33.0	0.29	< 0.0050	0.668	< 0.50	1.29	14.8	< 0.010	8.86	233	< 0.010	< 0.10	< 10	1.12	< 0.50	< 1.0
	EV_MW_SPR1C_WG_2021_Q2_NP	2021 05 13	435	< 1.0	< 0.10	< 0.10	199	< 0.020	< 0.050	13	0.0662	116	< 0.10	< 0.10	< 0.20	< 10	< 0.050	19.3	35.2	< 0.10	< 0.0050	0.569	< 0.50	1.36	9.39	< 0.010	12.4	251	< 0.010	< 0.10	< 0.30	1.07	< 0.50	< 1.0
	EV_MW_SPR1C_WG_2021_Q3_NP	2021 07 18	281	1.3	0.11	< 0.10	118	< 0.020	< 0.050	15	0.0482	75.4	0.20	< 0.10	0.29	< 10	< 0.050	13.4	22.5	0.32	< 0.0050	0.872	< 0.50	1.25	3.65	< 0.010	7.72	173	< 0.010	< 0.10	< 0.30	0.994	< 0.50	1.4
	EV_MW_SPR1C_WG_2021_Q4_NP	2021 11 14	430	1.4	0.11	< 0.10	206	< 0.020	< 0.050	18	0.0966	116	0.13	< 0.10	0.43	< 10	< 0.050	21.1	34.0	< 0.10	< 0.0050	0.672	< 0.50	1.68	7.10	< 0.010	12.7	282	< 0.010	< 0.10	< 0.30	1.31	< 0.50	1.0
EV_MW_MCgwA**	EV_MW_MCGWA_WG_2021_Q1_NP	2021 02 02	391	< 3.0	0.13	0.17	489	< 0.020	< 0.050	35	0.0226	102	< 0.10	0.15	0.20	92	< 0.050	22.3	33.4	30.1	< 0.0050	2.97	1.43	2.25	0.99	< 0.010	14.9	420	0.013	< 0.10	< 10	0.593	< 0.50	< 1.0
	EV_MW_MCGWA_WG_2021_Q2_NP	2021 05 13	434	2.7	0.14	0.14	548	< 0.020	< 0.050	35	0.0333	114	< 0.10	0.17	< 0.20	70	< 0.050	25.7	36.4	32.9	< 0.0050	3.17	1.75	2.33	0.913	< 0.010	15.0	447	0.014	< 0.10	< 0.30	0.627	< 0.50	1.5
	EV_MW_MCGWA_GW_2021_Q3_NP	2021 07 16	395	1.0	< 0.10	0.16	403	< 0.020	< 0.050	36	0.0165	99.9	< 0.10	0.17	0.28	94	< 0.050	21.8	35.4	33.3	< 0.0050	2.71	1.66	2.46	0.840	< 0.010	15.9	424	0.014	< 0.10	< 0.30	0.654	< 0.50	2.2
	EV_MW_MCGWA_WG_2021_Q4_NP	2021 11 21	376	< 1.0	0.11	0.15	359	< 0.020	< 0.050	33	0.0215	97.3	< 0.10	0.17	< 0.20	90	< 0.050	20.6	32.4	27.2	< 0.0050	3.18	1.68	2.27	1.14	< 0.010	14.1	403	0.013	< 0.10	< 0.30	0.640	< 0.50	1.2
EV_MW_MCgwB**	EV_MW_MCGWB_WG_2021_Q1_NP	2021 02 02	409	< 3.0	< 0.10	0.12	252	< 0.020	< 0.050	44	0.0791	110	< 0.10	0.11	0.60	< 10	< 0.050	17.4	33.0	0.22	< 0.0050	2.99	2.02	2.41	1.96	< 0.010	17.1	311	0.017	< 0.10	< 10	0.694	< 0.50	< 1.0
	EV_MW_MCGWB_WG_2021_Q2_NP	2021 05 13	456	< 1.0	< 0.10	0.14	263	< 0.020	< 0.050	55	0.0808	126	< 0.10	< 0.10	0.40	< 10	< 0.050	18.9	34.3	0.28	< 0.0050	3.16	1.70	2.68	1.82	< 0.010	17.2	342	0.016	< 0.10	< 0.30	0.733	< 0.50	1.1
	EV_MW_MCGWB_GW_2021_Q3_NP	2021 07 17	373	< 1.0	< 0.10	0.12	229	< 0.020	< 0.050	53	0.0926	97.9	0.10	0.10	0.32	< 10	< 0.050	15.4	31.3	0.14	< 0.0050	3.28	1.72	2.81	1.65	< 0.010	16.6	308	0.020	< 0.10	< 0.30	0.730	< 0.50	1.6
	EV_MW_MCGWB_WG_2021_Q4_NP	2021 11 21	365	< 1.0	< 0.10	0.14	218	< 0.020	< 0.050	39	0.0718	97.4	0.12	< 0.10	0.34	< 10	< 0.050	14.8	29.5	0.12	< 0.0050	3.30	1.61	2.34	1.97	< 0.010	13.8	312	0.014	< 0.10	< 0.30	0.710	< 0.50	< 1.0
Sparwood Area - Elk River (Study Area 12)																																				
EV_ER1gwS	EV_ER1GWS_WG_2021_Q1_N	2021 02 26	312	< 3.0	< 0.10	0.11	117	< 0.020	< 0.050	10	0.0143	82.1	0.35	< 0.10	0.35	< 10	< 0.050	7.4	26.1	< 0.10	< 0.0050	0.987	< 0.50	0.789	13	< 0.010	6.73	224	< 0.010	< 0.10	< 10	1.20	< 0.50	< 1.0
	EV_ER1GWS_WG_Q2-2021_NP	2021 06 10	280	1.2	< 0.10	0.11	139	< 0.020	< 0.050	10	0.0124	77.7	0.26	< 0.10	0.20	< 10	< 0.050	8.3	20.9	< 0.10	< 0.0050	0.904	< 0.50	1.01	6.56	< 0.010	10.8	201	< 0.010	< 0.10	< 0.30	0.960	< 0.50	< 1.0
	EV_ER1gwS_WG_2021_Q3_NP	2021 09 12	236	1.2	< 0.10	0.10	126	< 0.020	< 0.050	< 10	0.0102	64.9	0.23	< 0.10	< 0.20	< 10	< 0.050	7.3	18.0	0.11	< 0.0050	0.950	< 0.50	0.904	7.97	< 0.010	6.54	183	< 0.010	< 0.10	< 0.30	0.949	< 0.50	< 1.0
	EV_ER1gwS_WG_2021_Q4_NP	2021 11 17	257	< 1.0	< 0.10	0.15	127	< 0.020	< 0.050	< 10	0.0148	68.6	0.24	< 0.10	0.73	< 10	< 0.050	8.5	20.9	< 0.10	< 0.0050	1.16	< 0.50	0.827	8.60	< 0.010	6.52	202	< 0.010	< 0.10	< 0.30	1.12	< 0.50	< 1.0
EV_ER1gwD	EV_ER1GWD_WG_2021_Q1_N	2021 02 26	285	6.6	< 0.10	< 0.10	84.0	< 0.020	< 0.050	< 10	< 0.0050	73.7	0.36	< 0.10	0.37	< 10	< 0.050	6.9	24.5	1.56	< 0.0050	1.27	< 0.50	0.652	10	< 0.010	3.59	226	< 0.010	< 0.10	< 10	1.47	< 0.50	< 1.0
	EV_ER1GWD_WG_2021_Q2_NP	2021 06 10	251	6.0	0.34	0.14	89.4	< 0.020	< 0.050	11	0.0064	67.4	0.35	< 0.10	0.36	< 10	< 0.050	8.2	20.2	0.19	< 0.0050	1.82	0.68	0.954	3.69	< 0.010	3.67	203	< 0.010	< 0.10	< 0.30	1.36	< 0.50	5.2
	EV_ER1gwD_WG_2021_Q3_NP	2021 09 12	215	5.3	0.10	< 0.10	79.6	< 0.020	< 0.050	< 10	0.0060	56.8	0.42	< 0.10	0.30	< 10	< 0.050	6.9	17.8	0.36	< 0.0050	1.51	< 0.50	0.669	3.18	< 0.010	2.98	180	< 0.010	< 0.10	< 0.30	1.28	< 0.50	3.0
	EV_MW_MC10A_WG_2021_Q3_NP	Duplicate	214	5.8	0.11	< 0.10	77.9	< 0.020	< 0.050	< 10	< 0.0050	56.7	0.43	< 0.10	0.30	< 10	< 0.050	6.9	17.5	0.39	< 0.0050	1.50	< 0.50	0.660	3.35	< 0.010	2.92	180	< 0.010	< 0.10	< 0.30	1.29	< 0.50	3.0
	QA/QC RPD%		0	9	*	*	2	*	*	*	*	0	*	*	*	*	*	0	2	*	*	1	*	1	5	*	2	0	*	*	*	1	*	*
	EV_ER1gwD_WG_2021_Q4_NP	2021 11 17	230	5.2	0.13	0.12	87.0	< 0.020	< 0.050	10	0.0080	61.7	0.39	< 0.10	0.83	< 10	< 0.050	8.1	18.5	< 0.10	< 0.0050	1.67	< 0.50	0.709	4.24	< 0.010	3.12	197	< 0.010	< 0.10	< 0.30	1.36	< 0.50	3.1

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Standard/guideline varies with pH.

[e] Standard/guideline varies with Hardness.

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

[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

[h] Guideline is temperature, pH, DOC and hardness dependent.

[i] 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.

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

[k] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

[l] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Metals																														
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[j]
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[e]	n/a	10[f]	40	20-90[e]	n/a	40-160[e]	n/a	n/a	n/a	0.25	10,000	250-1,500[e]	n/a	20	0.5-15[e]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[e]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[d]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[k]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BC Guideline																																		
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	50[d]	9	n/a	1,000	0.13	n/a	1,200	0.261-0.457[e]	n/a	1	4	0.2-4.1[h]	n/a	7.89-19.6[e]	n/a	n/a	1,190 - 2,462[e]	0.02[i]	7,600	119-150[e]	n/a	2	1.5[e]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	39.8-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	100[d]	n/a	5	n/a	n/a	n/a	n/a	0.789-2.592[e]	n/a	n/a	110	0.2-25[h]	350	117-417[e]	n/a	n/a	2,006-3,390[e]	n/a	46,000	n/a	n/a	n/a	3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	62.3-282[e]
Sparwood Area - Elk River (Study Area 12)																																		
RG_DW-03-04	RG_DW-03-04_WP_Q1-2021_NP	2021 03 09	291	< 3.0	0.10	< 0.10	159	< 0.020	< 0.050	< 10	0.0145	73.7	0.13	< 0.10	0.38	< 10	< 0.050	8.9	26.1	< 0.10	-	1.10	< 0.50	1.03	12	< 0.010	7.58	183	< 0.010	< 0.10	< 10	1.06	< 0.50	1.2
	RG_DW-03-04_WP_Q2-2021_NP	2021 06 08	271	< 1.0	< 0.10	< 0.10	164	< 0.020	< 0.050	< 10	0.0136	70.2	0.11	< 0.10	0.36	< 10	< 0.050	8.9	23.2	< 0.10	-	1.05	< 0.50	0.969	8.79	< 0.010	8.82	175	< 0.010	< 0.10	< 0.30	1.08	< 0.50	1.8
	RG_DW-03-04_WP_Q3-2021_NP	2021 07 20	205	< 1.0	0.10	< 0.10	110	< 0.020	< 0.050	< 10	0.0107	53.8	0.15	< 0.10	0.49	< 10	< 0.050	7.5	17.2	< 0.10	-	1.17	< 0.50	0.772	4.18	< 0.010	7.45	128	< 0.010	< 0.10	< 0.30	0.797	< 0.50	2.4
	RG_DW-03-04_WP_2021-10-25_NP	2021 10 25	269	< 1.0	0.10	0.12	144	< 0.020	< 0.050	11	0.0084	68.0	0.16	< 0.10	0.33	< 10	< 0.050	9.0	24.2	< 0.10	-	1.02	< 0.50	0.936	5.67	< 0.010	8.06	168	< 0.010	< 0.10	< 0.30	0.941	< 0.50	2.0
RG_MW-03-04	RG_MW-03-04_WP_Q1-2021_NP	2021 03 25	324	1.7	< 0.10	0.14	129	< 0.020	< 0.050	10	0.0117	82.3	0.12	< 0.10	0.70	< 10	< 0.050	9.8	28.8	0.19	< 0.0050	0.910	< 0.50	0.898	10.1	< 0.010	6.92	191	< 0.010	< 0.10	< 0.30	1.17	< 0.50	< 1.0
	RG_MW-03-04_WG_2021_Q2_NP	2021 06 10	201	1.7	0.11	0.16	93.7	< 0.020	< 0.050	11	0.0074	52.1	0.12	< 0.10	0.26	< 10	< 0.050	8.1	17.3	0.21	< 0.0050	1.07	< 0.50	0.838	3.40	< 0.010	5.41	120	< 0.010	< 0.10	< 0.30	0.782	< 0.50	< 1.0
	RG_MW-03-04_WG_2021_Q3_NP	2021 09 28	264	1.1	0.12	0.14	154	< 0.020	< 0.050	14	0.0134	66.8	0.14	< 0.10	0.21	< 10	< 0.050	10.6	23.6	0.17	< 0.0050	1.01	< 0.50	1.08	5.93	< 0.010	6.08	178	< 0.010	< 0.10	< 0.30	1.12	< 0.50	< 1.0
	RG_MW-03-04_WG_2021_Q4_NP	2021 11 24	220	2.0	0.12	0.15	120	< 0.020	< 0.050	10	0.0094	55.7	< 0.10	< 0.10	0.80	< 10	< 0.050	8.5	19.6	0.15	< 0.0050	1.05	< 0.50	0.921	3.77	< 0.010	4.81	139	< 0.010	< 0.10	< 0.30	0.813	< 0.50	1.2
Michel Creek Downstream of Gate Creek and Bodie Creek - Gate Creek and Bodie Creek (+ denotes well part of Study Area 9b)																																		
EV_MW_GT1A+	EV_MW_GT1A_WG_2021_Q1_NP	2021 01 28	275	< 3.0	< 0.10	0.23	64.5	< 0.020	< 0.050	11	< 0.0050	75.1	< 0.10	< 0.10	< 0.20	128	< 0.050	10.1	21.2	79.2	< 0.0050	1.40	< 0.50	0.732	0.203	< 0.010	2.86	125	< 0.010	< 0.10	< 10	0.452	< 0.50	< 1.0
	EV_MW_GT1A_WG_2021_Q2_NP	2021 04 29	277	1.2	< 0.10	0.23	64.2	< 0.020	< 0.050	13	< 0.0050	75.5	< 0.10	< 0.10	< 0.20	112	< 0.050	10.6	21.4	77.3	< 0.0050	1.50	< 0.50	0.771	< 0.050	< 0.010	2.80	131	< 0.010	< 0.10	< 0.30	0.407	< 0.50	< 1.0
	EV_MW_GT1A_WG_2021_Q3_NP	2021 07 12	259	1.6	< 0.10	0.20	64.5	< 0.020	< 0.050	12	< 0.0050	68.9	< 0.10	< 0.10	< 0.20	128	< 0.050	9.7	21.1	77.6	< 0.0050	1.23	< 0.50	0.776	0.051	< 0.010	2.94	123	< 0.010	< 0.10	< 0.30	0.353	< 0.50	< 1.0
	EV_MW_GT1A_WG_2021_Q4_NP	2021 10 27	284	1.1	< 0.10	0.17	68.6	< 0.020	< 0.050	12	< 0.0050	76.1	0.25	< 0.10	< 0.20	136	< 0.050	11.0	22.7	79.4	< 0.0050	1.57	< 0.50	0.783	0.265	< 0.010	2.90	129	< 0.010	< 0.10	< 0.30	0.415	< 0.50	< 1.0
	EV_MW_BC10A_WG_2021_Q4_NP	Duplicate	275	1.2	< 0.10	0.15	67.4	< 0.020	< 0.050	< 10	< 0.0050	72.8	< 0.10	< 0.10	< 0.20	133	< 0.050	10.6	22.6	78.0	< 0.0050	1.49	< 0.50	0.773	0.311	< 0.010	2.92	129	< 0.010	< 0.10	< 0.30	0.430	< 0.50	< 1.0
	QA/QC RPD%		3	*	*	*	2	*	*	*	*	4	*	*	*	2	*	4	0	2	*	5	*	1	16	*	1	0	*	*	*	4	*	*
EV_MW_GT1B+	EV_MW_GT1B_WG_2021_Q1_NP	2021 01 28	331	< 3.0	0.34	0.17	22.3	< 0.020	< 0.050	13	0.0325	74.7	< 0.10	< 0.10	0.29	< 10	< 0.050	23.2	35.1	< 0.10	< 0.0050	2.18	3.56	1.34	***22.6***	< 0.010	4.43	215	< 0.010	< 0.10	< 10	2.36	< 0.50	1.3
	EV_MW_GT1B_WG_2021_Q2_NP	2021 04 29	1,080	1.4	0.79	0.27	57.8	< 0.020	< 0.050	30	0.118	199	< 0.10	< 0.10	0.39	< 10	< 0.050	91.2	142	< 0.10	< 0.0050	6.64	13.8	3.98	***207***	< 0.010	5.50	615	0.011	< 0.10	< 0.30	7.35	< 0.50	3.5
	EV_MW_GT1B_WG_2021_Q3_NP	2021 07 12	941	1.3	1.15	0.24	81.4	< 0.020	< 0.050	40	0.140	179	< 0.10	< 0.10	0.48	< 10	< 0.050	119	120	< 0.10	< 0.0050	5.83	13.7	4.62	***173***	< 0.010	7.02	668	0.022	< 0.10	< 0.30	6.12	< 0.50	4.2
	EV_MW_GT1B_WG_2021_Q4_NP	2021 10 27	996	1.8	0.96	0.21	48.6	< 0.020	< 0.050	28	0.111	181	< 0.10	< 0.10	0.36	< 10	< 0.050	102	132	0.26	< 0.0050	5.74	13.4	4.24	***194***	< 0.010	5.69	676	0.012	< 0.10	< 0.30	7.32	< 0.50	3.6
EV_MW_BC1A+	EV_MW_BC1A_WG_2021_Q1_NP	2021 01 20	1,510	< 3.0	0.85	0.23	70.9	< 0.020	< 0.050	54	0.243	310	0.13	0.18	0.33	< 10	< 0.050	188	178	5.28	< 0.0050	5.80	1.76	7.12	***274***	< 0.010	11.8	1,280	0.026	< 0.10	< 10	7.89	< 0.50	5.1
	EV_MW_BC1A_WG_2021_Q2_NP	2021 04 19	1,320	1.5	0.69	0.25	59.1	< 0.020	< 0.050	42	0.200	256	0.23	0.24	0.49	31	< 0.050	153	165	4.15	< 0.0050	5.39	2.59	5.88	***283***	< 0.010	9.93	1,190	0.018	< 0.10	< 0.30	9.06	< 0.50	5.6
	EV_MW_BC1A_WG_2021_Q3_NP	2021 07 12	1,270	2.8	0.77	0.22	55.6	< 0.040	< 0.100	55	0.219	244	< 0.20	0.29	< 0.40	< 20	< 0.100	170	161	5.32	< 0.0050	5.81	2.11	6.17	***226***	< 0.020	11.0	1,100	0.022	< 0.20	< 0.60	8.26	< 1.00	4.9
	EV_MW_BC1A_WG_2021_Q4_NP	2021 11 05	1,230	1.0	0.77	0.18	55.1	< 0.020	< 0.050	55	0.208	249	0.13	0.18	0.59	< 10	< 0.050	168	148	3.27	< 0.0050	5.46	1.76	6.58	***196***	< 0.010	11.0	1,130	0.024	< 0.10	< 0.30	7.06	< 0.50	5.3
EV_MW_BC1B+	EV_MW_BC1B_WG_2021_Q1_NP	2021 01 21	1,730	< 3.0	1.37	0.28	45.7	< 0.040	< 0.10	41	0.321	312	< 0.20	< 0.20	1.39	< 20	< 0.10	172	231	0.48	< 0.0050	*10.1*	3.1	6.85	***384***	< 0.020	9.61	1,430	0.039	< 0.20	< 10	*15.2*	< 1.0	7.8
	EV_MW_BC1B_WG_2021_Q2_NP	2021 04 19	1,460	2.7	1.19	0.22	29.5	< 0.040	< 0.100	41	0.267	264	< 0.20	< 0.20	< 0.40	< 20	< 0.100	150	194	0.32	< 0.0050	8.03	4.36	6.56	***286***	< 0.020	10.9	1,290	0.021	< 0.20	< 0.60	*11.4*	< 1.00	6.6
	EV_MW_BC1B_WG_2021_Q3_NP	2021 07 12	1,330	< 2.0	1.60	0.22	34.0	< 0.040	< 0.100	65	0.321	242	< 0.20	< 0.20	< 0.40	< 20	< 0.100	181	176	0.32	< 0.0050	8.54	5.04	7.31	***236***	< 0.020	11.6	1,160	0.026	< 0.20	< 0.60	9.53	< 1.00	7.1
	EV_MW_BC1B_WG_2021_Q4_NP	2021 11 05	1,420	1.1	1.40	0.23	37.1	< 0.020	< 0.050	45	0.307	271	< 0.10	< 0.10	0.35	< 10	< 0.050	180	180	0.34	< 0.0050	9.08	3.23	7.10	***265***	< 0.010	10.3	1,280	0.039	< 0.10	< 0.30	*11.0*	< 0.50	6.1
EV_RCSgw+	EV_RCSGW_WG_2021_Q1_NP	2021 02 23	1,820	< 3.0	0.28	< 0.20	44.9	< 0.040	0.22	24	0.306	390	< 0.20	< 0.20	***412***	< 20	2.40	78.2	206	9.27	< 0.0050	1.47	15.4	3.87	***272***	< 0.020	8.13	490	< 0.020	< 0.20	< 10	8.64	< 1.0	148
	EV_RCSGW_WG_2021_Q2_NP	2021 05 24	1,520	3.3	0.24	< 0.20	37.1	< 0.040	< 0.100	< 20	0.199	319	< 0.20	< 0.20	79.7	51	0.840	61.6	177	10.0	< 0.0050	1.38	6.60	3.35	***232***	< 0.020	10.4	430	< 0.020	< 0.20	< 0.60	6.34	< 1.00	95.7
	EV_RCSGW_WG_2021_Q3_NP	2021 07 28	1,560	3.1	0.26	< 0.20	34.2	< 0.040	< 0.100	21	0.212	326	< 0.20	< 0.20	**173**	21	2.11	67.0	181	3.07	< 0.0050	1.56	3.78	3.65	***232***	< 0.020	5.43	424	< 0.020	< 0.20	< 0.60	7.23	< 1.00	99.4
	EV_RCSgw_WG_2021_Q4_NP	2021 11 07	1,550	< 2.0	0.23	< 0.20	38.5	< 0.040	< 0.100	20	0.224	334	< 0.20	< 0.20	**95.4**	87	0.264	71.9	174	11.8	< 0.0050	1.08	3.63	3.76	***222***	< 0.020	5.83	425	< 0.020	< 0.20	< 0.60	6.77	< 1.00	148

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Standard/guideline varies with pH.

[e] Standard/guideline varies with Hardness.

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

[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

[h] Guideline is temperature, pH, DOC and hardness dependent.

[i] 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.

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

[k] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

[l] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Metals																														
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[l]
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[e]	n/a	10[f]	40	20-90[e]	n/a	40-160[e]	n/a	n/a	n/a	0.25	10,000	250-1,500[e]	n/a	20	0.5-15[e]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[e]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[d]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[k]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BC Guideline																																		
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	50[d]	9	n/a	1,000	0.13	n/a	1,200	0.261-0.457[e]	n/a	1	4	0.2-4.1[h]	n/a	7.89-19.6[e]	n/a	n/a	1,190 - 2,462[e]	0.02[i]	7,600	119-150[e]	n/a	2	1.5[e]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	39.8-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	100[d]	n/a	5	n/a	n/a	n/a	n/a	0.789-2.592[e]	n/a	n/a	110	0.2-25[h]	350	117-417[e]	n/a	n/a	2,006-3,390[e]	n/a	46,000	n/a	n/a	n/a	3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	62.3-282[e]
Michel Creek Downstream of Gate Creek and Bodie Creek - Gate Creek and Bodie Creek (+ denotes well part of Study Area 9b)																																		
EV_BCgw+	EV_BCGW_WG_2021_Q1_NP	2021 01 28	300	< 3.0	0.12	0.10	32.3	< 0.020	< 0.050	12	0.0247	76.2	< 0.10	< 0.10	1.17	< 10	< 0.050	17.0	26.6	< 0.10	< 0.0050	1.09	< 0.50	0.871	13.5	< 0.010	3.93	145	< 0.010	< 0.10	< 10	1.19	< 0.50	1.8
	EV_BCGW_WG_2021_Q2_NP	2021 04 29	302	1.0	0.12	0.14	34.5	< 0.020	< 0.050	13	0.0261	73.9	0.13	< 0.10	1.01	< 10	< 0.050	16.5	28.6	< 0.10	< 0.0050	1.18	< 0.50	0.958	14.3	< 0.010	4.15	144	< 0.010	< 0.10	< 0.30	1.18	< 0.50	1.3
	EV_BCGW_WG_2021_Q3_NP	2021 07 04	355	1.3	0.11	0.12	39.6	< 0.020	< 0.050	13	0.0348	84.2	0.15	< 0.10	0.97	< 10	0.053	20.9	35.1	< 0.10	< 0.0050	1.08	< 0.50	1.16	***20.4***	< 0.010	4.68	172	< 0.010	< 0.10	< 0.30	1.41	< 0.50	2.4
	EV_BCGW_WG_2021_Q4_NP	2021 10 26	344	2.5	0.11	0.12	38.4	< 0.020	< 0.050	15	0.0300	82.7	0.14	< 0.10	1.32	< 10	< 0.050	19.0	33.4	0.64	< 0.0050	1.08	< 0.50	1.03	***20.2***	< 0.010	4.21	162	< 0.010	< 0.10	< 0.30	1.40	< 0.50	< 1.0
EV_WH50gw+	EV_WH50_WG_2021_Q1_NP	2021 02 25	323	< 3.0	< 0.10	0.12	105	< 0.020	< 0.050	< 10	0.0237	80.1	0.12	< 0.10	0.44	10	< 0.050	7.9	30.0	1.09	< 0.0050	0.931	< 0.50	0.798	11.2	< 0.010	4.90	182	< 0.010	< 0.10	< 10	1.46	< 0.50	< 1.0
	EV_WH50GW_WG_2021_Q2_NP	2021 05 13	224	1.6	0.10	0.11	79.2	< 0.020	< 0.050	< 10	0.0163	57.9	< 0.10	< 0.10	0.36	34	< 0.050	7.5	19.4	2.78	< 0.0050	1.05	< 0.50	0.741	4.68	< 0.010	3.80	127	< 0.010	< 0.10	< 0.30	0.866	< 0.50	< 1.0
	EV_WH50GW_WG_2021_Q3_NP	2021 07 15	200	1.0	0.13	0.13	88.5	< 0.020	< 0.050	12	0.0147	49.6	< 0.10	< 0.10	0.40	18	< 0.050	7.8	18.6	1.90	< 0.0050	1.12	< 0.50	0.933	4.23	< 0.010	3.37	130	< 0.010	< 0.10	< 0.30	0.815	< 0.50	< 1.0
	EV_WH50GW_WG_2021_Q4_NP	2021 11 25	201	< 1.0	0.14	< 0.10	78.0	< 0.020	< 0.050	10	0.0066	51.0	< 0.10	< 0.10	0.47	< 10	< 0.050	7.6	18.0	2.62	< 0.0050	1.04	< 0.50	0.778	3.83	< 0.010	2.99	130	< 0.010	< 0.10	< 0.30	0.831	< 0.50	< 1.0
Michel Creek Downstream of Gate Creek and Bodie Creek - Michel Creek Valley Bottom (+ denotes well part of Study Area 9b)																																		
EV_BRgw+	EV_BRGW_WG_2021_Q1_NP	2021 02 25	694	4.3	< 0.10	0.11	60.0	< 0.020	< 0.050	37	0.0538	175	< 0.10	< 0.10	0.43	30	< 0.050	50.9	62.4	2.83	< 0.0050	0.603	2.21	2.20	19	< 0.010	9.40	326	< 0.010	< 0.10	< 10	1.72	< 0.50	2.1
	EV_BRGW_WG_2021_Q2_NP	2021 05 13	688	< 1.0	< 0.10	< 0.10	60.9	< 0.020	< 0.050	35	0.0542	179	< 0.10	< 0.10	0.24	16	< 0.050	52.6	58.6	1.24	< 0.0050	0.626	1.54	2.10	12.9	< 0.010	8.48	348	< 0.010	< 0.10	< 0.30	1.58	< 0.50	1.8
	EV_BRGW_GW_2021_Q3_NP	2021 07 16	563	< 1.0	< 0.10	< 0.10	54.9	< 0.020	< 0.050	32	0.0448	142	0.23	< 0.10	< 0.20	11	< 0.050	42.7	50.6	0.63	< 0.0050	0.624	1.29	2.00	***46.3***	< 0.010	8.53	279	< 0.010	< 0.10	< 0.30	1.45	< 0.50	2.5
	EV_BRGW_WG_2021_Q4_NP	2021 11 25	599	< 1.0	< 0.10	< 0.10	52.6	< 0.020	< 0.050	35	0.0433	156	< 0.10	< 0.10	0.25	< 10	< 0.050	46.5	50.9	4.60	< 0.0050	0.618	1.24	1.92	***21.6***	< 0.010	8.40	311	< 0.010	< 0.10	< 0.30	1.70	< 0.50	4.4
EV_HW1+	EV_HW1_WG_2021_Q1_NP	2021 02 24	658	< 3.0	0.11	< 0.10	52.6	< 0.020	< 0.050	24	0.0690	159	0.11	< 0.10	13.6	< 10	0.063	50.0	63.3	0.27	< 0.0050	0.690	0.66	2.21	***54***	< 0.010	10.9	333	0.012	< 0.10	< 10	1.65	< 0.50	14.5
	EV_HW1_WG_2021_Q2_NP	2021 05 13	656	1.6	< 0.10	0.11	52.0	< 0.020	< 0.050	26	0.0722	158	< 0.10	< 0.10	22.6	< 10	0.236	65.1	63.6	0.31	< 0.0050	0.678	0.83	2.20	***42.9***	< 0.010	14.0	340	0.015	< 0.10	< 0.30	1.54	< 0.50	34.8
	EV_HW1_WG_2021_Q3_NP	2021 07 15	632	< 1.0	0.12	0.13	55.7	< 0.020	< 0.050	25	0.0824	147	0.13	< 0.10	21.6	< 10	0.150	57.6	64.4	0.29	< 0.0050	0.705	0.98	2.45	***57.4***	< 0.010	13.5	336	0.018	< 0.10	< 0.30	1.66	< 0.50	22.8
	EV_HW1_WG_2021_Q4_NP	2021 11 07	614	1.2	0.13	< 0.10	54.4	< 0.020	< 0.050	22	0.0715	147	0.15	< 0.10	***965***	< 10	0.152	52.9	59.9	0.28	< 0.0050	0.683	1.16	2.23	***58.5***	< 0.010	10.9	327	0.018	< 0.10	< 0.30	1.73	< 0.50	15.9
EV_MW_MC1A	EV_MW_MC1A_WG_2021_Q1_NP	2021 01 21	417	< 3.0	< 0.10	0.63	**10,600**	< 0.020	< 0.050	70	< 0.0050	110	< 0.10	< 0.10	0.22	1,100	< 0.050	126	34.8	111	< 0.0050	0.173	< 0.50	4.76	< 0.050	< 0.010	21.4	1,880	< 0.010	< 0.10	< 10	0.219	< 0.50	8.6
	EV_MW_MC1A_WG_2021_Q2_NP	2021 04 18	372	2.4	< 0.20	0.56	9,640	< 0.040	< 0.100	61	< 0.0100	97.2	< 0.20	< 0.20	< 0.40	1,100	< 0.100	113	31.5	104	< 0.0050	0.161	< 1.00	4.31	< 0.100	< 0.020	18.4	1,750	< 0.020	< 0.20	< 0.60	0.159	< 1.00	4.6
	EV_MW_MC1A_WG_2021_Q3_NP	2021 07 04	386	3.0	< 0.20	0.53	9,490	< 0.040	< 0.100	66	< 0.0100	100	< 0.20	< 0.20	< 0.40	1,040	< 0.100	118	33.1	103	< 0.0050	0.174	< 1.00	4.65	< 0.100	< 0.020	20.0	1,800	< 0.020	< 0.20	< 0.60	0.191	< 1.00	5.3
	EV_MW_MC1A_WG_2021_Q4_NP	2021 11 24	393	2.4	< 0.20	0.52	9,110	< 0.040	< 0.100	59	< 0.0100	101	< 0.20	< 0.20	0.81	1,140	< 0.100	98.8	34.1	112	< 0.0050	0.224	< 1.00	4.50	< 0.100	< 0.020	19.7	1,700	< 0.020	< 0.20	< 0.60	0.182	< 1.00	4.1
EV_MW_MC1B	EV_MW_MC1B_WG_2021_Q1_NP	2021 01 21	579	< 3.0	< 0.10	5.51	639	< 0.020	< 0.050	52	< 0.0050	151	< 0.10	0.10	< 0.20	*12,000*	< 0.050	146	49.3	*505*	< 0.0050	2.21	< 0.50	3.94	0.055	< 0.010	25.4	893	< 0.010	< 0.10	< 10	0.671	< 0.50	< 1.0
	EV_MW_MC1B_WG_2021_Q2_NP	2021 04 18	645	2.1	< 0.10	4.88	698	< 0.020	< 0.050	33	< 0.0050	166	< 0.10	0.72	< 0.20	*14,100*	< 0.050	87.5	56.0	*1,190*	< 0.0050	1.47	1.24	2.93	0.324	< 0.010	31.6	769	< 0.010	< 0.10	< 0.30	0.640	< 0.50	3.9
	EV_MW_MC1B_WG_2021_Q3_NP	2021 07 04	598	1.2	< 0.10	5.09	632	< 0.020	< 0.050	55	< 0.0050	157	< 0.10	0.18	< 0.20	*13,400*	< 0.050	147	50.0	*662*	< 0.0050	2.01	0.68	3.65	0.052	< 0.010	29.2	854	< 0.010	< 0.10	< 0.30	0.610	< 0.50	< 1.0
	EV_MW_MC1B_WG_2021_Q4_NP	2021 11 24	573	1.4	< 0.10	6.45	733	< 0.020	< 0.050	52	< 0.0050	150	< 0.10	0.26	< 0.20	*13,800*	< 0.050	86.3	48.3	*870*	< 0.0050	1.97	0.62	3.71	0.083	< 0.020	24.3	747	< 0.010	< 0.10	< 0.30	0.415	< 0.50	< 1.0
EV_MW_MC2A+	EV_MW_MC2A_WG_2021_Q1_NP	2021 01 21	424	< 3.0	< 0.10	0.99	5,960	< 0.020	< 0.050	62	< 0.0050	110	< 0.10	< 0.10	0.28	1,600	< 0.050	268	36.5	55.5	< 0.0050	0.125	< 0.50	4.14	< 0.050	< 0.010	48.1	1,710	< 0.010	< 0.10	< 10	0.014	< 0.50	3.4
	EV_MW_MC2A_WG_2021_Q2_NP	2021 04 18	390	< 1.0	< 0.10	0.78	5,720	< 0.020	< 0.050	57	< 0.0050	101	< 0.10	< 0.10	< 0.20	1,340	< 0.050	211	33.4	53.0	< 0.0050	0.123	< 0.50	3.73	< 0.050	< 0.010	37.6	1,540	< 0.010	< 0.10	< 0.30	0.011	< 0.50	3.3
	EV_MW_MC2A_WG_2021_Q3_NP	2021 07 04	406	2.5	< 0.20	0.87	5,360	< 0.040	< 0.100	67	< 0.0100	106	< 0.20	< 0.20	< 0.40	1,380	< 0.100	244	34.3	52.8	< 0.0050	0.117	< 1.00	3.80	< 0.100	< 0.020	40.9	1,530	< 0.020	< 0.20	< 0.60	< 0.020	< 1.00	4.2
	EV_MW_MC2A_WG_2021_Q4_NP	2021 11 22	396	< 2.0	< 0.20	0.86	5,590	< 0.040	< 0.100	66	< 0.0100	102	< 0.20	< 0.20	< 0.40	1,400	< 0.100	235	34.2	52.3	< 0.0050	0.126	< 1.00	3.78	< 0.100	< 0.020	40.3	1,470	< 0.020	< 0.20	< 0.60	< 0.020	< 1.00	3.6
EV_MW_MC2B+	EV_MW_MC2B_WG_2021_Q1_NP	2021 01 26	705	< 3.0	0.10	< 0.10	54.8	< 0.020	< 0.050	25	0.105	171	0.18	< 0.10	0.46	< 10	< 0.050	52.4	67.1	< 0.10	< 0.0050	0.619	0.51	2.15	***53.9***	< 0.010	11.5	371	0.011	< 0.10	< 10	1.64	< 0.50	1.2
	EV_MW_MC2B_WG_2021_Q2_NP	2021 04 18	577	< 1.0	< 0.10	0.11	49.5	< 0.020	< 0.050	22	0.0875	136	0.15	< 0.10	< 0.20	< 10	< 0.050	51.0	57.7	< 0.10	< 0.0050	0.598	< 0.50	2.06	***47.1***	< 0.010	10.8	314	< 0.010	< 0.10	< 0.30	1.49	< 0.50	1.2
	EV_MW_MC2B_WG_2021_Q3_NP	2021 07 04	600	< 1.0	0.12	0.13	51.3	< 0.020	< 0.050	26	0.0958	141	0.23	< 0.10	< 0.20	< 10	< 0.050	56.3	60.2	< 0.10	< 0.0050	0.683	0.69	2.30	***54.2***	< 0.010	12.2	328	< 0.010	< 0.10	< 0.30	1.60	< 0.50	1.4
	EV_MW_MC2B_WG_2021_Q4_NP	2021 11 22	625	< 1.0	0.10	< 0.10	53.9	< 0.020	< 0.050	25	0.102	148	0.16	< 0.10	0.75	< 10	< 0.050	53.9	62.0	< 0.10	< 0.0050	0.566	0.54	2.16	***67.8***	< 0.010	10.2	319	0.011	< 0.10	< 0.30	1.70	< 0.50	1.6

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Standard/guideline varies with pH.

[e] Standard/guideline varies with Hardness.

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

[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

[h] Guideline is temperature, pH, DOC and hardness dependent.

[i] 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.

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

[k] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

[l] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Metals																																
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[l]
				mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																				
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[e]	n/a	10[f]	40	20-90[e]	n/a	40-160[e]	n/a	n/a	n/a	0.25	10,000	250-1,500[e]	n/a	20	0.5-15[e]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[e]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[d]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[k]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BC Guideline																																				
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	50[d]	9	n/a	1,000	0.13	n/a	1,200	0.261-0.457[e]	n/a	1	4	0.2-4.1[h]	n/a	7.89-19.6[e]	n/a	n/a	1,190 - 2,462[e]	0.02[i]	7,600	119-150[e]	n/a	2	1.5[e]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	39.8-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	100[d]	n/a	5	n/a	n/a	n/a	n/a	0.789-2.592[e]	n/a	n/a	110	0.2-25[h]	350	117-417[e]	n/a	n/a	2,006-3,390[e]	n/a	46,000	n/a	n/a	n/a	3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	62.3-282[e]
Erickson Creek and Michel Creek Downstream of Erickson Creek (~ denotes well part of Study Area 10)																																				
EV_WF_SW[l]	EV_WF_SW_WG_2021_Q1_NP	2021 03 29	222	1.7	0.44	0.11	2.32	< 0.020	< 0.050	< 10	0.0055	12.3	0.21	< 0.10	0.74	53	< 0.050	11.3	46.4	*203*	< 0.0050	0.817	< 0.50	3.18	0.066	< 0.010	4.46	7.39	< 0.010	0.13	< 0.30	< 0.010	< 0.50	< 1.0
	EV_WF_SW_WG_2021_Q2_NP	2021 06 06	340	< 1.0	< 0.10	< 0.10	1.27	< 0.020	< 0.050	< 10	< 0.0050	19.1	< 0.10	< 0.10	< 0.20	25	< 0.050	21.6	71.0	*588*	< 0.0050	1.67	< 0.50	2.95	0.212	< 0.010	4.21	11.0	< 0.010	< 0.10	< 0.30	0.047	< 0.50	< 1.0
	EV_WF_SW_WG_2021_Q3_NP	2021 09 20	422	< 1.0	< 0.10	0.23	7.57	< 0.020	< 0.050	< 10	< 0.0050	65.4	< 0.10	2.13	< 0.20	4,050	< 0.050	17.7	62.9	*331*	< 0.0050	1.53	2.98	2.69	< 0.050	< 0.010	3.94	72.9	< 0.010	< 0.10	< 0.30	1.47	< 0.50	1.2
	EV_WF_SW_WG_2021_Q4_NP	2021 12 09	256	< 1.0	< 0.10	0.14	3.07	< 0.020	< 0.050	< 10	< 0.0050	25.5	< 0.10	0.47	< 0.20	627	< 0.050	12.4	46.6	*222*	< 0.0050	1.34	0.98	2.90	0.187	< 0.010	3.91	24.0	< 0.010	< 0.10	< 0.30	0.376	< 0.50	< 1.0
EV_ECgw~	EV_ECGW_WG_2021_Q2_NP	2021 05 16	162	1.4	< 0.10	0.35	49.6	< 0.020	< 0.050	112	0.0208	37.0	< 0.10	< 0.10	0.65	< 10	< 0.050	13.4	16.8	85.6	< 0.0050	*14.0*	2.14	1.05	0.071	< 0.050	33.9	398	0.043	< 0.10	< 0.30	1.58	< 0.50	1.5
	EV_ECGW_WG_2021_Q3_NP	2021 07 19	153	< 1.0	< 0.10	0.40	54.5	< 0.020	< 0.050	113	0.0215	35.1	< 0.10	0.11	0.80	< 10	< 0.050	12.3	15.9	107	< 0.0050	*14.4*	0.98	1.07	0.086	< 0.010	32.1	408	0.047	< 0.10	< 0.30	1.58	< 0.50	1.9
	EV_ECGW_WG_2021_Q4_NP	2021 10 26	156	3.7	< 0.10	0.42	53.6	< 0.020	< 0.050	110	0.0279	34.8	< 0.10	0.21	1.33	< 10	< 0.050	12.3	16.8	126	< 0.0050	*14.4*	2.00	1.12	0.122	< 0.010	31.3	387	0.041	< 0.10	< 0.30	1.64	< 0.50	2.9
EV_MW_SP1A~	EV_MW_SP1A_WG_2021_Q1_NP	2021 03 11	301	< 1.0	< 0.10	< 0.10	559	< 0.020	< 0.050	27	< 0.0050	76.2	< 0.10	< 0.10	< 0.20	540	< 0.050	93.7	27.0	60.8	< 0.0050	0.374	< 0.50	3.51	< 0.050	< 0.010	9.15	292	< 0.010	< 0.10	< 0.30	0.104	< 0.50	< 1.0
	EV_MW_SP1A_WG_2021_Q2_NP	2021 05 16	300	< 1.0	< 0.10	< 0.10	552	< 0.020	< 0.050	28	< 0.0050	76.5	< 0.10	< 0.10	< 0.20	425	< 0.050	92.7	26.4	59.8	< 0.0050	0.392	< 0.50	3.30	< 0.050	< 0.010	9.15	295	< 0.010	< 0.10	< 0.30	0.108	< 0.50	< 1.0
	EV_MW_SP1A_GW_2021_Q3_NP	2021 07 16	279	< 1.0	< 0.10	< 0.10	622	< 0.020	< 0.050	26	< 0.0050	69.9	< 0.10	< 0.10	< 0.20	469	< 0.050	82.5	25.4	60.5	< 0.0050	0.357	< 0.50	3.47	< 0.050	< 0.010	9.63	288	< 0.010	< 0.10	< 0.30	0.099	< 0.50	1.0
	EV_MW_SP1A_WG_2021_Q4_NP	2021 10 19	299	1.3	< 0.10	< 0.10	760	< 0.020	< 0.050	27	< 0.0050	76.7	< 0.10	< 0.10	< 0.20	448	< 0.050	101	26.1	61.2	< 0.0050	0.293	< 0.50	3.57	0.167	< 0.010	9.85	320	< 0.010	< 0.10	< 0.30	0.084	< 0.50	< 1.0
EV_MW_SP1B~	EV_MW_SP1B_WG_2021_Q1_NP	2021 03 11	255	< 1.0	< 0.10	0.10	160	< 0.020	< 0.050	< 10	0.0098	66.4	0.15	< 0.10	< 0.20	< 10	< 0.050	6.4	21.7	< 0.10	< 0.0050	0.719	< 0.50	0.738	9.82	< 0.010	5.69	154	< 0.010	< 0.10	< 0.30	0.813	< 0.50	< 1.0
	EV_MW_SP1B_WG_2021_Q2_NP	2021 05 16	243	< 1.0	< 0.10	< 0.10	148	< 0.020	< 0.050	< 10	0.0079	64.3	0.12	< 0.10	< 0.20	< 10	< 0.050	6.1	20.1	< 0.10	< 0.0050	0.711	< 0.50	0.669	4.01	< 0.010	5.51	150	< 0.010	< 0.10	< 0.30	0.773	< 0.50	< 1.0
	EV_MW_SP1B_GW_2021_Q3_NP	2021 07 16	194	< 1.0	< 0.10	< 0.10	128	< 0.020	< 0.050	< 10	0.0076	50.6	0.14	< 0.10	< 0.20	< 10	< 0.050	5.2	16.4	< 0.10	< 0.0050	0.768	< 0.50	0.665	2.20	< 0.010	5.75	126	< 0.010	< 0.10	< 0.30	0.659	< 0.50	< 1.0
	EV_EC5GW_WG_2021_Q3_NP	Duplicate	197	< 1.0	< 0.10	< 0.10	125	< 0.020	< 0.050	< 10	0.0057	51.6	0.14	< 0.10	< 0.20	< 10	< 0.050	5.5	16.5	< 0.10	< 0.0050	0.756	< 0.50	0.678	2.39	< 0.010	5.86	124	< 0.010	< 0.10	< 0.30	0.658	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	*	2	*	*	*	*	2	*	*	*	*	*	6	1	*	*	2	*	2	8	*	2	2	*	*	*	0	*	*
	EV_MW_SP1B_WG_2021_Q4_NP	2021 10 19	238	< 1.0	< 0.10	0.11	160	< 0.020	< 0.050	10	0.0060	64.3	0.13	< 0.10	< 0.20	< 10	< 0.050	7.1	18.7	< 0.10	< 0.0050	0.836	< 0.50	0.828	3.74	< 0.010	6.32	166	< 0.010	< 0.10	< 0.30	0.783	< 0.50	< 1.0
EV_MW_SP1C~	EV_MW_SP1C_WG_2021_Q1_NP	2021 03 11	242	3.3	< 0.10	< 0.10	162	< 0.020	< 0.050	< 10	0.0281	66.6	0.14	< 0.10	0.44	< 10	< 0.050	8.9	18.5	0.44	< 0.0050	0.800	< 0.50	0.830	3.91	< 0.010	7.80	162	< 0.010	< 0.10	< 0.30	0.820	< 0.50	< 1.0
	EV_MW_SP1C_WG_2021_Q2_NP	2021 05 16	234	1.0	< 0.10	< 0.10	148	< 0.020	< 0.050	< 10	0.0353	63.8	0.11	< 0.10	< 0.20	< 10	< 0.050	8.8	18.1	< 0.10	< 0.0050	0.841	< 0.50	0.835	2.60	< 0.010	9.26	149	< 0.010	< 0.10	< 0.30	0.836	< 0.50	< 1.0
	EV_MW_SP1C_GW_2021_Q3_NP	2021 07 16	200	1.4	< 0.10	< 0.10	149	< 0.020	< 0.050	< 10	0.0279	53.7	0.14	< 0.10	0.79	< 10	< 0.050	7.8	16.0	0.28	< 0.0050	0.797	< 0.50	0.878	1.86	< 0.010	7.81	134	< 0.010	< 0.10	< 0.30	0.606	< 0.50	1.3
	EV_MW_SP1C_WG_2021_Q4_NP	2021 10 19	234	< 1.0	< 0.10	< 0.10	172	< 0.020	< 0.050	< 10	0.0229	64.6	0.14	< 0.10	< 0.20	< 10	< 0.050	9.0	17.7	0.17	< 0.0050	0.886	< 0.50	0.863	2.05	< 0.010	7.50	166	< 0.010	< 0.10	< 0.30	0.776	< 0.50	< 1.0
Blanks																																				
Field Blanks																																				
RG_DW-02-20	RG_DW-F_WP_Q1-2021_1	2021 03 03	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.10	< 0.10	-	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
EV_OCgw	EV_MC6GW_WG_2021_Q1_NP	2021 03 19	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0005(	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_GC1B	EV_MW_BC10B_WG_2021_Q1_NP	2021 03 21	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_MCGWD	EV_MW_MC10B_WG_2021_Q1_NP	2021 03 25	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_MW_SPR1A	EV_MW_BC10B_WG_2021_Q2_NP	2021 05 30	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_MCgwS	EV_EC6GW_WG_2021_Q2_NP	2021 05 30	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_OCgw	EV_MC6GW_WG_2021_Q2_NP	2021 05 31	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0005(	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
RG_DW-02-20	RG_DW-F_WP_Q2-2021_1	2021 06 08	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	-	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_LSgw	EV_MW_BC10B_WG_2021_Q3_NP_FB	2021 07 14	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_MW_SP1B	EV_EC6GW_WG_2021_Q3_NP	2021 07 16	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0

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

< Denotes concentration less than indicated detection limit.

- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).

[d] Standard/guideline varies with pH.

[e] Standard/guideline varies with Hardness.

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

[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

[h] Guideline is temperature, pH, DOC and hardness dependent.

[i] 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.

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

[k] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

[l] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Metals																														
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[l]
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[e]	n/a	10[f]	40	20-90[e]	n/a	40-160[e]	n/a	n/a	n/a	0.25	10,000	250-1,500[e]	n/a	20	0.5-15[e]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[e]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[f]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[d]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[f]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[f]	20[g]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[k]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BC Guideline																																		
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	50[d]	9	n/a	1,000	0.13	n/a	1,200	0.261-0.457[e]	n/a	1	4	0.2-4.1[h]	n/a	7.89-19.6[e]	n/a	n/a	1,190 - 2,462[e]	0.02[i]	7,600	119-150[e]	n/a	2	1.5[e]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	39.8-187.5[e]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	100[d]	n/a	5	n/a	n/a	n/a	n/a	0.789-2.592[e]	n/a	n/a	110	0.2-25[h]	350	117-417[e]	n/a	n/a	2,006-3,390[e]	n/a	46,000	n/a	n/a	n/a	3[e]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	62.3-282[e]
Blanks																																		
Field Blanks																																		
RG_DW-02-20	RG_DW-F_WP_Q3-2021_3	2021 07 21	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	0.50	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	-	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_MW_GV4B	EV_MW_MC10B_WG_2021_Q3_NP	2021 07 30	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_OCgw	EV_MC6GW_WG_2021_Q3_NP	2021 09 08	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_ER1gwD	EV_MW_MC10B_WG_2021_Q3_NP	2021 09 12	< 0.50	2.1	< 0.10	< 0.10	0.16	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_GCGW	EV_MC10B_WG_2021_Q4_NP	2021 10 24	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_MW_GT1A	EV_MW_BC10B_WG_2021_Q4_NP	2021 10 27	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_OCgw	EV_MC6GW_WG_2021_Q4_NP	2021 11 21	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
EV_MW_MC3	EV_EC6GW_WG_2021_Q4_NP	2021 11 22	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
Trip Blanks																																		
	RG_DW-T_WP_Q1-2021_1	2021 03 03	< 0.50	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	EV_MC7GW_WG_2021_Q1_NP	2021 03 19	< 0.50	1.2	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	0.14	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	1.7
	EV_MW_BC10C_WG_2021_Q1_NP	2021 03 21	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	EV_MW_MC10C_WG_2021_Q1_NP	2021 03 25	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	EV_EC7GW_WG_2021_Q2_NP	2021 05 30	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	EV_MW_BC10C_WG_2021_Q2_NP	2021 05 30	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	EV_MC7GW_WG_2021_Q2_NP	2021 05 31	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	RG_DW-T_WP_Q2-2021_1	2021 06 08	< 0.50	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	EV_MW_BC10C_WG_2021_Q3_NP_TB	2021 07 14	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	RG_DW-T_WP_Q3-2021_3	2021 07 21	< 0.50	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	EV_MW_MC10C_WG_2021_Q3_NP	2021 09 12	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	RG_MW_MC10C_WG_2021_10_01_NP	2021 10 01	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.10	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	EV_MC10C_WG_2021_Q4_NP	2021 10 24	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	EV_MW_BC10C_WG_2021_Q4_NP	2021 10 27	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	EV_MC7GW_WG_2021_Q4_NP	2021 11 21	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	EV_EC7GW_WG_2021_Q4_NP	2021 11 22	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0

All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit.
- 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.

BLUE	Concentration greater than BCWQG Aquatic Life Long-term Average guideline and/or BCWQG Aquatic Life Short-term Maximum guideline
BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).
[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute") (in absence of both total and dissolved metals concentrations, all guidelines have been applied to the available concentrations).
[d] Standard/guideline varies with pH.
[e] Standard/guideline varies with Hardness.
[f] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[g] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[h] Guideline is temperature, pH, DOC and hardness dependent.
[i] 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.
[j] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.
[k] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.
[l] Monitoring wells within 10m of high watermark, samples compared to CSR and BCWQG.

TABLE EV-05: Summary of Analytical Results Compared to Secondary Screening Criteria for Selenium (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	SPO/Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
SPO			Elk River [EV_ER1 (0200393)]	19
Compliance Point			Michel Creek [EV_MC2 (E300091)]	28
Grave/Harmer Creek Watershed and Elk River Downstream of Grave Creek Confluence (^ denotes well part of Study Area 7)				
RG_DW-02-20^	RG_DW-02-20_WP_Q1-2021_NP	2021 03 03	Elk River [EV_ER1 (0200393)]	13.5
	RG_DW-02-40_WP_Q1-2021_1	Duplicate	Elk River [EV_ER1 (0200393)]	15.5
		QA/QC RPD%		14
	RG_DW-02-20_WP_Q2-2021_NP	2021 06 08	Elk River [EV_ER1 (0200393)]	18.7
	RG_DW-02-40_WP_Q2-2021_1	Duplicate	Elk River [EV_ER1 (0200393)]	19.4
		QA/QC RPD%		4
	RG_DW-02-20_WP_Q3-2021_NP	2021 07 21	Elk River [EV_ER1 (0200393)]	16.6
	RG_DW-02-40_WP_Q3-2021_3	Duplicate		16.8
		QA/QC RPD%		1
	RG_DW-02-20_WP_2021_10_28_NP	2021 10 28	Elk River [EV_ER1 (0200393)]	12.2
RG_MW_WW^	RG_MW_WW_WP_Q1-2021_NP	2021 03 25	Elk River [EV_ER1 (0200393)]	10.8
	RG_MW_WW_WG_2021_Q2_NP	2021 06 10	Elk River [EV_ER1 (0200393)]	10.3
	RG_MW_WW_WG_2021_Q4_NP	2021 11 23	Elk River [EV_ER1 (0200393)]	11.6
Sparwood Area - Baldy and Sparwood Ridges				
EV_MW_MC3	EV_MW_MC3_WG_2021_Q2_NP	2021 04 19	Elk River [EV_ER1 (0200393)]	23.2
	EV_MW_MC3_WG_2021_Q3_NP	2021 07 09	Elk River [EV_ER1 (0200393)]	13.0
	EV_MW_MC3_WG_2021_Q4_NP	2021 11 22	Elk River [EV_ER1 (0200393)]	24.2
	EV_EC5GW_WG_2021_Q4_NP	Duplicate	Elk River [EV_ER1 (0200393)]	22.1
		QA/QC RPD%		9
Sparwood Area - Michel Creek (denotes well part of Study Area 9a)**				
EV_MW_SPR1C**	EV_MW_SPR1C_WG_2021_Q1_NP	2021 02 26	Michel Creek [EV_MC2 (E300091)]	14.8
Sparwood Area - Elk River (Study Area 12)				
EV_ER1gwS	EV_ER1GWS_WG_2021_Q1_N	2021 02 26	Elk River [EV_ER1 (0200393)]	13
RG_DW-03-04	RG_DW-03-04_WP_Q1-2021_NP	2021 03 09	Elk River [EV_ER1 (0200393)]	12
RG_MW-03-04	RG_MW-03-04_WP_Q1-2021_NP	2021 03 25	Elk River [EV_ER1 (0200393)]	10.1
Michel Creek Downstream of Gate Creek and Bodie Creek - Gate Creek and Bodie Creek (+ denotes well part of Study Area 9b)				
EV_MW_GT1B+	EV_MW_GT1B_WG_2021_Q1_NP	2021 01 28	Michel Creek [EV_MC2 (E300091)]	22.6
	EV_MW_GT1B_WG_2021_Q2_NP	2021 04 29	Michel Creek [EV_MC2 (E300091)]	207
	EV_MW_GT1B_WG_2021_Q3_NP	2021 07 12	Michel Creek [EV_MC2 (E300091)]	173
	EV_MW_GT1B_WG_2021_Q4_NP	2021 10 27	Michel Creek [EV_MC2 (E300091)]	194
EV_MW_BC1A+	EV_MW_BC1A_WG_2021_Q1_NP	2021 01 20	Michel Creek [EV_MC2 (E300091)]	274
	EV_MW_BC1A_WG_2021_Q2_NP	2021 04 19	Michel Creek [EV_MC2 (E300091)]	283
	EV_MW_BC1A_WG_2021_Q3_NP	2021 07 12	Michel Creek [EV_MC2 (E300091)]	226
	EV_MW_BC1A_WG_2021_Q4_NP	2021 11 05	Michel Creek [EV_MC2 (E300091)]	196
EV_MW_BC1B+	EV_MW_BC1B_WG_2021_Q1_NP	2021 01 21	Michel Creek [EV_MC2 (E300091)]	384
	EV_MW_BC1B_WG_2021_Q2_NP	2021 04 19	Michel Creek [EV_MC2 (E300091)]	286
	EV_MW_BC1B_WG_2021_Q3_NP	2021 07 12	Michel Creek [EV_MC2 (E300091)]	236
	EV_MW_BC1B_WG_2021_Q4_NP	2021 11 05	Michel Creek [EV_MC2 (E300091)]	265
EV_RCSgw+	EV_RCSGW_WG_2021_Q1_NP	2021 02 23	Michel Creek [EV_MC2 (E300091)]	272
	EV_RCSGW_WG_2021_Q2_NP	2021 05 24	Michel Creek [EV_MC2 (E300091)]	232
	EV_RCSGW_WG_2021_Q3_NP	2021 07 28	Michel Creek [EV_MC2 (E300091)]	232
	EV_RCSgw_WG_2021_Q4_NP	2021 11 07	Michel Creek [EV_MC2 (E300091)]	222
EV_BCgw+	EV_BCGW_WG_2021_Q1_NP	2021 01 28	Michel Creek [EV_MC2 (E300091)]	13.5
	EV_BCGW_WG_2021_Q2_NP	2021 04 29	Michel Creek [EV_MC2 (E300091)]	14.3
	EV_BCGW_WG_2021_Q3_NP	2021 07 04	Michel Creek [EV_MC2 (E300091)]	20.4
	EV_BCGW_WG_2021_Q4_NP	2021 10 26	Michel Creek [EV_MC2 (E300091)]	20.2
EV_WH50gw+	EV_WH50_WG_2021_Q1_NP	2021 02 25	Michel Creek [EV_MC2 (E300091)]	11.2

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

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.

SHADED Concentration greater than SPO by Area/Compliance Point by Area

TABLE EV-05: Summary of Analytical Results Compared to Secondary Screening Criteria for Selenium (EVO)

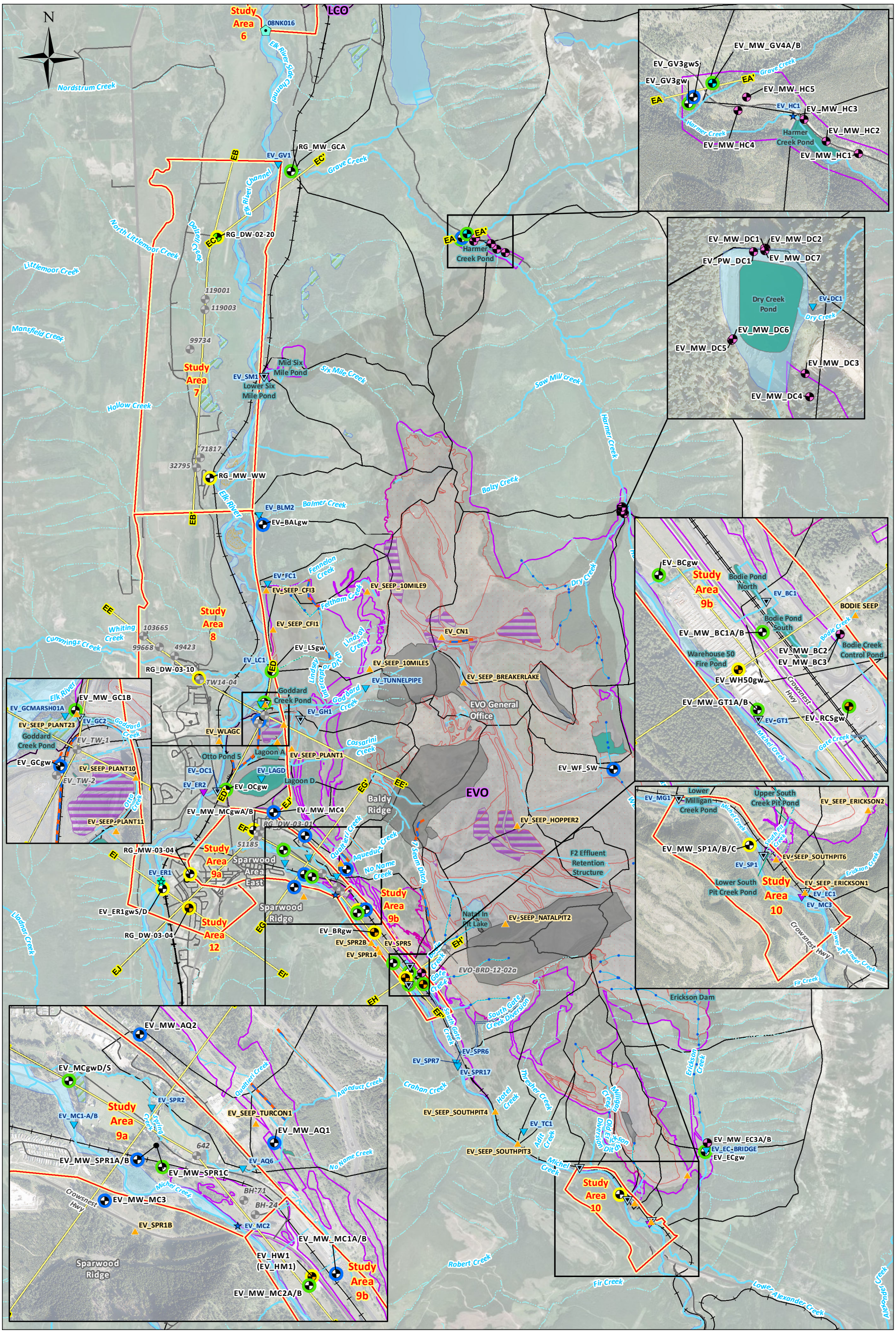
Sample Location	Sample ID	Sample Date (yyyy mm dd)	SPO/Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
SPO			Elk River [EV_ER1 (0200393)]	19
Compliance Point			Michel Creek [EV_MC2 (E300091)]	28
Michel Creek Downstream of Gate Creek and Bodie Creek - Michel Creek Valley Bottom (+ denotes well part of Study Area 9b)				
EV_BRgw+	EV_BRGW_WG_2021_Q1_NP	2021 02 25	Michel Creek [EV_MC2 (E300091)]	19
	EV_BRGW_WG_2021_Q2_NP	2021 05 13	Michel Creek [EV_MC2 (E300091)]	12.9
	EV_BRGW_GW_2021_Q3_NP	2021 07 16	Michel Creek [EV_MC2 (E300091)]	46.3
	EV_BRGW_WG_2021_Q4_NP	2021 11 25	Michel Creek [EV_MC2 (E300091)]	21.6
EV_HW1+	EV_HW1_WG_2021_Q1_NP	2021 02 24	Michel Creek [EV_MC2 (E300091)]	54
	EV_HW1_WG_2021_Q2_NP	2021 05 13	Michel Creek [EV_MC2 (E300091)]	42.9
	EV_HW1_WG_2021_Q3_NP	2021 07 15	Michel Creek [EV_MC2 (E300091)]	57.4
	EV_HW1_WG_2021_Q4_NP	2021 11 07	Michel Creek [EV_MC2 (E300091)]	58.5
EV_MW_MC2B+	EV_MW_MC2B_WG_2021_Q1_NP	2021 01 26	Michel Creek [EV_MC2 (E300091)]	53.9
	EV_MW_MC2B_WG_2021_Q2_NP	2021 04 18	Michel Creek [EV_MC2 (E300091)]	47.1
	EV_MW_MC2B_WG_2021_Q3_NP	2021 07 04	Michel Creek [EV_MC2 (E300091)]	54.2
	EV_MW_MC2B_WG_2021_Q4_NP	2021 11 22	Michel Creek [EV_MC2 (E300091)]	67.8

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

SHADED Concentration greater than SPO by Area/Compliance Point by Area

Drawings

EV-01: Sample Location Plan – Elkview Operations
EV-02: Groundwater Elevations from Q4 2021 and Inferred Groundwater Flow Direction – Elkview Operations (Study Areas 7, 8 and 10)
EV-03: Groundwater Elevations from Q4 2021 and Inferred Groundwater Flow Direction – Elkview Operations (Study Areas 9a, 9b and 12)
EV-04: Elkview Operations Inferred Geological Cross Section EA-EA'
EV-05: Elkview Operations Inferred Geological Cross Section EB-EB'
EV-06: Elkview Operations Inferred Geological Cross Section EC-EC'
EV-07: Elkview Operations Inferred Geological Cross Section ED-ED'
EV-08: Elkview Operations Inferred Geological Cross Section EE-EE'
EV-09: Elkview Operations Inferred Geological Cross Section EF-EF'
EV-10: Elkview Operations Inferred Geological Cross Section EG-EG'
EV-11: Elkview Operations Inferred Geological Cross Section EH-EH'
EV-12: Elkview Operations Inferred Geological Cross Section EI-EI'
EV-13: Elkview Operations Inferred Geological Cross Section EJ-EJ'
EV-14: Spatial Distribution of Nitrate Nitrogen in Groundwater – Elkview Operations (Study Areas 7 and 8)
EV-15: Spatial Distribution of Sulphate in Groundwater – Elkview Operations (Study Areas 7 and 8)
EV-16: Spatial Distribution of Dissolved Cadmium in Groundwater – Elkview Operations (Study Areas 7 and 8)
EV-17: Spatial Distribution of Dissolved Selenium in Groundwater – Elkview Operations (Study Areas 7 and 8)
EV-18: Spatial Distribution of Nitrate in Groundwater – Elkview Operations (Study Areas 9a and b, 10 and 12)
EV-19: Spatial Distribution of Sulphate in Groundwater – Elkview Operations (Study Areas 9a and b, 10 and 12)
EV-20: Spatial Distribution of Dissolved Cadmium in Groundwater – Elkview Operations (Study Areas 9a and b, 10 and 12)
EV-21: Spatial Distribution of Dissolved Selenium in Groundwater – Elkview Operations (Study Areas 9a and b, 10 and 12)



Legend

Groundwater Stations[a]
- Monitoring Well
- Background well included in the RGMP
- Domestic Well
- Supply Well
- Well included in the RGMP
- Well included in the SSGMP
- Well included in both the RGMP and the SSGMP
- Monitoring Well (Other Programs)
- Monitoring Wells to be Considered for Inclusion in SSGMP and/or RGMP

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring
- Hydrometric stations
- Seep

Site Features
- Highway
- Secondary Road
- Rails
- Geological Cross Section
- Study Areas
- Tailings/Settling Pond
- Waste Water Pond
- End-Pit Lake
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Watersheds
- EVO Permitted Boundary

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel
- Island
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:65000 Scale)

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. Locations of overlapping wells have been adjusted for clarity.

References:
1. Information provided by Teck Coal Limited.
2.Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 0.5 1 2 3 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

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Sample Location Plan - Elkview Operations

CHK'D: RS	DATE: 2022-03-11	SCALE: 1:65,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING EV-01

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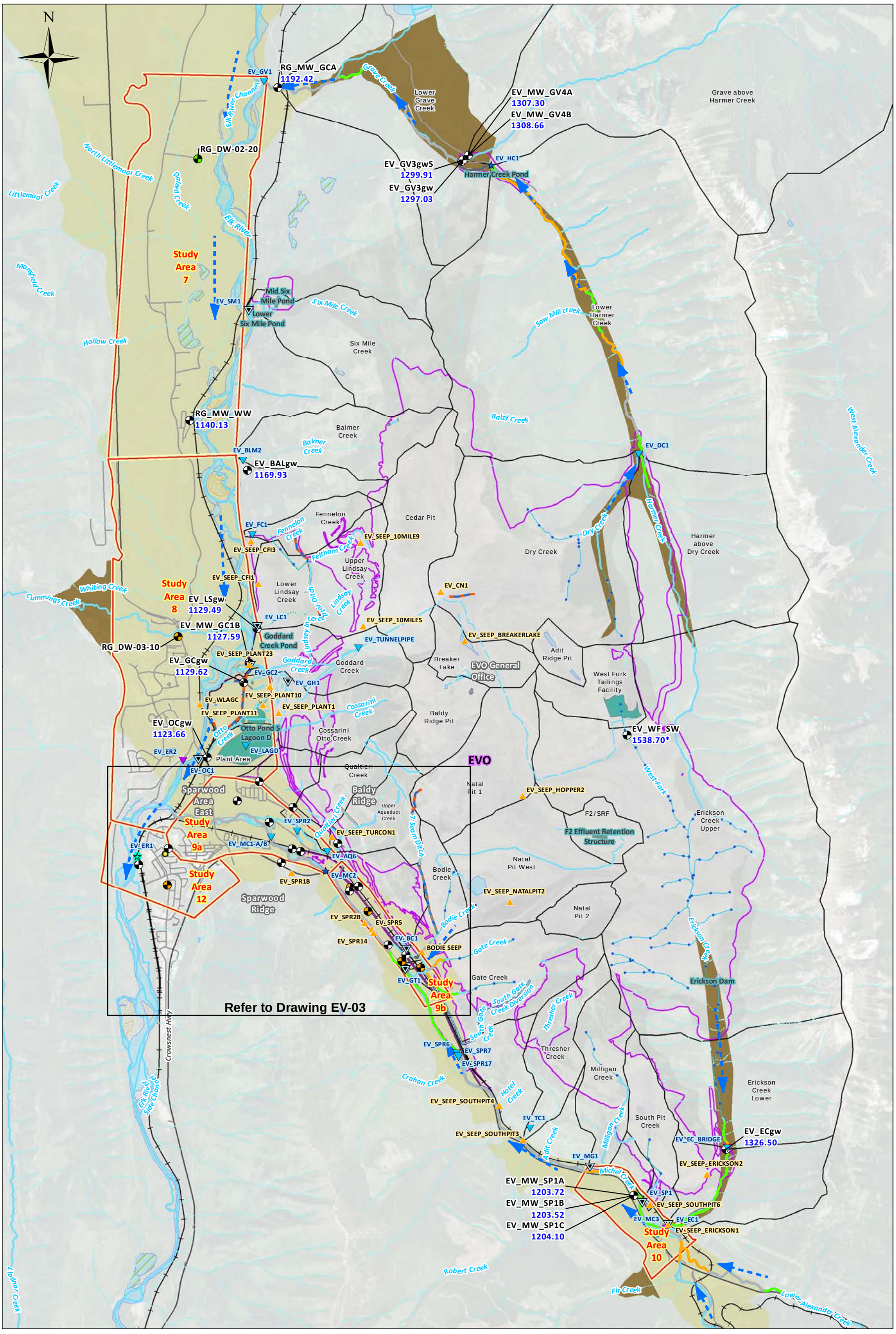
Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Legend

Groundwater Stations
- Monitoring
- Supply
- Domestic

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep

Flow Status
- Gaining
- Losing
- No Change
- Not Available/ Insufficient Information

Site Features
- Highway
- Secondary Road
- Rails
- Approximate GW flow direction
- Study Areas
- Tailings/Settling Pond
- Waste Water Pond
- Watersheds
- Interpreted Tributary Valley-bottom Extent
- Interpreted Main Valley-bottom Extent
- EVO Permitted Boundary

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Culvert
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel
- Island
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:60000 Scale)
- Castle FR_FRABCH_A Watershed ID

1143.80 Water level (masl) measured in October/November 2021

1538.70* Water level (masl) measured on December 9, 2021

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. Stations used to assess flow status are not shown on the map. Readers are referred to report references.
5. Flow accretion studies completion dates:
· Grave Creek: May and October 2020
· Harmer Creek: October 2018
· Erickson Creek: May 2019
· Michel Creek, Alexander Creek: July 2021
· Gate, South Gate, Bodie Creek: October 2018

References:
1. Information provided by Teck Coal Limited.

0 0.5 1 2 3 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

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Groundwater Elevations from Q4 2021 and Inferred Groundwater Flow Direction - Elkview Operations (Study Areas 7, 8 and 10)

CHK'D: RS	DATE: 2022-03-09	SCALE: 1:60,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING EV-02

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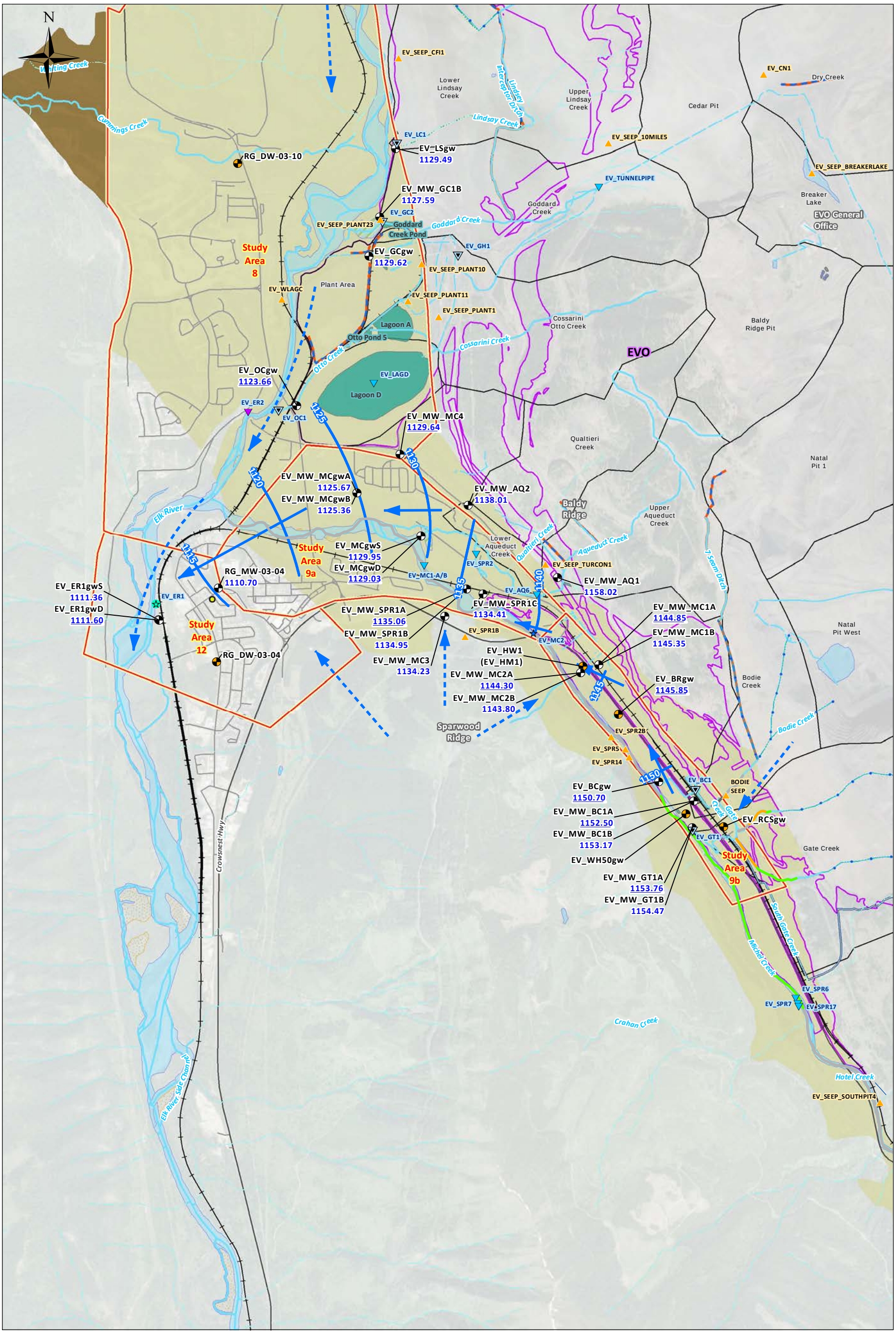

Legend

Groundwater Stations
- Monitoring
- Supply

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep

Flow Status
- Gaining
- Losing
- No Change
- Not Available/ Insufficient Information

Site Features
- Highway
- Secondary Road
- Rails
- Castle FR_FRABCH_A Watershed ID

- Interpreted GW contours (masl)
- Interpreted GW flow direction
- Approximate GW flow direction
- Study Areas
- Tailings/Settling Pond
- Waste Water Pond
- Watersheds
- Interpreted Tributary Valley-bottom Extent
- Interpreted Main Valley-bottom Extent
- EVO Permitted Boundary

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel
- Island
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:30000 Scale)

1143.80 Water level (masl) measured in October/November 2021

1538.70* Water level (masl) measured on December 9, 2021

1143.80 Water level (masl) used for contouring

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. Stations used to assess flow status are not shown on the map. Readers are referred to report references.
5. Flow accretion studies completion dates:
· Michel Creek, Alexander Creek: July 2021
· Gate, South Gate, and Bodie Creek: October 2018

References:
1. Information provided by Teck Coal Limited.
2.Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 150 300 600 900 1,200 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

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Groundwater Elevations from Q4 2021 and Inferred Groundwater Flow Direction - Elkview Operations (Study Areas 9a, 9b and 12)

CHK'D: RS	DATE: 2022-03-10	SCALE: 1:30,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING EV-03

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

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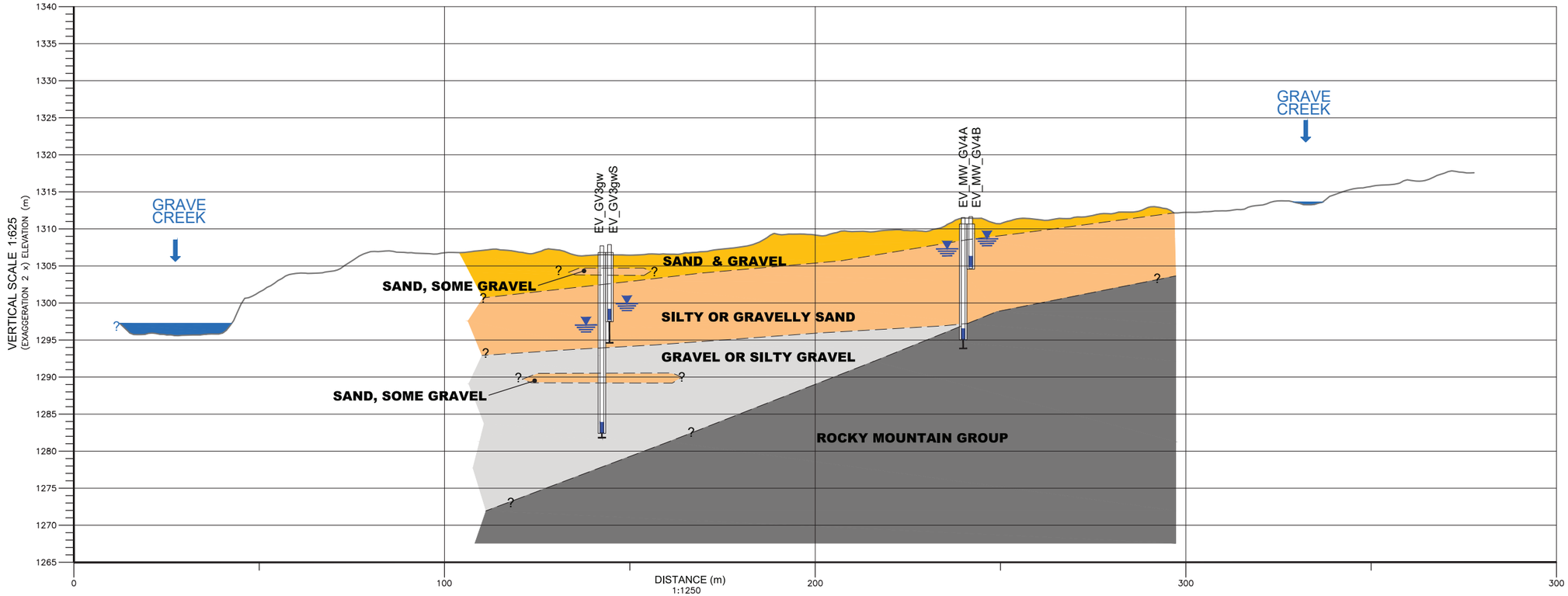
EA
WEST

EA'
EAST



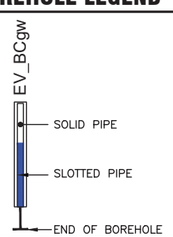
LEGEND

- SAND & GRAVEL
- SAND
- GRAVEL
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

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.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

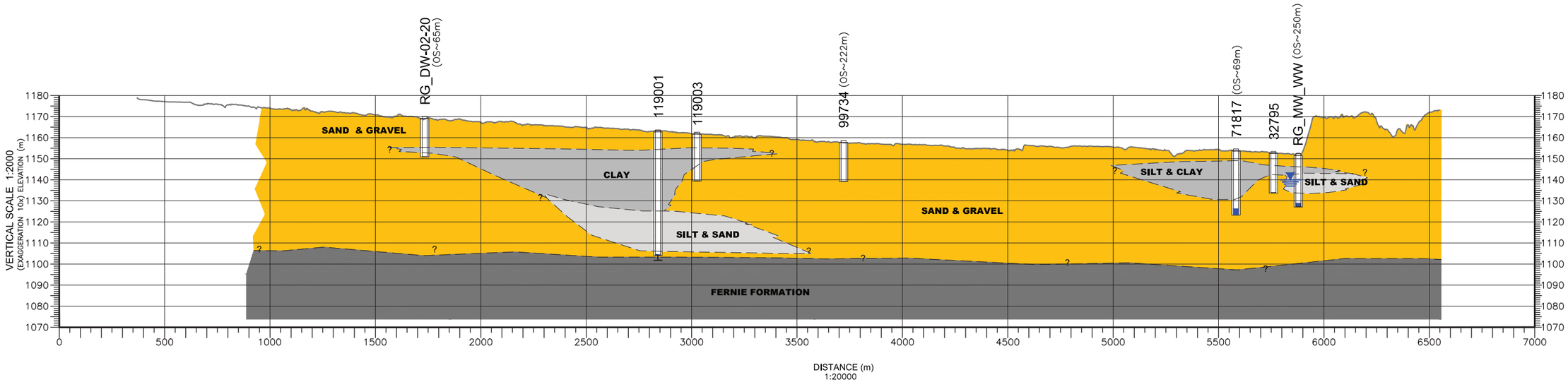
TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION EA-EA'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220222.0821	CADFILE: 635544-X2R18	**DRAWING EV-04**

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG

EB
NORTH

EB'
SOUTH



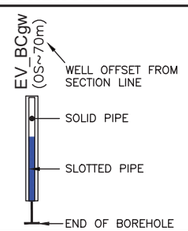
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

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. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION EB-EB'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220222.0822	CADFILE: 635544-X2R18	**DRAWING EV-05**

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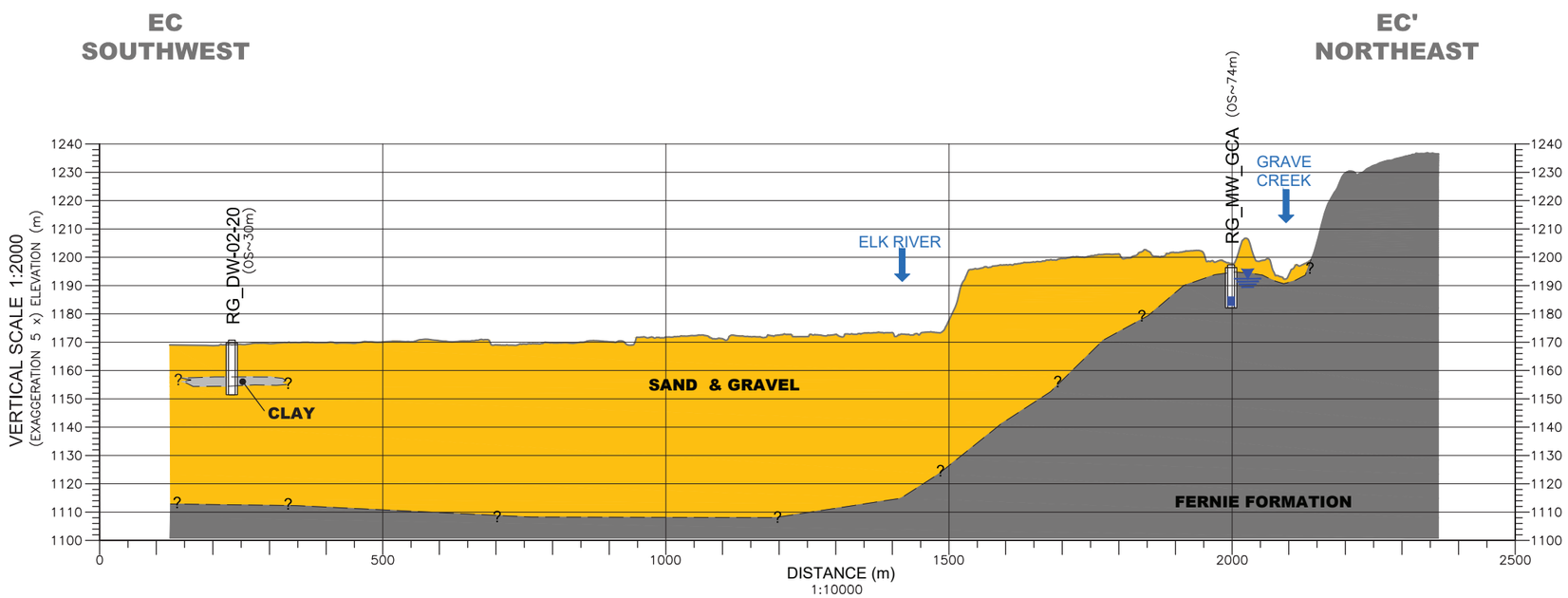
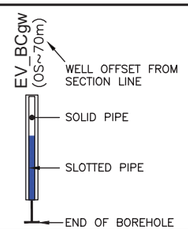


LEGEND

- **SAND & GRAVEL**
- **CLAY**
- **BEDROCK**
- INFERRED STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION EC-EC'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220222.0823	CADFILE: 635544-X2R18	**DRAWING EV-06**

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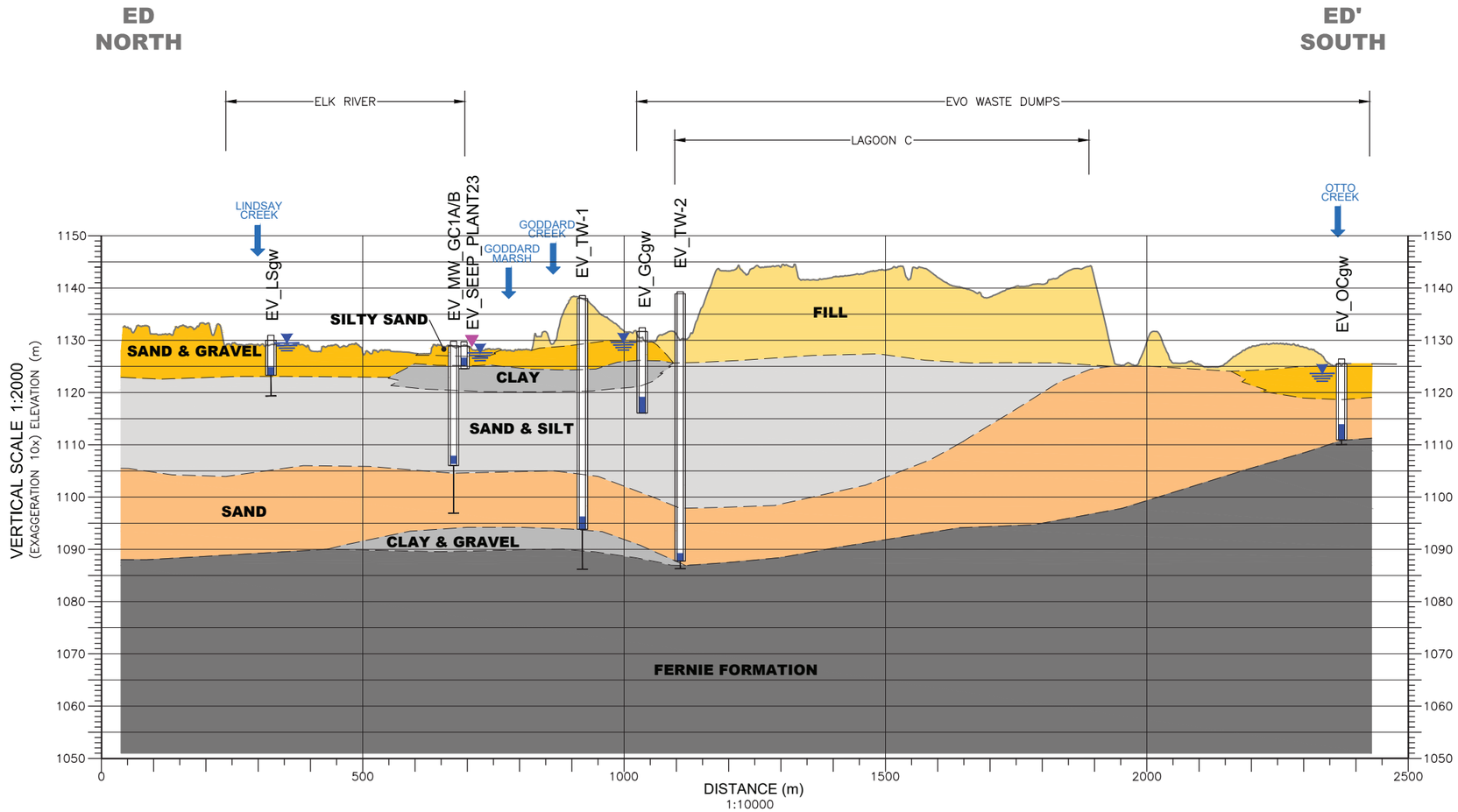


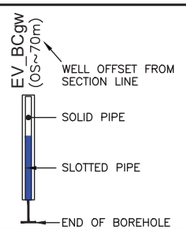
LEGEND

- FILL
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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2. INFORMATION PRESENTED IS WITHIN 25m OF SECTION LINE UNLESS INDICATED OTHERWISE ON DRAWING.
3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

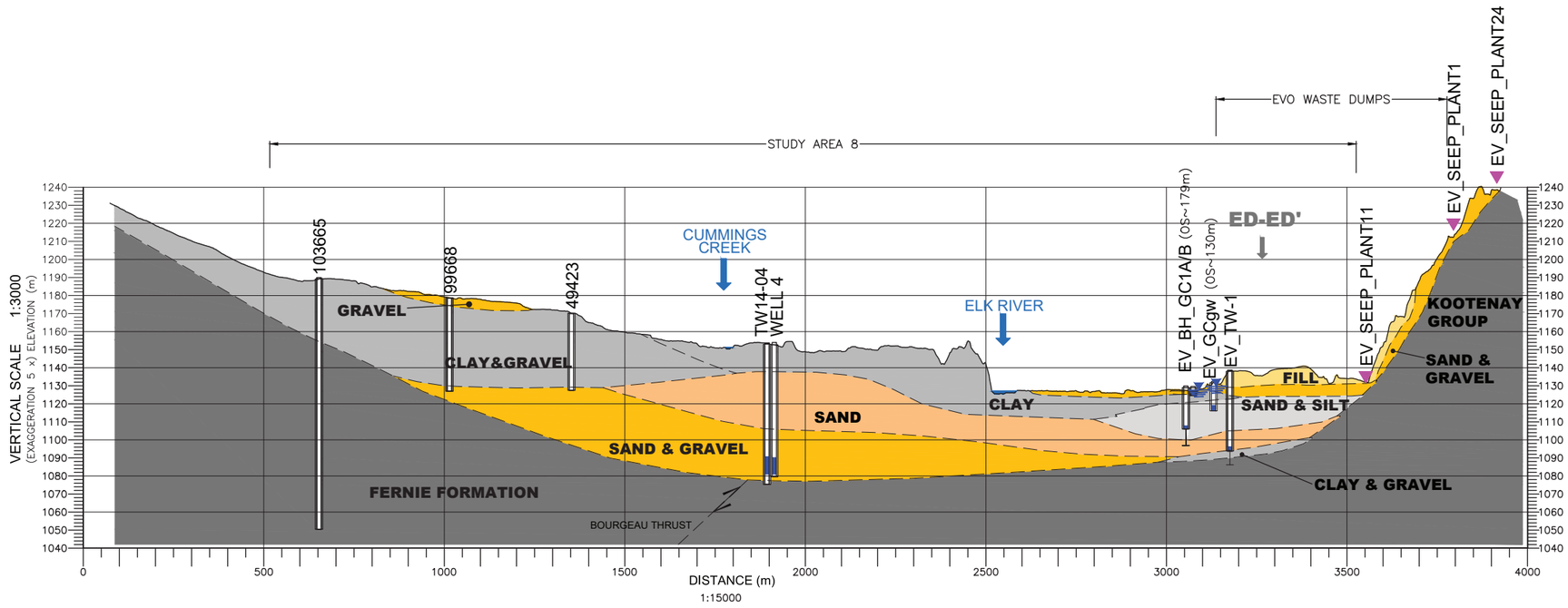
TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION ED-ED'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220222.1333	CADFILE: 635544-X2R18	**DRAWING EV-07**

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG

EE
NORTHWEST

EE'
SOUTHEAST



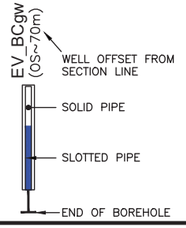
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

–	–	–
DWG. NO.	DATE	DESCRIPTION

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

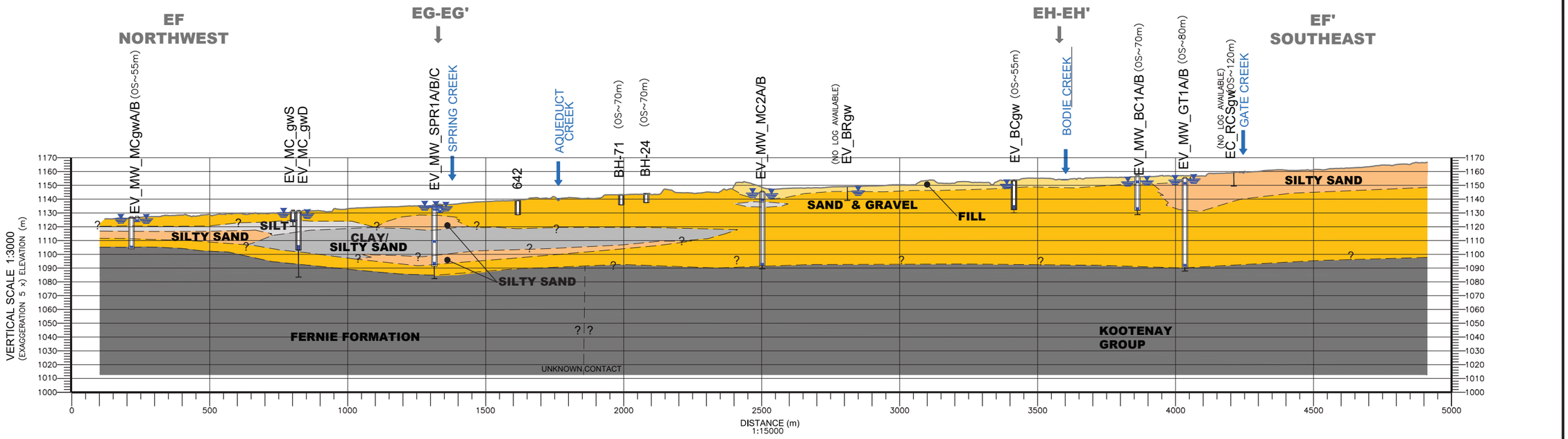
PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION EE-EE'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No:	REV.: 0
CHK'D: KC	PLOT: 20220222.0825	CADFILE: 635544-X2R18	**DRAWING EV-08**	

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG



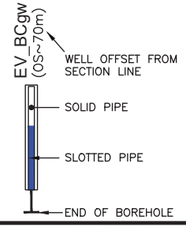
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS SHOWN ON SECTIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.

REFERENCE DRAWINGS

–	–	–
DWG. NO.	DATE	DESCRIPTION

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME: TECK COAL LIMITED
–

PROJECT LOCATION: ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

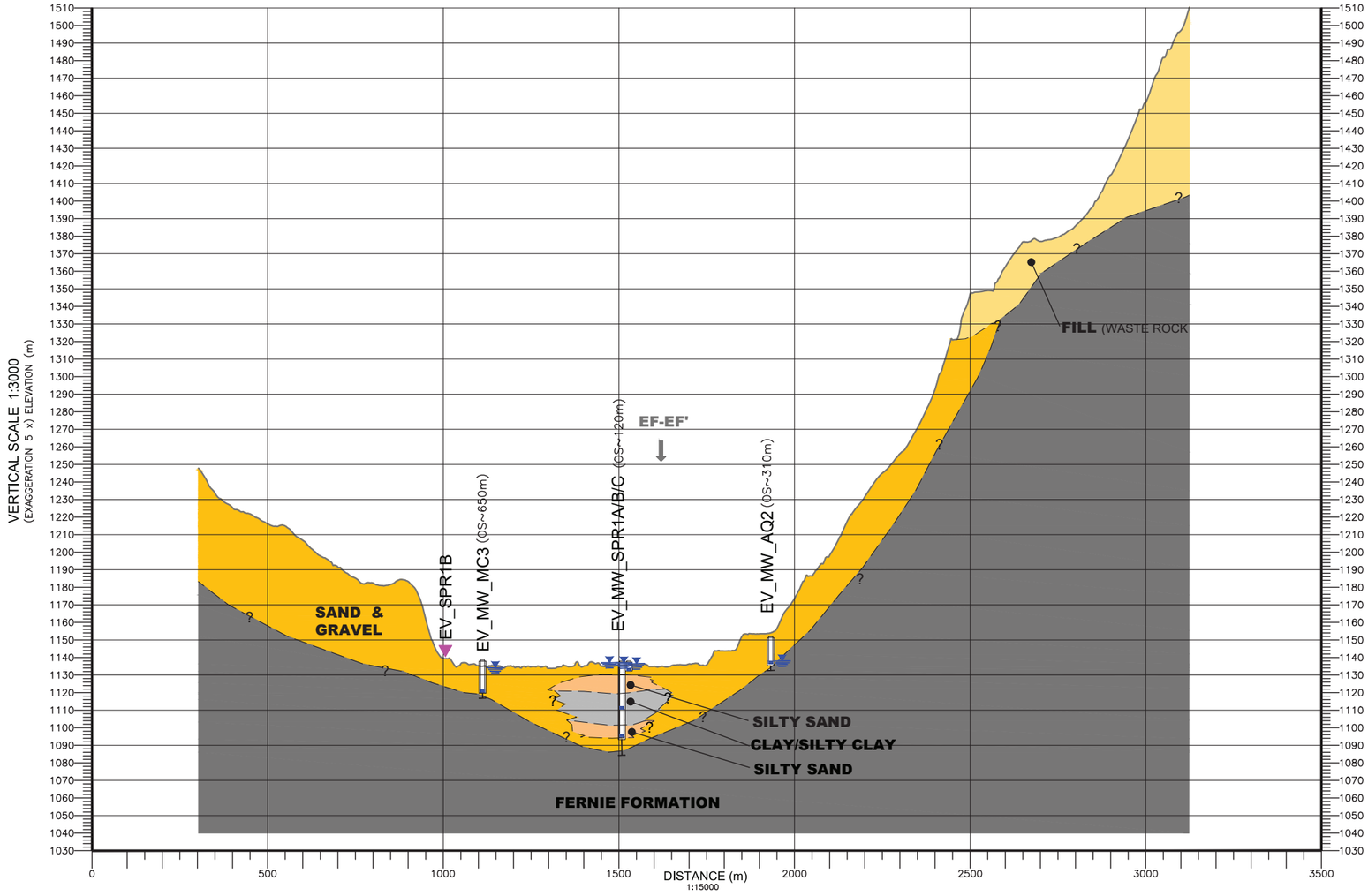
TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION EF-EF'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220222.0827	CADFILE: 635544-X2R18	DRAWING EV-09

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG

EG
SOUTHWEST

EG'
NORTHEAST



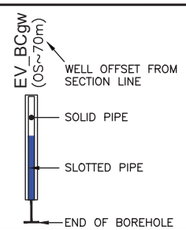
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

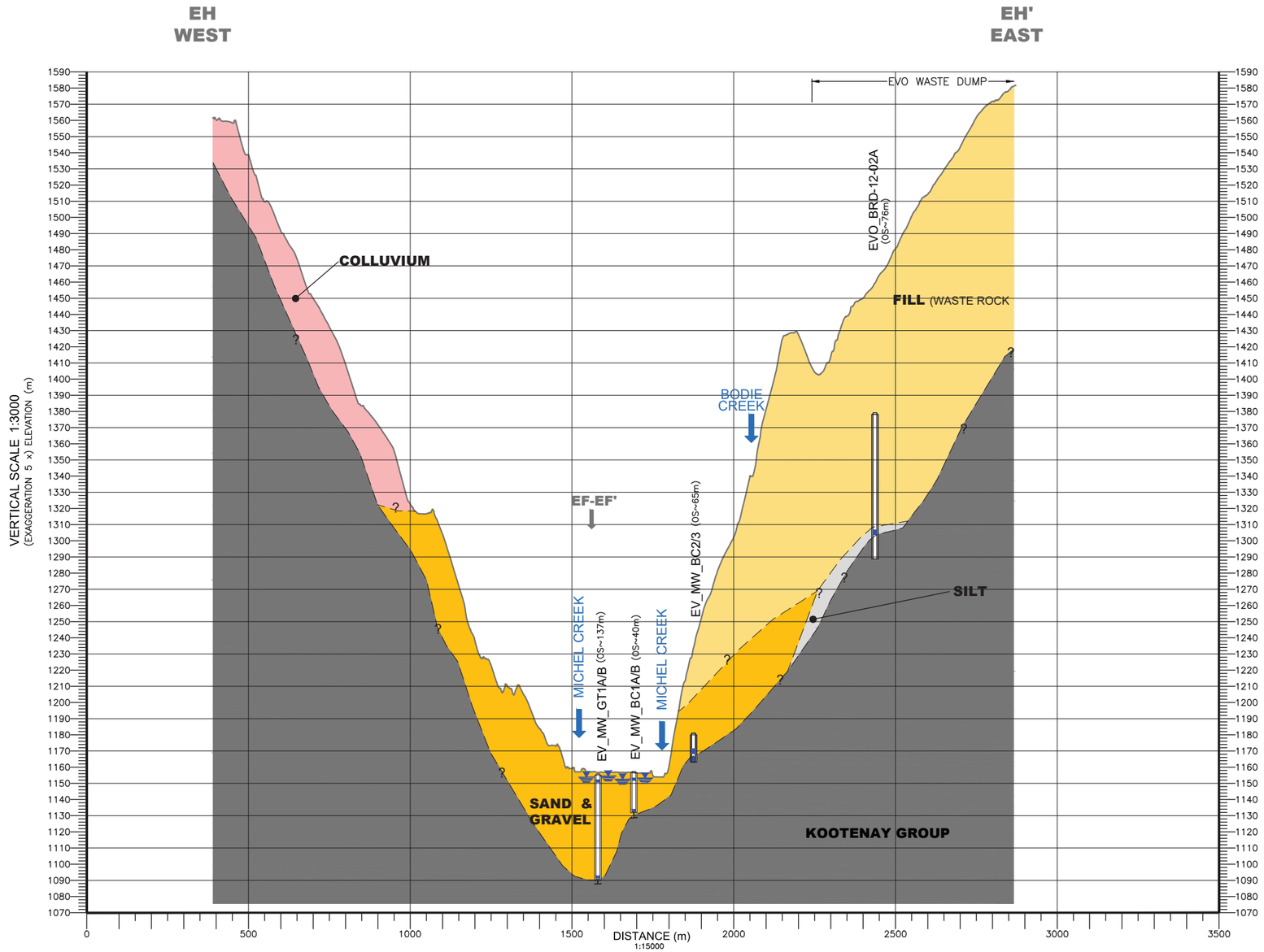
PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION EG-EG'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No: REV.: **0**
CHK'D: KC	PLOT: 20220222.0829	CADFILE: 635544-X2R18	**DRAWING EV-10**

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG



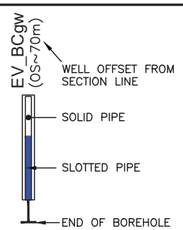
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.
4. GROUND ELEVATION FOR SECTIONS WAS OBTAINED FROM LIDAR. GROUNDWATER ELEVATIONS WERE CALCULATED USING LIDAR GROUND SURFACE ELEVATIONS.
5. DEPTH TO GROUNDWATER AT EVO_BRD-12-02A WAS MEASURED ON 2012/09/27.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION EH-EH'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220222.0830	CADFILE: 635544-X2R18	**DRAWING EV-11**

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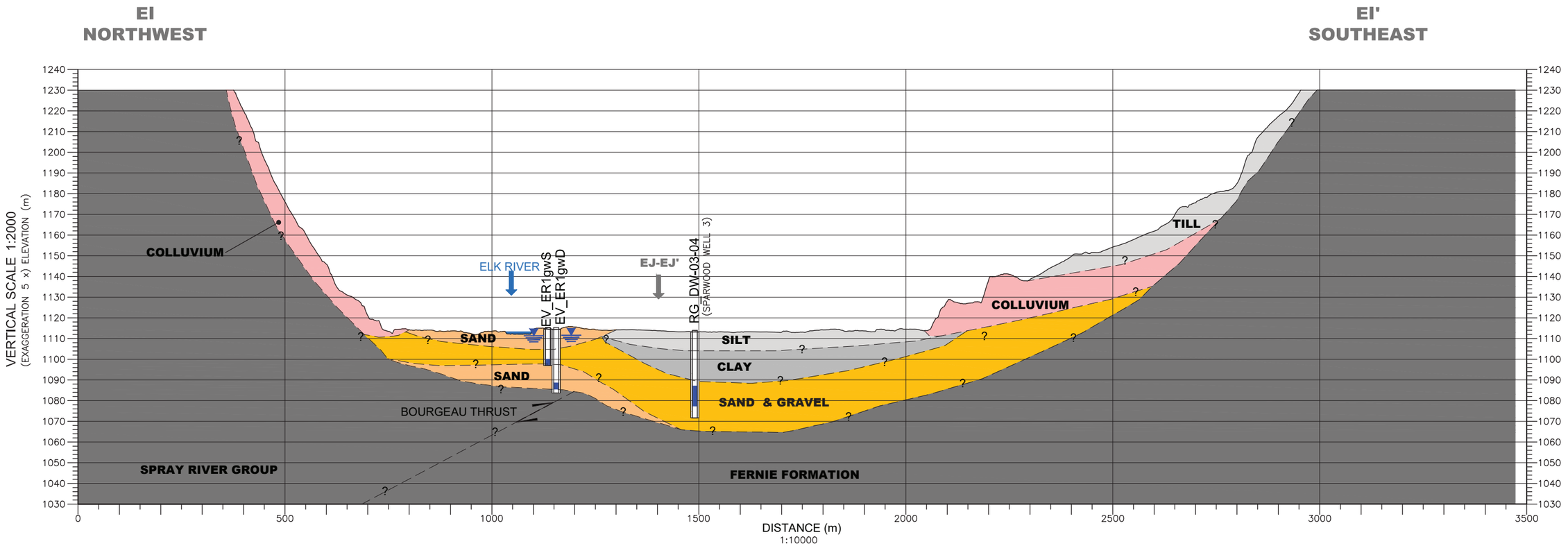


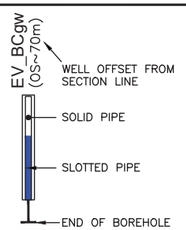
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

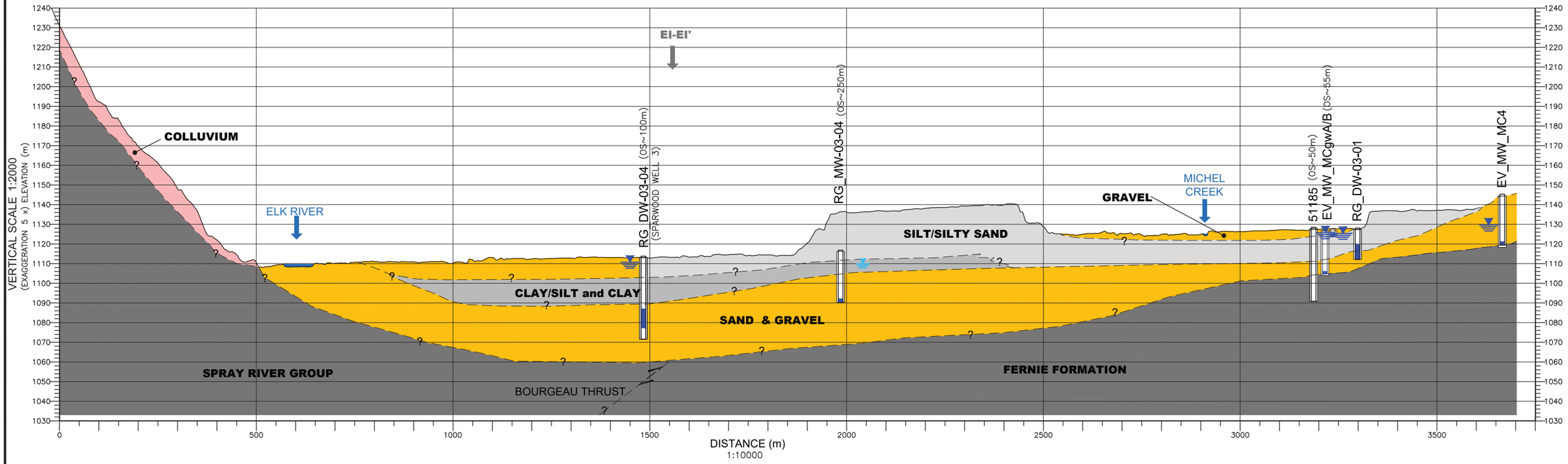
TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION EI-EI'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220222.0831	CADFILE: 635544-X2R18	**DRAWING EV-12**

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG

EJ
SOUTHWEST

EJ'
NORTHEAST



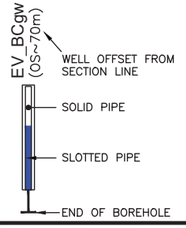
LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT/SILTY SAND
- CLAY/SILT and CLAY
- BEDROCK

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND



NOTES

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3. ORIGINAL DRAWING IN COLOUR.
4. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-02-22	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

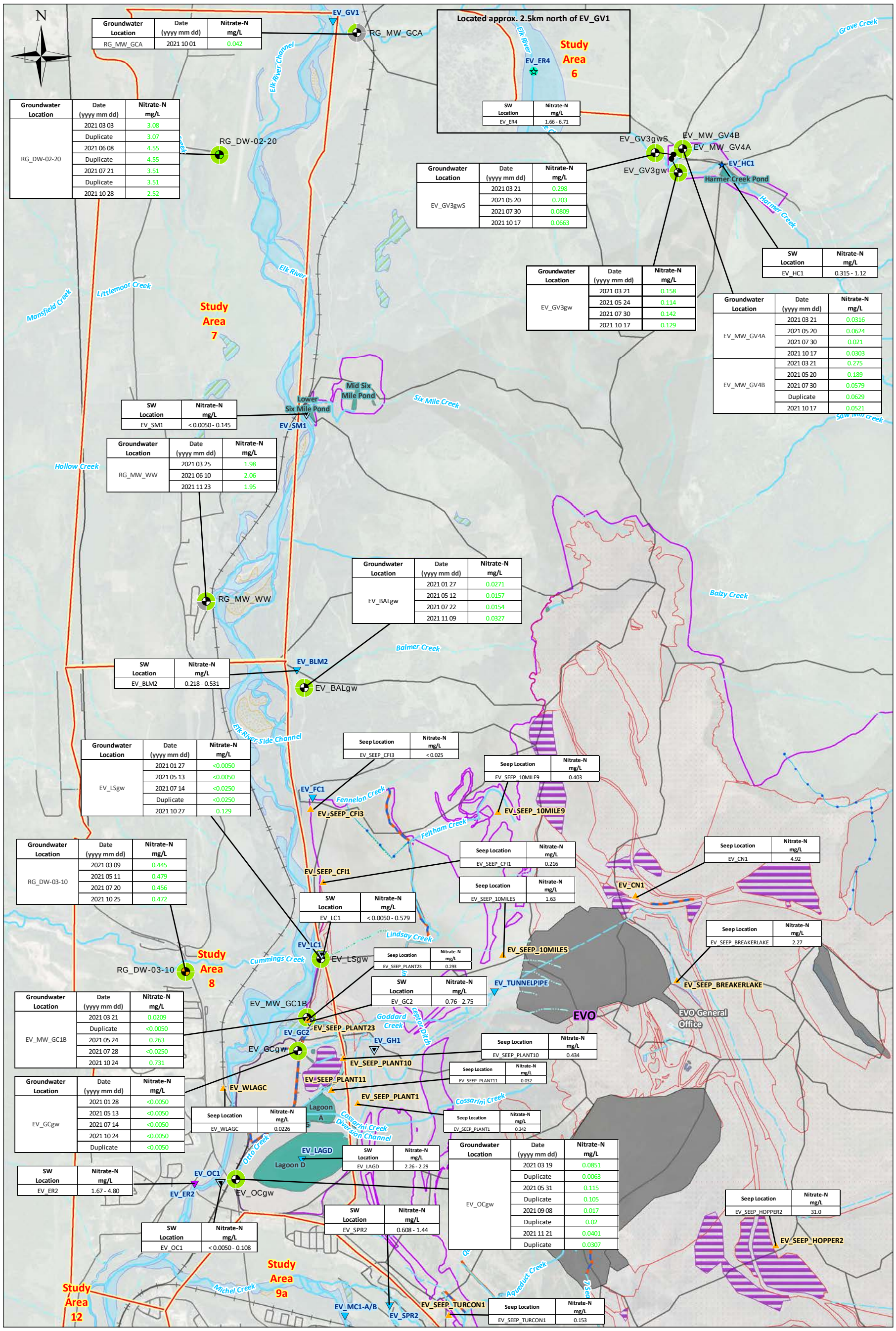
PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS
INFERRED GEOLOGICAL CROSS SECTION EJ-EJ'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-14	DWG No: REV.: 0
CHK'D: KC	PLOT: 20220222.0834	CADFILE: 635544-X2R18	**DRAWING EV-13**

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG



Legend

Groundwater Stations[4]: Monitoring Well; Domestic Well; Supply Well

Surface Water Stations: Compliance Point; Receiving Environment; Authorized Discharge; Monitoring

Seep

Site Features: Highway; Secondary Road; Rails; Study Areas; Tailings/Settling Pond; Waste Water Pond; Pit

Stockpiles; Waste Dump (Spoils); Watersheds; Mine Permitted Areas

Water Features: Stream + Stream Ditch; Intermittent + Indefinite Stream; Subsurface

Culvert; Ditch; Rock Drain; Water Pipeline; Island; Lake/River Bed; Wetted Area/Wetland (Based on 1:22000 Scale)

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

Primary Screening Criteria	Nitrate-N mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

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. Locations of overlapping wells have been adjusted for clarity.
5. Nitrate-N = Nitrate Nitrogen

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

0 250 500 1,000 1,500 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

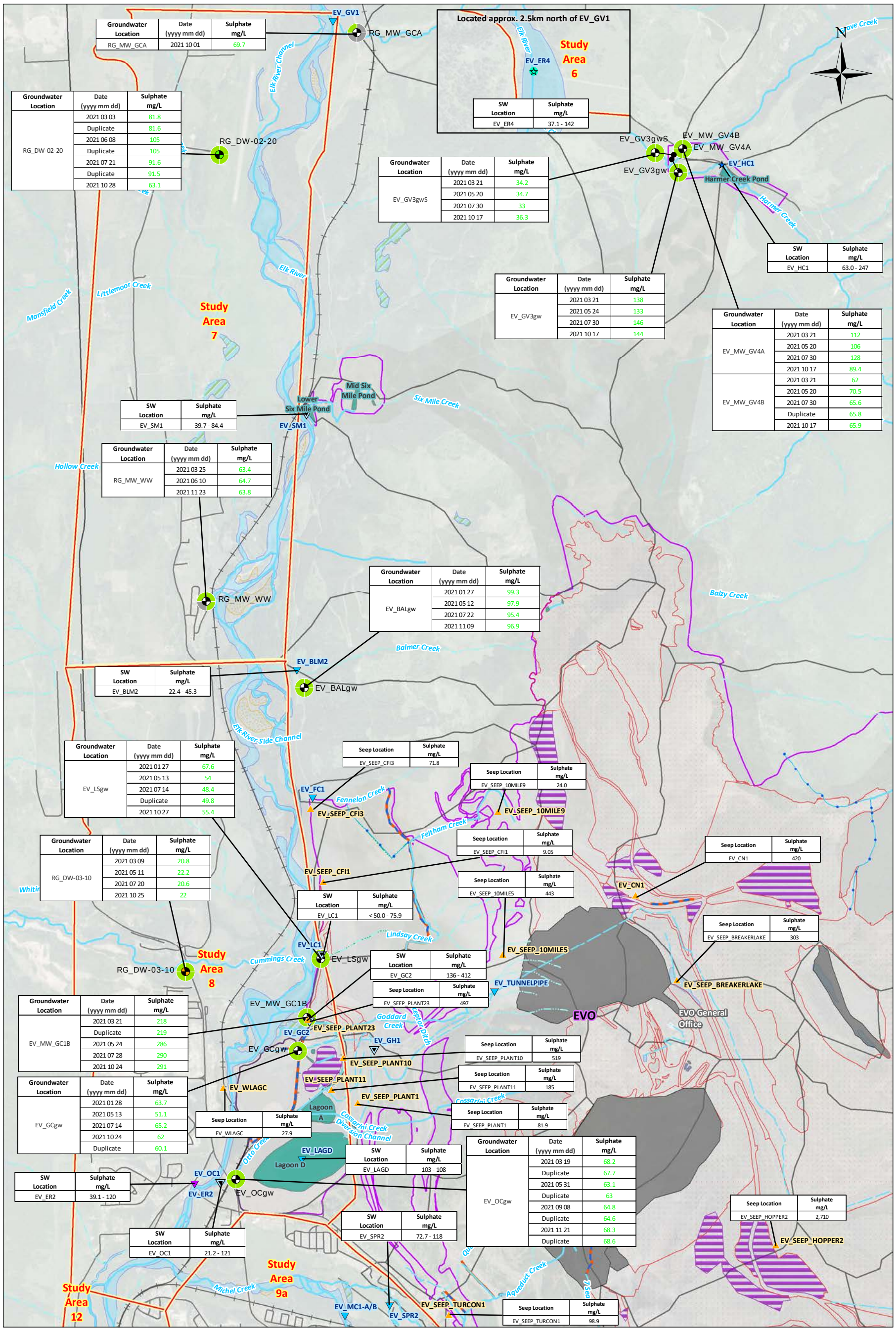
SNC·LAVALIN

Spatial Distribution of Nitrate Nitrogen in Groundwater - Elkview Operations (Study Areas 7 and 8)

CHK'D: RS | DATE: 2022-03-09 | SCALE: 1:35,000 | Ref Num: DRAWING EV-14
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GISMap Series\635544_2021 RGMP SSGMP Annual Report\635544-83-SpatialDist_N_EVO_SA7_8.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Legend

Groundwater Stations[4]: Monitoring Well; Domestic Well; Supply Well

Surface Water Stations: Compliance Point; Receiving Environment; Authorized Discharge; Monitoring; Seep

Site Features: Highway; Secondary Road; Rails; Study Areas; Tailings/Settling Pond; Waste Water Pond; Pit; Stockpiles; Waste Dump (Spoils); Watersheds; Mine Permitted Areas

Water Features: Stream + Stream Ditch; Intermittent + Indefinite Stream; Subsurface; Culvert; Ditch; Rock Drain; Water Pipeline; Island; Lake/River Bed; Wetted Area/Wetland (Based on 1:22000 Scale)

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

Primary Screening Criteria	Sulphate mg/L
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	n/a
CSR Livestock Watering	1,000
CSR Drinking Water	500

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

0 250 500 1,000 1,500 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

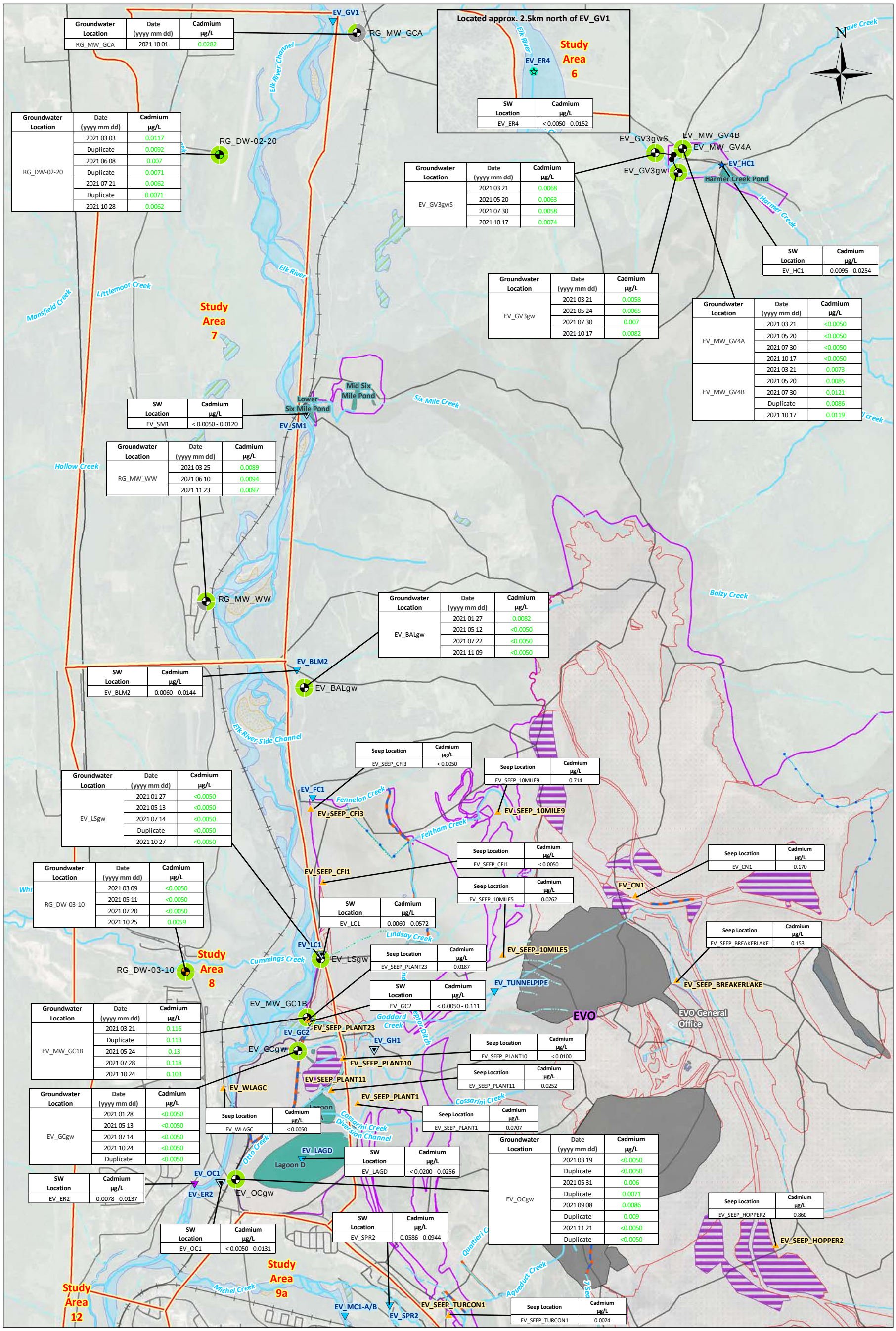
SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater - Elkview Operations (Study Areas 7 and 8)

CHK'D: RS | BY: CW | DATE: 2022-03-09 | SCALE: 1:35,000 | COORD SYS: NAD 1983 UTM Zone 11N | Ref Num: DRAWING EV-15

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GISMap Series\635544_2021 RGMP SSGMP Annual Report\635544-84-SpatialDist_SO4_EVO_SA7_8.mxd



Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
RG_MW_GCA	2021 10 01	0.0282

SW Location	Cadmium µg/L
EV_ER4	< 0.0050 - 0.0152

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
RG_DW-02-20	2021 03 03	0.0117
	Duplicate	0.0092
	2021 06 08	0.007
	Duplicate	0.0071
	2021 07 21	0.0062
	Duplicate	0.0071
	2021 10 28	0.0062

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_GV3gwS	2021 03 21	0.0068
	2021 05 20	0.0063
	2021 07 30	0.0058
	2021 10 17	0.0074

SW Location	Cadmium µg/L
EV_HC1	0.0095 - 0.0254

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_GV3gw	2021 03 21	0.0058
	2021 05 24	0.0065
	2021 07 30	0.007
	2021 10 17	0.0082

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_GV4A	2021 03 21	<0.0050
	2021 05 20	<0.0050
	2021 07 30	<0.0050
	2021 10 17	<0.0050
EV_MW_GV4B	2021 03 21	0.0073
	2021 05 20	0.0085
	2021 07 30	0.0121
	Duplicate	0.0086
	2021 10 17	0.0119

SW Location	Cadmium µg/L
EV_SM1	< 0.0050 - 0.0120

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
RG_MW_WW	2021 03 25	0.0089
	2021 06 10	0.0094
	2021 11 23	0.0097

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_BALgw	2021 01 27	0.0082
	2021 05 12	<0.0050
	2021 07 22	<0.0050
	2021 11 09	<0.0050

SW Location	Cadmium µg/L
EV_BLM2	0.0060 - 0.0144

Seep Location	Cadmium µg/L
EV_SEEP_CFI3	< 0.0050

Seep Location	Cadmium µg/L
EV_SEEP_10MILE9	0.714

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_LSgw	2021 01 27	<0.0050
	2021 05 13	<0.0050
	2021 07 14	<0.0050
	Duplicate	<0.0050
	2021 10 27	<0.0050

Seep Location	Cadmium µg/L
EV_SEEP_CFI1	< 0.0050

Seep Location	Cadmium µg/L
EV_CN1	0.170

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
RG_DW-03-10	2021 03 09	<0.0050
	2021 05 11	<0.0050
	2021 07 20	<0.0050
	2021 10 25	0.0059

Seep Location	Cadmium µg/L
EV_SEEP_10MILE5	0.0262

SW Location	Cadmium µg/L
EV_LC1	0.0060 - 0.0572

Seep Location	Cadmium µg/L
EV_SEEP_BREAKERLAKE	0.153

Seep Location	Cadmium µg/L
EV_SEEP_PLANT23	0.0187

SW Location	Cadmium µg/L
EV_GC2	< 0.0050 - 0.111

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_GC1B	2021 03 21	0.116
	Duplicate	0.113
	2021 05 24	0.13
	2021 07 28	0.118
	2021 10 24	0.103

Seep Location	Cadmium µg/L
EV_SEEP_PLANT10	< 0.0100

Seep Location	Cadmium µg/L
EV_SEEP_PLANT11	0.0252

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_GCgw	2021 01 28	<0.0050
	2021 05 13	<0.0050
	2021 07 14	<0.0050
	2021 10 24	<0.0050
	Duplicate	<0.0050

Seep Location	Cadmium µg/L
EV_WLAGC	< 0.0050

Seep Location	Cadmium µg/L
EV_SEEP_PLANT1	0.0707

SW Location	Cadmium µg/L
EV_LAGD	< 0.0200 - 0.0256

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_OCgw	2021 03 19	<0.0050
	Duplicate	<0.0050
	2021 05 31	0.006
	Duplicate	0.0071
	2021 09 08	0.0086
	Duplicate	0.009
	2021 11 21	<0.0050
	Duplicate	<0.0050

SW Location	Cadmium µg/L
EV_ER2	0.0078 - 0.0137

SW Location	Cadmium µg/L
EV_OC1	< 0.0050 - 0.0131

SW Location	Cadmium µg/L
EV_SPR2	0.0586 - 0.0944

Seep Location	Cadmium µg/L
EV_SEEP_HOPPER2	0.860

Seep Location	Cadmium µg/L
EV_SEEP_TURCON1	0.0074

Legend

Groundwater Stations[4]: Monitoring Well; Domestic Well; Supply Well

Surface Water Stations: Compliance Point; Receiving Environment; Authorized Discharge; Monitoring; Seep

Site Features: Highway; Secondary Road; Rails; Study Areas; Tailings/Settling Pond; Waste Water Pond; Pit; Stockpiles; Waste Dump (Spoils); Watersheds; Mine Permitted Areas

Water Features: Stream + Stream Ditch; Intermittent + Indefinite Stream; Subsurface; Culvert; Ditch; Rock Drain; Water Pipeline; Island; Lake/River Bed; Wetted Area/Wetland (Based on 1:35000 Scale)

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

^ Dissolved phase of the parameter is shown in the spatial plot.

Primary Screening Criteria	Cadmium^ µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

0 250 500 1,000 1,500 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

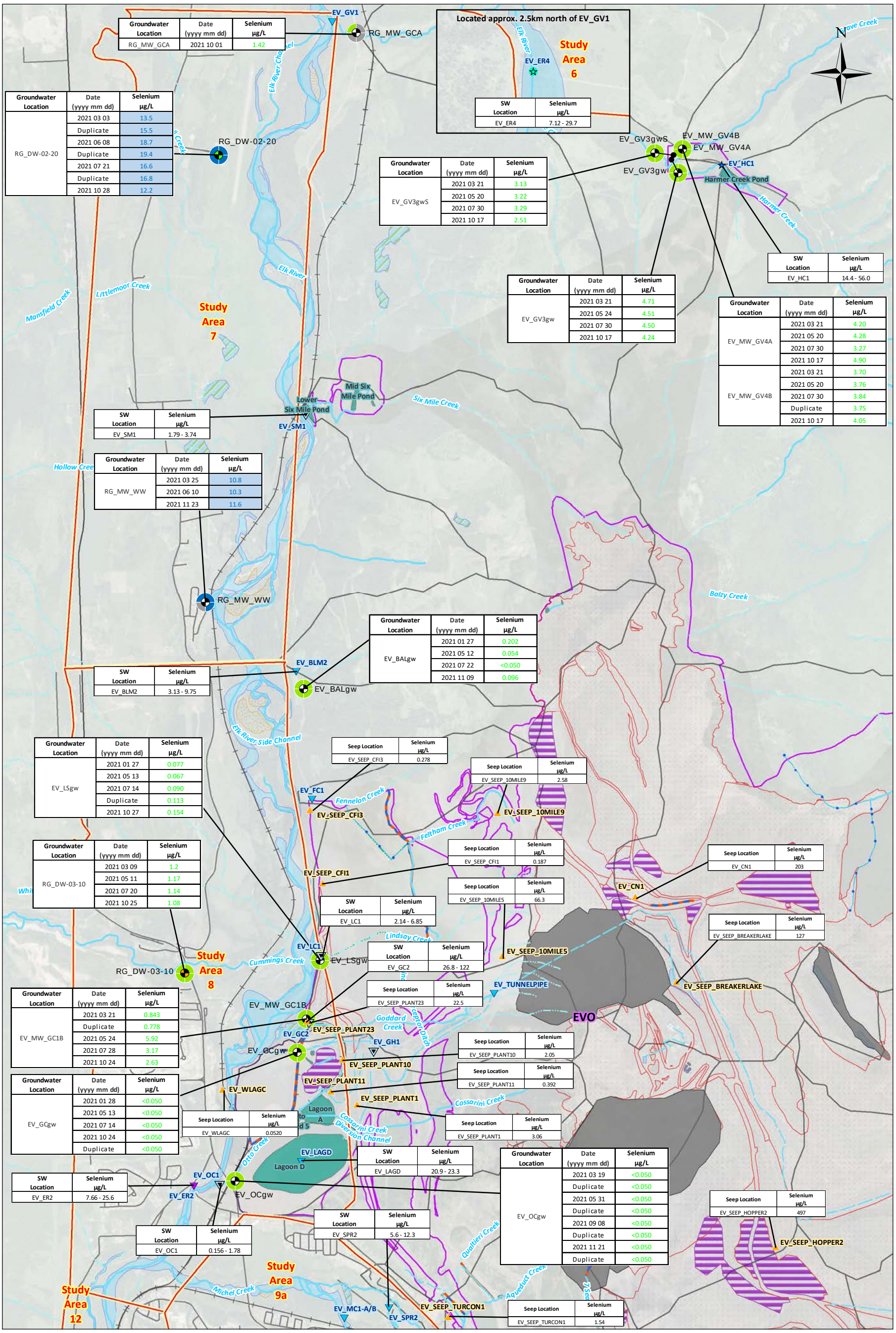
SNC·LAVALIN

Spatial Distribution of Dissolved Cadmium in Groundwater - Elkview Operations (Study Areas 7 and 8)

CHK'D: RS | DATE: 2022-03-09 | SCALE: 1:35,000 | Ref Num: DRAWING EV-16
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-85-SpatialDist_Cd_EVO_SA7_8.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
RG_MW_GCA	2021 10 01	1.42

SW Location	Selenium µg/L
EV_ER4	7.12 - 29.7

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
RG_DW-02-20	2021 03 03	13.5
	Duplicate	15.5
	2021 06 08	18.7
	Duplicate	19.4
	2021 07 21	16.6
	Duplicate	16.8
	2021 10 28	12.2

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_GV3gwS	2021 03 21	3.13
	2021 05 20	3.22
	2021 07 30	3.29
	2021 10 17	2.51

SW Location	Selenium µg/L
EV_HC1	14.4 - 56.0

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_GV3gw	2021 03 21	4.71
	2021 05 24	4.51
	2021 07 30	4.50
	2021 10 17	4.24

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_GV4A	2021 03 21	4.20
	2021 05 20	4.28
	2021 07 30	3.27
	2021 10 17	4.90
EV_MW_GV4B	2021 03 21	3.70
	2021 05 20	3.76
	2021 07 30	3.84
	Duplicate	3.75
	2021 10 17	4.05

SW Location	Selenium µg/L
EV_SM1	1.79 - 3.74

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
RG_MW_WW	2021 03 25	10.8
	2021 06 10	10.3
	2021 11 23	11.6

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_BALgw	2021 01 27	0.202
	2021 05 12	0.054
	2021 07 22	<0.050
	2021 11 09	0.096

SW Location	Selenium µg/L
EV_BLM2	3.13 - 9.75

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_LSgw	2021 01 27	0.077
	2021 05 13	0.067
	2021 07 14	0.090
	Duplicate	0.113
	2021 10 27	0.154

Seep Location	Selenium µg/L
EV_SEEP_CFI3	0.278

Seep Location	Selenium µg/L
EV_SEEP_10MILE9	2.58

Seep Location	Selenium µg/L
EV_SEEP_CFI1	0.187

Seep Location	Selenium µg/L
EV_CN1	203

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
RG_DW-03-10	2021 03 09	1.2
	2021 05 11	1.17
	2021 07 20	1.14
	2021 10 25	1.08

SW Location	Selenium µg/L
EV_LC1	2.14 - 6.85

Seep Location	Selenium µg/L
EV_SEEP_10MILE5	66.3

Seep Location	Selenium µg/L
EV_SEEP_BREAKERLAKE	127

SW Location	Selenium µg/L
EV_GC2	26.8 - 122

Seep Location	Selenium µg/L
EV_SEEP_PLANT23	22.5

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_GC1B	2021 03 21	0.843
	Duplicate	0.778
	2021 05 24	5.92
	2021 07 28	3.17
	2021 10 24	2.63

Seep Location	Selenium µg/L
EV_SEEP_PLANT10	2.05

Seep Location	Selenium µg/L
EV_SEEP_PLANT11	0.392

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_GCgw	2021 01 28	<0.050
	2021 05 13	<0.050
	2021 07 14	<0.050
	2021 10 24	<0.050
	Duplicate	<0.050

Seep Location	Selenium µg/L
EV_WLAGC	0.0520

Seep Location	Selenium µg/L
EV_SEEP_PLANT1	3.06

SW Location	Selenium µg/L
EV_LAGD	20.9 - 23.3

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_OCgw	2021 03 19	<0.050
	Duplicate	<0.050
	2021 05 31	<0.050
	Duplicate	<0.050
	2021 09 08	<0.050
	Duplicate	<0.050
	2021 11 21	<0.050
	Duplicate	<0.050

SW Location	Selenium µg/L
EV_ER2	7.66 - 25.6

SW Location	Selenium µg/L
EV_OC1	0.156 - 1.78

SW Location	Selenium µg/L
EV_SPR2	5.6 - 12.3

Seep Location	Selenium µg/L
EV_SEEP_HOPPER2	497

Seep Location	Selenium µg/L
EV_SEEP_TURCON1	1.54

Legend

Groundwater Stations[4]: Monitoring Well; Domestic Well; Supply Well
Surface Water Stations: Compliance Point; Receiving Environment; Authorized Discharge; Monitoring; Seep
Site Features: Highway; Secondary Road; Rails; Study Areas; Tailings/Settling Pond; Waste Water Pond; Pit
Water Features: Stockpiles; Waste Dump (Spoils); Watersheds; Mine Permitted Areas; Stream + Stream Ditch; Intermittent + Indefinite Stream; Subsurface; Culvert; Ditch; Rock Drain; Water Pipeline; Island; Lake/River Bed; Wetted Area/Wetland (Based on 1:35000 Scale)

Q4 Q1 / Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

^ Dissolved phase of the parameter is shown in the spatial plot.

Primary Screening Criteria	Selenium^ µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

0 250 500 1,000 1,500 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

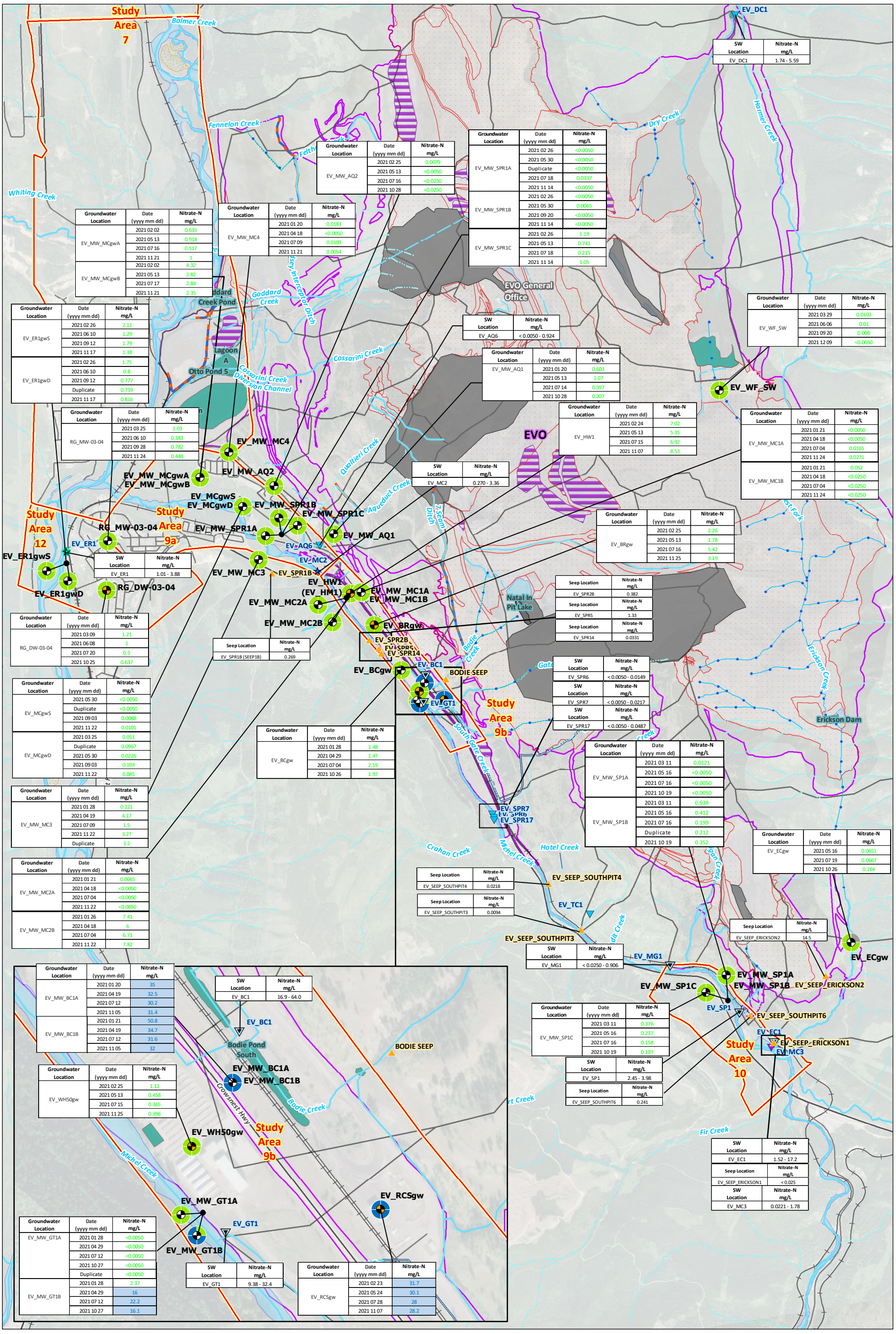
Spatial Distribution of Dissolved Selenium in Groundwater - Elkview Operations (Study Areas 7 and 8)

CHK'D: RS | DATE: 2022-03-09 | SCALE: 1:35,000 | Ref Num: DRAWING EV-17
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-86-SpatialDist_Se_EVO_SA7_8.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

Spatial Distribution of Nitrate Nitrogen in Groundwater - Elkview Operations (Study Areas 9a and b, 10 and 12)



SW Location	Nitrate-N mg/L
EV_DC1	1.74 - 5.59

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_AQ2	2021 02 25	0.0079
	2021 05 13	<0.0050
	2021 07 16	<0.0250
	2021 10 28	<0.0250

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_SPR1A	2021 02 26	<0.0050
	2021 05 30	<0.0050
	Duplicate	<0.0050
	2021 07 18	0.0337
	2021 11 14	<0.0050
EV_MW_SPR1B	2021 02 26	<0.0050
	2021 05 30	0.0065
	2021 09 20	<0.0050
	2021 11 14	<0.0050
EV_MW_SPR1C	2021 02 26	1.19
	2021 05 13	0.741
	2021 07 18	0.215
	2021 11 14	1.05

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_MCgwA	2021 02 02	0.635
	2021 05 13	0.918
	2021 07 16	0.517
	2021 11 21	1
EV_MW_MCgwB	2021 02 02	4.32
	2021 05 13	2.82
	2021 07 17	2.84
	2021 11 21	2.35

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_MC4	2021 01 20	0.0183
	2021 04 18	<0.0050
	2021 07 09	0.0109
	2021 11 21	0.0054

SW Location	Nitrate-N mg/L
EV_AQ6	< 0.0050 - 0.924

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_WF_SW	2021 03 29	0.0103
	2021 06 06	0.01
	2021 09 20	0.008
	2021 12 09	<0.0050

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_ER1gwS	2021 02 26	2.11
	2021 06 10	1.29
	2021 09 12	1.79
	2021 11 17	1.38
EV_ER1gwD	2021 02 26	1.75
	2021 06 10	0.8
	2021 09 12	0.777
	Duplicate	0.759
	2021 11 17	0.816

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_AQ1	2021 01 20	0.603
	2021 05 13	1.07
	2021 07 14	0.397
	2021 10 28	0.207

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
RG_MW-03-04	2021 03 25	1.03
	2021 06 10	0.383
	2021 09 28	0.782
	2021 11 24	0.448

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_HW1	2021 02 24	7.02
	2021 05 13	5.35
	2021 07 15	6.92
	2021 11 07	8.53

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_MC1A	2021 01 21	<0.0050
	2021 04 18	<0.0050
	2021 07 04	0.0165
	2021 11 24	0.0271
EV_MW_MC1B	2021 01 21	0.052
	2021 04 18	<0.0250
	2021 07 04	<0.0250
	2021 11 24	<0.0250

SW Location	Nitrate-N mg/L
EV_MC2	0.270 - 3.36

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_BRgw	2021 02 25	2.26
	2021 05 13	1.78
	2021 07 16	5.42
	2021 11 25	3.19

Seep Location	Nitrate-N mg/L
EV_SPR2B	0.382

Seep Location	Nitrate-N mg/L
EV_SPR5	1.33

Seep Location	Nitrate-N mg/L
EV_SPR14	0.0331

SW Location	Nitrate-N mg/L
EV_SPR6	< 0.0050 - 0.0149

SW Location	Nitrate-N mg/L
EV_SPR7	< 0.0050 - 0.0217

SW Location	Nitrate-N mg/L
EV_SPR17	< 0.0050 - 0.0487

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_SP1A	2021 03 11	0.0121
	2021 05 16	<0.0050
	2021 07 16	<0.0050
	2021 10 19	<0.0050
EV_MW_SP1B	2021 03 11	0.939
	2021 05 16	0.412
	2021 07 16	0.199
	Duplicate	0.212
	2021 10 19	0.352

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_ECgw	2021 05 16	0.0651
	2021 07 19	0.0667
	2021 10 26	0.164

Seep Location	Nitrate-N mg/L
EV_SEEP_SOUTHPIT4	0.0218

Seep Location	Nitrate-N mg/L
EV_SEEP_SOUTHPIT3	0.0094

SW Location	Nitrate-N mg/L
EV_MG1	< 0.0250 - 0.906

Seep Location	Nitrate-N mg/L
EV_SEEP_ERICKSON2	14.5

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_SP1C	2021 03 11	0.376
	2021 05 16	0.237
	2021 07 16	0.158
	2021 10 19	0.197

SW Location	Nitrate-N mg/L
EV_SP1	2.45 - 3.98

Seep Location	Nitrate-N mg/L
EV_SEEP_SOUTHPIT6	0.241

SW Location	Nitrate-N mg/L
EV_EC1	1.52 - 17.2

Seep Location	Nitrate-N mg/L
EV_SEEP_ERICKSON1	< 0.025

SW Location	Nitrate-N mg/L
EV_MC3	0.0221 - 1.78

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
RG_DW-03-04	2021 03 09	1.21
	2021 06 08	1
	2021 07 20	0.5
	2021 10 25	0.637

Seep Location	Nitrate-N mg/L
EV_SPR1B (SEEP1B)	0.269

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MCgwS	2021 05 30	<0.0050
	Duplicate	<0.0050
	2021 09 03	0.0088
	2021 11 22	0.0101
EV_MCgwD	2021 03 25	0.051
	Duplicate	0.0967
	2021 05 30	0.0226
	2021 09 03	0.193
	2021 11 22	0.085

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_BCgw	2021 01 28	1.48
	2021 04 29	1.47
	2021 07 04	2.19
	2021 10 26	1.97

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_MC3	2021 01 28	0.221
	2021 04 19	4.17
	2021 07 09	1.5
	2021 11 22	3.27
	Duplicate	3.2

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_MC2A	2021 01 21	0.0065
	2021 04 18	<0.0050
	2021 07 04	<0.0050
	2021 11 22	<0.0050
EV_MW_MC2B	2021 01 26	7.41
	2021 04 18	6
	2021 07 04	6.71
	2021 11 22	7.82

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_BC1A	2021 01 20	35
	2021 04 19	32.5
	2021 07 12	30.2
	2021 11 05	31.4
EV_MW_BC1B	2021 01 21	50.8
	2021 04 19	34.7
	2021 07 12	31.6
	2021 11 05	32

SW Location	Nitrate-N mg/L
EV_BC1	16.9 - 64.0

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_WH50gw	2021 02 25	1.12
	2021 05 13	0.458
	2021 07 15	0.365
	2021 11 25	0.396

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_MW_GT1A	2021 01 28	<0.0050
	2021 04 29	<0.0050
	2021 07 12	<0.0050
	2021 10 27	<0.0050
	Duplicate	<0.0050
EV_MW_GT1B	2021 01 28	2.37
	2021 04 29	16
	2021 07 12	22.2
	2021 10 27	16.1

SW Location	Nitrate-N mg/L
EV_GT1	9.38 - 32.4

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
EV_RCSgw	2021 02 23	31.7
	2021 05 24	30.1
	2021 07 28	28
	2021 11 07	28.2

Legend

Groundwater Stations[4]
- Monitoring Well
- Supply Well

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep
- Monitoring/Seep (Other Programs)

Site Features
- Highway
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- Waste Water Pond
- End-Pit Lake
- Pit
- Stockpiles
- Waste Dump (Spoils)

- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel

- Island
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:45000 Scale)

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green below the applicable screening criteria
Blue above the applicable screening criteria
Grey no sample collected

Primary Screening Criteria	Nitrate-N mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

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. Locations of overlapping wells have been adjusted for clarity.
5. Nitrate-N = Nitrate Nitrogen

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

0 250 500 1,000 1,500 2,000 Meters

PROJECT LOCATION: Elk Valley, BC

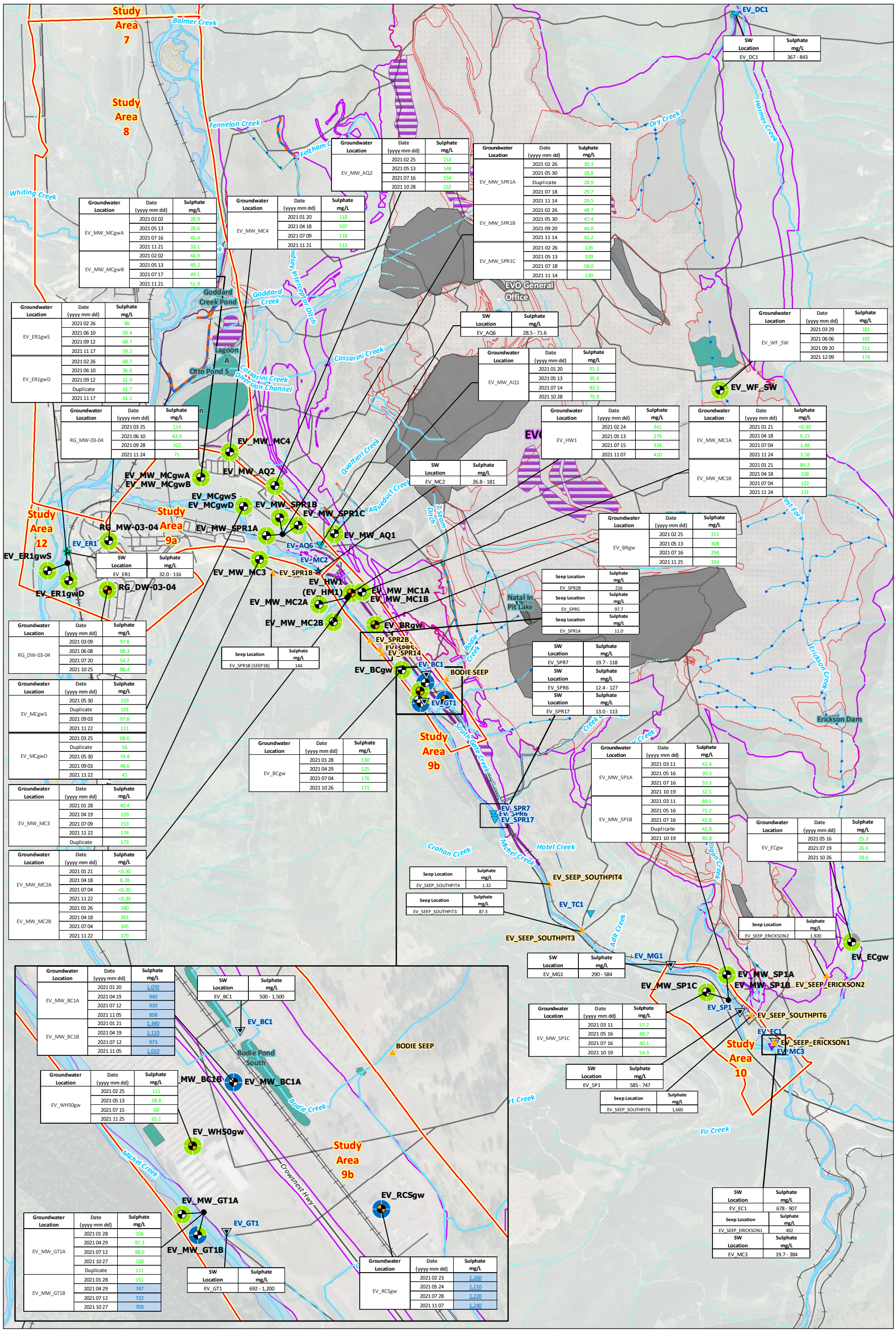
CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

CHK'D: RS | DATE: 2022-03-22 | SCALE: 1:45,000 | Ref Num:
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING EV-18

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-87-SpatialDist_N_EVO_SA9-10-12.mxd



Legend

Groundwater Stations[4]: Monitoring Well; Supply Well

Surface Water Stations: Compliance Point; Order Station; Receiving Environment; Authorized Discharge; Monitoring; Seep; Monitoring/Seep (Other Programs)

Site Features: Highway; Secondary Road; Rails; Study Areas; Tailings/Settling Pond; Waste Water Pond; End-Pit Lake; Pit; Stockpiles; Waste Dump (Spoils)

Watersheds; Mine Permitted Areas

Water Features: Stream + Stream Ditch; Intermittent + Indefinite Stream; Subsurface; Ditch; Rock Drain; Water Pipeline; Bypass/Diversion Channel

Island; Lake/River Bed; Wetted Area/Wetland (Based on 1:45000 Scale)

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

Primary Screening Criteria	Sulphate mg/L
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	n/a
CSR Livestock Watering	1,000
CSR Drinking Water	500

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

0 250 500 1,000 1,500 2,000 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

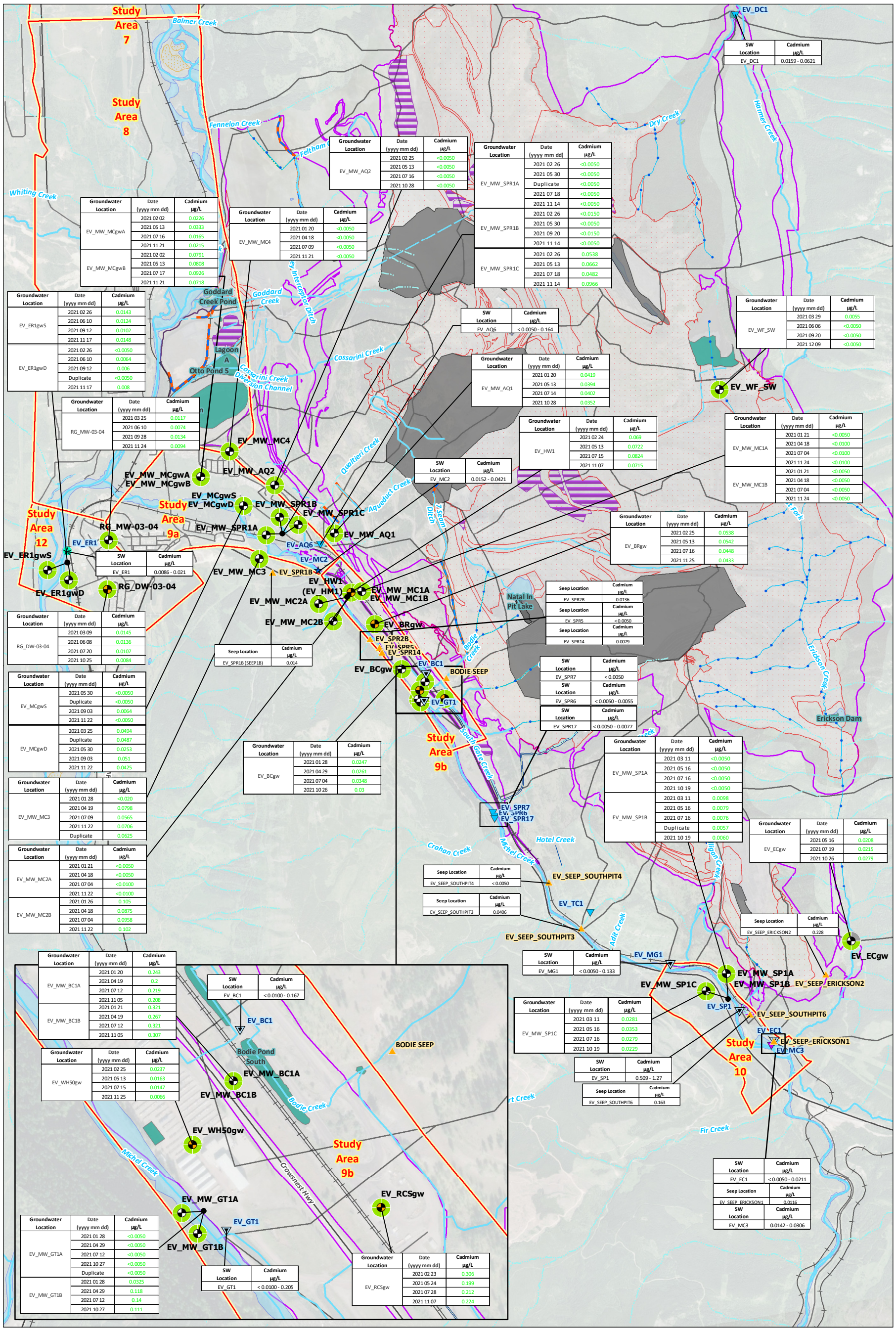
Spatial Distribution of Sulphate in Groundwater - Elkview Operations (Study Areas 9a and b, 10 and 12)

CHK'D: RS | DATE: 2022-03-22 | SCALE: 1:45,000 | Ref Num: DRAWING EV-19

BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GISMap Series\635544_2021 RGMP SSGMP Annual Report\635544-88-SpatialDist_SO4_EVO_SA9-10-12.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



SW Location	Cadmium µg/L
EV_DC1	0.0159 - 0.0621

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_AQ2	2021 02 25	<0.0050
	2021 05 13	<0.0050
	2021 07 16	<0.0050
	2021 10 28	<0.0050

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_SPR1A	2021 02 26	<0.0050
	2021 05 30	<0.0050
	Duplicate	<0.0050
	2021 07 18	<0.0050
	2021 11 14	<0.0050
EV_MW_SPR1B	2021 02 26	<0.0150
	2021 05 30	<0.0050
	2021 09 20	<0.0150
	2021 11 14	<0.0050
EV_MW_SPR1C	2021 02 26	0.0538
	2021 05 13	0.0662
	2021 07 18	0.0482
	2021 11 14	0.0966

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_MCgwA	2021 02 02	0.0226
	2021 05 13	0.0333
	2021 07 16	0.0165
	2021 11 21	0.0215
EV_MW_MCgwB	2021 02 02	0.0791
	2021 05 13	0.0808
	2021 07 17	0.0926
	2021 11 21	0.0718

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_MC4	2021 01 20	<0.0050
	2021 04 18	<0.0050
	2021 07 09	<0.0050
	2021 11 21	<0.0050

SW Location	Cadmium µg/L
EV_AQ6	< 0.0050 - 0.164

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_WF_SW	2021 03 29	0.0055
	2021 06 06	<0.0050
	2021 09 20	<0.0050
	2021 12 09	<0.0050

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_ER1gwS	2021 02 26	0.0143
	2021 06 10	0.0124
	2021 09 12	0.0102
	2021 11 17	0.0148
EV_ER1gwD	2021 02 26	<0.0050
	2021 06 10	0.0064
	2021 09 12	0.006
	Duplicate	<0.0050
	2021 11 17	0.008

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_AQ1	2021 01 20	0.0419
	2021 05 13	0.0394
	2021 07 14	0.0402
	2021 10 28	0.0352

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
RG_MW-03-04	2021 03 25	0.0117
	2021 06 10	0.0074
	2021 09 28	0.0134
	2021 11 24	0.0094

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_HW1	2021 02 24	0.069
	2021 05 13	0.0722
	2021 07 15	0.0824
	2021 11 07	0.0715

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_MC1A	2021 01 21	<0.0050
	2021 04 18	<0.0100
	2021 07 04	<0.0100
	2021 11 24	<0.0100
EV_MW_MC1B	2021 01 21	<0.0050
	2021 04 18	<0.0050
	2021 07 04	<0.0050
	2021 11 24	<0.0050

SW Location	Cadmium µg/L
EV_MC2	0.0152 - 0.0421

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_BRgw	2021 02 25	0.0538
	2021 05 13	0.0542
	2021 07 16	0.0448
	2021 11 25	0.0433

SW Location	Cadmium µg/L
EV_ER1	0.0086 - 0.021

Seep Location	Cadmium µg/L
EV_SPR2B	0.0136
EV_SPR5	<0.0050
EV_SPR14	0.0079

Seep Location	Cadmium µg/L
EV_SPR1B (SEEP1B)	0.014

SW Location	Cadmium µg/L
EV_SPR7	< 0.0050
EV_SPR6	< 0.0050 - 0.0055
EV_SPR17	< 0.0050 - 0.0077

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
RG_DW-03-04	2021 03 09	0.0145
	2021 06 08	0.0136
	2021 07 20	0.0107
	2021 10 25	0.0084

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MCgwS	2021 05 30	<0.0050
	Duplicate	<0.0050
	2021 09 03	0.0064
	2021 11 22	<0.0050
EV_MCgwD	2021 03 25	0.0494
	Duplicate	0.0487
	2021 05 30	0.0253
	2021 09 03	0.051
	2021 11 22	0.0425

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_BCgw	2021 01 28	0.0247
	2021 04 29	0.0261
	2021 07 04	0.0348
	2021 10 26	0.03

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_SP1A	2021 03 11	<0.0050
	2021 05 16	<0.0050
	2021 07 16	<0.0050
	2021 10 19	<0.0050
EV_MW_SP1B	2021 03 11	0.0098
	2021 05 16	0.0079
	2021 07 16	0.0076
	Duplicate	0.0057
	2021 10 19	0.0060

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_MC3	2021 01 28	<0.020
	2021 04 19	0.0798
	2021 07 09	0.0565
	2021 11 22	0.0706
	Duplicate	0.0625

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_ECgw	2021 05 16	0.0208
	2021 07 19	0.0215
	2021 10 26	0.0279

Seep Location	Cadmium µg/L
EV_SEEP_SOUTHPIT4	< 0.0050

Seep Location	Cadmium µg/L
EV_SEEP_SOUTHPIT3	0.0406

Seep Location	Cadmium µg/L
EV_SEEP_ERICKSON2	0.228

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_MC2A	2021 01 21	<0.0050
	2021 04 18	<0.0050
	2021 07 04	<0.0100
	2021 11 22	<0.0100
EV_MW_MC2B	2021 01 26	0.105
	2021 04 18	0.0875
	2021 07 04	0.0958
	2021 11 22	0.102

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_BC1A	2021 01 20	0.243
	2021 04 19	0.2
	2021 07 12	0.219
	2021 11 05	0.208
EV_MW_BC1B	2021 01 21	0.321
	2021 04 19	0.267
	2021 07 12	0.321
	2021 11 05	0.307

SW Location	Cadmium µg/L
EV_BC1	< 0.0100 - 0.167

SW Location	Cadmium µg/L
EV_MG1	< 0.0050 - 0.133

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_SP1C	2021 03 11	0.0281
	2021 05 16	0.0353
	2021 07 16	0.0279
	2021 10 19	0.0229

SW Location	Cadmium µg/L
EV_SP1	0.509 - 1.27

Seep Location	Cadmium µg/L
EV_SEEP_SOUTHPIT6	0.163

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_WH50gw	2021 02 25	0.0237
	2021 05 13	0.0163
	2021 07 15	0.0147
	2021 11 25	0.0066

SW Location	Cadmium µg/L
EV_EC1	< 0.0050 - 0.0211

Seep Location	Cadmium µg/L
EV_SEEP_ERICKSON1	0.0116

SW Location	Cadmium µg/L
EV_MC3	0.0142 - 0.0306

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_MW_GT1A	2021 01 28	<0.0050
	2021 04 29	<0.0050
	2021 07 12	<0.0050
	2021 10 27	<0.0050
	Duplicate	<0.0050
EV_MW_GT1B	2021 01 28	0.0325
	2021 04 29	0.118
	2021 07 12	0.14
	2021 10 27	0.111

SW Location	Cadmium µg/L
EV_GT1	< 0.0100 - 0.205

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
EV_RCSgw	2021 02 23	0.306
	2021 05 24	0.199
	2021 07 28	0.212
	2021 11 07	0.224

Legend

Groundwater Stations[4]
- Monitoring Well
- Supply Well

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep
- Monitoring/Seep (Other Programs)

Site Features
- Highway
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- Waste Water Pond
- End-Pit Lake
- Pit
- Stockpiles
- Waste Dump (Spoils)

- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel

- Island
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:45000 Scale)

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green below the applicable screening criteria
Blue above the applicable screening criteria
Grey no sample collected

^ Dissolved phase of the parameter is shown in the spatial plot.

Primary Screening Criteria	Cadmium^ µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

0 250 500 1,000 1,500 2,000 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

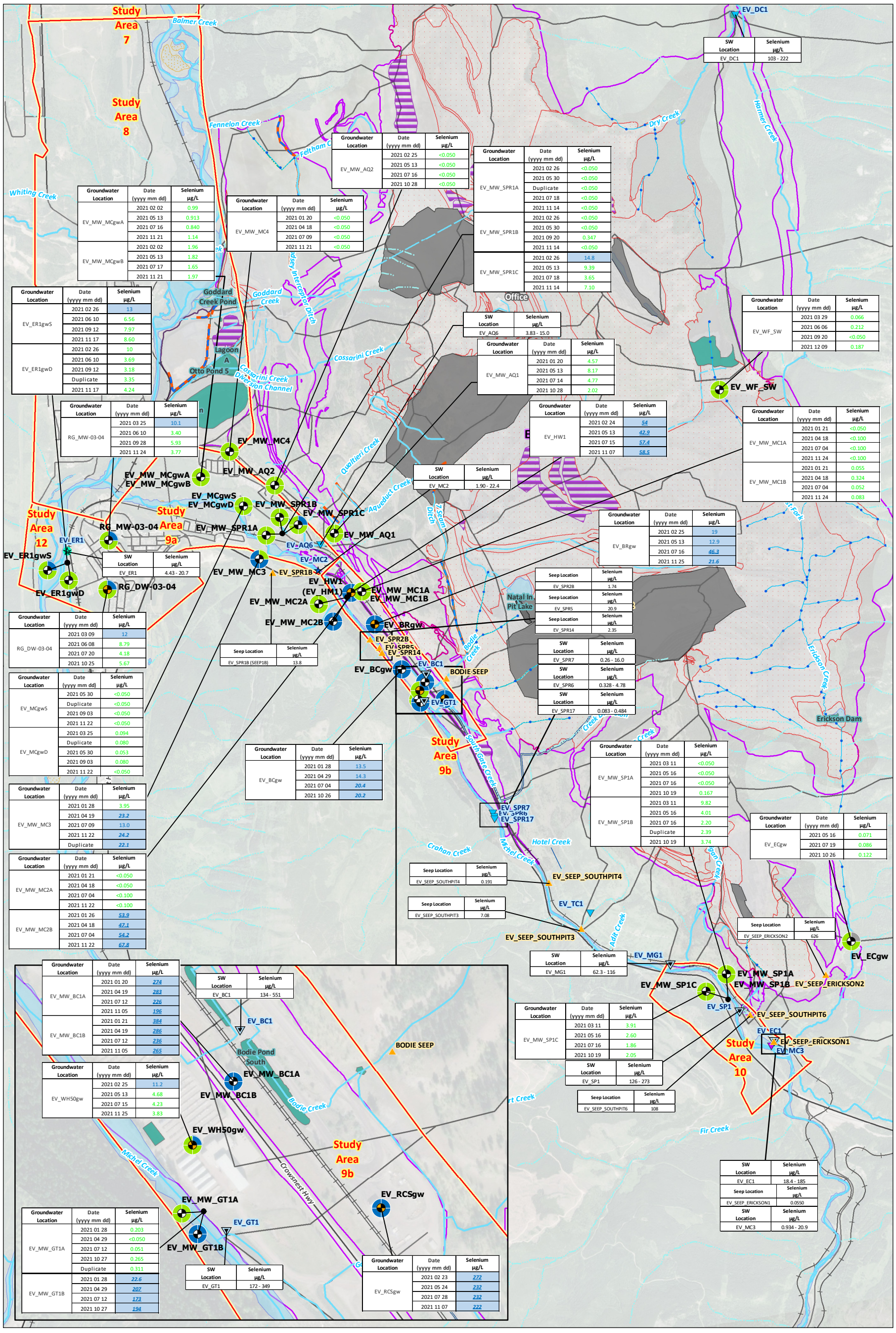
SNC·LAVALIN

Spatial Distribution of Dissolved Cadmium in Groundwater - Elkview Operations (Study Areas 9a and b, 10 and 12)

CHK'D: RS | DATE: 2022-03-22 | SCALE: 1:45,000 | Ref Num:
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING EV-20

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-89-SpatialDist_Cd_EVO_SA9-10-12.mxd



SW Location	Selenium µg/L
EV_DC1	103 - 222

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_AQ2	2021 02 25	<0.050
	2021 05 13	<0.050
	2021 07 16	<0.050
	2021 10 28	<0.050

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_SPR1A	2021 02 26	<0.050
	2021 05 30	<0.050
	Duplicate	<0.050
	2021 07 18	<0.050
	2021 11 14	<0.050
EV_MW_SPR1B	2021 02 26	<0.050
	2021 05 30	<0.050
	2021 09 20	0.347
	2021 11 14	<0.050
EV_MW_SPR1C	2021 02 26	14.8
	2021 05 13	9.39
	2021 07 18	3.65
	2021 11 14	7.10

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_MCgwA	2021 02 02	0.99
	2021 05 13	0.913
	2021 07 16	0.840
	2021 11 21	1.14
EV_MW_MCgwB	2021 02 02	1.96
	2021 05 13	1.82
	2021 07 17	1.65
	2021 11 21	1.97

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_MC4	2021 01 20	<0.050
	2021 04 18	<0.050
	2021 07 09	<0.050
	2021 11 21	<0.050

SW Location	Selenium µg/L
EV_AQ6	3.83 - 15.0

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_ER1gwS	2021 02 26	13
	2021 06 10	6.56
	2021 09 12	7.97
	2021 11 17	8.60
EV_ER1gwD	2021 02 26	10
	2021 06 10	3.69
	2021 09 12	3.18
	Duplicate	3.35
	2021 11 17	4.24

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_AQ1	2021 01 20	4.57
	2021 05 13	8.17
	2021 07 14	4.77
	2021 10 28	2.02

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_WF_SW	2021 03 29	0.066
	2021 06 06	0.212
	2021 09 20	<0.050
	2021 12 09	0.187

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
RG_MW-03-04	2021 03 25	10.1
	2021 06 10	3.40
	2021 09 28	5.93
	2021 11 24	3.77

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_HW1	2021 02 24	54
	2021 05 13	42.9
	2021 07 15	57.4
	2021 11 07	58.5

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_MC1A	2021 01 21	<0.050
	2021 04 18	<0.100
	2021 07 04	<0.100
	2021 11 24	<0.100
EV_MW_MC1B	2021 01 21	0.055
	2021 04 18	0.324
	2021 07 04	0.052
	2021 11 24	0.083

SW Location	Selenium µg/L
EV_MC2	1.90 - 22.4

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_BRgw	2021 02 25	19
	2021 05 13	12.9
	2021 07 16	46.3
	2021 11 25	21.6

SW Location	Selenium µg/L
EV_ER1	4.43 - 20.7

Seep Location	Selenium µg/L
EV_SPR2B	1.74

Seep Location	Selenium µg/L
EV_SPR5	20.9

Seep Location	Selenium µg/L
EV_SPR14	2.35

SW Location	Selenium µg/L
EV_SPR7	0.26 - 16.0

SW Location	Selenium µg/L
EV_SPR6	0.328 - 4.78

SW Location	Selenium µg/L
EV_SPR17	0.083 - 0.484

Seep Location	Selenium µg/L
EV_SPR1B (SEEP1B)	13.8

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
RG_DW-03-04	2021 03 09	12
	2021 06 08	8.79
	2021 07 20	4.18
	2021 10 25	5.67

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MCgwS	2021 05 30	<0.050
	Duplicate	<0.050
	2021 09 03	<0.050
	2021 11 22	<0.050
EV_MCgwD	2021 03 25	0.094
	Duplicate	0.080
	2021 05 30	0.053
	2021 09 03	0.080
	2021 11 22	<0.050

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_BCgw	2021 01 28	13.5
	2021 04 29	14.3
	2021 07 04	20.4
	2021 10 26	20.2

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_SP1A	2021 03 11	<0.050
	2021 05 16	<0.050
	2021 07 16	<0.050
	2021 10 19	0.167
EV_MW_SP1B	2021 03 11	9.82
	2021 05 16	4.01
	2021 07 16	2.20
	Duplicate	2.39
	2021 10 19	3.74

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_ECgw	2021 05 16	0.071
	2021 07 19	0.086
	2021 10 26	0.122

Seep Location	Selenium µg/L
EV_SEEP_SOUTHPIT4	0.191

Seep Location	Selenium µg/L
EV_SEEP_SOUTHPIT3	7.08

Seep Location	Selenium µg/L
EV_SEEP_ERICKSON2	626

SW Location	Selenium µg/L
EV_MG1	62.3 - 116

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_SP1C	2021 03 11	3.91
	2021 05 16	2.60
	2021 07 16	1.86
	2021 10 19	2.05

SW Location	Selenium µg/L
EV_SP1	126 - 273

Seep Location	Selenium µg/L
EV_SEEP_SOUTHPIT6	108

SW Location	Selenium µg/L
EV_EC1	18.4 - 185

Seep Location	Selenium µg/L
EV_SEEP_ERICKSON1	0.0550

SW Location	Selenium µg/L
EV_MC3	0.934 - 20.9

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_MC2A	2021 01 21	<0.050
	2021 04 18	<0.050
	2021 07 04	<0.100
	2021 11 22	<0.100
EV_MW_MC2B	2021 01 26	53.9
	2021 04 18	47.1
	2021 07 04	54.2
	2021 11 22	67.8

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_MC3	2021 01 28	3.95
	2021 04 19	23.2
	2021 07 09	13.0
	2021 11 22	24.2
	Duplicate	22.1

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_BC1A	2021 01 20	274
	2021 04 19	283
	2021 07 12	226
	2021 11 05	196
EV_MW_BC1B	2021 01 21	384
	2021 04 19	286
	2021 07 12	236
	2021 11 05	265

SW Location	Selenium µg/L
EV_BC1	134 - 551

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_WH50gw	2021 02 25	11.2
	2021 05 13	4.68
	2021 07 15	4.23
	2021 11 25	3.83

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_MW_GT1A	2021 01 28	0.203
	2021 04 29	<0.050
	2021 07 12	0.051
	2021 10 27	0.265
	Duplicate	0.311
EV_MW_GT1B	2021 01 28	22.6
	2021 04 29	207
	2021 07 12	173
	2021 10 27	194

SW Location	Selenium µg/L
EV_GT1	172 - 349

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
EV_RCSgw	2021 02 23	272
	2021 05 24	232
	2021 07 28	232
	2021 11 07	222

Legend

Groundwater Stations[4]
- Monitoring Well
- Supply Well

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep

Site Features
- Highway
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- Waste Water Pond
- End-Pit Lake
- Pit
- Stockpiles
- Waste Dump (Spoils)

- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Rock Drain
- Water Pipeline
- Bypass/Diversion Channel

- Island
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:45000 Scale)

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green below the applicable screening criteria
Blue above the applicable screening criteria
Grey no sample collected

^ Dissolved phase of the parameter is shown in the spatial plot.

Primary Screening Criteria	Selenium^ µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Ltd.
2. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,

0 250 500 1,000 1,500 2,000 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater - Elkview Operations (Study Areas 9a and b, 10 and 12)

CHK'D: RS | DATE: 2022-03-22 | SCALE: 1:45,000
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

Ref Num: **DRAWING EV-21**

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GISMap Series\635544_2021 RGMP SSGMP Annual Report\635544-90-SpatialDist_Se_EVO_SA9-10-12.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

Attachment I: Borehole Logs

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_GV3gw

SHEET 1 OF 3

LOCATION: See Location Plan

BORING DATE: October 23, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5522255 E: 656580

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		400.51							Stick-up +0.91 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SANDY GRAVEL, fine-grained, sub-angular to angular, moderately graded, dry, very loose		0.00							
1				398.98							
2		SAND, some gravel, fine to coarse-grained, sub-rounded to sub-angular, moderately graded, dry, very loose		1.52							
3				397.61							
		SANDY GRAVEL, fine-grained, sub-angular to angular, moderately graded, dry, very loose		2.90							
4				395.94							
5		SAND, some gravel, localized thin zones of gravel, fine to coarse-grained, sub-rounded to sub-angular, moderately graded, moist, very loose		4.57							Bentonite Chips
6											
7											
8											
9											
10											15 Nov 2013 ▽
		CONTINUED NEXT PAGE									

DEPTH SCALE 1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_GV3gw

SHEET 2 OF 3

LOCATION: See Location Plan

N: 5522255 E: 656580

BORING DATE: October 23, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, some gravel, localized thin zones of gravel, fine to coarse-grained, sub-rounded to sub-angular, moderately graded, moist, very loose *(continued)*									
11											
12											
13		SILTY GRAVEL, fine-grained, sub-rounded to sub-angular, poorly graded, wet, very loose		367.55 12.95							
14											
15		GRAVEL, fine-grained, sub-rounded to sub-angular, well graded, moist, very loose		365.88 14.63							Bentonite Chips
16				384.35 16.15							
17		SAND, some gravel, fine to coarse-grained, sub-rounded to sub-angular, moderately graded, moist, very loose									
18				382.98 17.53							
19		GRAVEL, some silt, fine-grained, sub-rounded to sub-angular, poorly graded, moist, very loose									
20		SILTY GRAVEL, fine-grained, sub-rounded to sub-angular, poorly graded, wet, very loose		381.46 19.05							
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_GV3gw

SHEET 3 OF 3

LOCATION: See Location Plan

N: 5522255 E: 656580

BORING DATE: October 23, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SILTY GRAVEL, fine-grained, sub-rounded to sub-angular, poorly graded, wet, very loose *(continued)*		379.63							
21		SILTY GRAVEL, fine and coarse-grained, sub-angular to angular, poorly graded, wet, very loose		20.88							Bentonite Chips
22											
23											Silica Sand
24											Slotted Section
25		End of BOREHOLE.		375.51 25.00							Silica Sand
26		NOTES: Standpipe installed to 24.4 m upon well completion. Groundwater level measured at 9.9 mbgs on November 15, 2013.									
27											
28											
29											
30											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GV3gwS

PAGE 1 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2020 08 31	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1307.011	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1307.883	Date Drilled:	2020 08 10
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5522259.297	Easting: 656580.106	Log Typed By:	AS

Drilling Legend: Sample Interval; Odex

Water/NAPL Levels: Water Level 1; Water Level 2; NAPL; NAPL

Reading within indicated scale; Reading outside indicated scale

Soil Vapour (ppm)

Solid PVC; Slotted PVC

Well Name 1: EV_GV3gwS

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
0	SANDY GRAVEL, fine to coarse gravel, subangular, fine to coarse grained sand, containing cobbles, well graded, grey, loose, dry. At 0.3 m - organics.			GV3GWS-01		
2	At 2.1 m - damp, brown.			GV3GWS-02		
3	GRAVELLY SAND, fine to coarse grained sand, fine to coarse gravel, subangular to subrounded, well graded, brown, loose, moist.			GV3GWS-03		
5	Below 4.9 m - gravel, fine, some silt.			GV3GWS-04		
6	At 5.9 m - wet.					
7	SILTY GRAVEL, fine to coarse, subangular to angular, some sand, fine to coarse, brown, medium dense, damp.			GV3GWS-05		
8	SILTY SAND, fine to coarse grained, some gravel, fine, subangular to angualar, well graded, brown, medium dense, wet.			GV3GWS-06		
9	SILTY GRAVEL, fine to coarse, angular to subangular, some sand, fine to coarse, brown, medium dense, wet.			GV3GWS-07		
10						

BENTONITE
BENTONITE
EV_GV3gwS
SAND
BENTONITE

NOTES
Bolded sample denotes sample analyzed.
* Denotes blind field duplicate.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GV3gwS

PAGE 2 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2020 08 31	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1307.011	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1307.883	Date Drilled:	2020 08 10
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5522259.297	Easting: 656580.106	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_GV3gwS

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SILTY GRAVEL, fine to coarse, angular to subangular, some sand, fine to coarse, brown, medium dense, wet. *(continued)*						
11			GV3GWS-08				
12	Bottom of hole at 12.2 m.						
13							
14							
15							
16							
17							
18							
19							
20							

BENTONITE

NOTES
Bolded sample denotes sample analyzed.
* Denotes blind field duplicate.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GV4A

PAGE 1 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2020 08 31	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1310.661	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1311.532	Date Drilled:	2020 08 09
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5522317.465	Easting: 656664.666	Log Typed By:	AS

Drilling Legend: Sample Interval; Odex

Water/NAPL Levels: Water Level 1; Water Level 2; NAPL; NAPL

Reading within indicated scale; Reading outside indicated scale

Soil Vapour (ppm)

Solid PVC; Slotted PVC

Well Name 1: EV_MW_GV4A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular, some silt, well graded, brown, loose, moist, organics.			GV4A-01		
1	At 1.07 m - wet.					
2	SILTY, GRAVELLY SAND, fine to coarse grained, fine gravel, subangular, well graded, brown, medium dense, moist.			GV4A-02		
3				GV4A-03		
4	Below 4.0 m - some clay, loose, wet.					
5				GV4A-04		
6						
7	SAND, fine to coarse grained, trace silt, trace gravel, subrounded, light brown, medium dense, dry.			GV4A-05		
	SILT and SAND, fine to coarse grained sand, some gravel, fine, subangular, some clay, well graded, light brown, medium dense, wet.					
8	SAND, fine to coarse grained, some gravel, fine, angular, trace clay, well graded, light brown, dense, wet.			GV4A-06		
9						
10				GV4A-07		

BENTONITE

BENTONITE

BENTONITE

NOTES
Bolded sample denotes sample analyzed.
* Denotes blind field duplicate.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GV4A

PAGE 2 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2020 08 31	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1310.661	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1311.532	Date Drilled:	2020 08 09
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5522317.465	Easting: 656664.666	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

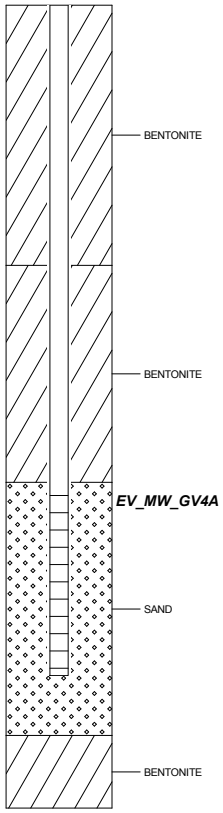
Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_GV4A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SAND, fine to coarse grained, some gravel, fine, angular, trace clay, well graded, light brown, dense, wet. *(continued)*						
11	SILTY SAND, fine to coarse grained sand, some clay, trace gravel, fine to coarse, angular, containing cobbles, well graded, light brown, dense, wet.			GV4A-08			
12							
13	SILT and SAND, fine grained sand, some clay, containing cobbles, light brown, very dense, wet.			GV4A-09			
14	BEDROCK, light brown, sandstone, fine grained.			GV4A-10			
15	At 15.0 m - some grey rock chips, fine grained.						
16				GV4A-11			
17	Bottom of hole at 16.8 m.						
18							
19							
20							



NOTES
Bolded sample denotes sample analyzed.
* Denotes blind field duplicate.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GV4B

PAGE 1 OF 1

Drilling Contractor	Owen's Drilling	Date Monitored	2020 09 30	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1310.636	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1311.661	Date Drilled:	2020 08 10
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5522318.467	Easting: 656662.164	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_GV4B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular, some silt, well graded, brown, loose.						
1	At 1.07 m - wet.						
2	GRAVELLY SAND, fine to coarse grained, fine gravel, subangular, well graded, brown, medium dense, moist.						
3							
4							
5	SILTY, GRAVELLY SAND, fine to coarse grained sand, fine to coarse gravel, subangular, some clay, well graded, brown, loose, wet.						
6	Bottom of hole at 6.1 m.						
7							
8							
9							
10							

BENTONITE

EV_MW_GV4B

SAND

NOTES

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : RG_BH_GCA

PAGE 1 OF 2

Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	683032
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 09 07
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: RG_MW_GCA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, some silt, containing cobbles (80-150 mm), fill material.					60	
1							
2	BEDROCK, shale, dark grey, very weak, laminated, very intensely fractured, dry.						
3						100	
4	BEDROCK, shale, dark grey, weak, thinly bedded, moderately fractured, dry. Between 3.7 m and 4.0 m - fracture zone, wet, cohesive sediment.						
5							BENTONITE
6	BEDROCK, shale, dark grey, moderate strength, thinly bedded.					100	
7	Between 7.3 m and 7.9 m - fracture zone, wet, cohesive sediment.						
8						100	
9	BEDROCK, shale, dark grey, moderate strength, unfractured.					100	
10							

NOTES

QA/QC: SD 2021 09 22 Print Date:2021-10-26

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : RG_BH_GCA

PAGE 2 OF 2

Drilling Contractor	Mud Bay Drilling Co. Ltd.	Date Monitored	n/a	Project Number:	683032
Drilling Method	Vibratory Sonic	Ground Surface Elev. (m)	TBD	Borehole Logged By:	AH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	TBD	Date Drilled:	2021 09 07
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Vibrasonic

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: RG_MW_GCA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	BEDROCK, shale, dark grey, moderate strength, unfractured. *(continued)*					50	
11	Between 11.3 m and 13.1 m - moderately healed fractures with white mineralization (calcite).						
12							
13	Between 13.1 m and 14.5 m - clean fractures, no secondary mineralization.						
14	Bottom of hole at 14.5 m.						
15							
16							
17							
18							
19							
20							

BENTONITE
RG_MW_GCA
SAND
SLOUGH

NOTES

QA/QC: SD 2021 09 22 Print Date:2021-10-26

BRITISH COLUMBIA

Report 1 - Detailed Well Record

RG_DW-02-20

Well Tag Number: 101942

Owner: ELK VALLEY FLYING CLUB

Address:

Area:

WELL LOCATION:
KOOTENAY Land District
District Lot: 4144 Plan: Lot:
Township: Section: Range:
Indian Reserve: Meridian: Block:
Quarter:
Island:
BCGS Number (NAD 27): 082G086231 Well: 4

Class of Well: Water supply
Subclass of Well: Domestic
Orientation of Well: Vertical
Status of Well: New
Well Use: Private Domestic
Observation Well Number:
Observation Well Status:
Construction Method:
Diameter: inches
Casing drive shoe: Y
Well Depth: 60 feet
Elevation: feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag: N
File Info Flag: N
Sieve Info Flag: N
Screen Info Flag: N

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 2002-04-02 00:00:00

Driller: J. R. Drilling
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 60 (Driller's Estimate) U.S. Gallons per Minute
Development Method: Air lifting
Pump Test Info Flag: N
Artesian Flow:
Artesian Pressure (ft):
Static Level: 7 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag: N
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag: N
Material:
Method:
Depth (ft):
Thickness (in):
Liner from To: feet

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe
0	60	6	Steel	Y

GENERAL REMARKS:
MEASUREMENTS: TOP OF CASING. PITLESS UNIT: WELDED. SHOE: BARBER. WATER QUALITY AND QUANTITY NOT GUARANTEED BY CONTRACTOR.

LITHOLOGY INFORMATION:

From	0 to	47 Ft.	gravel
From	47 to	52 Ft.	clay
From	52 to	60 Ft.	gravel

- Return to Main
- Return to Search Options
- Return to Search Criteria

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : RG_BH_WW

PAGE 1 OF 3

Drilling Contractor	SNC-Lavalin	Date Monitored	n/a	Project Number:	631283
Drilling Method	Hydrovac/Odex	Ground Surface Elev. (m)	n/a	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	n/a	Date Drilled:	2020 09 19
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Vac. Extraction
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale
Soil Vapour (ppm)
10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: RG_MW_WW

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
0	SAND and SILT, fine grained sand, fine grained silt, trace gravel, fine and coarse, brown, dense, damp/dry.					
1						
	SAND and GRAVEL, fine to coarse grained sand, fine and coarse gravel, subrounded, cobbles, rounded, brown/grey, loose, damp/dry.					
2						
3						
4				WW-01		
5	At 4.9 m - damp.					
	SILT and CLAY, brown, soft, medium plasticity, moist.					
6						
7						
8				WW-02		
9	SILT and SAND, fine grained , brown, soft, low plasticity, wet.					
10						

BENTONITE

BENTONITE

NOTES
Bolded sample denotes sample analyzed. * Denotes blind field duplicate.

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : RG_BH_WW

PAGE 2 OF 3

Drilling Contractor	SNC-Lavalin	Date Monitored	n/a	Project Number:	631283
Drilling Method	Hydrovac/Odex	Ground Surface Elev. (m)	n/a	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	n/a	Date Drilled:	2020 09 19
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	AS

Drilling Legend: Sample Interval; Vac. Extraction; Odex

Water/NAPL Levels: Water Level 1; Water Level 2; NAPL; NAPL

Reading within indicated scale; Reading outside indicated scale

Solid PVC; Slotted PVC

Well Name 1: RG_MW_WW

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SILT and SAND, fine grained , brown, soft, low plasticity, wet. *(continued)*						
11							BENTONITE
12							
13				WW-03			
	SILT and SAND, fine to medium grained, brown, soft, low plasticity, wet.						
14	SILT and SAND, fine grained, brown, soft, low plasticity, wet.						
15							BENTONITE
16				WW-04			
17							
18	SAND, medium grained, some fine grained, some silt, brown, wet.						
19							BENTONITE
20							

NOTES
Bolded sample denotes sample analyzed. * Denotes blind field duplicate.

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : RG_BH_WW

PAGE 3 OF 3

Drilling Contractor	SNC-Lavalin	Date Monitored	n/a	Project Number:	631283
Drilling Method	Hydrovac/Odex	Ground Surface Elev. (m)	n/a	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	n/a	Date Drilled:	2020 09 19
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: n/a	Easting: n/a	Log Typed By:	AS

Drilling Legend: Sample Interval; Vac. Extraction; Odex

Water/NAPL Levels: Water Level 1; Water Level 2; NAPL; NAPL

Reading within indicated scale; Reading outside indicated scale

Solid PVC; Slotted PVC

Well Name 1: RG_MW_WW

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
20	SAND, medium grained, some fine grained, some silt, brown, wet. *(continued)*						
	At 20.4 m - some coarse grained sand, trace gravel.			WW-05			
21	SAND and GRAVEL, fine to coarse grained sand, fine and coarse gravel, subrounded to subangular, some silt, well graded, brown, medium dense, wet.						
22				WW-06			
23							
24				WW-07			
	Bottom of hole at 24.4 m.						
25							
26							
27							
28							
29							
30							

BENTONITE

RG_MW_WW

SAND

NOTES
Bolded sample denotes sample analyzed. * Denotes blind field duplicate.

DATA ENTRY: AM

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_BALgw

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: October 27, 2014

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	FIELD EC AND ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface											Stick-up =1.0 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD); JR Drilling	SAND, medium to coarse-grained, some gravel, bolders and cobbles, sub-angular to sub-rounded, well graded, brown / grey, dry		0.00									
4		SAND and GRAVEL, sub-rounded to rounded, well graded, brown, dry		4.30									Bentonite Chips
10		*CONTINUED NEXT PAGE*											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT

CHECKED:

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 12/30/14

DATA ENTRY: AM

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_BALgw

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: October 27, 2014

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	FIELD EC AND ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	CLAY, some sand and fine gravel, sub-angular to sub-rounded, poorly graded, dark grey, moist		10.10							Bentonite Chips
		SILTSTONE, fine-grained, grey / brown		10.40							
11		--- Fractured with water from 10.7 to 11.3 m									28 Oct 2014 ▽
		--- Competent from 11.3 m									
12											Slotted Section
		End of BOREHOLE.		12.74							
13		NOTES: Standpipe installed to 12.7 m upon well completion. Groundwater level measured at 11.1 mbgs on October 28, 2014.									
14											
15											
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 12/30/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED:

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_GCgw

SHEET 1 OF 2

LOCATION: See Location Plan
N: 5513879 E: 653059

BORING DATE: October 25, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. Φ U - O	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Solid 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	Ground Surface		344.42							Stick-up +0.72 m
		SAND, fine to medium-grained, sub-rounded to sub-angular, well graded, dark black carbonaceous, dry, very loose		0.00							
1				342.90							
		SANDY GRAVEL, trace silt, fine-grained, sub-rounded to sub-angular, poorly graded, moist, very loose		1.52							14 Nov 2013 ▽
2											
3											
				340.61							
4		CLAY, some gravel, fine-grained, sub-rounded to sub-angular, poorly graded, moist, firm		3.81							
5											Bentonite Chips
6											
7											
8				336.19							
		SILTY CLAY, well graded, wet, very soft		8.23							
9											
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_GCgw

SHEET 2 OF 2

LOCATION: See Location Plan
N: 5513879 E: 653059

BORING DATE: October 25, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Ω- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SILTY CLAY, well graded, wet, very soft *(continued)*									Bentonite Chips
11											
12											Silica Sand
13											
14											Slotted Section
15				320.02							
		End of BOREHOLE.		15.60							
16		NOTES: Standpipe installed to 15.6 m upon well completion. Groundwater level measured at 2.0 mbgs on November 14, 2013.									
17											
18											
19											
20											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: JPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_LSgw

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: October 24, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5514731 E: 653274

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		345.03							Stick-up =0.93 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	FILL - Sand sized particles, medium to coarse-grained, sub-rounded to sub-angular, well graded, dark black carbonaceous, moist, very loose		0.00							
1											
				343.51							
		SANDY GRAVEL, some silt, fine-grained, sub-rounded to sub-angular, poorly graded, moist, very loose		1.52							
2											Bentonite Chips
3											14 Nov 2013 ▽
				341.22							
		GRAVELY SAND, coarse-grained with fine-grained gravel, sub-rounded to sub-angular, poorly graded, moist, very loose		3.81							
4											
5											Silica Sand
6											Slotted Section
				338.16							
7		SANDY SILT, fine to medium-grained, wet, mud		6.86							
8											Silica Sand
9											
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE 1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_LSgw

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: October 24, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5514731 E: 653274

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	JR Drilling	SANDY SILT, fine to medium-grained, wet, mud *(continued)*		334.36							Silica Sand
		End of BOREHOLE.		10.67							
11		NOTES: Standpipe installed to 6.7 m upon well completion. Groundwater level measured at 3.4 mbgs on November 14, 2013.									
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_OCgw

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: November 7, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5512671 E: 652460

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q- ● rem V. ⊕ U- ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		342.60							Stick-up =0.89 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SANDY GRAVEL, fine-grained with occasional coarse grains, rounded to sub-rounded, moderately graded, dry, very loose		0.00							
				341.07							
1		SAND and GRAVEL, coarse sand and fine gravel, rounded to sub-rounded, angular, poorly graded, moist, very loose — Hole is being drilled on the edge of a waste rock pile — Moisture at 2.1 m		1.52							
2											15 Nov 2013 ▽
3											
				338.94							
4		GRAVEL, trace sand, fine to coarse-grained, sub-rounded to rounded, poorly graded, moist, loose		3.66							
5											Bentonite Chips
6											
				335.89							
7		SAND, fine to medium-grained with occasional coarse grains, some gravel, fine to coarse-grained, sub-angular to sub-rounded, dry to moist, loose,		6.71							
8											
9											
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_OCgw

SHEET 2 OF 2

LOCATION: See Location Plan
N: 5512071 E: 652480

BORING DATE: November 7, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, fine to medium-grained with occasional coarse grains, some gravel, fine to coarse-grained, sub-angular to sub-rounded, dry to moist, loose, *(continued)*											Bentonite Chips
11													Silica Sand
12													
13		SAND, fine to medium-grained with occasional coarse grains, some fine-grained gravel, sub-angular to sub-rounded, moist, loose to compact		329.79 12.80									Slotted Section
14				328.12									
15		BEDROCK		14.46									Silica Sand Tail Pipe
		End of BOREHOLE.		327.06 15.54									
16		NOTES: Standpipe installed to 14.6 m upon well completion. Groundwater level measured at 2.1 mbgs on November 15, 2013.											
17													
18													
19													
20													

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GC1B

PAGE 1 OF 1

Drilling Contractor	Owen's Drilling	Date Monitored	2020 09 01	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1128.870	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1129.706	Date Drilled:	2020 08 13
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5514183.858	Easting: 653147.008	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

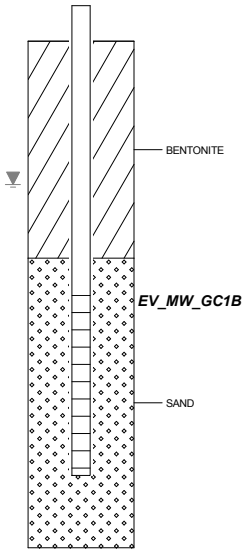
Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_GC1B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SILTY SAND, fine grained, trace gravel, fine, subangular, poorly graded, dark brown, loose, dry, organics.						
2	SANDY GRAVEL, fine to coarse gravel, subrounded to subangular, fine to coarse grained sand, trace silt, organics, dark brown, loose, dry.						
3	At 2.7 m - wet.						
4	CLAY, some silt, brown, medium plasticity, soft, moist.						
	Bottom of hole at 4.3 m.						



NOTES

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

McElhanney Consulting	District of Sparwood	BOREHOLE: Well 4
INSTALLED BY: Waterline Resources Inc.	Sparwood Water Supply Well	PROJECT #: 2283-17-002
DRILL TYPE: Dual Rotary	EAST: 652027 NORTH: 5514569	ELEVATION: 1152.72 (masl)

FILL TYPE: Backfill | Bentonite | Grout | Open Hole | Cement | Sand | Slough | Unknown

SAMPLE TYPE: Shelby Tube | No Recovery | Split Spoon | Disturbed | Dynamic Cone | Core | Grab Sample

Depth (m)	SOIL DESCRIPTION	WELL INSTALLATION
0	Fill, sand and gravel some silt,, dry	Stickup = 1.28 m
3.66 mbgl	Clay, med to dk brown, plastic, soft, moist	Bentonite surface seal from 0 to 6 m
14.94 mbgl	Silty Sand, some gravel	
20.57 mbgl	Silty Gravelly Sand, moist, well graded, stiff	NPGWL= 27.94 mbgl Pump discharge (203 mm ID) Production casing (304.8mm ID) from 0 to 62.3m
45.72 mbgl	Sand and Gravel, wet	
	45% gravel, 55% sand, trace fines	Intake Pump K-Packer at 61.4 mbgl Riser pipe (ID=254 mm) from 61.4 to 62.3 mbgl K-Packer 100 slot stainless steel screen from 62.3 to 71.5 mbgl (diameter: 254 mm
	65% gravel, 35% sand no fines	
	45% gravel, 55% sand	Sump from 71.5 to 73.0 mbgl
	END OF HOLE AT 73.15 m Water Level Date 2018-09-09	

Waterline	TYPE: Water Supply Well	COMPLETION DEPTH: 73.0 (m)
	LOGGED BY: DvE	COMPLETION DATE: Sept 7, 2018
	CHECKED BY: SN	Date printed: 27-Nov-2018

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_AQ1

PAGE 1 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1173.956	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1174.862	Date Drilled:	2019 01 11
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511292.053	Easting: 654572.618	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_AQ1

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, subangular, well graded, dark brown, dense, damp.						
3	GRAVEL, fine to coarse, some fine to coarse grained sand, trace silt, subangular to angular, well graded, dark brown, dense, damp.						
8	From 7.9 m to 12.5 m - brown						
10							

BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_AQ1

PAGE 2 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1173.956	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1174.862	Date Drilled:	2019 01 11
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511292.053	Easting: 654572.618	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_AQ1

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	GRAVEL, fine to coarse, some fine to coarse grained sand, trace silt, subangular to angular, well graded, dark brown, dense, damp. *(continued)*						
11							
12	At 12.5 m - moist						
13							
14							
15							
16	At 16.5 m - light brown At 16.8 m - wet						
17							
18							
19	At 18.9 m - loose, potentially silt or clay						
20	BEDROCK, dry.						

BENTONITE
BENTONITE
EV_MW_AQ1
SAND
BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_AQ1

PAGE 3 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1173.956	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1174.862	Date Drilled:	2019 01 11
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511292.053	Easting: 654572.618	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_AQ1

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4	
20	BEDROCK, dry. *(continued)*							
21								BENTONITE
22	Bottom of hole at 22.3 m.							
23								
24								
25								
26								
27								
28								
29								
30								

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_AQ2

PAGE 1 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1150.689	Borehole Logged By:	RG/AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1151.673	Date Drilled:	2019 01 23
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511871.860	Easting: 653854.171	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_AQ2

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, coarse grained sand, coarse gravel, subangular, poorly graded, loose, dry.						
1	GRAVEL, coarse, subangular, poorly graded, dry.						
2							
3							
4	At 4.3 m - damp						
5	SAND, fine to medium grained, subangular to subrounded, poorly graded, brown, damp.						
6							
7	At 7.5 m - trace fine to coarse gravel, subangular						
8							
9							
10							

BENTONITE

BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_AQ2

PAGE 2 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1150.689	Borehole Logged By:	RG/AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1151.673	Date Drilled:	2019 01 23
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511871.860	Easting: 653854.171	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_AQ2

Depth in Metres	Soil Description
10	SAND, fine to medium grained, subangular to subrounded, poorly graded, brown, damp. *(continued)*
11	SAND and GRAVEL, fine to medium grained sand, fine to coarse gravel, subangular to subrounded, poorly graded, dark grey-black, damp, interbedded.
12	
13	SAND, fine to medium grained, subangular to subrounded, poorly graded, dark grey-black, damp.
14	GRAVEL, fine to coarse, subangular, well graded, dark grey-black.
15	
16	BEDROCK, shale, grey, very hard, damp.
17	
18	
19	Bottom of hole at 18.6 m.
20	

BENTONITE
EV_MW_AQ2
SAND
BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC4

PAGE 1 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1144.345	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1145.308	Date Drilled:	2019 01 09
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5512279.753	Easting: 653309.224	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Well Name 1: EV_MW_MC4
- Solid PVC
- Slotted PVC

Depth in Metres	Soil Description
0	GRAVEL, fine to coarse, some fine to coarse grained sand, trace silt, subangular to subrounded, well graded, brown, dense, damp.
3	At 3.0 m - dark brown
7	SAND, fine grained, trace fine gravel, some silt, subrounded, poorly graded, dark brown, medium dense, moist.
8	At 7.9 m - no gravel
10	

BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC4

PAGE 2 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1144.345	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1145.308	Date Drilled:	2019 01 09
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5512279.753	Easting: 653309.224	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Well Name 1: EV_MW_MC4
- Solid PVC
- Slotted PVC

Depth in Metres

10 SAND, fine grained, trace fine gravel, some silt, subrounded, poorly graded, dark brown, medium dense, moist. *(continued)*

11

12 SAND, fine grained, silty, dark brown, poorly graded, medium dense, moist.

13

14

15

16

17 At 17.1 m - wet

18

19

20

BENTONITE

BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC4

PAGE 3 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1144.345	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1145.308	Date Drilled:	2019 01 09
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5512279.753	Easting: 653309.224	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC4

Depth in Metres	Soil Description
20	SAND, fine grained, silty, dark brown, poorly graded, medium dense, moist. *(continued)*
21	
22	
23	
24	
25	BEDROCK.
26	Bottom of hole at 26.2 m.
27	
28	
29	
30	

BENTONITE
EV_MW_MC4
SAND
BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC3

PAGE 1 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.925	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.815	Date Drilled:	2019 01 23
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510983.197	Easting: 653666.891	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC3

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, cobbles present, trace silt, subrounded to angular, well graded, brown, dense, dry.						
	At 0.6 m - very dense (cobbles), damp						
5	GRAVEL, fine to coarse, trace coarse grained sand, cobbles present, angular to subrounded, well graded, brown, very dense, damp.						
	At 6.1 m - fine to coarse grained sand						
	At 6.4 m - some sand						
8	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, cobbles present, trace silt, subrounded to subangular, well graded, brown, dense, damp.						
	At 8.3 m - no cobbles present						
9	At 9.1 m - no silt						
10							

BENTONITE
SLOUGH
BENTONITE
SLOUGH

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC3

PAGE 2 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.925	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.815	Date Drilled:	2019 01 23
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510983.197	Easting: 653666.891	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Depth in Metres | Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC3

10 SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, cobbles present, trace silt, subrounded to subangular, well graded, brown, dense, damp. *(continued)*

At 10.1 m - some silt, moist

11

12

13

14 GRAVEL, fine to coarse, some silt, trace fine to coarse grained sand, angular to subrounded, well graded, brown, dense, moist.

15

16

At 16.5 m - wet

17

BEDROCK, hard.

18

19

20

SLOUGH

BENTONITE

EV_MW_MC3

SAND

BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC3

PAGE 3 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.925	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.815	Date Drilled:	2019 01 23
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510983.197	Easting: 653666.891	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Depth in Metres | Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery | Soil Vapour (ppm) 10^1 10^2 10^3 10^4

- ○ Reading within indicated scale
- ● Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC3

20 BEDROCK, hard. *(continued)*

BENTONITE

21 Bottom of hole at 21.0 m.

22

23

24

25

26

27

28

29

30

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwS

SHEET 1 OF 2

LOCATION: See Location Plan

N: 5511624 E: 653476

BORING DATE: November 6, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		344.73							Stick-up =0.98 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, coarse and medium-grained, and fine-grained GRAVEL, rounded to sub-rounded, moderately graded, dark brown, damp, very loose		0.00 / 343.61							
1		SAND, fine and medium-grained, sub-rounded to sub-angular, poorly graded, brown, dry, very loose		0.91							15 Nov 2013 ▽
2											
3											Bentonite Pellets
4											
		CLAYEY SILT, some fine-grained sand, dark brown to grey, moist, soft to very loose		4.57 / 340.16							
5											
		CLAYEY SILT, some fine-grained sand, dark brown to grey, wet, very soft, very loose (runny)		5.49 / 339.24							Silica Sand
6											Slotted Section
7											
8											Slough
9											
		CLAY, some fine-grained sand, well-sorted, moist, compact		9.14 / 335.58							
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwS

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: November 6, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5511624 E: 653476

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp — W — Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	JR Drilling	CLAY, some fine-grained sand, well-sorted, moist, compact *(continued)*		334.06							Slough
		End of BOREHOLE.		10.67							
11		NOTES: Standpipe installed to 7.32 m upon well completion. Groundwater level measured at 3.8 mbgs on November 7, 2013. Groundwater level measured at 1.1 mbgs on November 15, 2013.									
12											
13											
14											
15											
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 1 OF 5

LOCATION: See Location Plan
N: 5511616 E: 653475

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		344.73									Stick-up =0.84 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, coarse and medium-grained, and fine-grained GRAVEL, rounded to sub-rounded, moderately graded, wet, very loose		0.00									
3													15 Nov 2013 ▽
		SAND, fine and medium-grained, sub-rounded to sub-angular, well graded, dry, very loose		341.07 3.66									
5													Bentonite Pellets
				339.09									
6		SILT, some fine-grained sand, well graded, very loose --- Wet at 5.8 m		5.64									
				336.65									
8		CLAY, some fine-grained sand, well-sorted, moist, compact		8.08									
10		*CONTINUED NEXT PAGE*											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 2 OF 5

LOCATION: See Location Plan

N: 5511616 E: 653475

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q- ● rem V. ⊕ U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	CLAY, some fine-grained sand, well-sorted, moist, compact *(continued)*									
11				333.30							
		SILT, some fine-grained sand, well graded, wet, very loose		11.43							
12											
13											
14				330.40							
		CLAY, some fine-grained sand, well-sorted, wet, soft		14.33							
15											Bentonite Pellets
				328.88							
16		CLAY, some fine-grained sand, well-sorted, moist, compact		15.85							
17											
				327.36							
18		CLAY, some fine-grained sand, well-sorted, moist, loose		17.37							
19											
20											
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 3 OF 5

LOCATION: See Location Plan

N: 5511616 E: 653475

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	CLAY, some fine-grained sand, well-sorted, moist, loose *(continued)*									Bentonite Pellets
21											
22											
23											Silica Sand
24											
25											
26											Slotted Section
27											
28											Silica Sand
29											
30		*CONTINUED NEXT PAGE*									Bentonite Pellets / Slough

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 4 OF 5

LOCATION: See Location Plan

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5511616 E: 653475

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30	Sonic 127 mm (ID) Casing 152.4 mm (OD) / JR Drilling	CLAY, some fine-grained sand, well-sorted, moist, loose *(continued)*									
				314.26							
		CLAY, some fine-grained sand, well-sorted, wet, soft		30.45							
31											
32											
33											
34											
35											Slough
36											
37				307.54							
		SAND, coarse-grained, sub-angular to angular, well graded, wet, very loose		37.19							
38											
				305.87							
39		SILT and SAND, coarse-grained, sub-angular, moderately-sorted, wet, very loose		38.66							
40		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_MCgwD

SHEET 5 OF 5

LOCATION: See Location Plan
N: 6511616 E: 653475

BORING DATE: November 3, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q- ●, U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
40		SILT and SAND, coarse-grained, sub-angular, moderately-sorted, wet, very loose *(continued)*		304.34									
		SANDY SILT, fine-grained, moderately-sorted, wet, very loose		40.39									
41													
42													
				302.06									
43	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	CLAYEY SAND, fine-grained, some coarse-grained gravel, angular, moderately-sorted, brown, wet, very loose		42.67									Slough
44				300.69									
		GRAVEL, fine-grained, sub-rounded, moderately-sorted, grey to brown, very loose, wet		44.04									
				299.02									
45		SAND, medium-grained with some fine grains, sub-rounded, poorly graded, mainly black to grey and brown, wet		44.81									
46													
47				297.18									
		End of BOREHOLE.		47.65									
48		NOTES: Sloughing present to 29.9 m. Standpipe installed to 27.6 m upon well completion. Groundwater level measured at 2.5 mbgs on November 7, 2013. Groundwater level measured at 3.4 mbgs on November 15, 2013.											
49													
50													

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SPR1

PAGE 1 OF 6

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.376	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.248 1138.247	Date Drilled:	2019 01 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511277.374	Easting: 653946.968	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SPR1-A
Well Name 2: EV_MW_SPR1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	COBBLES, rounded, up to 20 cm, grey.						
1	SAND, fine grained, some fine to coarse gravel, rounded to subrounded, poorly graded, brown, loose, dry.						
2							
3	SAND and GRAVEL, fine to coarse grained sand, coarse gravel, subrounded, well graded, brown, damp.						D1 D2
4	At 4.0 m - moist						
5	At 4.9 m - wet						
6	At 5.5 m - fine grained sand, trace silt						
7	SAND, fine grained, silty, soft, loose, damp.						
8							
9							
10							

BENTONITE
SAND
BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SPR1

PAGE 2 OF 6

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.376	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.248 1138.247	Date Drilled:	2019 01 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511277.374	Easting: 653946.968	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SPR1-A
Well Name 2: EV_MW_SPR1-B

10 SAND, fine grained, silty, soft, loose, damp. *(continued)*

11

12

13

14

15 — BENTONITE

16

17

18 CLAY, silty, brown, intermediate plasticity, moisture level at plastic limit.

19

20

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SPR1

PAGE 3 OF 6

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.376	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.248 1138.247	Date Drilled:	2019 01 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511277.374	Easting: 653946.968	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Soil Vapour (ppm)

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SPR1-A
Well Name 2: EV_MW_SPR1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
20	CLAY, silty, brown, intermediate plasticity, moisture level at plastic limit. *(continued)*					
21	At 20.7 m - moisture level below plastic limit					
22						
23						
24						
25	GRAVEL, fine, subrounded, poorly graded, damp to wet.					
26	SAND and SILT, fine grained sand, poorly graded, moist.					
27						
28						
29	At 28.7 m - damp					
30						

BENTONITE
EV_MW_SPR1-B
SAND
BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SPR1

PAGE 4 OF 6

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.376	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.248 1138.247	Date Drilled:	2019 01 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511277.374	Easting: 653946.968	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SPR1-A
Well Name 2: EV_MW_SPR1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
30	SAND and SILT, fine grained sand, poorly graded, moist. *(continued)*						
31							
32							
33							
34							
35	At 34.7 m - dense						
36							
37	SAND, fine grained, silty, poorly graded, loose, wet.						
38							
39	At 39.0 m - some silt to silty						
40							

BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SPR1

PAGE 5 OF 6

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.376	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.248 1138.247	Date Drilled:	2019 01 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511277.374	Easting: 653946.968	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SPR1-A
Well Name 2: EV_MW_SPR1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
40	SAND, fine grained, silty, poorly graded, loose, wet. *(continued)*						
41							
42	At 42.1 m - trace gravel						
43							
44	At 43.6 m - silty						
45							
46							
47							
48							
49							
50							

BENTONITE
EV_MW_SPR1-A
SAND
BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SPR1

PAGE 6 OF 6

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 08	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.376	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.248 1138.247	Date Drilled:	2019 01 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511277.374	Easting: 653946.968	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SPR1-A
Well Name 2: EV_MW_SPR1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
50	SAND, fine grained, silty, poorly graded, loose, wet. *(continued)*						
	BEDROCK, shale, angular, black.						
51							
52							
53	Bottom of hole at 53.3 m.						
54							
55							
56							
57							
58							
59							
60							

BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SPR-C

PAGE 1 OF 1

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 06	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1137.270	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1138.188	Date Drilled:	2019 01 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511278.052	Easting: 653945.619	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SPR1-C

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
0	COBBLES, rounded, up to 20 cm, grey.					
1	SAND, fine grained, some fine to coarse gravel, rounded to subrounded, poorly graded, brown, loose, dry.					
2						
3						
4	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, well graded, brown, damp. At 4.0 m - moist					
5	At 4.9 m - wet Bottom of hole at 5.2 m.					
6						
7						
8						
9						
10						

BENTONITE

EV_MW_SPR1-C

SAND

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MCgwA

PAGE 1 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1126.629	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1127.623	Date Drilled:	2020 05 07
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511969.374	Easting: 652962.530	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MCgwA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular, some silt, well graded, grey, loose, moist, organics.			MCgwA-01			
1	At 0.45 m - no organics.						
2	At 2.1 m - wet.			MCgwA-02			
3	SILT, some clay, grey, soft, medium plastic, damp.			**MCgwA-03**			
4							
5				MCgwA-04			
6	SILT and SAND, fine grained sand, grey, soft, low plastic, poorly graded, damp.						
7				MCgwA-05			
8	SILTY SAND, fine grained, grey, very soft, low plastic, poorly graded, moist. From 8.2 m to 9.1 m - trace sand, medium to coarse grained.			MCgwA-06			
9							
10				**MCgwA-07**			

BENTONITE
SLOUGH
BENTONITE

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MCgwA

PAGE 2 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1126.629	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1127.623	Date Drilled:	2020 05 07
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511969.374	Easting: 652962.530	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Well Name 1: EV_MW_MCgwA
- Solid PVC
- Slotted PVC

Depth in Metres	Soil Description	Sample Number
10	SILTY SAND, fine grained, grey, very soft, low plastic, poorly graded, moist. *(continued)*	**MCgwA-07**
11	At 11.0 m - increase in moisture.	MCgwA-08
12		
13		MCgwA-09
14		MCgwA-10
15	SAND, fine to medium grained, some silt, grey, poorly graded, loose, wet, heaving.	
16		MCgwA-11
17		MCgwA-12
18		
19		MCgwA-13
20		MCgwA-14

BENTONITE

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MCgwA

PAGE 3 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1126.629	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1127.623	Date Drilled:	2020 05 07
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511969.374	Easting: 652962.530	Log Typed By:	VL

Drilling Legend: Sample Interval; Odex

Water/NAPL Levels: Water Level 1; Water Level 2; NAPL; NAPL

Reading within indicated scale; Reading outside indicated scale

Solid PVC; Slotted PVC

Well Name 1: EV_MW_MCgwA

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
20	SAND, fine to medium grained, some silt, grey, poorly graded, loose, wet, heaving. *(continued)*			MCgwA-14			
21	SANDY GRAVEL, fine to coarse gravel, subrounded to subangular, fine to coarse grained sand, some silt, well graded, grey, medium dense, wet.			**MCgwA-15**			
22	BEDROCK, dark grey, siltstone, dry, very soft.			MCgwA-16			
	Bottom of hole at 22.6 m.						
23							
24							
25							
26							
27							
28							
29							
30							

BENTONITE

EV_MW_MCgwA

SAND

BENTONITE

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MCgwB

PAGE 1 OF 1

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1126.643	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1127.601	Date Drilled:	2020 05 07
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511969.539	Easting: 652963.190	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

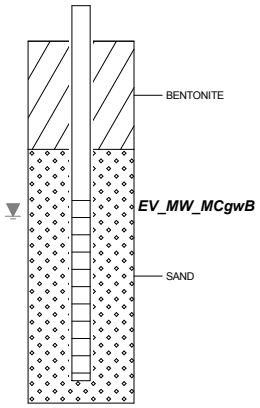
Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MCgwB

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular, some silt, well graded, grey, loose, moist, organics.						
	At 0.45 m - no organics.						
1							
2	At 2.1 m - wet.						
	SILT, some clay, grey, soft, medium plastic, damp.						
3	Bottom of hole at 3.1 m.						
4							
5							
6							
7							
8							
9							
10							



NOTES

QA/QC: MB 2020 06 22 Print Date:2020-12-02

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwS

SHEET 1 OF 2

LOCATION: See Location Plan
N: 5510955 E: 651374

BORING DATE: October 30, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○; 20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊖W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	Ground Surface		339.85							Stick-up +0.96 m
		SAND, medium and coarse-grained with some fine grains, rounded to sub-rounded, moderately graded, dry, very loose		0.00							
1											
2											
3											
4											
5											16 Nov 2013 ▽ Bentonite Chips
6											
				333.15							
7		SAND, medium to coarse-grained, some fine-grained gravel, sub-rounded, sub-angular, moderately sorted, dry, very loose		6.71							
8											
				331.32							
9		SAND, medium to coarse-grained, some fine-grained gravel, sub-rounded, sub-angular and angular, moderately sorted, wet, very loose		8.53							
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwS

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: October 30, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5510955 E: 651374

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp — W — Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID); Casing 152.4 mm (OD); JR Drilling	SAND, medium to coarse-grained, some fine-grained gravel, sub-rounded, sub-angular and angular, moderately sorted, wet, very loose *(continued)*									Bentonite Chips
11											
12											
13											
14											Silica Sand
15											
16											Slotted Section
17				322.24							
		End of BOREHOLE.		17.61							
18		NOTES: Standpipe installed to 17.6 m upon well completion. Groundwater level measured at 8.2 mbgs on October 30, 2013. Groundwater level measured at 4.7 mbgs on November 16, 2013.									
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwD

SHEET 1 OF 4

LOCATION: See Location Plan
N: 5510952 E: 651379

BORING DATE: 29 and 31 October, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. + Q- ●, rem V. ⊕ U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		339.85									Stick-up =0.71 m
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SILTY SAND, fine-grained with occasional medium grains, rounded to sub-rounded, moderately graded, minor organics (roots), dry, very loose		0.00 / 338.33									
1		SAND, medium and coarse-grained, and fine-grained with some coarse-grained GRAVEL, poorly sorted, sub-rounded, sub-angular and angular clasts, dry, very loose		1.52									
2													
3													
4													16 Nov 2013 ▽
5													Bentonite Chips
6													
7													
8													
9													
10				329.95 / 9.91									
		CONTINUED NEXT PAGE											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwD

SHEET 2 OF 4

LOCATION: See Location Plan

N: 5510952 E: 651379

BORING DATE: 29 and 31 October, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SANDY GRAVEL, fine-grained with some coarse grains, sub-rounded to sub-angular, poorly sorted, wet, very loose *(continued)*									
11											
12											
13											
14											
15											Bentonite Chips
16											
17		SAND, medium to coarse-grained, some fine-grained gravel, angular to sub-angular, moderately sorted, wet, very loose		322.94 / 16.92							
18											
19											
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE 1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwD

SHEET 3 OF 4

LOCATION: See Location Plan
N: 5510952 E: 651379

BORING DATE: 29 and 31 October, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q- ● rem V. ⊕ U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	SAND, medium to coarse-grained, some fine-grained gravel, angular to sub-angular, moderately sorted, wet, very loose *(continued)*									Bentonite Chips
21											
22											
23											
24											Silica Sand
25											
26											
27											Slotted Section
28		SILTY SAND, fine to medium-grained, occasional angular gravel, rounded to sub-rounded, moderately graded, dry, very loose (BEDROCK)		311.96 / 27.69							
29											Silica Sand / Bentonite Pellets / Slough
30		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ER1gwD

SHEET 4 OF 4

LOCATION: See Location Plan

BORING DATE: 29 and 31 October, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5510952 E: 651379

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30	JR Drilling	SILTY SAND, fine to medium-grained, occasional angular gravel, rounded to sub-rounded, moderately graded, dry, very loose (BEDROCK) *(continued)*		309.07							Slough
31		End of BOREHOLE.		30.78							
32		NOTES: Standpipe installed to 28.9 m upon well completion. Groundwater level measured at 4.6 mbgs on November 16, 2013.									
33											
34											
35											
36											
37											
38											
39											
40											

DEPTH SCALE
1 : 50

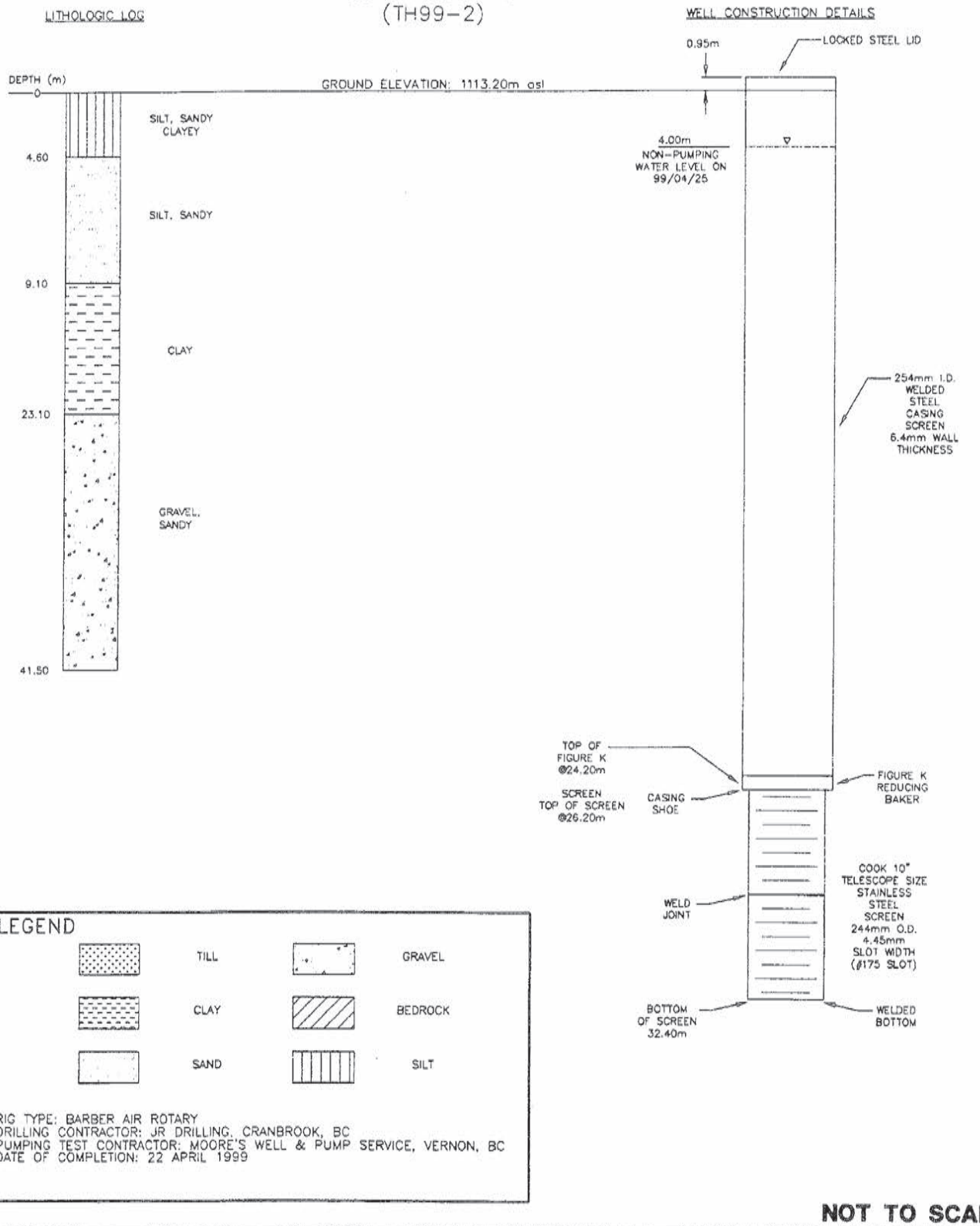
Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

TEST PRODUCTION (TH99-2)



NOT TO SCALE

uma	**HYDROGEOLOGICAL EVALUATION OF A NEW TEST WELL DISTRICT OF SPARWOOD, BC**	**FIG. 3**

JOB# 0764-206-00-02

RG_DW-03-04 (Sparwood Well 3;
TH99-2, WTN 77913)

BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 77913	Construction Date: 1999-03-23 00:00:00
Owner: DISTRICT OF SPARWOOD	Driller: J. R. Drilling
	Well Identification Plate Number: 16686
Address: 425 PINE AVENUE	Plate Attached By: SONNY SAAD
	Where Plate Attached: SOUTH WALL OF PUMP BUILDING
Area: SPARWOOD	
	PRODUCTION DATA AT TIME OF DRILLING:
WELL LOCATION:	Well Yield: 666 (Driller's Estimate) U.S. Gallons per Minute
KOOTENAY Land District	Development Method:
District Lot: Plan: 14652 Lot: 3	Pump Test Info Flag: N
Township: Section: Range:	Artesian Flow:
Indian Reserve: Meridian: Block:	Artesian Pressure (ft):
Quarter:	Static Level: 11 feet
Island:	
BCGS Number (NAD 83): 082G076231 Well: 4	WATER QUALITY:
	Character:
Class of Well: Water supply	Colour:
Subclass of Well: Domestic	Odour:
Orientation of Well:	Well Disinfected: N
Status of Well: New	EMS ID:
Licence General Status: UNLICENSED	Water Chemistry Info Flag:
Well Use: Water Supply System	Field Chemistry Info Flag:
Observation Well Number:	Site Info (SEAM):
Observation Well Status:	
Construction Method:	Water Utility:
Diameter: 10 inches	Water Supply System Name: DISTRICT OF SPARWOOD WATER SYSTEM
Casing drive shoe:	Water Supply System Well Name: DISTRICT OF SPARWOOD WELL #3
Well Depth: 106 feet	
Elevation: 0 feet (ASL)	SURFACE SEAL:
Final Casing Stick Up: inches	Flag: N
Well Cap Type:	Material:
Bedrock Depth: feet	Method:
Lithology Info Flag: N	Depth (ft):
File Info Flag: N	Thickness (in):
Sieve Info Flag: N	
Screen Info Flag: Y	WELL CLOSURE INFORMATION:
	Reason For Closure:
Site Info Details:	Method of Closure:
Other Info Flag:	Closure Sealant Material:
Other Info Details:	Closure Backfill Material:

		Details of Closure:		
Screen from	to feet	Type	Slot Size	
86	106		17	
0	0		0	
0	0		0	
Casing from	to feet	Diameter	Material	Drive Shoe
null	null	0	null	null

GENERAL REMARKS:
10" WELL TH99-2

LITHOLOGY INFORMATION:

From 0 to 13 Ft. GRAVEL

From 13 to 15 Ft. GRAVEL & SAND

From 15 to 30 Ft. SILT & CLAY

From 30 to 76 Ft. CLAY

From 76 to 78 Ft. GRAVEL & CLAY

From 78 to 136 Ft. GRAVEL

- Return to Main
- Return to Search Options
- Return to Search Criteria

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : RG_BH-03-04

PAGE 1 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2020 10 01	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1115.992	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1115.863	Date Drilled:	2020 09 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511207.762	Easting: 651852.976	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Soil Vapour (ppm)

Solid PVC
Slotted PVC

Well Name 1: RG_MW-03-04

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4	Well Name 1: RG_MW-03-04
0	SAND, medium to coarse grained, trace gravel, fine, subrounded, grey, loose, dry.							ROAD BOX
1								
2								
3								
4	SAND and SILT, fine to coarse grained sand, trace clay, brown, loose, moist.							
5	CLAY, trace silt, brown, firm, high plasticity, damp.			04-05				BENTONITE
6								
7								
8	SILT and CLAY, dark brown, firm, high plasticity, damp.							
9								
10								

NOTES
Bolded sample denotes sample analyzed.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : RG_BH-03-04

PAGE 2 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2020 10 01	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1115.992	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1115.863	Date Drilled:	2020 09 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511207.762	Easting: 651852.976	Log Typed By:	AS

Drilling Legend: Sample Interval; Odex

Water/NAPL Levels: Water Level 1; Water Level 2; NAPL; NAPL

Reading within indicated scale; Reading outside indicated scale

Solid PVC; Slotted PVC

Well Name 1: RG_MW-03-04

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4	Well Construction
10	SILT and CLAY, dark brown, firm, high plasticity, damp. *(continued)*							ROAD BOX
11	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded, trace silt, well graded, brown, medium dense, wet.			04-04				BENTONITE
12								SLOUGH
13								
14	GRAVELLY SAND, fine to coarse grained sand, fine to coarse gravel, subangular to subrounded, some silt, well graded, brown, medium dense, wet.			04-02				
15	Between 14.6 and 14.9 m - clay.							BENTONITE
16	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, some silt, well graded, brown, medium dense, wet.							
17								SLOUGH
18								
19				04-03				BENTONITE
20								

NOTES
Bolded sample denotes sample analyzed.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : RG_BH-03-04

PAGE 3 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2020 10 01	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1115.992	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1115.863	Date Drilled:	2020 09 21
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5511207.762	Easting: 651852.976	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: RG_MW-03-04

Depth in Metres	Soil Description
20	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, some silt, well graded, brown, medium dense, wet. *(continued)*
21	
22	
23	
24	SANDY GRAVEL, fine to coarse gravel, subrounded to subangular, medium to coarse grained sand, trace silt, well graded, containing cobbles, brown, medium dense.
25	04-01
26	Bottom of hole at 25.9 m.
27	
28	
29	
30	

ROAD BOX
BENTONITE
RG_MW-03-04
SAND

NOTES
Bolded sample denotes sample analyzed.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GT1

PAGE 1 OF 7

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.515	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.442 1157.457	Date Drilled:	2019 01 17
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509290.376	Easting: 655651.100	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Depth in Metres | Soil Description | Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_GT1-A
Well Name 2: EV_MW_GT1-B

0 FILL, coal and shale boulders, angular, black, dry.

1 GRAVEL, coarse, some fine to medium grained sand, subrounded to rounded, poorly graded, brown, dry, hydrocarbon-like odour.

2 S ▽

D ▽

3 SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, subrounded, well graded, dark brown, damp to moist.

4 SAND, fine to coarse grained, trace fine to coarse gravel, silty, subrounded, well graded, dark brown, moist to wet.

5

6

7 At 7.6 m - fine grained sand, no gravel

8

9

10 At 9.8 m - fine to coarse grained sand, trace gravel

BENTONITE

EV_MW_GT1-B

SAND

BENTONITE

NOTES
Tar was being stored in area at time of drilling.

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GT1

PAGE 2 OF 7

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.515	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.442 1157.457	Date Drilled:	2019 01 17
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509290.376	Easting: 655651.100	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_GT1-A
Well Name 2: EV_MW_GT1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SAND, fine to coarse grained, trace fine to coarse gravel, silty, subrounded, well graded, dark brown, moist to wet. *(continued)*						
11							
12							
13							
14							
15							BENTONITE
16							
17							
18							
19							
20	At 19.5 m - fine grained sand and silt, wet						

NOTES
Tar was being stored in area at time of drilling.

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GT1

PAGE 3 OF 7

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.515	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.442 1157.457	Date Drilled:	2019 01 17
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509290.376	Easting: 655651.100	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

- Solid PVC
- Slotted PVC

Well Name 1: EV_MW_GT1-A
Well Name 2: EV_MW_GT1-B

Depth in Metres

20 SAND, fine to coarse grained, trace fine to coarse gravel, silty, subrounded, well graded, dark brown, moist to wet.
(continued)

21

22

23

24 SAND and GRAVEL, fine to coarse grained sand, coarse gravel, trace silt, subrounded, well graded, brown, wet.

25 BENTONITE

26

27

28

29

30

NOTES
Tar was being stored in area at time of drilling.

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GT1

PAGE 4 OF 7

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.515	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.442 1157.457	Date Drilled:	2019 01 17
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509290.376	Easting: 655651.100	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_GT1-A
Well Name 2: EV_MW_GT1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
30	SAND and GRAVEL, fine to coarse grained sand, coarse gravel, trace silt, subrounded, well graded, brown, wet. *(continued)* At 30.5 m - medium to coarse grained sand, no silt, subrounded to rounded						
31							
32							
33							
34							
35							BENTONITE
36							
37	At 37.2 m - fine grained sand, some silt						
38							
39							
40							

NOTES
Tar was being stored in area at time of drilling.

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GT1

PAGE 5 OF 7

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.515	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.442 1157.457	Date Drilled:	2019 01 17
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509290.376	Easting: 655651.100	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_GT1-A
Well Name 2: EV_MW_GT1-B

40 SAND and GRAVEL, fine to coarse grained sand, coarse gravel, trace silt, subrounded, well graded, brown, wet. *(continued)*

41

42 At 42.1 m - coarse grained sand, coarse gravel, subrounded

43

44

45 At 44.5 m - some angular black shale clasts

BENTONITE

46

47

48 At 47.7 m - medium to coarse grained sand, fine to coarse gravel, subrounded

49

50

NOTES
Tar was being stored in area at time of drilling.

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GT1

PAGE 6 OF 7

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.515	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.442 1157.457	Date Drilled:	2019 01 17
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509290.376	Easting: 655651.100	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_GT1-A
Well Name 2: EV_MW_GT1-B

Depth in Metres	Soil Description
50	SAND and GRAVEL, fine to coarse grained sand, coarse gravel, trace silt, subrounded, well graded, brown, wet. *(continued)*
51	
52	
53	
54	
55	
56	
57	
58	GRAVEL, coarse, some coarse grained sand, poorly graded, grey.
59	
60	

BENTONITE

NOTES
Tar was being stored in area at time of drilling.

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_GT1

PAGE 7 OF 7

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.515	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.442 1157.457	Date Drilled:	2019 01 17
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509290.376	Easting: 655651.100	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

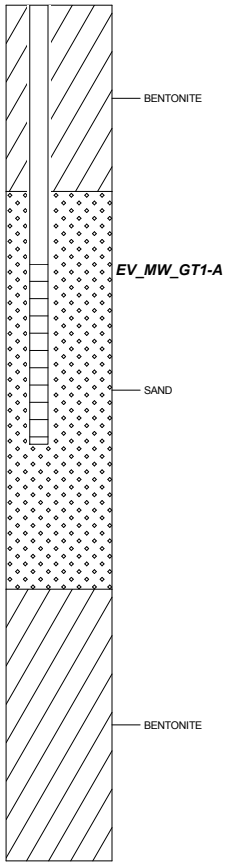
Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_GT1-A
Well Name 2: EV_MW_GT1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
60	GRAVEL, coarse, some coarse grained sand, poorly graded, grey. *(continued)*						
61							
62							
63							
64	SAND, silty.						
65	BEDROCK, shale, black, angular.						
66							
67	Bottom of hole at 67.2 m.						
68							
69							
70							



NOTES
Tar was being stored in area at time of drilling.

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_BC1

PAGE 1 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.271	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.085 1157.090	Date Drilled:	2019 01 15
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509503.141	Easting: 655664.927	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_BC1-A
Well Name 2: EV_MW_BC1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, some silt, subangular, well graded, black, loose, dry, wood debris present.						
1							
2							
3	At 3.5 m - damp						
4	At 4.1 m - wet SAND and GRAVEL, coarse grained sand, fine to coarse gravel, some silt, subrounded, well graded, wet.						
5	SAND, fine to medium grained, silty, trace gravel, poorly graded, wet.						
6	At 6.1 m - damp						
7							
8							
9							
10							

S
D

BENTONITE
EV_MW_BC1-B
SAND
BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_BC1

PAGE 2 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.271	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.085 1157.090	Date Drilled:	2019 01 15
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509503.141	Easting: 655664.927	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Soil Vapour (ppm)
10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_BC1-A
Well Name 2: EV_MW_BC1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
10	SAND, fine to medium grained, silty, trace gravel, poorly graded, wet. *(continued)*					
11						
12	GRAVEL, fine to coarse, subangular, some silt, well graded, loose, wet.					
13						
14						
15	SAND, fine to medium grained, silty, trace gravel, poorly graded, damp.					
16						
17						
18						
19	SAND and GRAVEL, fine to medium grained sand, fine to coarse gravel, some silt, subrounded to rounded, well graded, orange-brown, wet.					
20						

BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_BC1

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Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1156.271	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1157.085 1157.090	Date Drilled:	2019 01 15
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5509503.141	Easting: 655664.927	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_BC1-A
Well Name 2: EV_MW_BC1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
20	SAND and GRAVEL, fine to medium grained sand, fine to coarse gravel, some silt, subrounded to rounded, well graded, orange-brown, wet. *(continued)*						
21							
22	At 21.8 m - dark brown						
23							
24							
25							
26	BEDROCK.						
27							
28	Bottom of hole at 27.9 m.						
29							
30							

BENTONITE
EV_MW_BC1-A
SAND
BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_BCgw

SHEET 1 OF 3

LOCATION: See Location Plan
N: 6509659 E: 655381

BORING DATE: October 22, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80); nat V. +, rem V. ⊕; Q - ●, U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	Ground Surface		353.26									Stick-up =0.86 m
		SANDY GRAVEL, fine-grained with occasional coarse grains, rounded to sub-rounded, moderately graded, dry, very loose		0.00									
1													
				351.74									
		GRAVEL, trace sand, fine-grained with occasional coarse grains, rounded to sub-rounded, poorly graded, very loose		1.52									
2		— Moist at 2.1 m											12 Nov 2013 ▽
3													
4													
5													Bentonite Chips
6				347.17									
		Silty SANDY GRAVEL, fine-grained with occasional coarse grains, sub-rounded to sub-angular, poorly graded, wet, very loose		6.10									
7													
8													
9													
				343.51									
				9.75									
10		CONTINUED NEXT PAGE											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_BCgw

SHEET 2 OF 3

LOCATION: See Location Plan
N: 5509659 E: 655381

BORING DATE: October 22, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	GRAVEL, some sand, trace silt, fine-grained, sub-angular to angular, poorly graded, wet, very loose *(continued)*											
11													
12													
13													Bentonite Chips
14													
15		— Occasional coarse grains from 15.2 m											
16													
17													Silica Sand
18													
19													Slotted Section
20		*CONTINUED NEXT PAGE*											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DATA ENTRY: IPG

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_BCgw

SHEET 3 OF 3

LOCATION: Soo Location Plan

N: 5509659 E: 655381

BORING DATE: October 22, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20	Sonic 127 mm (ID) Casing 152.4 mm (OD) JR Drilling	GRAVEL, some sand, trace silt, fine-grained, sub-angular to angular, poorly graded, wet, very loose *(continued)*									Stotted Section
21											
22		Sandy SILTY GRAVEL, fine-grained, sub-angular to angular, poorly graded, wet, very loose		331.17 22.10							Silica Sand
23		End of BOREHOLE. NOTES: Standpipe installed to 20.7 m upon well completion. Groundwater level measured at 2.4 mbgs on October 23, 2013. Groundwater level measured at 2.2 mbgs on November 12, 2013.		330.10 23.18							
24											
25											
26											
27											
28											
29											
30											

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC1

PAGE 1 OF 4

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1147.631	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1148.587 1148.585	Date Drilled:	2019 01 20
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510593.103	Easting: 654902.674	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC1-A
Well Name 2: EV_MW_MC1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	FILL, coal and shale boulders, loose, dry.						
1							
2							
3	SAND and GRAVEL, fine to medium grained sand, coarse gravel, rounded, poorly graded, black to dark brown, dry, some coal.						
4	At 3.7 m - some silt, brown, damp						
5	SAND, fine grained, silty, poorly graded, brown, wet.						
6							
7							
8	At 7.6 m - some silt to silty						
9							
10							

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BENTONITE
EV_MW_MC1-B
SAND
BENTONITE/SLOUGH

NOTES

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC1

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Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1147.631	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1148.587 1148.585	Date Drilled:	2019 01 20
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510593.103	Easting: 654902.674	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC1-A
Well Name 2: EV_MW_MC1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SAND, fine grained, silty, poorly graded, brown, wet. *(continued)*						
11							
12							
13							
14							
15							
16	At 15.8 m - some medium to coarse grained sand						
17							
18							
19	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to rounded, well graded, brown, wet.						
20							

BENTONITE/SLOUGH

NOTES

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC1

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Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1147.631	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1148.587 1148.585	Date Drilled:	2019 01 20
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510593.103	Easting: 654902.674	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC1-A
Well Name 2: EV_MW_MC1-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
20	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to rounded, well graded, brown, wet. *(continued)*						
21	From 21.4 m to 22.6 m - gravelly						
22	At 22.6 m - subangular to subrounded						
23							
24							
25							
26							
27	SAND, fine grained, poorly graded, silty.						
28	BOULDERS, shale, angular, some gravel, rounded to subrounded.						
29							
30							

BENTONITE/SLOUGH
BENTONITE
EV_MW_MC1-A
SAND
BENTONITE

NOTES

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SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC1

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Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1147.631	Borehole Logged By:	AMH
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1148.587 1148.585	Date Drilled:	2019 01 20
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510593.103	Easting: 654902.674	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC1-A
Well Name 2: EV_MW_MC1-B

Depth in Metres	Soil Description
30	BEDROCK, shale, angular, black.
31	
32	Bottom of hole at 32.0 m.
33	
34	
35	
36	
37	
38	
39	
40	

BENTONITE

NOTES

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Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC2

PAGE 1 OF 6

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1146.989	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1147.950 1147.969	Date Drilled:	2019 01 14
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510529.408	Easting: 654758.366	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC2-A
Well Name 2: EV_MW_MC2-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	FILL, sand and gravel, fine to coarse grained sand, fine to coarse gravel, some silt, angular, well graded, black, dense, dry, coal present, wood debris present.						
1	At 1.1 m - subangular to angular						
2							
3	At 3.0 m - damp						D S
4							
5	GRAVEL, fine to coarse, trace fine to coarse grained sand, subangular, well graded, black, dense, wet.						
6							
7	SILT, brown, medium dense, wet.						
8	GRAVEL, fine to coarse, trace fine to coarse grained sand, subangular to angular, well graded, brown, dense, wet.						
9							
10							

BENTONITE
EV_MW_MC2-B
SAND
BENTONITE

NOTES

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SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC2

Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1146.989	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1147.950 1147.969	Date Drilled:	2019 01 14
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510529.408	Easting: 654758.366	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC2-A
Well Name 2: EV_MW_MC2-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	GRAVEL, fine to coarse, trace fine to coarse grained sand, subangular to angular, well graded, brown, dense, wet. *(continued)*						
11							
12							
13	From 12.8 m to 14.9 m - some silt						
14							
15							BENTONITE
16							
17	At 17.1 m - trace silt, some sand						
18							
19							
20	At 19.8 m - orange/brown						

NOTES

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SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC2

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Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1146.989	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1147.950 1147.969	Date Drilled:	2019 01 14
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510529.408	Easting: 654758.366	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery

Soil Vapour (ppm)
- ○ Reading within indicated scale
- ● Reading outside indicated scale

10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC2-A
Well Name 2: EV_MW_MC2-B

Depth in Metres	Soil Description
20	GRAVEL, fine to coarse, trace fine to coarse grained sand, subangular to angular, well graded, brown, dense, wet. *(continued)*
21	
	At 21.6 m - very dense
22	At 22.3 m - dense
	SAND, fine to coarse grained, some fine to coarse gravel, trace silt, subrounded to angular, well graded, orange/brown, dense, wet.
23	
	GRAVEL, fine to coarse, some fine to coarse grained sand, trace silt, subrounded to angular, well graded, light brown, dense, wet.
24	
25	
26	
27	
28	
29	
	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, subrounded to angular, well graded, brown, loose.
30	

BENTONITE

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SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC2

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Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1146.989	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1147.950 1147.969	Date Drilled:	2019 01 14
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510529.408	Easting: 654758.366	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC2-A
Well Name 2: EV_MW_MC2-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
30	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, subrounded to angular, well graded, brown, loose. *(continued)*						
31							
32							
33							
34							
35							
36							
37							
38							
39							
40	From 39.8 m to 41.1 m - angular gravel						

BENTONITE

NOTES

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SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC2

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Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1146.989	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1147.950 1147.969	Date Drilled:	2019 01 14
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510529.408	Easting: 654758.366	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC2-A
Well Name 2: EV_MW_MC2-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
40	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, subrounded to angular, well graded, brown, loose. *(continued)*						
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							

BENTONITE

NOTES

QA/QC: BH 2019 04 10 Print Date:2019-09-26

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_MC2

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Drilling Contractor	Owen's Drilling	Date Monitored	2019 03 07	Project Number:	660613
Drilling Method	Dual Rotary	Ground Surface Elev. (m)	1146.989	Borehole Logged By:	RAS
Borehole Dia. (m)	0.15	Top of Casing Elev. (m)	1147.950 1147.969	Date Drilled:	2019 01 14
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5510529.408	Easting: 654758.366	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Air Rotary

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_MC2-A
Well Name 2: EV_MW_MC2-B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
50	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, trace silt, subrounded to angular, well graded, brown, loose. *(continued)*						
51							
52	At 52.1 m - increased sand						
53							
54							
	BEDROCK.						
55							
	Bottom of hole at 55.8 m.						
56							
57							
58							
59							
60							

BENTONITE
EV_MW_MC2-A
SAND
BENTONITE

NOTES

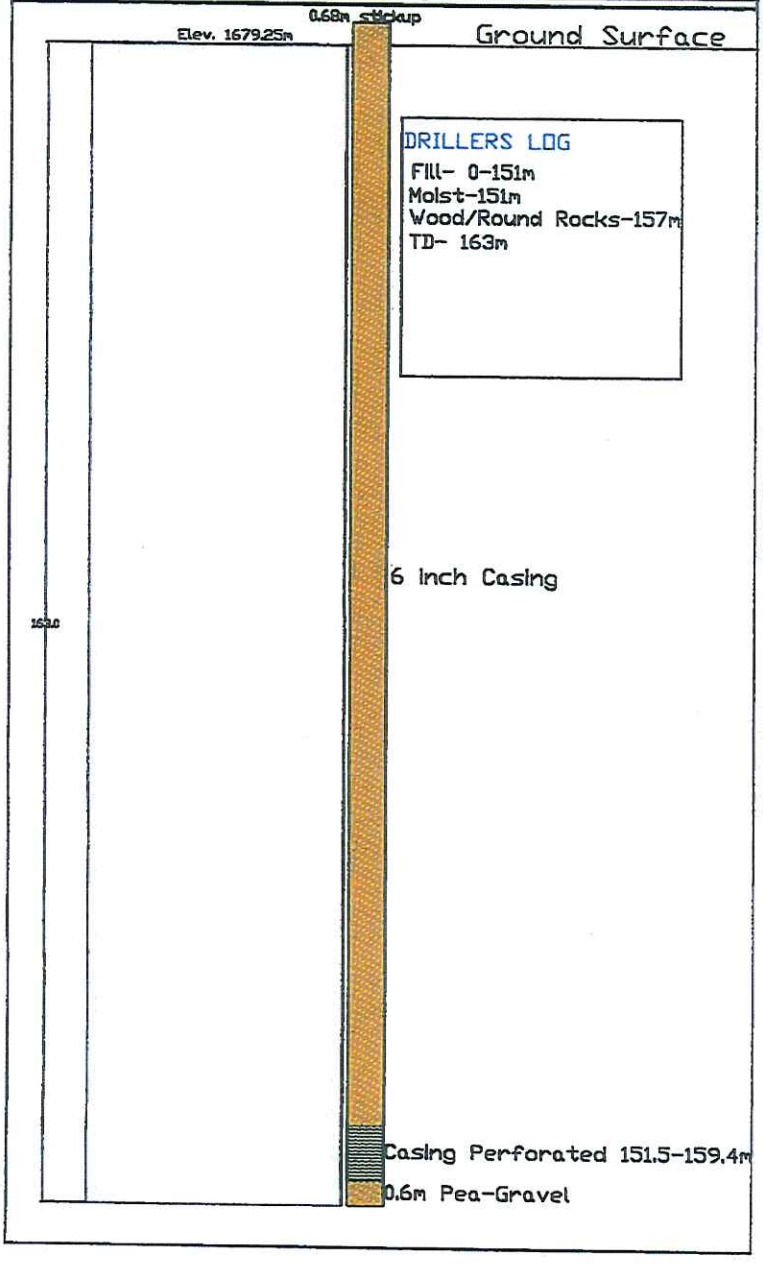
QA/QC: BH 2019 04 10 Print Date:2019-09-26

WF Tailings Migration Well (South WF-2)AS-BUILT

Northing: 49869
Easting: 20380
Elev.: 1679.25
Total Depth: Drilling 163.0m or 535ft

Piezo Depths: N/A
Contractor: J.R. Drilling Ltd. (Cranbrook)
E.V.C.C. Tech: D. Gfrerer
Start/Finish: April 11-16, 2005- 6" casing installed

EV_WF_SW



PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ECgw

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: October 27, 2013

DATUM: UTM Zone 11 (Nad 83)

N: 5506384 E: 660795

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		406.30							Stick-up +0.74 m
0	Solid 127 mm (ID) Casing 152.4 mm (OD) / JR Drilling	GRAVELLY SAND, medium and coarse-grained sand with occasional fine gravel grains, rounded to sub-rounded, moderately graded, dry, very loose		0.00							16 Nov 2014 ▽ Bentonite Chips
				404.77							
1		SAND, trace gravel, medium-grained, rounded to sub-rounded, moderately graded, dry, very loose		1.52							
2											Silica Sand
3											Slotted Section
				402.49							
4		CLAY and SAND, medium-grained with occasional coarse grains, rounded to sub-rounded, moderately graded, moist, firm		3.81							Silica Sand
5				401.12							
		SANDY CLAY, medium-grained with occasional coarse grains, rounded to sub-rounded, moderately graded, moist, firm		5.18							
6											
				399.44							
7		CLAY, some sand, medium-grained, rounded to sub-rounded, moderately graded, moist, semi-firm		6.86							Bentonite Pellets
8											
9											
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: RT

CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

PROJECT No.: 12.1349.0013

RECORD OF BOREHOLE: EV_ECgw

SHEET 2 OF 2

LOCATION: See Location Plan
N: 5506384 E: 660795

BORING DATE: October 27, 2013

DATUM: UTM Zone 11 (Nad 83)

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q- ● rem V. ⊕ U- ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	JR Drilling	CLAY, some sand, medium-grained, rounded to sub-rounded, moderately graded, moist, semi-firm *(continued)*		395.33							Bentonite Pellets
11		End of BOREHOLE.		10.97							
12		NOTES: Standpipe installed to 4.1 m upon well completion. Groundwater level measured at 1.8 mbgs on November 12, 2013.									
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: RT
CHECKED: CD

DATA ENTRY: IPG

BOREHOLE - EXPANDED ADD. LAB TESTING 12.1349.0013 BH LOGS.GPJ CALGARY.GDT 4/8/14

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SP1A

PAGE 1 OF 4

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1207.382	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1208.323	Date Drilled:	2020 05 05
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5505643.910	Easting: 659314.782	Log Typed By:	VL

Drilling Legend: Sample Interval; Odex

Water/NAPL Levels: Water Level 1; Water Level 2; NAPL; NAPL

Reading within indicated scale; Reading outside indicated scale

Soil Vapour (ppm)

Solid PVC; Slotted PVC

Well Name 1: EV_MW_SP1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
0	SAND, fine to coarse grained, some gravel, fine, subangular, dark brown, loose, damp, organics.			SP1A-01		
1	At 0.46 m - no organics.					
2	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular, occasional cobbles, well graded, grey, dense, damp.			SP1A-02		
3	SANDY GRAVEL, fine to coarse gravel, subangular, occasional cobbles, grey, dense, wet.			**SP1A-03**		
4	SILTY GRAVEL, fine to coarse gravel, subangular, some sand, brown, medium dense, wet.					
5				SP1A-04		
6						
7				SP1A-05		
8				**SP1A-06**		
9				SP1A-07		
10						

BENTONITE

SLOUGH

BENTONITE

SLOUGH

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SP1A

PAGE 2 OF 4

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1207.382	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1208.323	Date Drilled:	2020 05 05
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5505643.910	Easting: 659314.782	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SP1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SAND, fine to coarse grained, some silt, some gravel, fine, subangular, brown, medium dense, wet.			SP1A-07			
11				SP1A-08			
12							
13	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, some silt, well graded, brownish yellow, medium dense, wet.			**SP1A-09**			
14				SP1A-10			
15	SAND, fine grained, some silt, trace gravel, fine, subrounded to subangular, poorly graded, brown, loose, wet.			SP1A-11			
16							
17				SP1A-12			
18	SILTY SAND, fine grained sand, poorly graded, brown, loose, wet, encountered heaving.						
19				SP1A-13			
20				SP1A-14			

SLOUGH
BENTONITE
SLOUGH
BENTONITE
SLOUGH
BENTONITE

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SP1A

PAGE 3 OF 4

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1207.382	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1208.323	Date Drilled:	2020 05 05
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5505643.910	Easting: 659314.782	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale
Soil Vapour (ppm)
10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SP1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
20	SILTY SAND, fine grained sand, poorly graded, brown, loose, wet, encountered heaving. *(continued)*			SP1A-14		
21	SAND, fine to coarse grained, some silt, trace gravel, fine subrounded to subangular, grey, loose, wet.			SP1A-15		
22						
23				SP1A-16		
24						
25				SP1A-17		
26	SAND, fine to medium grained, trace silt, grey, medium dense, wet.			SP1A-18		
27						
28	At 28.0 m - coarse grained sand.			SP1A-19		
29	At 29.0 m - trace gravel, fine, subrounded to subangular.			**SP1A-20**		
30						

BENTONITE
EV_MW_SP1A
SAND

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SP1A

PAGE 4 OF 4

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1207.382	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1208.323	Date Drilled:	2020 05 05
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5505643.910	Easting: 659314.782	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Soil Description

Depth in Metres | Stratigraphy Plot | Sample Interval Core Run | Sample Number | Blow Count | % Recovery | Soil Vapour (ppm) | Well Name 1: EV_MW_SP1A

Soil Vapour (ppm): ○ Reading within indicated scale; ● Reading outside indicated scale; 10^1 10^2 10^3 10^4

Well Name 1: EV_MW_SP1A: Solid PVC; Slotted PVC

30 — SP1A-20 — SAND

Bottom of hole at 30.2 m.

31 32 33 34 35 36 37 38 39 40

NOTES
Bolded sample denotes sample analyzed.

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SP1B

PAGE 1 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1207.358	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1208.347	Date Drilled:	2020 05 06
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5505643.717	Easting: 659316.582	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SP1B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND, fine to coarse grained, some gravel, fine, subangular, dark brown, loose, damp, organics.						
	At 0.46 m - no organics.						
2	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular, occasional cobbles, well graded, grey, dense, damp.						
3	SANDY GRAVEL, fine to coarse gravel, subangular, occasional cobbles, grey, dense, wet.						
4	SILTY GRAVEL, fine to coarse, subangular, some sand, brown, medium dense, wet.						
10							

BENTONITE
SAND
SLOUGH
BENTONITE
SLOUGH
BENTONITE

NOTES

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SP1B

PAGE 2 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1207.358	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1208.347	Date Drilled:	2020 05 06
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5505643.717	Easting: 659316.582	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

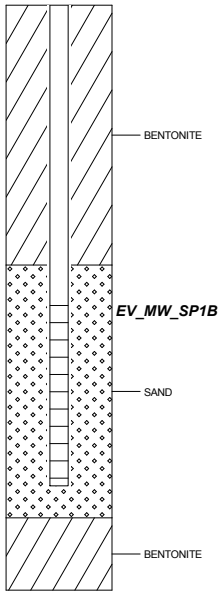
Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SP1B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SAND, fine to coarse grained, some silt, some gravel, fine, subangular to subrounded, brown, medium dense, wet.						
11							
12							
13	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, some silt, well graded, brownish yellow, medium dense, wet.						
14	SAND, fine to coarse grained, some silt, trace gravel, fine, subrounded to subangular, poorly graded, brown, medium dense, wet.						
15	Bottom of hole at 14.9 m.						
16							
17							
18							
19							
20							



NOTES

QA/QC: MB 2020 06 22 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : EV_BH_SP1C

PAGE 1 OF 1

Drilling Contractor	Owen's Drilling	Date Monitored	2020 05 19	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1207.366	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1208.391	Date Drilled:	2020 05 05
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5505642.125	Easting: 659315.597	Log Typed By:	VL

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: EV_MW_SP1C

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND, fine to coarse grained, some gravel, fine, subangular, dark brown, loose, damp, organics.						
	At 0.46 m - no organics.						
1							
2	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular, occasional cobbles, well graded, grey, dense, damp.						
3	SANDY GRAVEL, fine to coarse gravel, subangular, occasional cobbles, grey, dense, wet.						
4							
	Bottom of hole at 4.6 m.						
5							
6							
7							
8							
9							
10							

BENTONITE

EV_MW_SP1C

SAND

NOTES

QA/QC: MB 2020 06 22 Print Date:2020-12-02

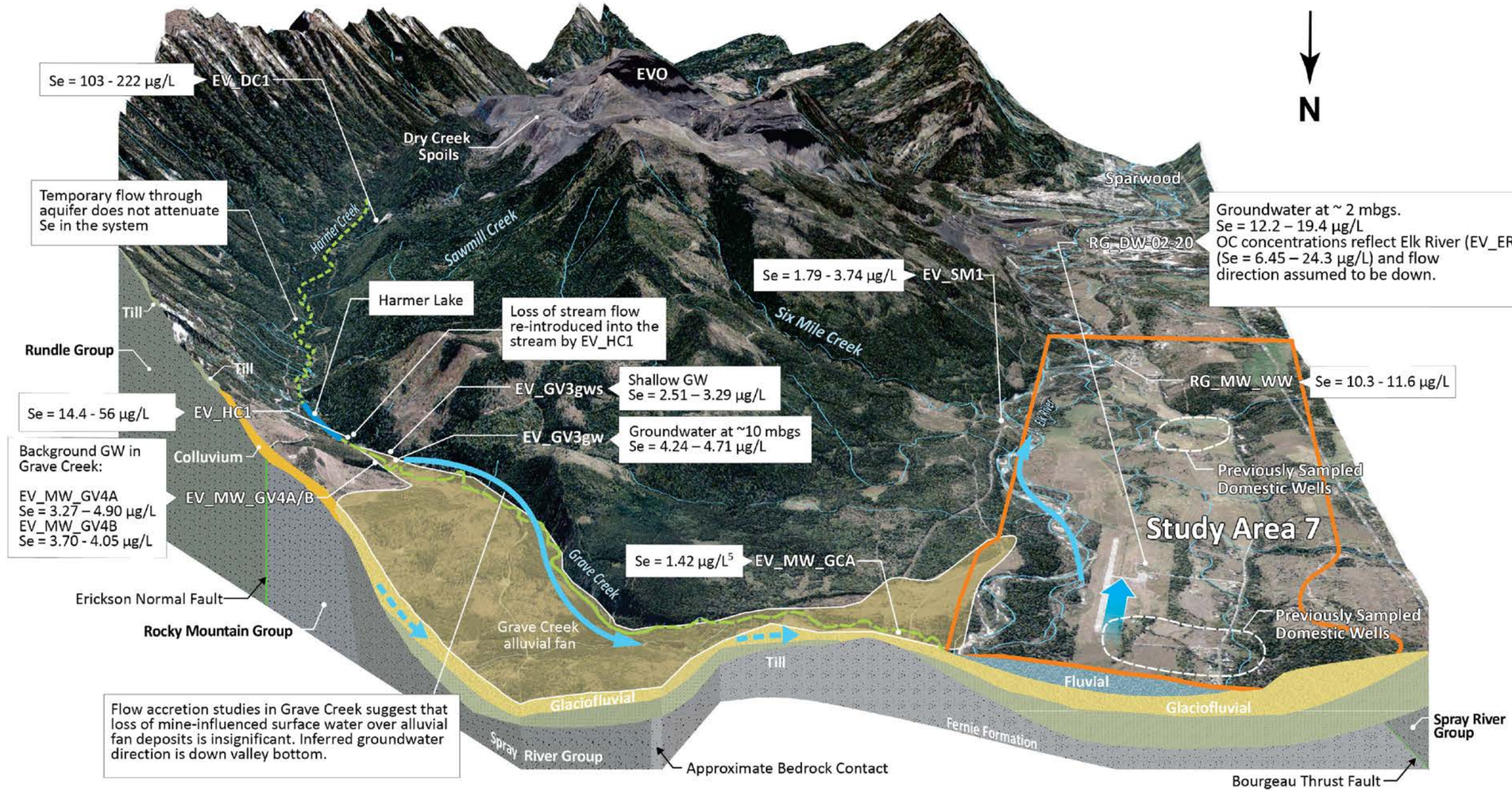
Attachment II: Block Diagrams

Diagram EV-01: Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at EVO – Grave Creek/Harmer Creek and Study Area 7

Diagram EV-02: Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at EVO – Elk River Proximal to EVO and Study Area 8

Diagram EV-03: Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at EVO – Michel Creek and Elk River Distal to EVO, Study Areas 9b and 12

Diagram EV-04: Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at EVO – Erickson Creek and Study Area 10



Flow Legend

- Main Stem Down-Valley Groundwater
- Gaining Reach
- Stable Reach
- Losing or Stable Reach
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:

1. Graphics from Brick Tudor Studios, LLC.
2. Geology derived from Monahan, 2000, BC Government.
3. Lorax Environmental, 2019, EVO Dry Creek and Harmer Creek Local Flow and Water Quality Investigation
4. SNC-Lavalin, 2020, Grave Creek and Line Creek Flow Accretion Studies, Summer and Fall 2020

NOTES:

1. Original in colour.
2. All concentrations shown are for 2021 minimum and maximum unless otherwise stated.
3. Subsurface geology is not to scale.
4. Vertical exaggeration 2x for topographic profile.
5. Only one sampling event at EV_MW_GCA.
6. mbgs denotes meters below ground surface.
7. OC denotes Order Constituents.

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

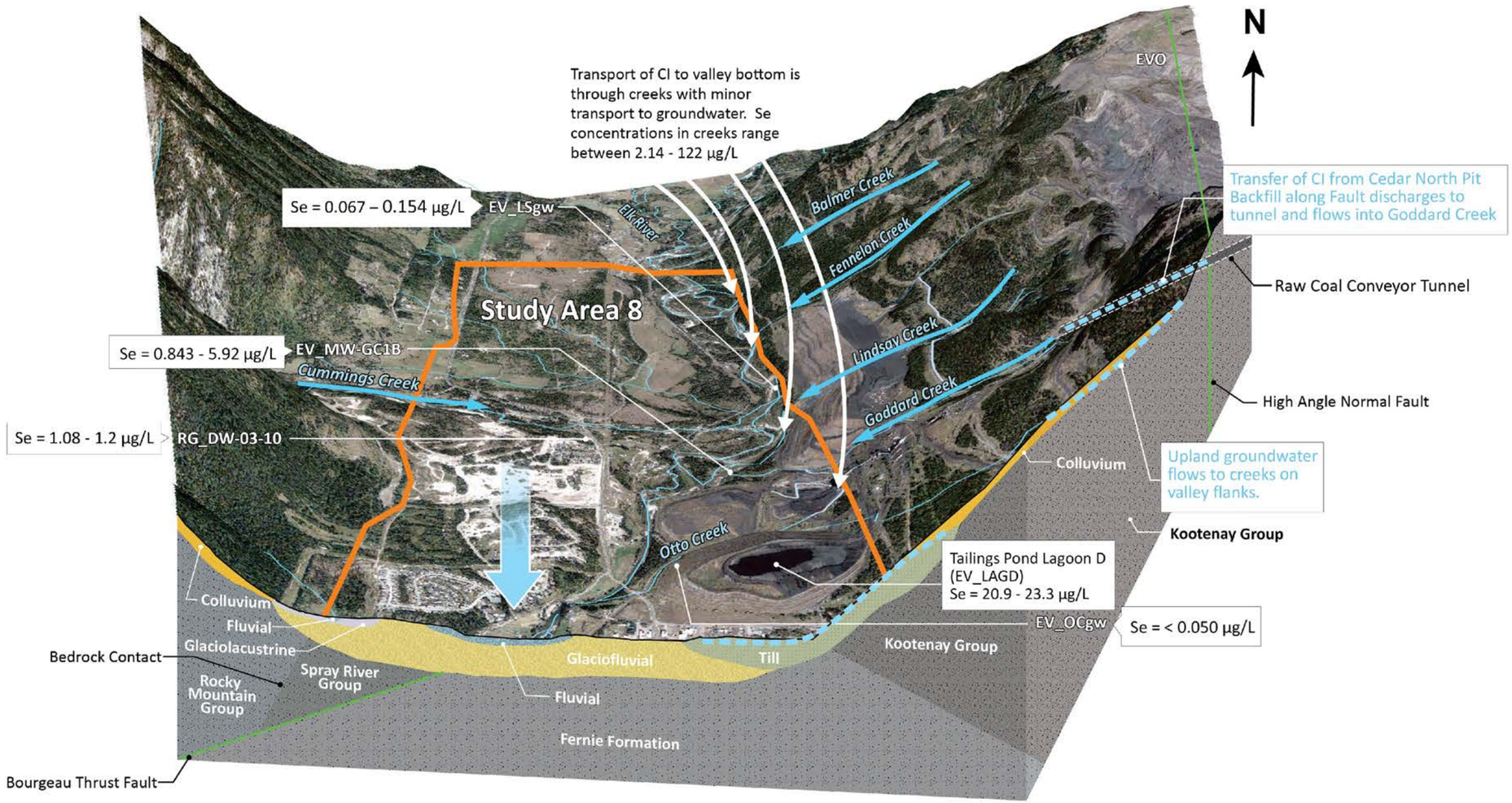
SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at EVO - Grave Creek/Harmer Creek and Study Area 7

BY:	SCALE:	DATE:	REF No:
CW		2022-02-22	DIAGRAM EV-01
CHK'D: KC	Proj Coord Sys:		

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-BlockDiagram_EV01.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:

1. Graphics from Brick Tudor Studios, LLC.
2. Geology derived from Monahan, 2000, BC Government.

NOTES:

1. Original in colour.
2. All concentrations shown are for 2021 minimum and maximum unless otherwise stated.
3. Subsurface geology is not to scale.
4. Vertical exaggeration 2x for topographic profile.
5. Bourgeau thrust fault strikes N-S and dips to the west.
6. Bedrock contact between the Rocky Mtn. Supergroup and the Spray River Group strikes N-S and dips to the west.
7. Bedrock contact between the Fernie Formation and the Kootenay Group strikes N-S and is inferred to dip to the east.

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

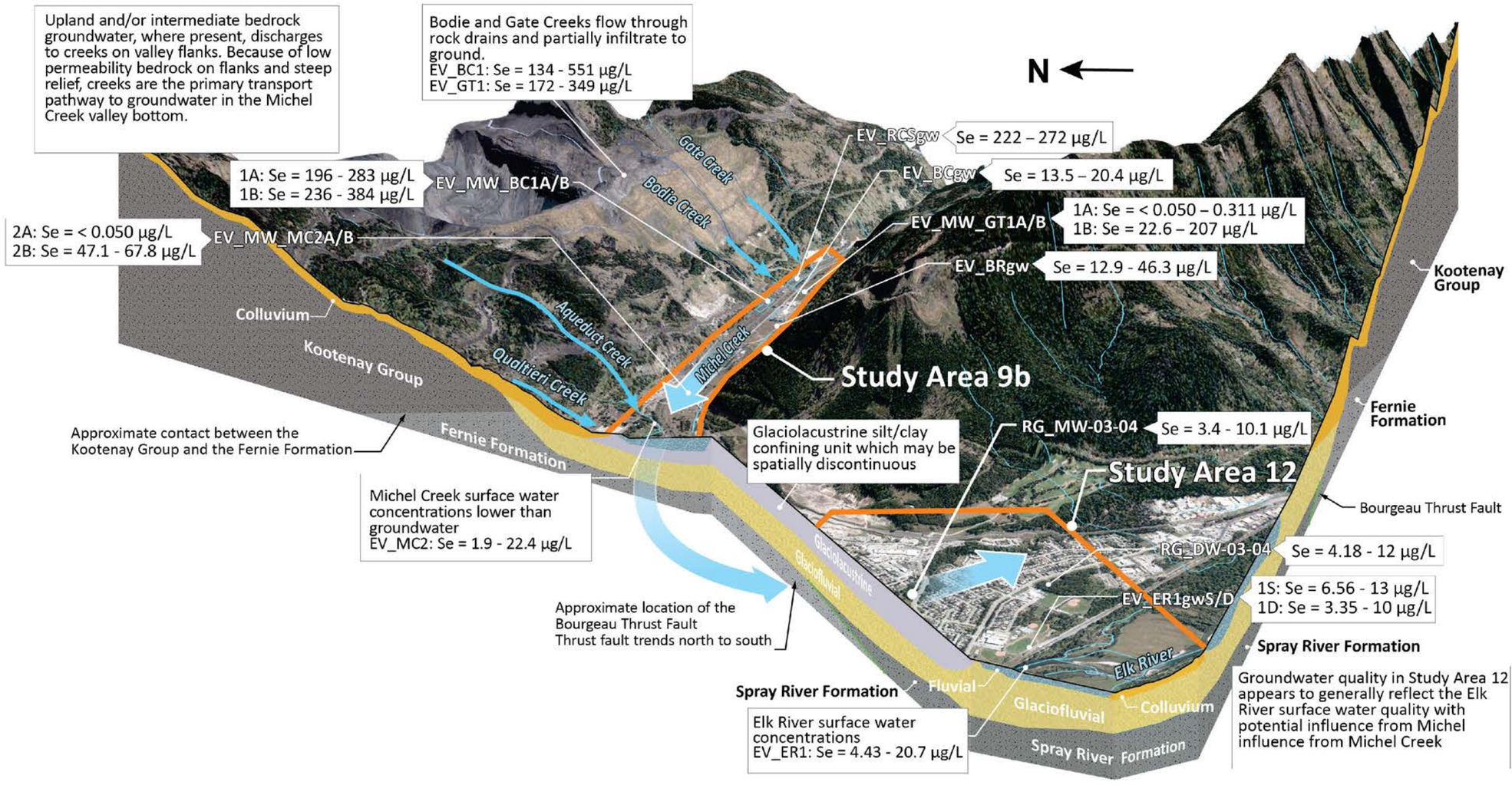
SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at EVO - Elk River Proximal to EVO and Study Area 8

BY:	SCALE:	DATE:	REF No:
CW		2022-02-22	DIAGRAM EV-02
CHK'D: KC	Proj Coord Sys:		

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-BlockDiagram_EV02.mxd



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

REFERENCES:

1. Graphics from Brick Tudor Studios, LLC.
2. Geology derived from Monahan, 2000, BC Government.

NOTES:

1. Original in colour.
2. All concentrations shown are for 2021 minimum and maximum unless otherwise stated.
3. Subsurface geology is not to scale.
4. Vertical exaggeration 2x for topographic profile.

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

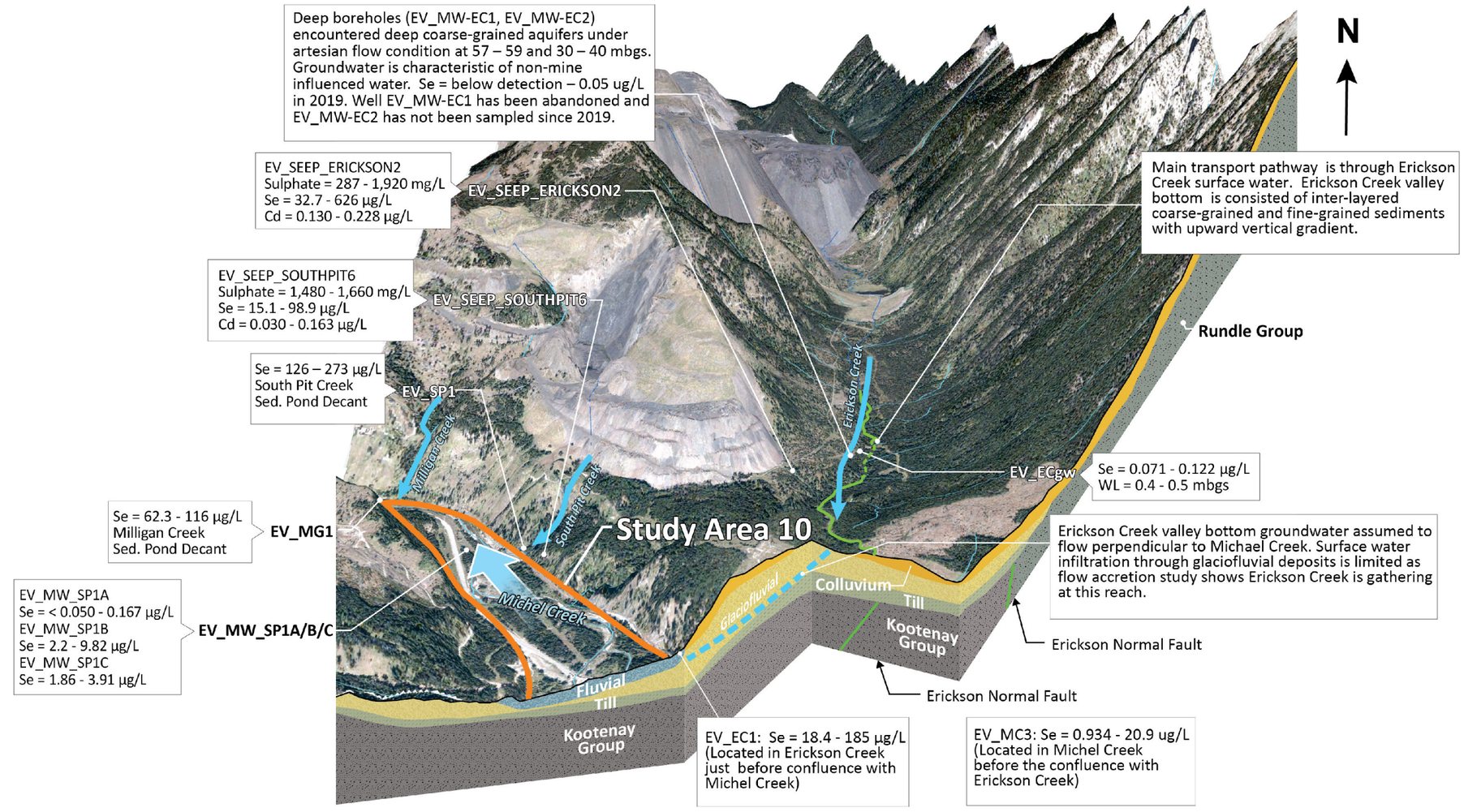
SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at EVO - Michel Creek and Elk River Distal to EVO, Study Areas 9b and 12

BY:	SCALE:	DATE:	REF No:
CW		2022-02-22	DIAGRAM EV-03
CHK'D: KC	Proj Coord Sys: NAD 1983 UTM Zone 10N		

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-BlockDiagram_EV03.mxd



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water
- Normal Fault
- Erickson Creek Gaining Reach
- Erickson Creek Losing Reach

REFERENCES:

1. Graphics from Brick Tudor Studios, LLC.
2. Geology derived from Monahan, 2000, BC Government.

NOTES:

1. Original in colour.
2. All concentrations shown are for 2021 minimum and maximum unless otherwise stated.
3. Subsurface geology is not to scale.
4. Vertical exaggeration 2x for topographic profile.
5. mbgs denotes metres below ground surface.

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at EVO - Erickson Creek and Study Area 10

BY: CW	SCALE:	DATE: 2022-03-01	REF No: DIAGRAM EV-04
CHK'D: KC	Proj Coord Sys:		

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-BlockDiagram_EV04.mxd

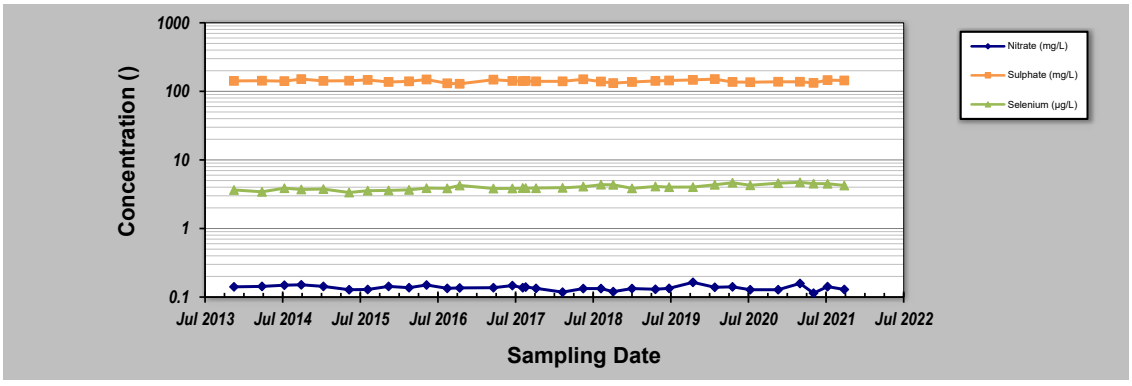
Attachment III: Mann-Kendall Analyses

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 18-Jan-22
Facility Name: Teck Coal Regional Groundwater - EVO
Conducted By: KC

Job ID: 671557
Location: EV_GV3gw

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	EV_GV3GW CONCENTRATION						
1	15-Nov-13	0.141	142	3.65				
2	28-Mar-14	0.143	143	3.43				
3	12-Jul-14	0.149	141	3.87				
4	30-Sep-14	0.151	151	3.71				
5	13-Jan-15	0.143	142	3.76				
6	15-May-15	0.128	143	3.35				
7	11-Aug-15	0.129	147	3.56				
8	18-Nov-15	0.143	137	3.59				
9	23-Feb-16	0.137	140	3.66				
10	16-May-16	0.15	149	3.88				
11	22-Aug-16	0.134	131	3.85				
12	20-Oct-16	0.136	129	4.24				
13	29-Mar-17	0.137	148	3.83				
14	27-Jun-17	0.147	142	3.84				
15	15-Aug-17	0.137	141	3.9				
16	29-Aug-17	0.14	142	3.89				
17	17-Oct-17	0.134	140	3.87				
18	20-Feb-18	0.118	140	3.92				
19	29-May-18	0.133	150	4.09				
20	21-Aug-18	0.133	139	4.36				
21	18-Oct-18	0.12	132	4.34				
22	15-Jan-19	0.133	137	3.85				
23	6-May-19	0.13	142	4.1				
24	10-Jul-19	0.134	144	4.01				
25	31-Oct-19	0.164	147	4.02				
26	11-Feb-20	0.139	151	4.34				
27	5-May-20	0.141	137	4.65				
28	28-Jul-20	0.128	136	4.27				
29	8-Dec-20	0.128	138	4.58				
30	21-Mar-21	0.158	138	4.71				
31	24-May-21	0.114	133	4.51				
32	30-Jul-21	0.142	146	4.5				
33	17-Oct-21	0.129	144	4.24				
34								
35								
Coefficient of Variation:		0.08	0.04	0.09				
Mann-Kendall Statistic (S):		-127	-66	356				
Confidence Factor:		97.5%	84.2%	>99.9%				
Concentration Trend:		Decreasing	Stable	Increasing				



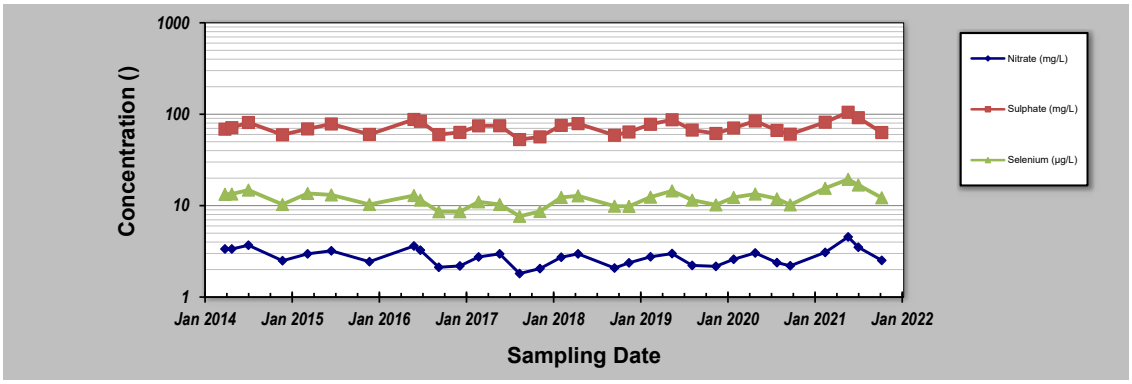
Notes:

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-Jan-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	RG_DW-02-20
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	RG_DW-02-20 CONCENTRATION						
1	26-Mar-14	3.36	68.6	13.3				
2	24-Apr-14	3.36	71.3	13.4				
3	3-Jul-14	3.69	81.2	14.8				
4	24-Nov-14	2.5	59.6	10.3				
5	10-Mar-15	2.97	69.1	13.6				
6	18-Jun-15	3.21	78.2	13.1				
7	26-Nov-15	2.44	60.2	10.3				
8	1-Jun-16	3.62	87.6	12.9				
9	28-Jun-16	3.26	83.6	11.5				
10	14-Sep-16	2.12	59.9	8.58				
11	12-Dec-16	2.19	63.3	8.57				
12	1-Mar-17	2.75	74.6	11				
13	29-May-17	2.97	74.8	10.3				
14	21-Aug-17	1.81	52.8	7.65				
15	15-Nov-17	2.05	56.5	8.64				
16	13-Feb-18	2.73	75.4	12.3				
17	25-Apr-18	2.97	78.9	12.8				
18	26-Sep-18	2.08	58.9	9.87				
19	26-Nov-18	2.37	63.9	9.83				
20	25-Feb-19	2.76	77.6	12.4				
21	27-May-19	2.99	87	14.5				
22	20-Aug-19	2.22	67.1	11.5				
23	28-Nov-19	2.17	61.6	10.2				
24	11-Feb-20	2.59	70.7	12.3				
25	12-May-20	3.04	84.3	13.4				
26	12-Aug-20	2.38	66.5	11.9				
27	7-Oct-20	2.2	60.5	10.2				
28	3-Mar-21	3.08	81.8	15.5				
29	8-Jun-21	4.55	105	19.4				
30	21-Jul-21	3.51	91.6	16.8				
31	28-Oct-21	2.52	63.1	12.2				
32								
33								
34								
35								
Coefficient of Variation:		0.22	0.17	0.21				
Mann-Kendall Statistic (S):		-43	55	30				
Confidence Factor:		76.1%	81.9%	68.8%				
Concentration Trend:		Stable	No Trend	No Trend				



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.
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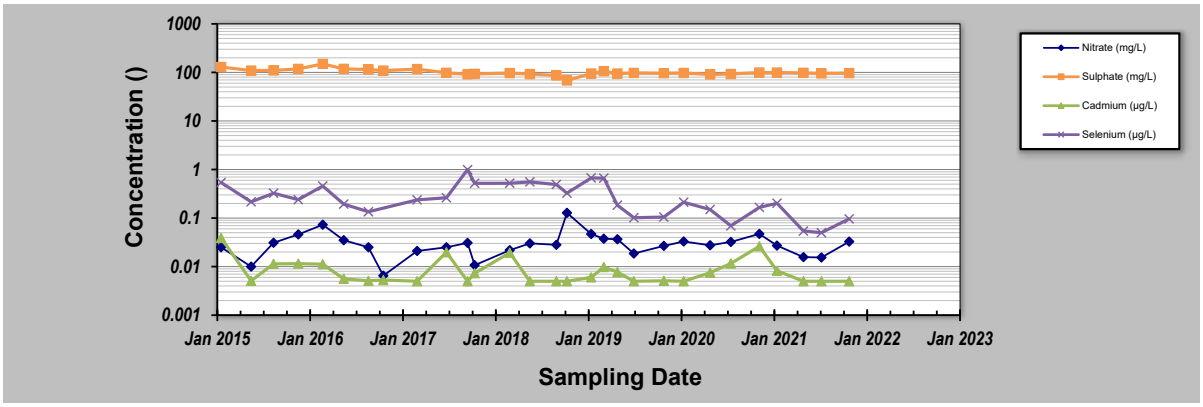
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	26-Jan-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_BALgw
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_BALGW CONCENTRATION						
1	16-Jan-15	0.025	129	0.039	0.54			
2	15-May-15	0.01	109	0.0051	0.216			
3	12-Aug-15	0.031	110	0.0114	0.325			
4	18-Nov-15	0.046	118	0.0115	0.24			
5	23-Feb-16	0.073	150	0.0112	0.457			
6	16-May-16	0.035	118	0.0056	0.194			
7	22-Aug-16	0.025	115	0.0051	0.135			
8	20-Oct-16	0.0065	109	0.0053	0.241			
9	3-Mar-17	0.021	117	0.005	0.237			
10	27-Jun-17	0.025	98.1	0.0198	0.262			
11	19-Sep-17	0.0308	91.6	0.005	0.992			
12	17-Oct-17	0.0107	93.3	0.0073	0.52			
13	5-Mar-18	0.0218	96.9	0.0193	0.521			
14	24-May-18	0.0301	92.6	0.005	0.555			
15	6-Sep-18	0.0281	86.6	0.005	0.491			
16	18-Oct-18	0.128	68.4	0.005	0.326			
17	22-Jan-19	0.0469	94.8	0.006	0.672			
18	13-Mar-19	0.0375	106	0.0098	0.663			
19	6-May-19	0.0366	94.8	0.0077	0.184			
20	10-Jul-19	0.0186	97.6	0.005	0.102			
21	6-Nov-19	0.0267	96.4	0.0051	0.105			
22	23-Jan-20	0.0329	97.3	0.005	0.212			
23	7-May-20	0.0275	90.6	0.0075	0.15			
24	28-Jul-20	0.0322	92.8	0.0116	0.069			
25	18-Nov-20	0.0471	99.6	0.0262	0.166			
26	27-Jan-21	0.0271	99.3	0.0082	0.202			
27	12-May-21	0.0157	97.9	0.005	0.054			
28	22-Jul-21	0.0154	95.4	0.005	0.05			
29	9-Nov-21	0.0327	96.9	0.005	0.096			
30								
Coefficient of Variation:		0.70	0.15	0.83	0.74			
Mann-Kendall Statistic (S):		15	-144	-76	-154			
Confidence Factor:		60.3%	99.7%	92.0%	99.9%			
Concentration Trend:		No Trend	Decreasing	Prob. Decreasing	Decreasing			



Notes:

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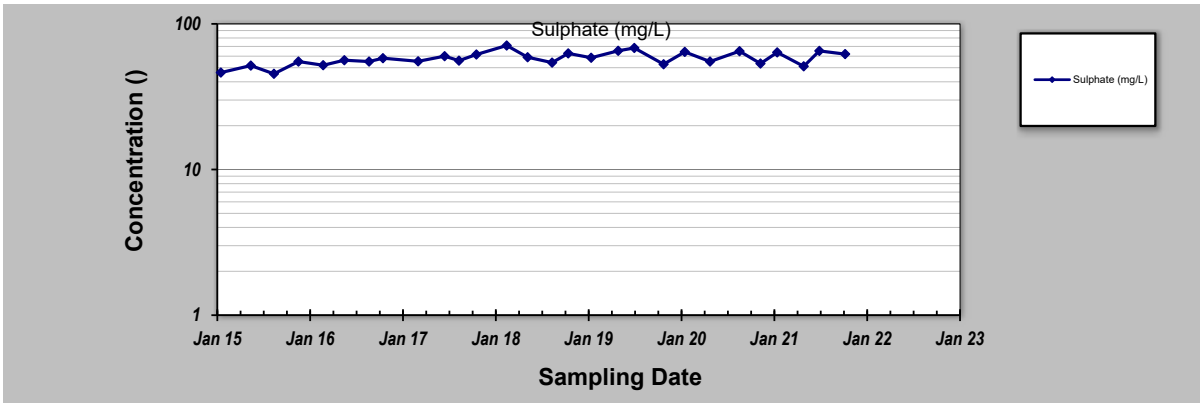
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	26-Jan-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_GCgw
Conducted By:	KC		

Parameter (units): Sulphate (mg/L)

Sampling Event	Sampling Date	EV_GCGW CONCENTRATION						
1	15-Jan-15	46.3						
2	13-May-15	51.7						
3	13-Aug-15	45.4						
4	18-Nov-15	55.1						
5	24-Feb-16	52						
6	18-May-16	56.3						
7	24-Aug-16	55.1						
8	18-Oct-16	58.1						
9	7-Mar-17	55.3						
10	20-Jun-17	60						
11	16-Aug-17	55.9						
12	24-Oct-17	61.6						
13	21-Feb-18	71						
14	15-May-18	59						
15	20-Aug-18	54.2						
16	23-Oct-18	62.7						
17	22-Jan-19	58.5						
18	9-May-19	65.3						
19	12-Jul-19	68.3						
20	5-Nov-19	52.8						
21	28-Jan-20	64.2						
22	7-May-20	55.1						
23	1-Sep-20	64.9						
24	23-Nov-20	53.4						
25	28-Jan-21	63.7						
26	13-May-21	51.1						
27	14-Jul-21	65.2						
28	24-Oct-21	62						
29								
30								
Coefficient of Variation:		0.11						
Mann-Kendall Statistic (S):		133						
Confidence Factor:		99.6%						
Concentration Trend:		Increasing						



Notes:

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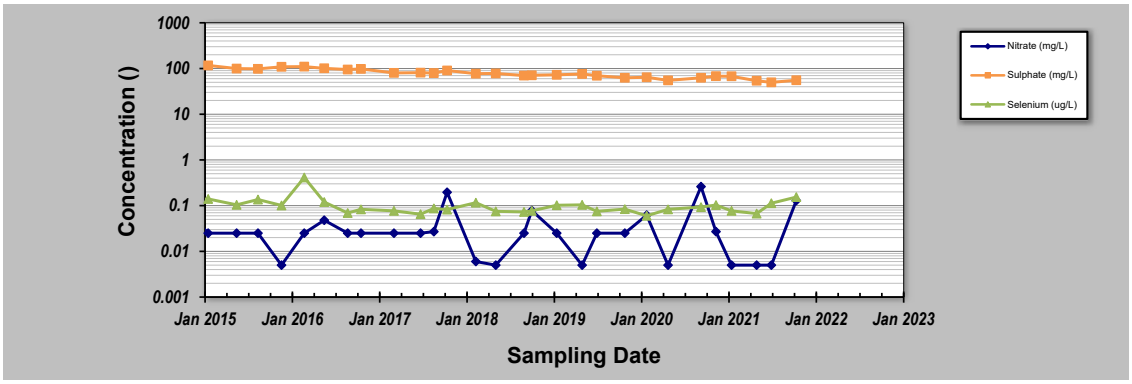
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 26-Jan-22
Facility Name: Teck Coal Regional Groundwater - EVO
Conducted By: KC

Job ID: 671557
Location EV_LSgw

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (ug/L)				
Sampling Event	Sampling Date	EV_LSGW CONCENTRATION						
1	14-Nov-13	0.05	137	0.24				
2	25-Mar-14	0.05	440	0.18				
3	7-Jul-14	0.05	120	0.12				
4	29-Sep-14	0.098	111	0.13				
5	14-Jan-15	0.025	117	0.14				
6	14-May-15	0.025	99.6	0.104				
7	12-Aug-15	0.025	98.3	0.136				
8	19-Nov-15	0.005	109	0.101				
9	23-Feb-16	0.025	110	0.413				
10	17-May-16	0.048	101	0.12				
11	24-Aug-16	0.025	95	0.069				
12	19-Oct-16	0.025	97.9	0.083				
13	7-Mar-17	0.025	80.1	0.077				
14	27-Jun-17	0.025	81.1	0.065				
15	22-Aug-17	0.027	79.5	0.087				
16	17-Oct-17	0.196	90.5	0.082				
17	15-Feb-18	0.006	77.1	0.116				
18	10-May-18	0.005	78.1	0.075				
19	6-Sep-18	0.025	70	0.073				
20	9-Oct-18	0.078	71	0.077				
21	22-Jan-19	0.025	72.8	0.102				
22	9-May-19	0.005	75.9	0.104				
23	10-Jul-19	0.025	69.5	0.075				
24	5-Nov-19	0.025	62.7	0.084				
25	5-Feb-20	0.062	64.3	0.06				
26	5-May-20	0.005	55	0.083				
27	21-Sep-20	0.261	62.7	0.093				
28	23-Nov-20	0.027	68	0.103				
29	27-Jan-21	0.005	67.6	0.077				
30	13-May-21	0.005	54	0.067				
31	14-Jul-21	0.005	49.8	0.113				
32	27-Oct-21	0.129	55.4	0.154				
33								
34								
35								
Coefficient of Variation:		1.28	0.71	0.59				
Mann-Kendall Statistic (S):		-81	-427	-151				
Confidence Factor:		90.2%	>99.9%	99.3%				
Concentration Trend:		Prob. Decreasing	Decreasing	Decreasing				



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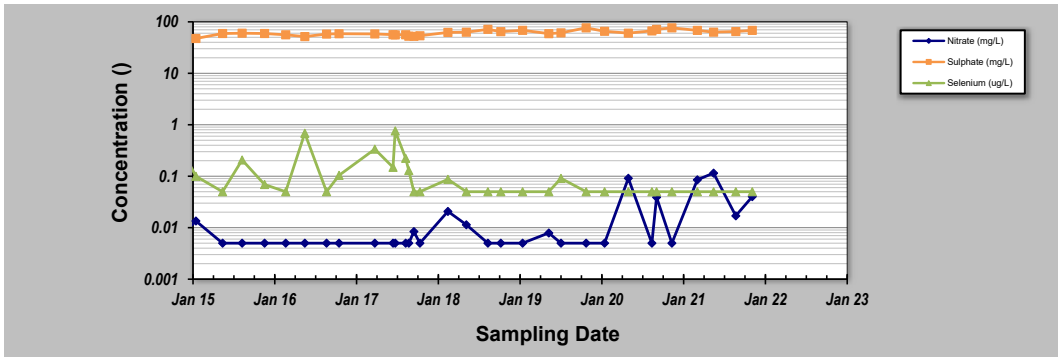
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 26-Jan-22
Facility Name: Teck Coal Regional Groundwater - EVO
Conducted By: KC

Job ID: 671557
Location EV_Ocgw

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (ug/L)				
Sampling Event	Sampling Date	EV_OCGW CONCENTRATION						
1	27-Mar-14	0.005	61.7	0.17				
2	14-Jul-14	0.0055	52.3	0.1				
3	4-Oct-14	0.005	53	0.67				
4	14-Jan-15	0.0135	47.5	0.1				
5	14-May-15	0.005	59.3	0.05				
6	10-Aug-15	0.005	60.1	0.207				
7	19-Nov-15	0.005	59.3	0.069				
8	22-Feb-16	0.005	56	0.05				
9	18-May-16	0.005	51.7	0.685				
10	24-Aug-16	0.005	57.9	0.05				
11	19-Oct-16	0.005	58.7	0.104				
12	29-Mar-17	0.005	58.2	0.336				
13	19-Jun-17	0.005	56.3	0.149				
14	29-Jun-17	0.005	55.8	0.76				
15	15-Aug-17	0.005	56.1	0.223				
16	29-Aug-17	0.005	52.5	0.129				
17	21-Sep-17	0.0084	52.3	0.05				
18	18-Oct-17	0.005	53.7	0.05				
19	21-Feb-18	0.0207	62.3	0.087				
20	15-May-18	0.0114	62.9	0.05				
21	20-Aug-18	0.005	71.5	0.05				
22	17-Oct-18	0.005	64.5	0.05				
23	23-Jan-19	0.005	68.4	0.05				
24	21-May-19	0.0079	59	0.05				
25	15-Jul-19	0.005	61.1	0.091				
26	5-Nov-19	0.005	76.4	0.05				
27	27-Jan-20	0.005	65.5	0.05				
28	13-May-20	0.0913	60.3	0.05				
29	27-Aug-20	0.005	66.7	0.05				
30	17-Sep-20	0.039	71.4	0.05				
31	25-Nov-20	0.005	76.4	0.05				
32	19-Mar-21	0.0851	68.2	0.05				
33	31-May-21	0.115	63.1	0.05				
34	8-Sep-21	0.017	64.8	0.05				
35	21-Nov-21	0.0401	68.3	0.05				
36								
37								
38								
39								
40								
Coefficient of Variation:		1.65	0.12	1.34				
Mann-Kendall Statistic (S):		156	284	-234				
Confidence Factor:		98.7%	>99.9%	>99.9%				
Concentration Trend:		Increasing	Increasing	Decreasing				



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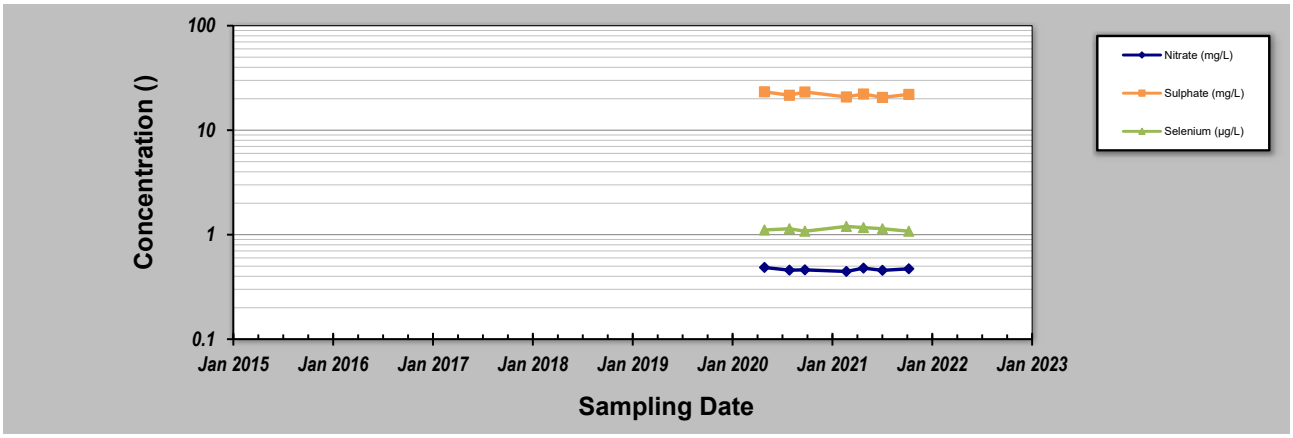
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	26-Jan-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	RG_DW-03-10
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	RG_DW-03-10 CONCENTRATION						
1	11-May-20	0.486	23.3	1.11				
2	11-Aug-20	0.458	21.6	1.14				
3	7-Oct-20	0.461	23.2	1.08				
4	9-Mar-21	0.445	20.8	1.2				
5	11-May-21	0.479	22.2	1.17				
6	20-Jul-21	0.456	20.6	1.14				
7	25-Oct-21	0.472	22	1.08				
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.03	0.05	0.04				
Mann-Kendall Statistic (S):		-3	-9	-1				
Confidence Factor:		61.4%	88.1%	50.0%				
Concentration Trend:		Stable	Stable	Stable				



Notes:

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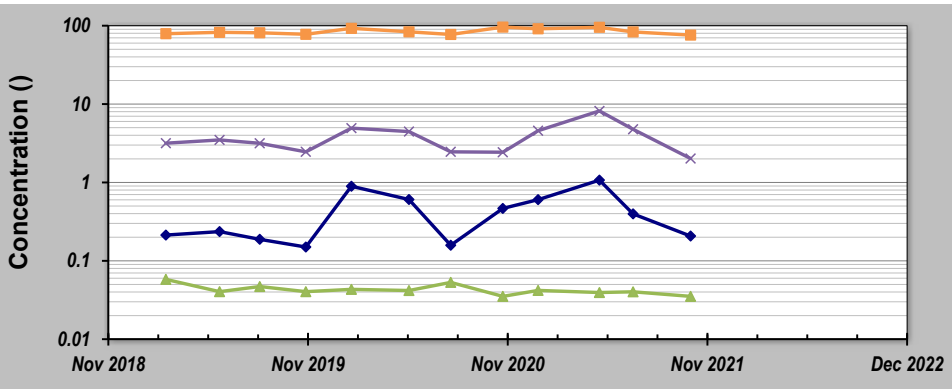
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_AQ1
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MW_AQ1 CONCENTRATION						
1	6-Mar-19	0.213	79.1	0.058	3.17			
2	13-Jun-19	0.236	82.3	0.0404	3.49			
3	26-Aug-19	0.188	81.2	0.047	3.16			
4	19-Nov-19	0.15	77.7	0.0404	2.46			
5	11-Feb-20	0.894	92.5	0.0432	4.93			
6	27-May-20	0.606	83.6	0.0418	4.46			
7	12-Aug-20	0.158	77.3	0.0531	2.46			
8	16-Nov-20	0.466	96	0.0352	2.43			
9	20-Jan-21	0.603	91.3	0.0419	4.57			
10	13-May-21	1.07	95.4	0.0394	8.17			
11	14-Jul-21	0.397	83.3	0.0402	4.77			
12	28-Oct-21	0.207	75.9	0.0352	2.02			
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.71	0.09	0.16	0.44			
Mann-Kendall Statistic (S):		10	6	-30	1			
Confidence Factor:		72.7%	63.1%	97.8%	50.0%			
Concentration Trend:		No Trend	No Trend	Decreasing	No Trend			



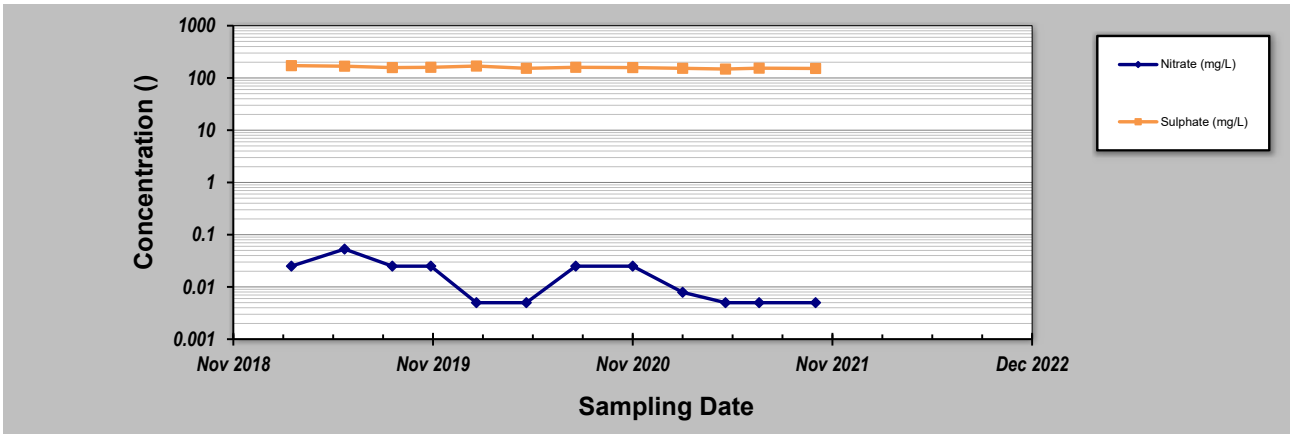
Notes:

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:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_AQ2
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)					
Sampling Event	Sampling Date	EV_MW_AQ2 CONCENTRATION						
1	7-Mar-19	0.025	172					
2	13-Jun-19	0.053	168					
3	9-Sep-19	0.025	158					
4	19-Nov-19	0.025	160					
5	11-Feb-20	0.005	169					
6	13-May-20	0.005	153					
7	12-Aug-20	0.025	160					
8	25-Nov-20	0.025	158					
9	25-Feb-21	0.0079	153					
10	15-May-21	0.005	148					
11	16-Jul-21	0.005	154					
12	28-Oct-21	0.005	152					
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.84	0.05					
Mann-Kendall Statistic (S):		-32	-41					
Confidence Factor:		98.4%	99.8%					
Concentration Trend:		Decreasing	Decreasing					



Notes:

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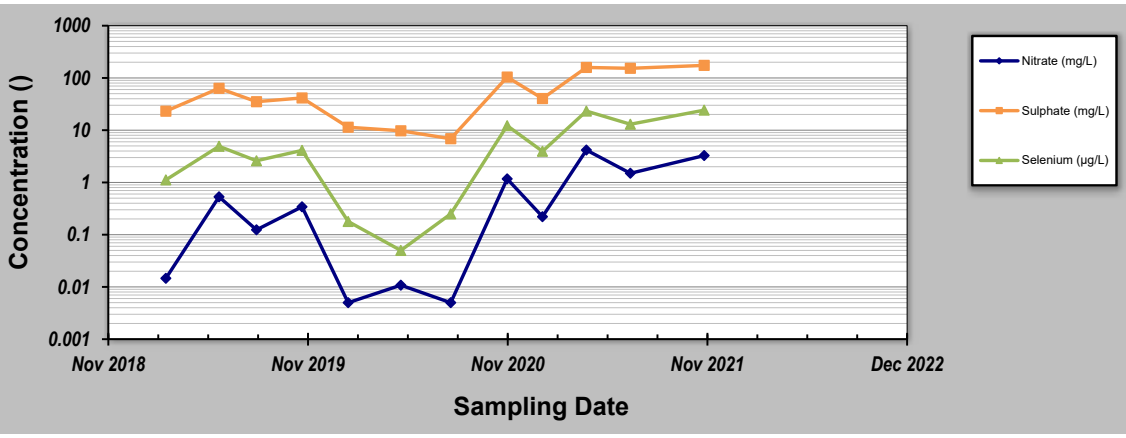
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_MC3
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	EV_MW_MC3 CONCENTRATION						
1	6-Mar-19	0.0146	23.1	1.12				
2	12-Jun-19	0.531	63.3	4.92				
3	20-Aug-19	0.124	35.1	2.6				
4	12-Nov-19	0.342	41.4	4.11				
5	5-Feb-20	0.005	11.4	0.179				
6	12-May-20	0.0108	9.75	0.05				
7	12-Aug-20	0.005	6.87	0.25				
8	24-Nov-20	1.17	104	12.2				
9	28-Jan-21	0.221	40.4	3.95				
10	19-Apr-21	4.17	159	23.2				
11	9-Jul-21	1.5	153	13				
12	22-Nov-21	3.27	174	24.2				
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		1.47	0.91	1.16				
Mann-Kendall Statistic (S):		25	24	28				
Confidence Factor:		95.0%	94.2%	96.9%				
Concentration Trend:		Prob. Increasing	Prob. Increasing	Increasing				



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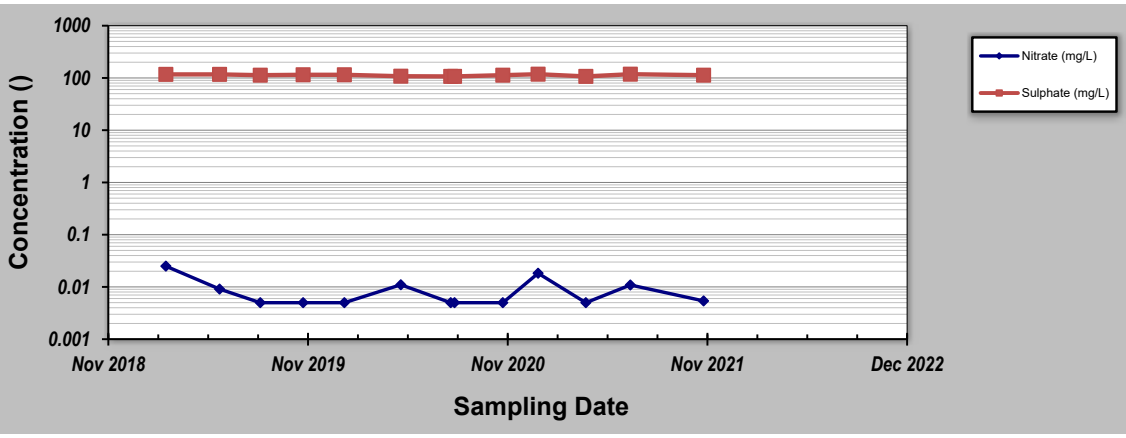
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_MC4
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)					

Sampling Event	Sampling Date	EV_MW_MC4 CONCENTRATION						
1	6-Mar-19	0.025	117					
2	13-Jun-19	0.0091	117					
3	27-Aug-19	0.005	113					
4	14-Nov-19	0.005	115					
5	29-Jan-20	0.005	115					
6	12-May-20	0.011	108					
7	12-Aug-20	0.005	107					
8	19-Aug-20	0.005	107					
9	16-Nov-20	0.005	113					
10	20-Jan-21	0.0183	118					
11	18-Apr-21	0.005	107					
12	9-Jul-21	0.0109	118					
13	21-Nov-21	0.0054	113					
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.71	0.04					
Mann-Kendall Statistic (S):		-3	-13					
Confidence Factor:		54.8%	76.4%					
Concentration Trend:		Stable	Stable					



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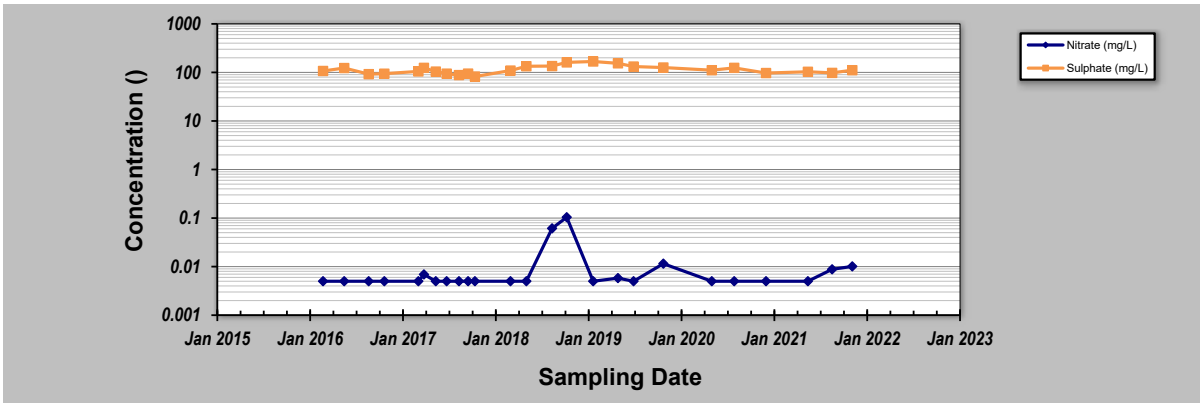
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MCgwS
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)					
Sampling Event	Sampling Date	EV_MCGWS CONCENTRATION					
1	24-Feb-16	0.005	107				
2	18-May-16	0.005	123				
3	23-Aug-16	0.005	92.2				
4	24-Oct-16	0.005	94.1				
5	8-Mar-17	0.005	105				
6	30-Mar-17	0.0069	124				
7	16-May-17	0.005	104				
8	28-Jun-17	0.005	94.2				
9	16-Aug-17	0.005	88.1				
10	21-Sep-17	0.005	94.4				
11	18-Oct-17	0.005	82.3				
12	8-Mar-18	0.005	109				
13	10-May-18	0.005	134				
14	20-Aug-18	0.0613	135				
15	17-Oct-18	0.104	161				
16	30-Jan-19	0.005	168				
17	8-May-19	0.0058	154				
18	9-Jul-19	0.005	132				
19	4-Nov-19	0.0115	126				
20	14-May-20	0.005	111				
21	11-Aug-20	0.005	124				
22	15-Dec-20	0.005	97				
23	30-May-21	0.005	103				
24	3-Sep-21	0.0088	97.8				
25	22-Nov-21	0.0101	111				
26							
27							
28							
29							
30							
Coefficient of Variation:		1.86	0.20				
Mann-Kendall Statistic (S):		57	48				
Confidence Factor:		90.3%	86.2%				
Concentration Trend:		Prob. Increasing	No Trend				



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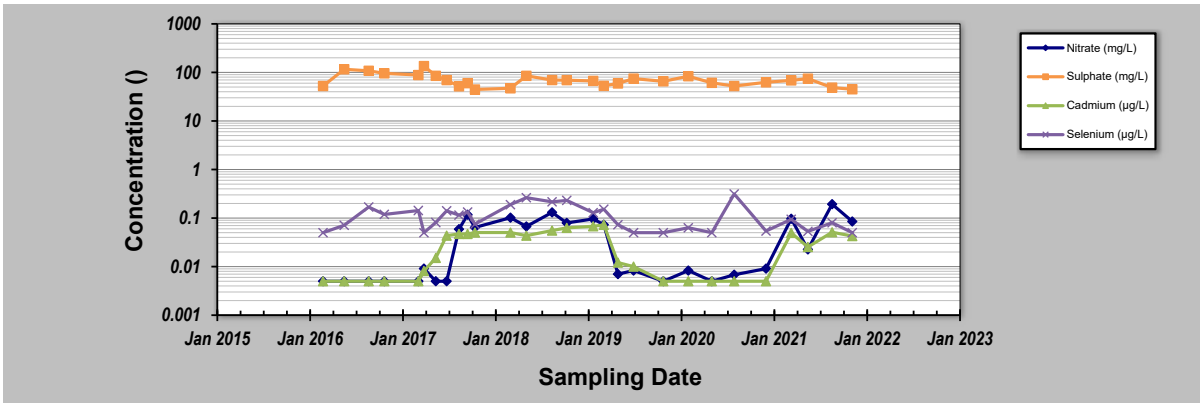
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MCgwD
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MCGWD CONCENTRATION						
1	24-Feb-16	0.005	52.5	0.005	0.05			
2	18-May-16	0.005	116	0.005	0.071			
3	23-Aug-16	0.005	108	0.005	0.169			
4	24-Oct-16	0.005	95.8	0.005	0.119			
5	8-Mar-17	0.005	88.3	0.005	0.143			
6	30-Mar-17	0.0091	135	0.0081	0.05			
7	16-May-17	0.005	85.1	0.0151	0.081			
8	28-Jun-17	0.005	69.4	0.0434	0.141			
9	16-Aug-17	0.059	51.7	0.047	0.115			
10	19-Sep-17	0.117	60.1	0.047	0.133			
11	18-Oct-17	0.0639	44.5	0.0503	0.075			
12	8-Mar-18	0.102	47.1	0.0503	0.189			
13	10-May-18	0.0671	85.1	0.0434	0.263			
14	20-Aug-18	0.131	69.6	0.0552	0.216			
15	17-Oct-18	0.0794	69.3	0.0627	0.231			
16	30-Jan-19	0.0959	66.8	0.0677	0.129			
17	13-Mar-19	0.073	52.9	0.0724	0.152			
18	8-May-19	0.007	59.2	0.0121	0.073			
19	9-Jul-19	0.0083	74.6	0.01	0.05			
20	4-Nov-19	0.005	65.6	0.005	0.05			
21	11-Feb-20	0.0083	83.5	0.005	0.063			
22	14-May-20	0.005	61	0.005	0.05			
23	11-Aug-20	0.0068	52.4	0.005	0.313			
24	15-Dec-20	0.0091	62.6	0.005	0.054			
25	25-Mar-21	0.0967	68.6	0.0494	0.094			
26	30-May-21	0.0226	74.4	0.0253	0.053			
27	3-Sep-21	0.193	48.6	0.051	0.08			
28	22-Nov-21	0.085	45	0.0425	0.05			
29								
30								
Coefficient of Variation:		1.12	0.31	0.83	0.62			
Mann-Kendall Statistic (S):		114	-125	70	-51			
Confidence Factor:		98.8%	99.4%	91.3%	83.7%			
Concentration Trend:		Increasing	Decreasing	Prob. Increasing	Stable			



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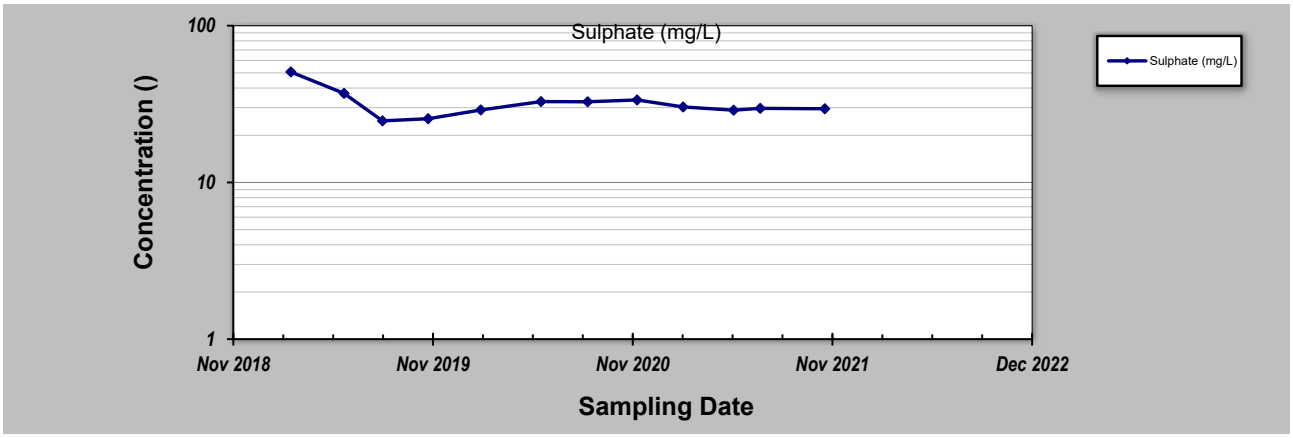
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_SPR1A
Conducted By:	KC		
Parameter (units)	Sulphate (mg/L)		

Sampling Event	Sampling Date	EV_MW_SPR1A CONCENTRATION
1	6-Mar-19	50.7
2	12-Jun-19	37
3	22-Aug-19	24.7
4	14-Nov-19	25.5
5	19-Feb-20	29
6	9-Jun-20	32.8
7	3-Sep-20	32.7
8	3-Dec-20	33.6
9	26-Feb-21	30.3
10	30-May-21	28.9
11	18-Jul-21	29.7
12	14-Nov-21	29.5
13		
14		
15		
16		
17		
18		
19		
20		
Coefficient of Variation:		0.21
Mann-Kendall Statistic (S):		-12
Confidence Factor:		77.0%
Concentration Trend:		Stable



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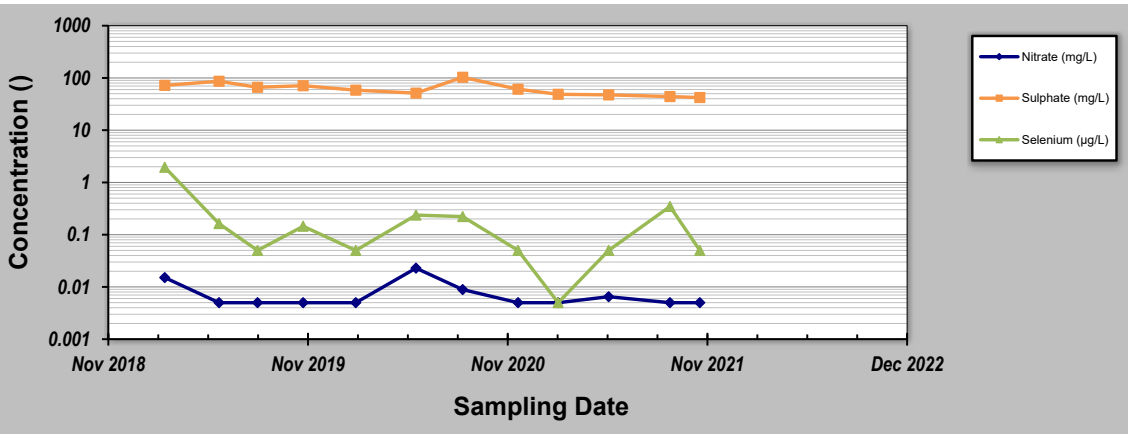
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_SPR1B
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	EV_MW_SPR1B CONCENTRATION						
1	4-Mar-19	0.0151	72.1	1.95				
2	12-Jun-19	0.005	86.5	0.163				
3	22-Aug-19	0.005	66.3	0.05				
4	14-Nov-19	0.005	71.1	0.145				
5	19-Feb-20	0.005	58.4	0.05				
6	9-Jun-20	0.0229	51.2	0.237				
7	3-Sep-20	0.0089	103	0.222				
8	14-Dec-20	0.005	60.9	0.05				
9	26-Feb-21	0.005	48.7	0.005				
10	30-May-21	0.0065	47.4	0.05				
11	20-Sep-21	0.005	44	0.347				
12	14-Nov-21	0.005	42.2	0.05				
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.72	0.29	1.94				
Mann-Kendall Statistic (S):		-8	-46	-16				
Confidence Factor:		68.1%	100.0%	84.5%				
Concentration Trend:		Stable	Decreasing	No Trend				



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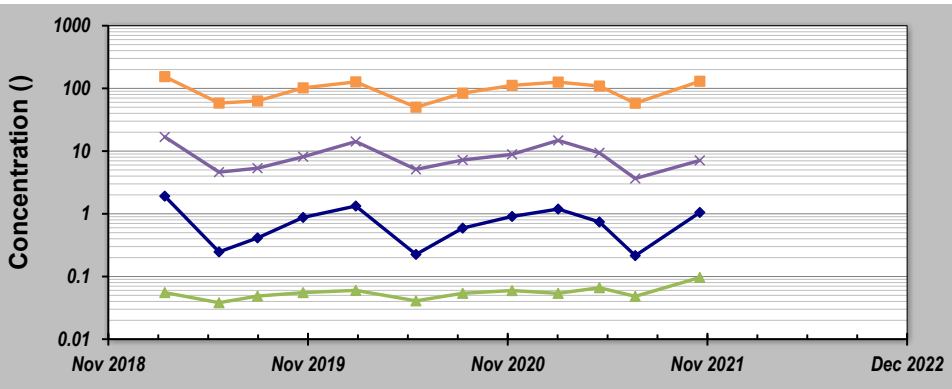
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_SPR1C
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MW_SPR1C CONCENTRATION						
1	4-Mar-19	1.91	154	0.0554	16.8			
2	12-Jun-19	0.247	58.3	0.0382	4.62			
3	22-Aug-19	0.412	63	0.0487	5.34			
4	14-Nov-19	0.876	102	0.0553	8.12			
5	19-Feb-20	1.33	127	0.0601	14.2			
6	9-Jun-20	0.225	50.1	0.0409	5.11			
7	3-Sep-20	0.591	83.8	0.0539	7.2			
8	3-Dec-20	0.907	112	0.0596	8.89			
9	26-Feb-21	1.19	126	0.0538	14.8			
10	13-May-21	0.741	109	0.0662	9.39			
11	18-Jul-21	0.215	58	0.0482	3.65			
12	14-Nov-21	1.05	130	0.0966	7.1			
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.64	0.35	0.26	0.49			
Mann-Kendall Statistic (S):		-2	6	18	-2			
Confidence Factor:		52.7%	63.1%	87.5%	52.7%			
Concentration Trend:		Stable	No Trend	No Trend	Stable			



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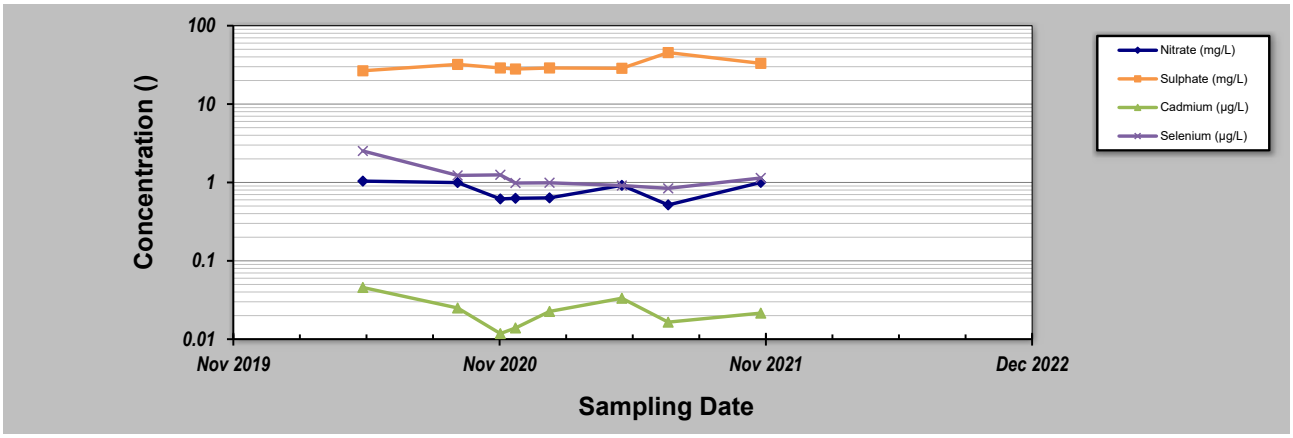
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_MCgwA
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MW_MCGWA CONCENTRATION						
1	20-May-20	1.04	26.6	0.0457	2.52			
2	28-Sep-20	0.996	32.1	0.025	1.23			
3	26-Nov-20	0.616	28.9	0.0118	1.25			
4	17-Dec-20	0.627	28	0.0139	0.984			
5	2-Feb-21	0.635	28.9	0.0226	0.99			
6	13-May-21	0.918	28.6	0.0333	0.913			
7	16-Jul-21	0.517	45.4	0.0165	0.84			
8	21-Nov-21	1	33.1	0.0215	1.14			
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.27	0.19	0.47	0.44			
Mann-Kendall Statistic (S):		-4	11	-4	-16			
Confidence Factor:		64.0%	88.7%	64.0%	96.9%			
Concentration Trend:		Stable	No Trend	Stable	Decreasing			



Notes:

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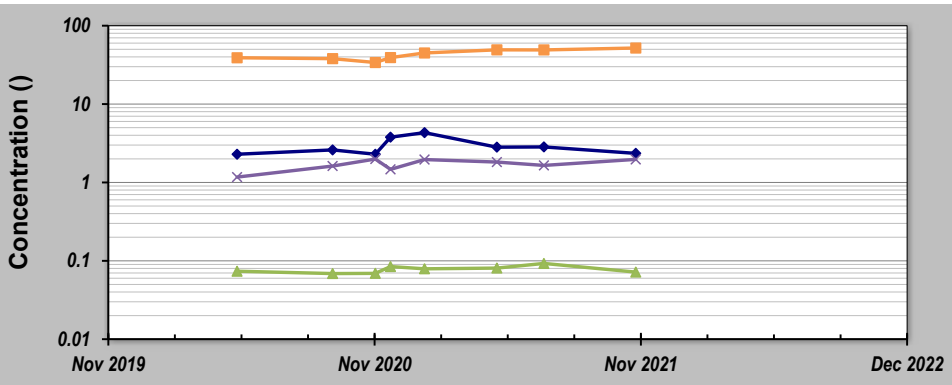
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_MCgwB
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MW_MCGWB CONCENTRATION						
1	19-May-20	2.29	39	0.0737	1.17			
2	28-Sep-20	2.6	38	0.0688	1.62			
3	26-Nov-20	2.29	33.9	0.0692	1.99			
4	17-Dec-20	3.78	39.2	0.0845	1.47			
5	2-Feb-21	4.32	44.9	0.0791	1.96			
6	13-May-21	2.82	49.2	0.0808	1.82			
7	17-Jul-21	2.84	49.1	0.0926	1.65			
8	21-Nov-21	2.35	51.9	0.0718	1.97			
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.26	0.15	0.11	0.17			
Mann-Kendall Statistic (S):		7	20	10	10			
Confidence Factor:		76.4%	99.3%	86.2%	86.2%			
Concentration Trend:		No Trend	Increasing	No Trend	No Trend			



Notes:

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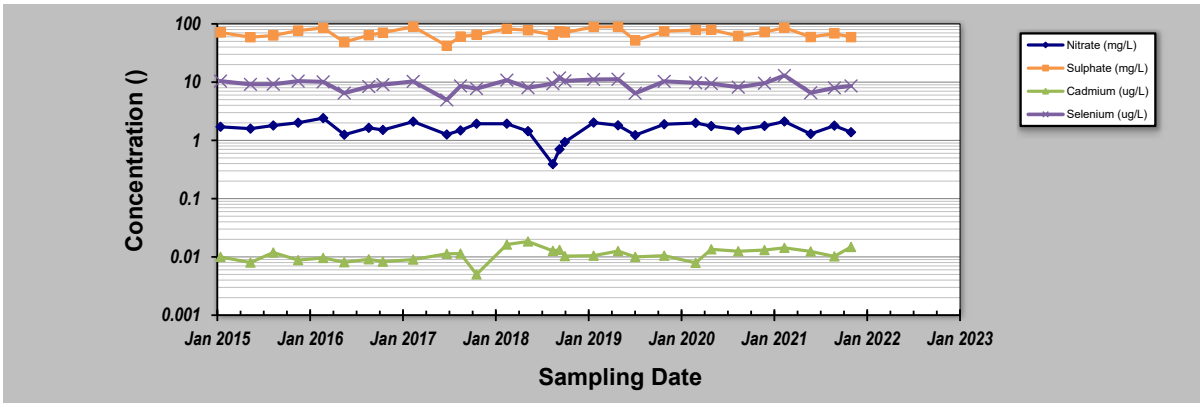
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_ER1gwS
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (ug/L)	Selenium (ug/L)			
Sampling Event	Sampling Date	EV_ER1GWS CONCENTRATION						
1	13-Jan-15	1.71	71.3	0.01	10.4			
2	12-May-15	1.59	59	0.008	9.16			
3	11-Aug-15	1.8	63.3	0.0119	9.22			
4	17-Nov-15	2.01	76.8	0.0088	10.4			
5	24-Feb-16	2.41	85.2	0.0096	10.1			
6	18-May-16	1.25	48.7	0.0081	6.49			
7	23-Aug-16	1.64	63.9	0.0091	8.39			
8	18-Oct-16	1.51	70.6	0.0083	9.04			
9	15-Feb-17	2.1	89.5	0.009	10.3			
10	28-Jun-17	1.26	42.1	0.0113	4.95			
11	22-Aug-17	1.48	60.6	0.0114	8.59			
12	24-Oct-17	1.93	65	0.005	7.74			
13	21-Feb-18	1.93	82.2	0.0163	10.8			
14	16-May-18	1.44	77.7	0.0184	8.02			
15	23-Aug-18	0.391	64.8	0.0127	9.4			
16	18-Sep-18	0.704	74.5	0.0132	11.8			
17	9-Oct-18	0.937	71.2	0.0103	10.5			
18	31-Jan-19	2.02	88.7	0.0105	11.1			
19	8-May-19	1.81	89.2	0.0126	11.2			
20	15-Jul-19	1.23	51.9	0.01	6.43			
21	7-Nov-19	1.89	74.9	0.0105	10.3			
22	11-Mar-20	1.99	78.7	0.0079	9.74			
23	12-May-20	1.76	79.3	0.0135	9.43			
24	27-Aug-20	1.52	62.2	0.0125	8.19			
25	9-Dec-20	1.77	72.4	0.0131	9.56			
26	26-Feb-21	2.11	86	0.0143	13			
27	10-Jun-21	1.29	59.4	0.0124	6.56			
28	12-Sep-21	1.79	68.7	0.0102	7.97			
29	17-Nov-21	1.38	59.2	0.0148	8.6			
30								
Coefficient of Variation:		0.27	0.18	0.25	0.19			
Mann-Kendall Statistic (S):		-21	28	134	-2			
Confidence Factor:		64.5%	69.2%	99.4%	50.7%			
Concentration Trend:		Stable	No Trend	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.*
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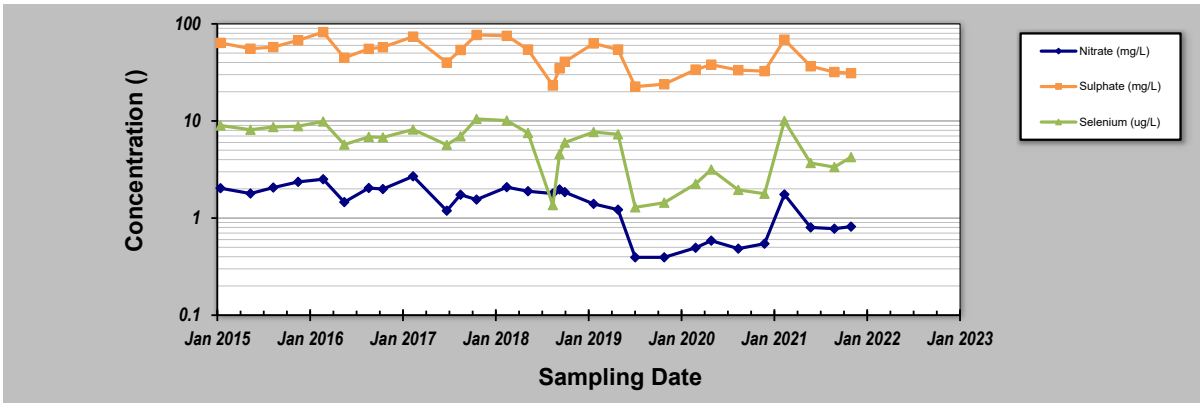
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_ER1gwD
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (ug/L)				
Sampling Event	Sampling Date	EV_ER1GWD CONCENTRATION						
1	13-Jan-15	2.03	63.7	8.98				
2	12-May-15	1.79	55.5	8.12				
3	11-Aug-15	2.06	57.6	8.66				
4	17-Nov-15	2.36	67.7	8.84				
5	24-Feb-16	2.51	82.2	9.88				
6	18-May-16	1.46	44.7	5.71				
7	23-Aug-16	2.04	55.3	6.86				
8	18-Oct-16	1.99	57.5	6.77				
9	15-Feb-17	2.69	73.8	8.16				
10	28-Jun-17	1.19	40	5.67				
11	22-Aug-17	1.74	53.8	6.95				
12	24-Oct-17	1.55	76.9	10.5				
13	21-Feb-18	2.08	75.3	10.1				
14	16-May-18	1.89	54.4	7.52				
15	23-Aug-18	1.79	23.2	1.36				
16	18-Sep-18	1.97	34.8	4.56				
17	9-Oct-18	1.85	40.7	5.99				
18	31-Jan-19	1.4	62.9	7.69				
19	8-May-19	1.22	54.4	7.28				
20	15-Jul-19	0.394	22.6	1.29				
21	7-Nov-19	0.394	23.9	1.44				
22	11-Mar-20	0.494	33.8	2.25				
23	12-May-20	0.585	38	3.16				
24	27-Aug-20	0.484	33.4	1.95				
25	9-Dec-20	0.544	32.6	1.78				
26	26-Feb-21	1.75	68.7	10				
27	10-Jun-21	0.8	36.6	3.69				
28	12-Sep-21	0.777	31.9	3.35				
29	17-Nov-21	0.816	31.1	4.24				
30								
Coefficient of Variation:		0.47	0.36	0.50				
Mann-Kendall Statistic (S):		-200	-175	-152				
Confidence Factor:		>99.9%	>99.9%	99.8%				
Concentration Trend:		Decreasing	Decreasing	Decreasing				



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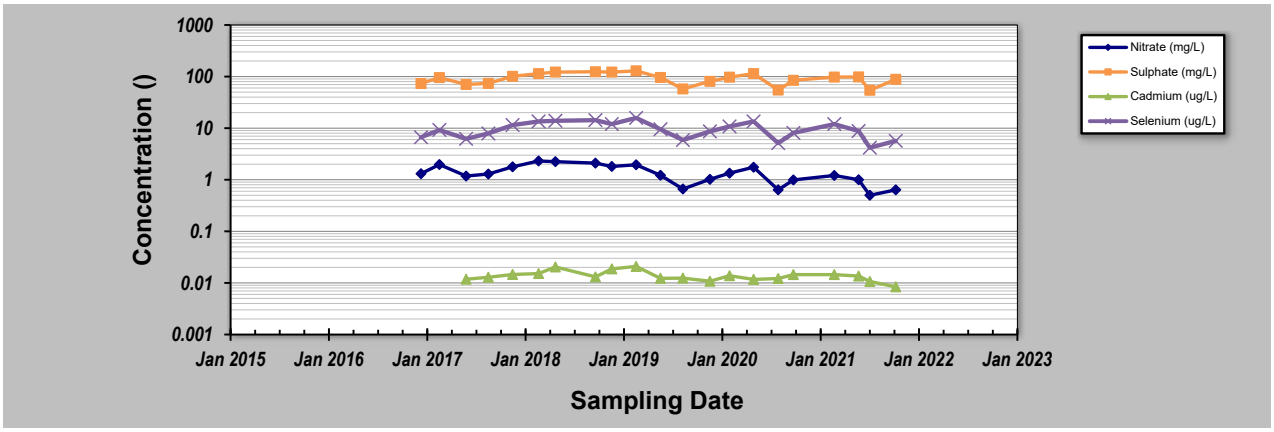
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	07-Feb-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	RG_DW-03-04
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (ug/L)	Selenium (ug/L)			
Sampling Event	Sampling Date	RG_DW-03-04 CONCENTRATION						
1	13-Dec-16	1.31	73.2		6.65			
2	20-Feb-17	1.97	95.5		9.21			
3	31-May-17	1.18	70.3	0.0118	6.21			
4	22-Aug-17	1.29	73.7	0.0129	7.9			
5	21-Nov-17	1.78	101	0.0146	11.5			
6	26-Feb-18	2.31	114	0.0152	13.5			
7	30-Apr-18	2.24	122	0.0204	13.9			
8	27-Sep-18	2.1	124	0.0131	14.3			
9	27-Nov-18	1.81	122	0.0187	12			
10	26-Feb-19	1.95	129	0.0209	15.8			
11	28-May-19	1.22	95.9	0.0123	9.5			
12	20-Aug-19	0.662	57.5	0.0124	5.88			
13	29-Nov-19	1.02	80.8	0.0108	8.64			
14	11-Feb-20	1.34	97.2	0.0138	10.8			
15	11-May-20	1.75	114	0.0117	13.5			
16	11-Aug-20	0.637	54.8	0.0122	5.13			
17	7-Oct-20	0.992	84.5	0.0145	8.08			
18	9-Mar-21	1.21	97.8	0.0145	12			
19	8-Jun-21	1	98.3	0.0136	8.79			
20	20-Jul-21	0.5	54.2	0.0107	4.18			
21	25-Oct-21	0.637	88.4	0.0084	5.67			
22								
23								
24								
25								
Coefficient of Variation:		0.40	0.25	0.23	0.35			
Mann-Kendall Statistic (S):		-99	-10	-44	-30			
Confidence Factor:		99.9%	60.6%	93.3%	80.7%			
Concentration Trend:		Decreasing	Stable	Prob. Decreasing	Stable			



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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_GT1A
Conducted By:	MBS		

Parameter (units)	Sulphate (mg/L)	Selenium (µg/L)					
Sampling Event	Sampling Date	EV_MW_GT1A CONCENTRATION						
1	5-Mar-19	107	0.418					
2	11-Jun-19	104	0.05					
3	26-Aug-19	115	0.05					
4	13-Nov-19	119	0.05					
5	13-Feb-20	114	0.05					
6	3-Jun-20	105	0.474					
7	1-Sep-20	109	0.106					
8	24-Nov-20	106	0.247					
9	28-Jan-21	106	0.203					
10	29-Apr-21	97.3	0.05					
11	12-Jul-21	98.6	0.051					
12	27-Oct-21	111	0.311					
13								
14								
15								
16								
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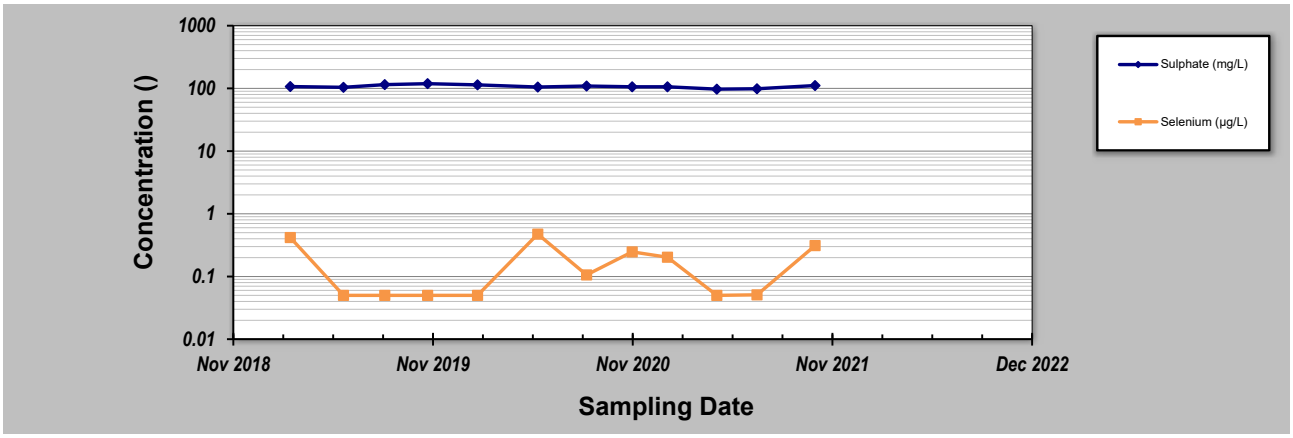
18								
19								
20								
Coefficient of Variation:		0.06	0.91					
Mann-Kendall Statistic (S):		-17	10					
Confidence Factor:		86.0%	72.7%					
Concentration Trend:		Stable	No Trend					



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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_GT1B
Conducted By:	MBS		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MW_GT1B CONCENTRATION						
1	5-Mar-19	5.07	270	0.0481	39.6			
2	11-Jun-19	4.26	254	0.0709	34.3			
3	26-Aug-19	17.4	840	0.189	161			
4	13-Nov-19	16.9	954	0.173	122			
5	13-Feb-20	27.2	889	0.121	201			
6	3-Jun-20	0.867	42.2	0.0226	6.58			
7	1-Sep-20	26.7	939	0.205	271			
8	24-Nov-20	22.3	698	0.118	202			
9	28-Jan-21	2.37	151	0.0325	22.6			
10	29-Apr-21	16	747	0.118	207			
11	12-Jul-21	22.2	722	0.14	173			
12	27-Oct-21	16.1	703	0.111	194			
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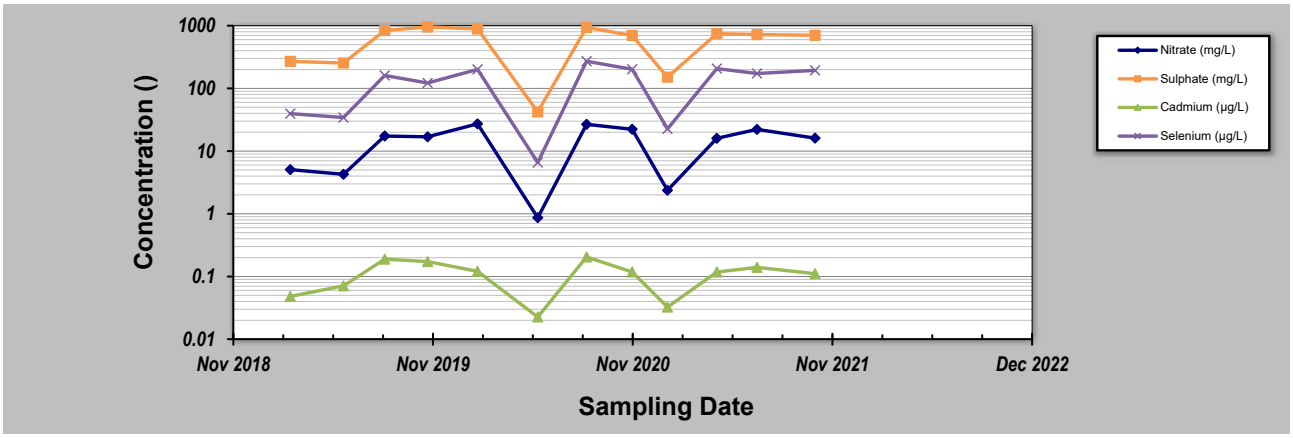
20								
Coefficient of Variation:		0.64	0.55	0.53	0.65			
Mann-Kendall Statistic (S):		4	-2	-1	18			
Confidence Factor:		58.0%	52.7%	50.0%	87.5%			
Concentration Trend:		No Trend	Stable	Stable	No Trend			



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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_BC1A
Conducted By:	MBS		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MW_BC1A CONCENTRATION						
1	5-Mar-19	15.3	753		97.5			
2	11-Jun-19	16.2	798	0.188	133			
3	20-Aug-19	17.8	882	0.183	146			
4	13-Nov-19	18.9	898	0.225	158			
5	13-Feb-20	22.7	827		166			
6	10-Jun-20	29.3	843	0.211	178			
7	31-Aug-20	25.8	899	0.168	180			
8	16-Nov-20	27.7	921	0.219	218			
9	20-Jan-21	35	1070	0.243	274			
10	19-Apr-21	32.5	940	0.2	283			
11	12-Jul-21	30.2	920	0.219	226			
12	5-Nov-21	31.4	858	0.208	196			
13								
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17								
18								
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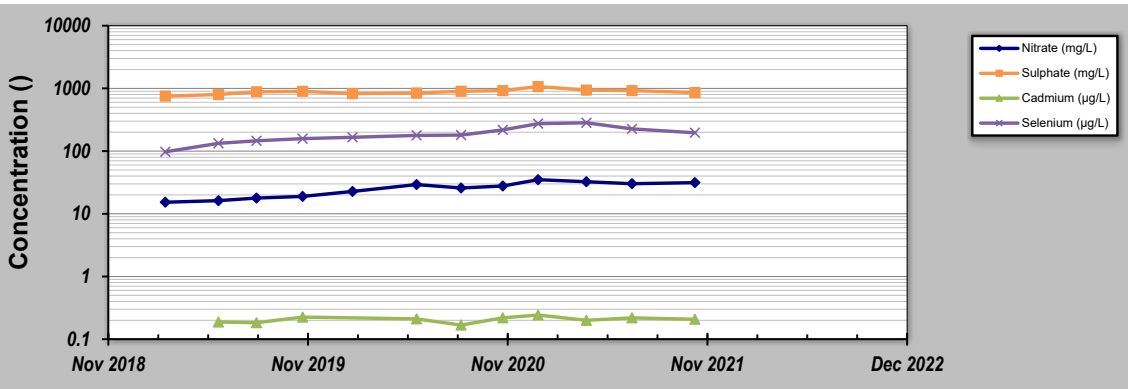
20								
Coefficient of Variation:		0.27	0.09	0.11	0.29			
Mann-Kendall Statistic (S):		52	36	8	54			
Confidence Factor:		>99.9%	99.3%	72.9%	>99.9%			
Concentration Trend:		Increasing	Increasing	No Trend	Increasing			



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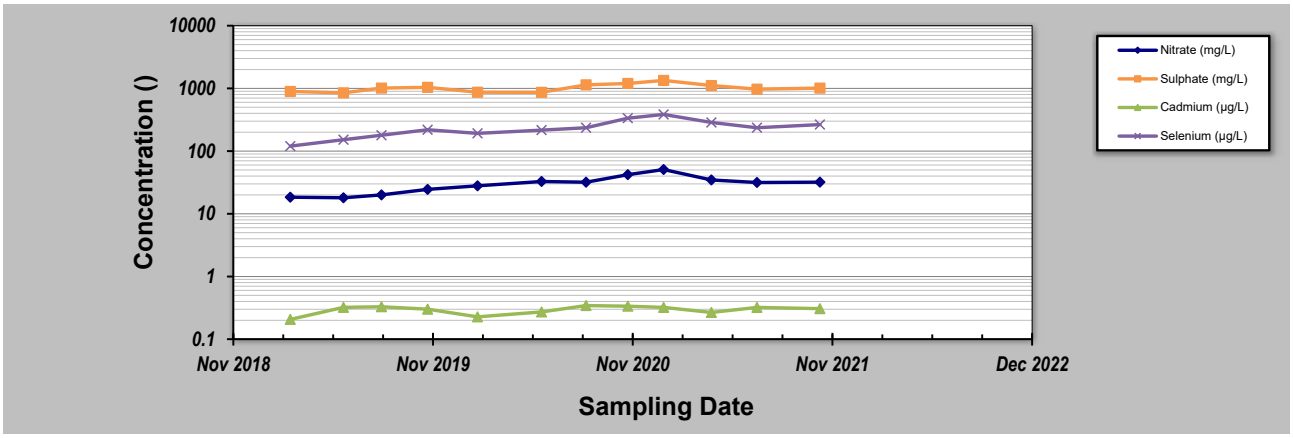
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_BC1B
Conducted By:	MBS		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MW_BC1B CONCENTRATION						
1	5-Mar-19	18.4	893	0.207	120			
2	11-Jun-19	18	849	0.322	152			
3	20-Aug-19	20	1010	0.329	179			
4	13-Nov-19	24.5	1040	0.301	219			
5	13-Feb-20	27.9	868	0.227	192			
6	10-Jun-20	32.8	865	0.272	216			
7	31-Aug-20	31.9	1140	0.344	236			
8	16-Nov-20	42.1	1200	0.336	335			
9	21-Jan-21	50.8	1340	0.321	384			
10	19-Apr-21	34.7	1110	0.267	286			
11	12-Jul-21	31.6	973	0.321	236			
12	5-Nov-21	32	1010	0.307	265			
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.32	0.15	0.15	0.32			
Mann-Kendall Statistic (S):		40	21	5	45			
Confidence Factor:		99.7%	91.3%	60.6%	100.0%			
Concentration Trend:		Increasing	Prob. Increasing	No Trend	Increasing			



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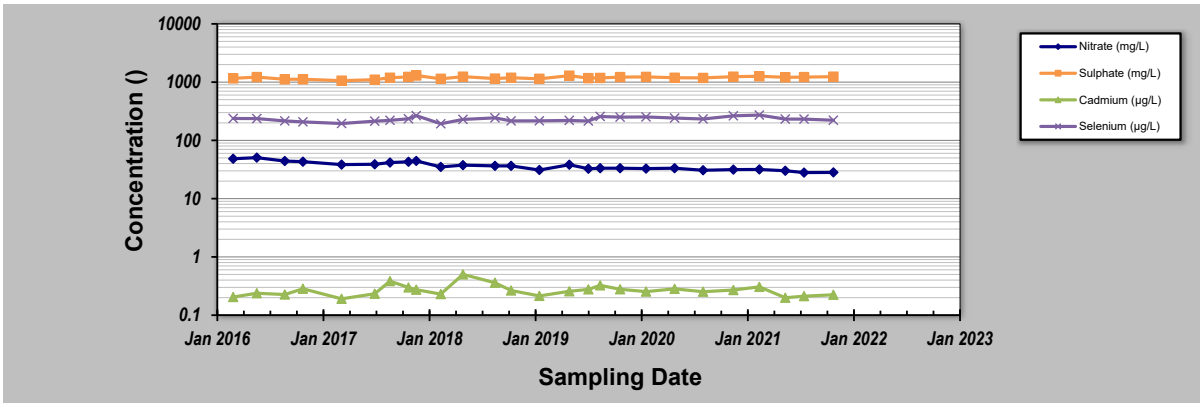
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_RCSgw
Conducted By:	MBS		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_RCSGW CONCENTRATION						
1	25-Feb-16	48.4	1160	0.205	238			
2	17-May-16	50.6	1220	0.238	237			
3	22-Aug-16	44.2	1120	0.226	216			
4	24-Oct-16	43.1	1120	0.284	208			
5	7-Mar-17	38.4	1060	0.191	195			
6	30-Jun-17	38.9	1100	0.233	214			
7	22-Aug-17	41.6	1190	0.384	221			
8	25-Oct-17	42.9	1230	0.299	235			
9	21-Nov-17	44.4	1300	0.274	266			
10	14-Feb-18	35	1140	0.23	193			
11	2-May-18	37.6	1240	0.501	229			
12	21-Aug-18	36.5	1150	0.36	244			
13	16-Oct-18	36.5	1190	0.265	216			
14	22-Jan-19	31	1140	0.214	217			
15	6-May-19	38.2	1290	0.257	220			
16	11-Jul-19	32.6	1170	0.277	215			
17	21-Aug-19	33.3	1180	0.325	257			
18	29-Oct-19	33.3	1220	0.278	251			
19	27-Jan-20	32.8	1230	0.254	253			
20	5-May-20	33.3	1190	0.283	242			
21	12-Aug-20	30.7	1180	0.253	233			
22	25-Nov-20	31.5	1240	0.27	264			
23	23-Feb-21	31.7	1260	0.306	272			
24	24-May-21	30.1	1210	0.199	232			
25	28-Jul-21	28	1220	0.212	232			
26	7-Nov-21	28.2	1240	0.224	222			
27								
28								
29								
30								
Coefficient of Variation:		0.17	0.05	0.25	0.09			
Mann-Kendall Statistic (S):		-247	114	-3	79			
Confidence Factor:		>99.9%	99.5%	51.7%	95.7%			
Concentration Trend:		Decreasing	Increasing	Stable	Increasing			



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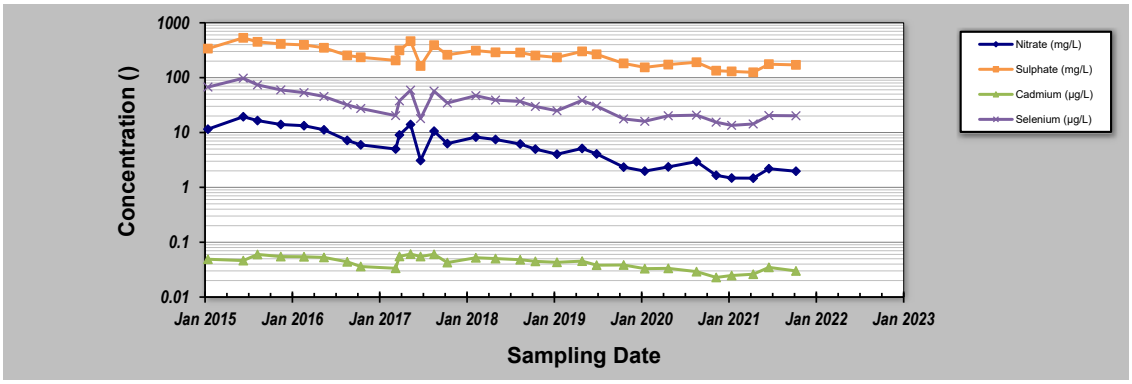
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 09-Feb-21
Facility Name: Teck Coal Regional Groundwater - EVO
Conducted By: MBS

Job ID: 671557
Location: EV_BCgw

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_BCGW CONCENTRATION						
1	13-Jan-15	11.5	338	0.049	67.3			
2	11-Jun-15	19.4	531	0.0463	97.6			
3	10-Aug-15	16.5	449	0.0599	73.8			
4	16-Nov-15	14	411	0.0548	59.7			
5	22-Feb-16	13.3	395	0.0544	53.2			
6	16-May-16	11.2	350	0.0529	45.3			
7	22-Aug-16	7.19	254	0.044	31.9			
8	18-Oct-16	5.96	235	0.0361	27.4			
9	14-Mar-17	5	206	0.0335	20.3			
10	30-Mar-17	9.04	314	0.0551	37.7			
11	16-May-17	14	462	0.0609	59			
12	27-Jun-17	3.09	163	0.0549	17.9			
13	23-Aug-17	10.6	391	0.0603	56.8			
14	18-Oct-17	6.27	261	0.0426	34.5			
15	15-Feb-18	8.25	311	0.0521	46.9			
16	9-May-18	7.46	289	0.0504	39			
17	21-Aug-18	6.17	287	0.048	36.7			
18	24-Oct-18	4.98	253	0.0448	29.8			
19	23-Jan-19	4.02	234	0.0431	24.9			
20	9-May-19	5.12	301	0.0453	38.5			
21	9-Jul-19	4.07	266	0.0382	30.2			
22	31-Oct-19	2.34	182	0.0385	17.7			
23	28-Jan-20	1.98	154	0.033	16			
24	6-May-20	2.36	173	0.0334	20.2			
25	2-Sep-20	2.95	191	0.0291	20.7			
26	24-Nov-20	1.66	134	0.0228	15.4			
27	28-Jan-21	1.48	130	0.0247	13.5			
28	29-Apr-21	1.47	125	0.0261	14.3			
29	4-Jul-21	2.19	176	0.0348	20.4			
30	26-Oct-21	1.97	171	0.03	20.2			
31								
32								
33								
34								
35								
Coefficient of Variation:		0.72	0.40	0.26	0.57			
Mann-Kendall Statistic (S):		-324	-271	-241	-270			
Confidence Factor:		>99.9%	>99.9%	>99.9%	>99.9%			
Concentration Trend:		Decreasing	Decreasing	Decreasing	Decreasing			



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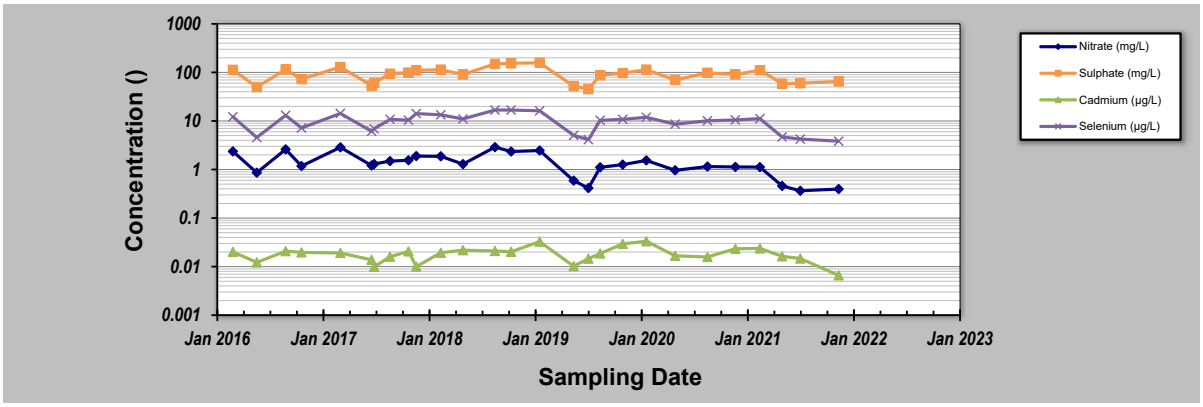
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 09-Feb-21
Facility Name: Teck Coal Regional Groundwater - EVO
Conducted By: MBS

Job ID: 671557
Location EV_WH50gw

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_WH50GW CONCENTRATION						
1	24-Feb-16	2.36	113	0.0201	12.2			
2	17-May-16	0.861	49.9	0.0122	4.56			
3	25-Aug-16	2.6	115	0.0208	13.1			
4	19-Oct-16	1.18	72.8	0.0196	7.17			
5	3-Mar-17	2.86	129	0.0191	14.3			
6	19-Jun-17	1.21	53.6	0.0138	6.12			
7	28-Jun-17	1.3	61	0.0099	6.89			
8	22-Aug-17	1.49	94.1	0.016	10.8			
9	25-Oct-17	1.55	99.4	0.0206	10.4			
10	21-Nov-17	1.89	110	0.01	14.2			
11	14-Feb-18	1.87	114	0.0193	13.4			
12	2-May-18	1.29	90.6	0.0218	11			
13	21-Aug-18	2.89	150	0.021	16.8			
14	16-Oct-18	2.35	154	0.0202	16.8			
15	23-Jan-19	2.46	158	0.0327	16.2			
16	21-May-19	0.59	52.1	0.0102	5.04			
17	11-Jul-19	0.414	45.3	0.0146	4.13			
18	21-Aug-19	1.11	87.5	0.0186	10.3			
19	7-Nov-19	1.26	96.8	0.0294	10.8			
20	28-Jan-20	1.54	114	0.0333	11.9			
21	7-May-20	0.963	69.7	0.0167	8.59			
22	27-Aug-20	1.15	98.1	0.0158	10.1			
23	2-Dec-20	1.13	90.6	0.0233	10.5			
24	25-Feb-21	1.12	111	0.0237	11.2			
25	13-May-21	0.458	58.8	0.0163	4.68			
26	15-Jul-21	0.365	60	0.0147	4.23			
27	25-Nov-21	0.396	65.1	0.0066	3.83			
28								
29								
30								
Coefficient of Variation:		0.53	0.35	0.35	0.40			
Mann-Kendall Statistic (S):		-137	-29	15	-65			
Confidence Factor:		99.8%	71.9%	61.4%	90.8%			
Concentration Trend:		Decreasing	Stable	No Trend	Prob. Decreasing			



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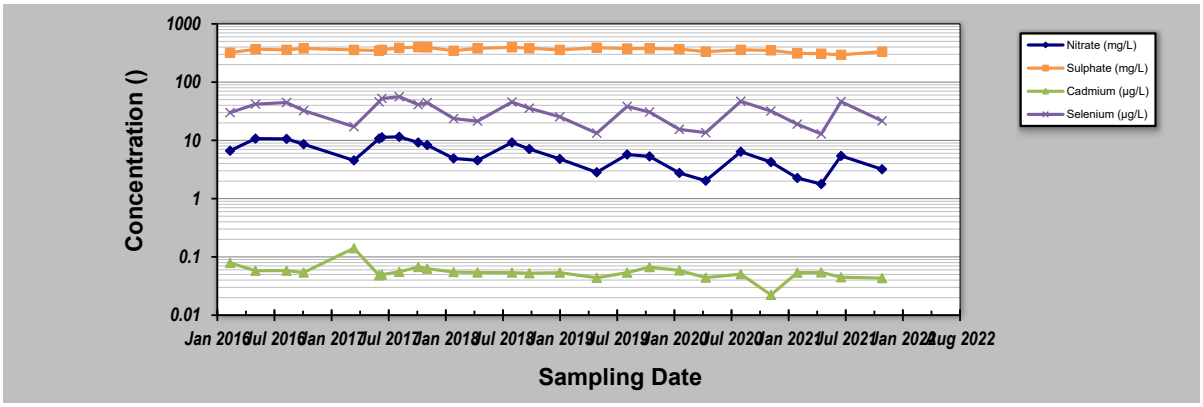
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_BRgw
Conducted By:	MBS		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_BRGW CONCENTRATION						
1	25-Feb-16	6.64	320	0.0788	30			
2	17-May-16	10.7	367	0.0579	41.9			
3	25-Aug-16	10.6	358	0.0581	44.7			
4	19-Oct-16	8.6	379	0.0539	32.5			
5	30-Mar-17	4.53	357	0.141	17.2			
6	19-Jun-17	10.7	348	0.0483	45.9			
7	28-Jun-17	11.3	358	0.0497	52.4			
8	23-Aug-17	11.5	387	0.0555	56.2			
9	23-Oct-17	9.18	399	0.0671	41.1			
10	21-Nov-17	8.31	395	0.0628	44.5			
11	14-Feb-18	4.9	346	0.055	23.7			
12	2-May-18	4.54	379	0.054	21.4			
13	21-Aug-18	9.2	396	0.0539	45.5			
14	16-Oct-18	7.1	382	0.0525	35.6			
15	22-Jan-19	4.8	357	0.0537	25.4			
16	21-May-19	2.83	389	0.0438	13.3			
17	27-Aug-19	5.72	376	0.0537	38.3			
18	7-Nov-19	5.31	378	0.0669	30.7			
19	11-Feb-20	2.76	369	0.0586	15.4			
20	6-May-20	2.03	334	0.0441	13.6			
21	27-Aug-20	6.38	358	0.0506	46.8			
22	2-Dec-20	4.24	351	0.0223	31.9			
23	25-Feb-21	2.26	311	0.0538	19			
24	13-May-21	1.78	308	0.0542	12.9			
25	16-Jul-21	5.42	294	0.0448	46.3			
26	25-Nov-21	3.19	334	0.0433	21.6			
27								
28								
29								
30								
Coefficient of Variation:		0.49	0.08	0.35	0.41			
Mann-Kendall Statistic (S):		-166	-87	-131	-77			
Confidence Factor:		>99.9%	97.1%	99.8%	95.3%			
Concentration Trend:		Decreasing	Decreasing	Decreasing	Decreasing			



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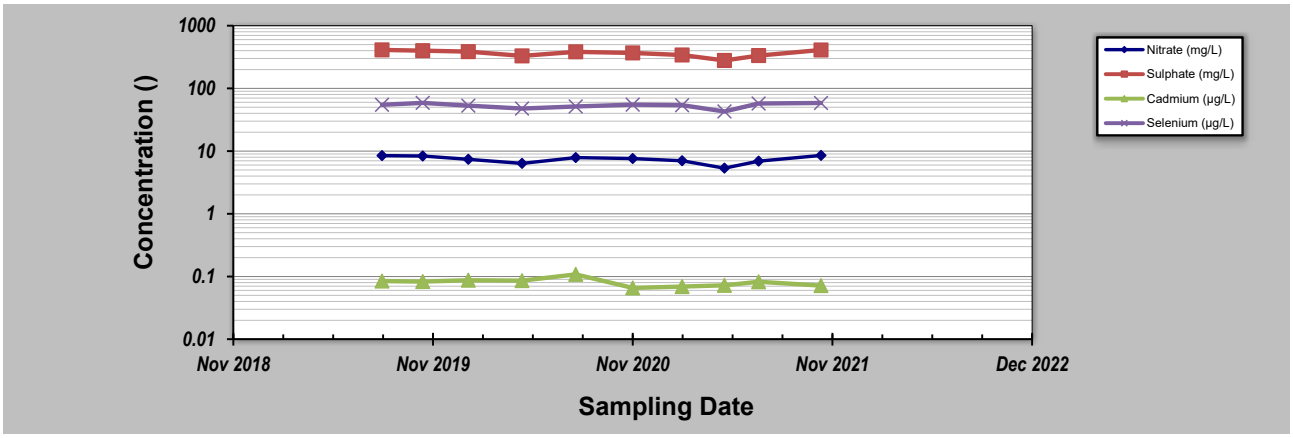
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_HW1
Conducted By:	MBS		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_HW1 CONCENTRATION						
1	21-Aug-19	8.47	411	0.0846	54.7			
2	4-Nov-19	8.35	400	0.0831	58.8			
3	27-Jan-20	7.4	386	0.0873	53			
4	5-May-20	6.37	330	0.0859	47.7			
5	12-Aug-20	7.88	383	0.108	51.5			
6	25-Nov-20	7.61	368	0.0657	55			
7	24-Feb-21	7.02	341	0.069	54			
8	13-May-21	5.35	279	0.0722	42.9			
9	15-Jul-21	6.92	334	0.0824	57.4			
10	7-Nov-21	8.53	410	0.0715	58.5			
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.14	0.12	0.15	0.09			
Mann-Kendall Statistic (S):		-13	-19	-13	3			
Confidence Factor:		85.4%	94.6%	85.4%	56.9%			
Concentration Trend:		Stable	Prob. Decreasing	Stable	No Trend			



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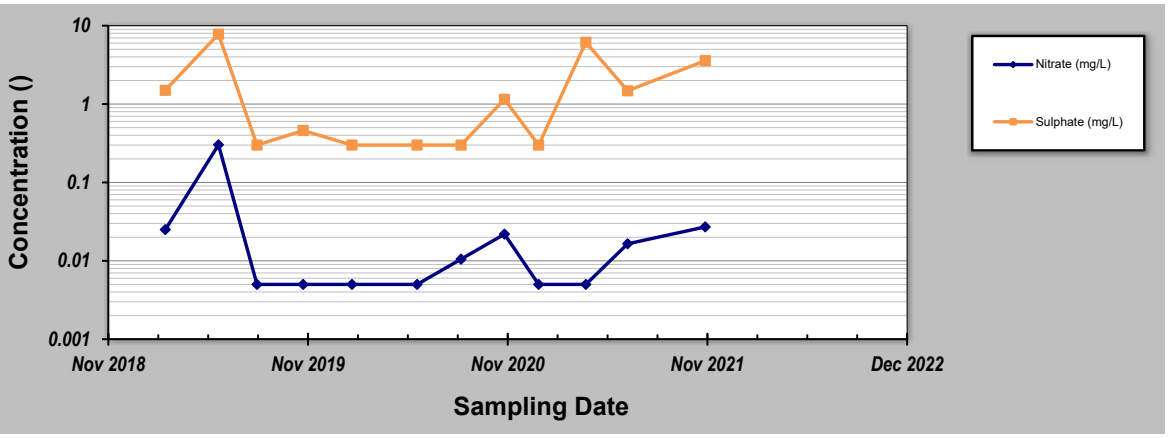
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_MC1A
Conducted By:	MBS		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)					

Sampling Event	Sampling Date	EV_MW_MC1A CONCENTRATION						
1	5-Mar-19	0.025	1.5					
2	11-Jun-19	0.302	7.8					
3	21-Aug-19	0.005	0.3					
4	14-Nov-19	0.005	0.46					
5	12-Feb-20	0.005	0.3					
6	11-Jun-20	0.005	0.3					
7	31-Aug-20	0.0105	0.3					
8	19-Nov-20	0.0219	1.15					
9	21-Jan-21	0.005	0.3					
10	18-Apr-21	0.005	6.15					
11	4-Jul-21	0.0165	1.48					
12	24-Nov-21	0.0271	3.58					
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		2.33	1.29					
Mann-Kendall Statistic (S):		3	6					
Confidence Factor:		55.4%	63.1%					
Concentration Trend:		No Trend	No Trend					



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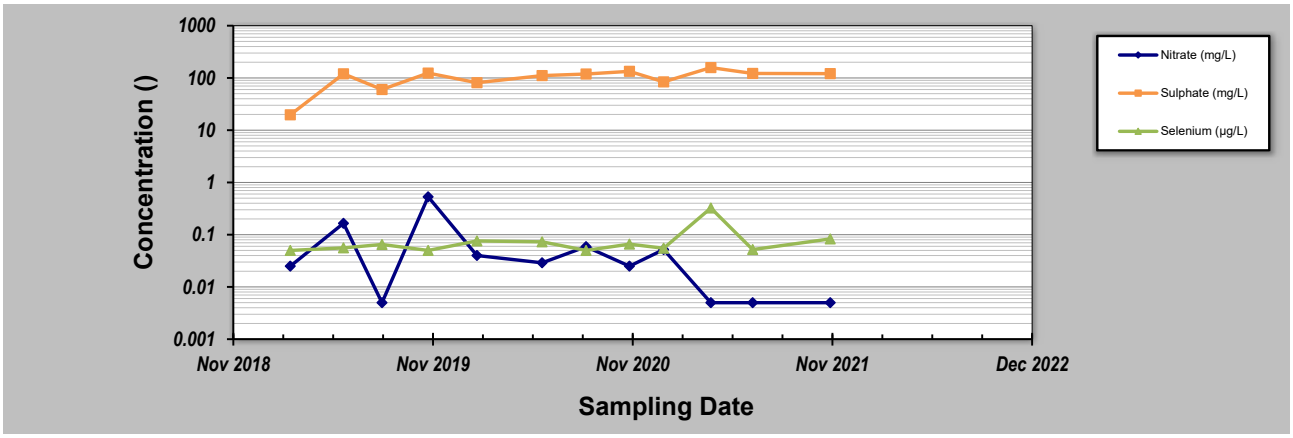
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_MC1B
Conducted By:	MBS		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	EV_MW_MC1B CONCENTRATION						
1	5-Mar-19	0.025	19.7	0.05				
2	11-Jun-19	0.165	120	0.056				
3	21-Aug-19	0.005	60.1	0.065				
4	14-Nov-19	0.531	124	0.05				
5	12-Feb-20	0.04	81.1	0.076				
6	11-Jun-20	0.029	111	0.073				
7	31-Aug-20	0.059	119	0.05				
8	19-Nov-20	0.025	134	0.066				
9	21-Jan-21	0.052	84.2	0.055				
10	18-Apr-21	0.005	158	0.324				
11	4-Jul-21	0.005	122	0.052				
12	24-Nov-21	0.005	121	0.083				
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		1.89	0.36	0.92				
Mann-Kendall Statistic (S):		-23	28	19				
Confidence Factor:		93.3%	96.9%	88.9%				
Concentration Trend:		Prob. Decreasing	Increasing	No Trend				



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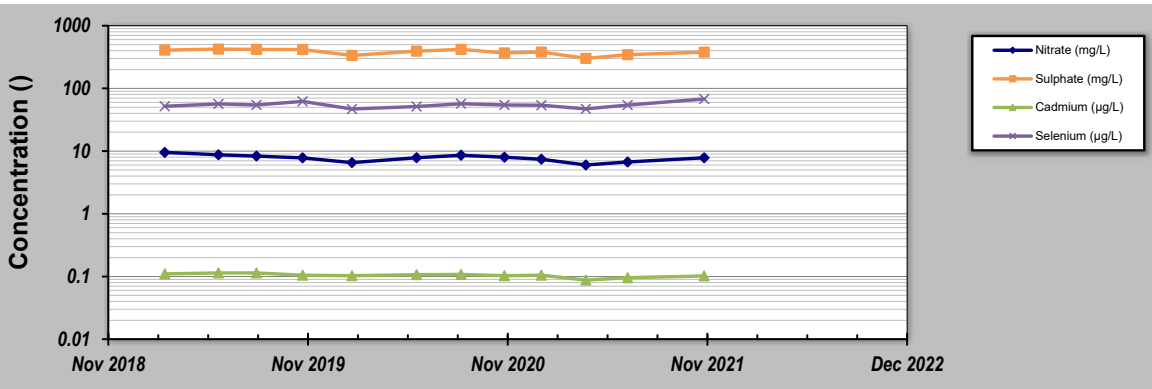
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	09-Feb-21	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_MC2B
Conducted By:	MBS		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MW_MC2B CONCENTRATION						
1	4-Mar-19	9.53	408	0.11	51.9			
2	11-Jun-19	8.74	424	0.114	56.5			
3	20-Aug-19	8.33	419	0.114	54.4			
4	13-Nov-19	7.8	417	0.105	62			
5	12-Feb-20	6.55	336	0.103	46.9			
6	10-Jun-20	7.84	393	0.107	51.4			
7	31-Aug-20	8.58	419	0.108	56.9			
8	19-Nov-20	7.99	368	0.103	54.4			
9	26-Jan-21	7.41	380	0.105	53.9			
10	18-Apr-21	6	301	0.0875	47.1			
11	4-Jul-21	6.71	345	0.0958	54.2			
12	22-Nov-21	7.82	379	0.102	67.8			
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.13	0.10	0.07	0.11			
Mann-Kendall Statistic (S):		-32	-31	-39	3			
Confidence Factor:		98.4%	98.1%	99.7%	55.4%			
Concentration Trend:		Decreasing	Decreasing	Decreasing	No Trend			



Notes:

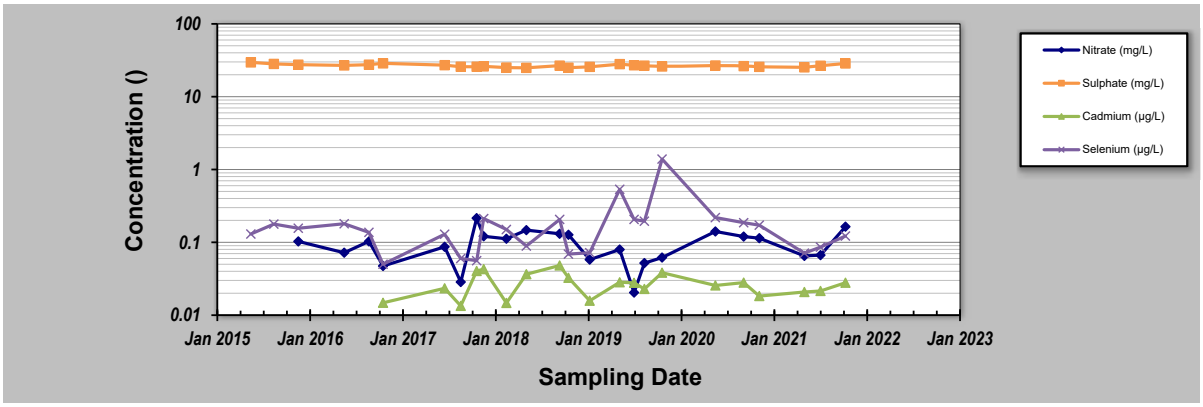
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably 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: 31-Jan-22
Facility Name: Teck Coal Regional Groundwater - EVO
Conducted By: KC

Job ID: 671557
Location EV_ECgw

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_ECGW CONCENTRATION						
1	14-May-15		29.6		0.13			
2	13-Aug-15		28.2		0.178			
3	18-Nov-15	0.103	27.5		0.156			
4	18-May-16	0.072	26.9		0.18			
5	24-Aug-16	0.103	27.5		0.137			
6	19-Oct-16	0.0473	28.7	0.0148	0.05			
7	20-Jun-17	0.0868	27.1	0.0234	0.129			
8	23-Aug-17	0.0285	25.8	0.0134	0.06			
9	25-Oct-17	0.215	25.8	0.0404	0.056			
10	22-Nov-17	0.121	26.1	0.0429	0.212			
11	20-Feb-18	0.112	25.1	0.0147	0.15			
12	10-May-18	0.147	24.9	0.0365	0.089			
13	19-Sep-18	0.131	26.7	0.0481	0.206			
14	24-Oct-18	0.127	25	0.0326	0.069			
15	16-Jan-19	0.0579	25.7	0.0158	0.072			
16	15-May-19	0.0796	28	0.0283	0.534			
17	11-Jul-19	0.0204	27	0.0278	0.206			
18	21-Aug-19	0.0519	26.7	0.0229	0.195			
19	30-Oct-19	0.0618	26	0.0383	1.39			
20	28-May-20	0.141	26.8	0.0256	0.219			
21	17-Sep-20	0.12	26.3	0.028	0.186			
22	18-Nov-20	0.114	25.7	0.0183	0.172			
23	16-May-21	0.0651	25.3	0.0208	0.071			
24	19-Jul-21	0.0667	26.6	0.0215	0.086			
25	26-Oct-21	0.164	28.6	0.0279	0.122			
26								
27								
28								
29								
30								
Coefficient of Variation:		0.48	0.05	0.37	1.31			
Mann-Kendall Statistic (S):		12	-80	-8	27			
Confidence Factor:		61.3%	96.8%	58.9%	72.6%			
Concentration Trend:		No Trend	Decreasing	Stable	No Trend			



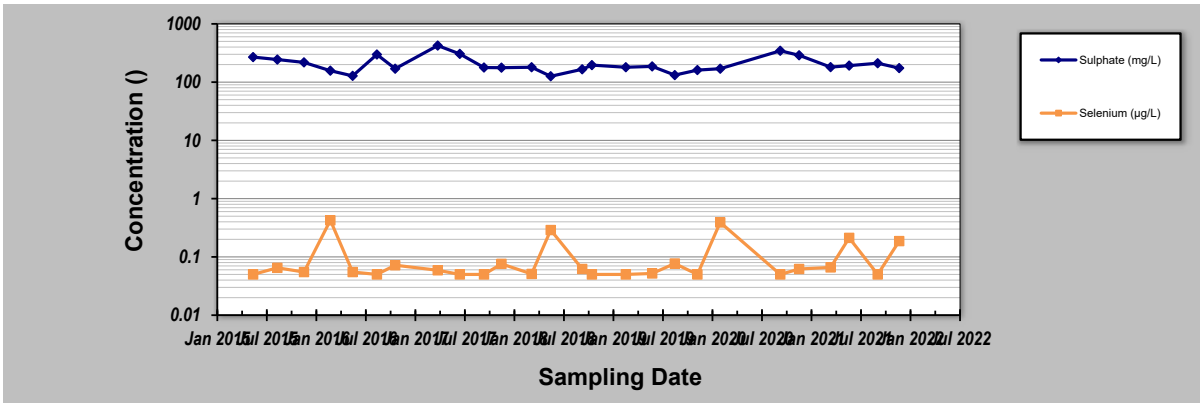
Notes:

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:	31-Jan-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_WF_SW
Conducted By:	KC		

Parameter (units)	Sulphate (mg/L)	Selenium (µg/L)					
Sampling Event	Sampling Date	EV_WF_SW CONCENTRATION					
1	14-May-15	269	0.05				
2	12-Aug-15	244	0.065				
3	19-Nov-15	218	0.055				
4	25-Feb-16	157	0.425				
5	18-May-16	128	0.055				
6	16-Aug-16	298	0.05				
7	23-Oct-16	170	0.072				
8	30-Mar-17	424	0.059				
9	20-Jun-17	305	0.05				
10	18-Sep-17	178	0.05				
11	22-Nov-17	177	0.076				
12	14-Mar-18	180	0.051				
13	24-May-18	126	0.289				
14	18-Sep-18	166	0.062				
15	24-Oct-18	196	0.05				
16	27-Feb-19	180	0.05				
17	5-Jun-19	186	0.052				
18	28-Aug-19	132	0.077				
19	20-Nov-19	161	0.05				
20	13-Feb-20	170	0.391				
21	23-Sep-20	345	0.05				
22	2-Dec-20	289	0.062				
23	29-Mar-21	181	0.066				
24	6-Jun-21	192	0.212				
25	20-Sep-21	211	0.05				
26	9-Dec-21	174	0.187				
27							
28							
29							
30							
Coefficient of Variation:		0.34	1.03				
Mann-Kendall Statistic (S):		-9	27				
Confidence Factor:		56.9%	71.5%				
Concentration Trend:		Stable	No Trend				



Notes:

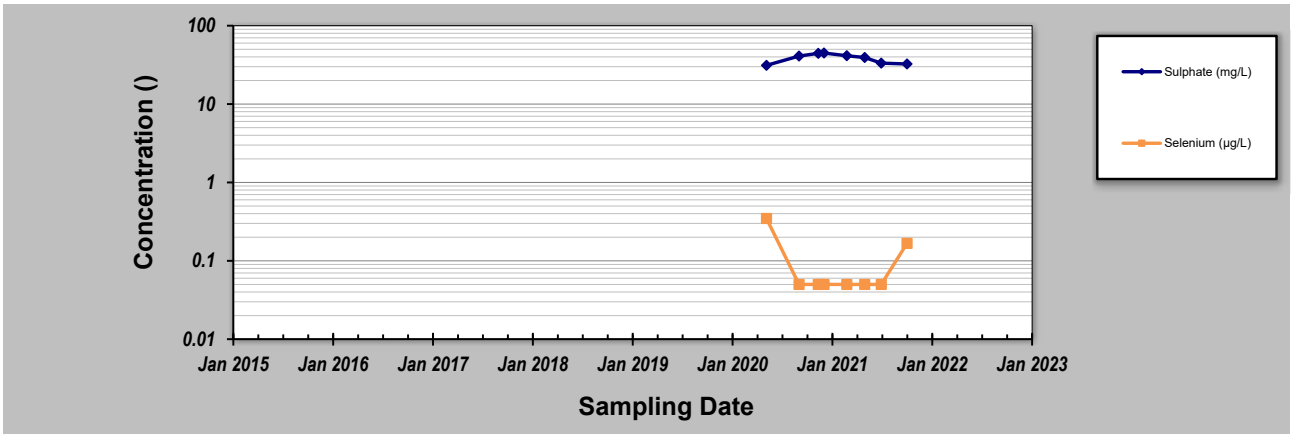
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably 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:	31-Jan-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_SP1A
Conducted By:	KC		

Parameter (units)	Sulphate (mg/L)	Selenium (µg/L)					

Sampling Event	Sampling Date	EV_MW_SP1A CONCENTRATION						
1	19-May-20	31.2	0.347					
2	16-Sep-20	41	0.05					
3	26-Nov-20	44.4	0.05					
4	17-Dec-20	44.8	0.05					
5	11-Mar-21	41.4	0.05					
6	16-May-21	39.3	0.05					
7	16-Jul-21	33.3	0.05					
8	19-Oct-21	32.5	0.167					
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.14	1.05					
Mann-Kendall Statistic (S):		-6	-1					
Confidence Factor:		72.6%	50.0%					
Concentration Trend:		Stable	No Trend					



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
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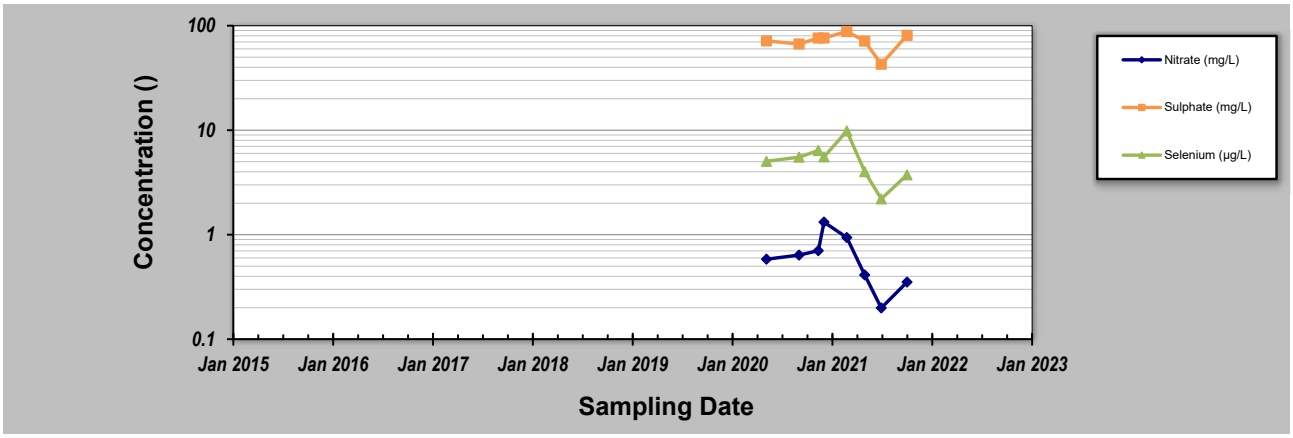
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	31-Jan-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_SP1B
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	EV_MW_SP1B CONCENTRATION						
1	19-May-20	0.583	71.6	5.04				
2	16-Sep-20	0.638	66.8	5.52				
3	26-Nov-20	0.703	76.3	6.39				
4	17-Dec-20	1.32	76.3	5.56				
5	11-Mar-21	0.939	88.1	9.82				
6	16-May-21	0.412	71.2	4.01				
7	16-Jul-21	0.199	42.8	2.2				
8	19-Oct-21	0.352	80.8	3.74				
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.55	0.19	0.43				
Mann-Kendall Statistic (S):		-8	3	-8				
Confidence Factor:		80.1%	59.4%	80.1%				
Concentration Trend:		Stable	No Trend	Stable				



Notes:

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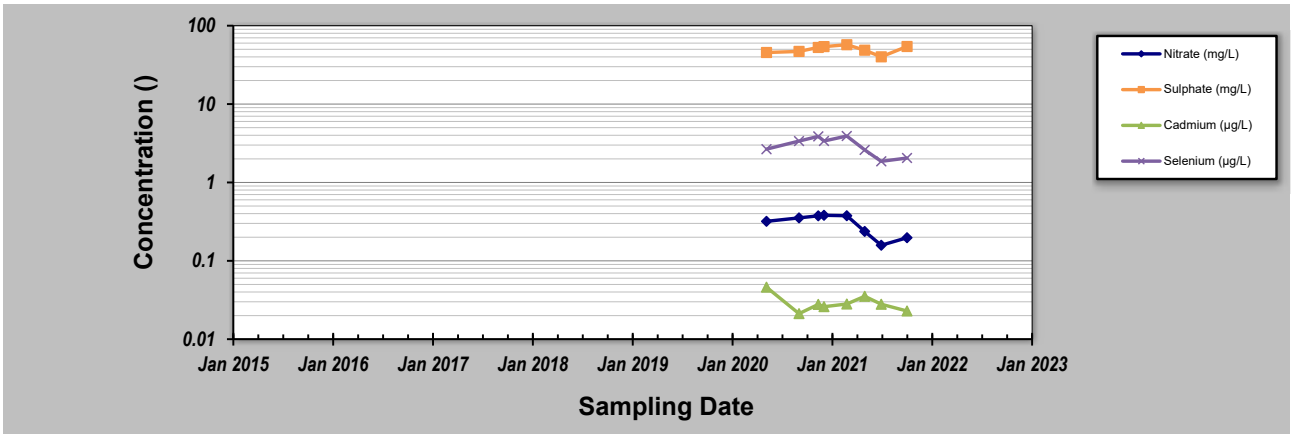
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology 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:	31-Jan-22	Job ID:	671557
Facility Name:	Teck Coal Regional Groundwater - EVO	Location	EV_MW_SP1C
Conducted By:	KC		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	EV_MW_SP1C CONCENTRATION						
1	19-May-20	0.319	45.5	0.0461	2.66			
2	16-Sep-20	0.353	47	0.0212	3.37			
3	26-Nov-20	0.375	52.8	0.0278	3.87			
4	17-Dec-20	0.381	54.1	0.026	3.38			
5	11-Mar-21	0.376	57.2	0.0281	3.91			
6	16-May-21	0.237	48.7	0.0353	2.6			
7	16-Jul-21	0.158	40.1	0.0279	1.86			
8	19-Oct-21	0.197	54.3	0.0229	2.05			
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.30	0.11	0.27	0.27			
Mann-Kendall Statistic (S):		-8	8	-2	-8			
Confidence Factor:		80.1%	80.1%	54.8%	80.1%			
Concentration Trend:		Stable	No Trend	Stable	Stable			



Notes:

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Appendix XII

Coal Mountain Mine 2021 SSGMP and RGMP Report

- Figures
- Tables
- Drawings
- Attachments
  - I. Borehole Logs
  - II. Block Diagrams
  - III. Mann-Kendall Analyses

1 Coal Mountain mine SSGMP and RGMP Report

1.1 Overview

Coal Mountain mine (CMm) is currently in care and maintenance phase of closure. It used to be called Coal Mountain Operations (CMO) until mining operations ceased in 2019. Groundwater monitoring in accordance with the approved 2018 Site-specific Groundwater Monitoring Program (SSGMP) Update was not affected by the change in operating status (SRK, 2018). The most recent SSGMP Update was completed in 2021, but is not yet approved (SNC-Lavalin, 2021a).

The site location for CMm and corresponding Regional Groundwater Monitoring Program (RGMP) Study Area 11 are provided on Drawing CM-01. CMm is located between two surface water drainages: Michel Creek and its tributary, Corbin Creek. Michel Creek flows northward along the western boundary of CMm and Corbin Creek flows northwest along the eastern edge of CMm through a rock drain beneath CMm East spoils (Drawing CM-01). Corbin Creek enters Michel Creek northwest of CMm, just upgradient of the rail loop. Both Michel and Corbin creeks drain mountainous, alpine areas to the south and east. Andy Good Creek is another key tributary of Michel Creek in the vicinity of CMm. Andy Good Creek drains an alpine area to the northwest with no mining activity and enters Michel Creek downgradient of the rail loop.

Results and discussion are organized based on the Corbin Creek and Michel Creek watersheds. A summary of wells included in each drainage area, well installation details and hydrogeological information for each well are provided in Table CM-01. Manual groundwater level measurements from 2021 and calculated vertical gradients are provided in Table CM-02. The 2021 fourth quarter (Q4) groundwater elevations are shown on Drawing CM-02. The 2021 water levels are presented in the geological context in three cross sections (Drawings CM-03 to -05) and a Block Diagram (Attachment II; Diagram CM-1). Drawings CM-06 to -09 provide a spatial summary of 2021 Order Constituent (OC) concentrations (nitrate, sulphate, cadmium and selenium). Figures CM-01 to -25 present precipitation, water level and chemistry data for discussion purposes.

Surficial deposits at CMm represent the combined influence of glacial activity and subsequent erosional and fluvial mechanisms, followed by anthropogenic activities. Generally, at CMm there is a layer of till overlying the bedrock interface, and coarser fluvial or colluvial sediments overlying the till (George et al., 1986). Surficial geology at CMm is shown on Drawing 5 of the main report, and descriptions of sediments encountered at monitoring wells are included with the borehole logs (Attachment II).

Sub-cropping bedrock at CMm consists of the upper portion of the Jurassic aged Fernie Formation (Fm) and the lower portion of the Jura-Cretaceous aged Kootenay Group (Drawing 3 of the main report). The Fernie Fm at CMm consists of a thick sequence of marine sediments. The lower portion of the formation, the Grey Beds, is a shale and siltstone sequence. The upper portion, or Passage Beds, is a medium thick sequence of dark grey siltstone and fine-grained sandstone. At CMm the Fernie Fm is found sub cropping along the eastern and western flanks of CMm.

The Kootenay Group has three subdivisions which are, in ascending order, the Morrissey Fm, the coal bearing Mist Mountain Fm and the Elk Fm. The upper portion of the Mist Mountain Fm and the entire Elk Fm has been removed by erosion and are no longer present at CMm. The Morrisey Fm at CMm consists

of the lower Weary Ridge Member and the upper Moose Mountain Member. The Weary Ridge Member is a crossbedded, fine-grained sandstone with interbeds of shale and siltstone. The Moose Mountain Member is a light grey medium grained resistant sandstone. Interbeds are generally absent except for the top few meters where coal stringers and dark grey shale interbeds can be found (Teck, 2013). The Kootenay Group (Morrisey Fm and Mist Mountain Fm) is exposed in the central portion of the site, which was thrust to the highest elevations of Coal Mountain.

There is a prominent thrust fault (Big Rip Fault) trending north-south through the middle of the CMm disturbance area and there are numerous associated minor faults associated with this fault (Drawing 3 of the main report; O'Neill, 2016). Relative movement of hanging walls, along the thrust faults, has been toward the east with dip separation in the order of tens to hundreds of meters. The main synclinal axis generally plunges northwards at a moderate angle but local reversals are present (Teck, 2013). Numerous cross sections showing the general structure and incline of bedrock formations are shown in GSC (1996). The bedrock and surficial geology of CMm have been discussed in detail as part of the 2021 SSGMP Update, which includes bedrock cross-sections for the area (SNC-Lavalin, 2021a).

1.2 Groundwater Monitoring Locations

The CMO SSGMP Update (SRK, 2018; updated in 2021 by SNC-Lavalin) and 2020 RGMP Update (SNC-Lavalin, 2020) specify the monitoring methods, frequencies, locations, and analysis requirements for CMm. These requirements were formulated based on the groundwater conceptual site model (CSM), which was developed based on information from previous reports. Descriptions of the physical setting, hydrology, geology, mine-related features, physical hydrogeology, and chemical hydrogeology inform the CSM, which is presented in the 2018 SSGMP Update (SRK, 2018), and 2021 SSGMP Update (SNC-Lavalin, 2021a).

There are 19 groundwater monitoring wells at CMm that support both the SSGMP and RGMP (Drawing CM-01; Table CM-01). Eight monitoring wells are installed in unconsolidated valley deposits and eleven are installed in bedrock units. Eight monitoring wells are located within the Corbin Creek Watershed. Eleven monitoring wells are within the Michel Creek watershed, of which, five are downgradient of the confluence with Corbin Creek.

1.3 Program Modifications

Data was collected in accordance with the approved 2018 SSGMP Update (SRK, 2018) and 2020 RGMP Update (SNC-Lavalin, 2020). Table A summarizes modifications from the SSGMP and RGMP programs.

Table A: CMm SSGMP and Study Area 11 Program Modifications

#	ID	Q[a]	Modification	Reason
1	CM_MW1-SH/DP	Q2, Q4	Reduced monitoring and sampling from quarterly to semi-annually	Recommendation in the 2020 RGMP Update

Notes:
[a] Q denotes Quarter (Q1, Q2, Q3, Q4).

1.4 Corbin Creek Watershed

A summary of 2021 groundwater monitoring and sampling results for the Corbin Creek Watershed is presented in Table B with references to supporting information (Drawings, Figures, Tables, and Appendices).

Table B: Summary of 2021 Groundwater Monitoring and Sampling Results for Corbin Creek Watershed

Hydrogeological Information		Description	Reference
Corbin Pond			
Monitoring Location	Relevant CMm SSGMP/RGMP Wells	CM_MW6-SH/DP	Drawing CM-01 Table CM-01 SNC-Lavalin, 2021a SRK, 2021
	Relevant Monitoring Wells from Other Programs[a]	n/a	
	Relevant Surface Water Monitoring Stations[b]	CM_CCHW, CM_CCPD, CM_PC2	
	Relevant Seep Monitoring Locations[b]	CM_CCDS	
Physical Hydrogeology	Groundwater Elevation Trends	› Quarterly groundwater elevations below Corbin Pond were measured in sand at CM_MW6-SH and bedrock (siltstone interpreted to be Fernie Fm) at CM_MW6-DP. Seasonal variability at these wells also followed a similar pattern in 2021 as previous years and Corbin Pond surface water outflow, with the highest levels measured during the spring (Q2) and lowest during the winter (Q1). Groundwater elevations at both wells were similar to 2019 and 2020 data.	Table CM-02 Drawing CM-02 Figure CM-01
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – The vertical hydraulic gradient between CM_MW6-SH/DP was 0.07 to 0.2 m/m upwards in 2021, similar to previous measurements. › **Lateral Hydraulic Gradient:** – The lateral hydraulic gradient in the lower Corbin Creek valley (Corbin Pond area) is steeper than in the Michel Creek valley with an estimated gradient of approximately 0.03 m/m as measured between CM_MW5-SH and CM_MW6-SH.	Table CM-02 Drawing CM-02
Chemistry	2021 SSGMP/RGMP Order Constituents Results	› Groundwater concentrations of OC were less than the primary screening criteria at all monitoring wells.	Table C Tables CM-03 to -05 Drawings CM-06 to -09 Figures CM-03 to -05
	Non-Order Mine-Related and Naturally Occurring Constituents	› Concentrations greater than primary screening criteria: – Fluoride: CM_MW6-SH (Q1 to Q4). – Sodium: CM_MW6-DP (Q1 to Q4). – Lithium: CM_MW6-SH (Q1 to Q4), CM_MW6-DP (Q1 to Q4). – Manganese: CM_MW6-SH (Q1 to Q4). › Fluoride, dissolved sodium, dissolved lithium and dissolved manganese are inferred to originate from natural sources. › All other constituents were less than the primary screening criteria.	Tables CM-03 and -04
	Mann-Kendall Trend Analysis	› All Mann-Kendall trend analysis results indicate stable, decreasing or no trend.	Table D Attachment III
Lower Corbin Creek Valley			
Monitoring Location	Relevant CMm SSGMP/RGMP Wells	CM_MW4-SH/DP, CM_MW5-SH/DP, CM_MW9, CM_MW10	Drawing CM-01 Table CM-01 SNC-Lavalin, 2021a SRK, 2021
	Relevant Monitoring Wells from Other Programs[a]	n/a	
	Relevant Surface Water Monitoring Stations[b]	CM_SPD, CM_CC1, CM_ND2	
	Relevant Seep Monitoring Stations[b]	CM_MM-SEEP3, CM_PLANT-SEEP1, CM_NS1	

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Table B (Cont'd): Summary of 2021 Groundwater Monitoring and Sampling Results for Corbin Creek Watershed

Hydrogeological Information		Description	Reference
Physical Hydrogeology	Groundwater Elevation Trends	› Groundwater elevations in lower Corbin Creek were continuously measured in valley-bottom gravel at CM_MW5-SH, and bedrock at CM_MW5-DP (siltstone interpreted to be Kootenay Group), CM_MW4-SH and CM_MW4-DP (siltstone interpreted to be Fernie Formation). › Groundwater level hydrographs followed similar pattern as the surface water (CM_CC1). Annual high-water levels occurred during the spring (April to June) generally corresponding with freshet, and annual lows during the winter (December to February). The annual range of groundwater levels was approximately 2.5 m for both wells in 2021, which is similar to previous years. › The pressure transducer data were compensated for atmospheric pressure variability using a barometric data logger deployed above the water column at CM_MW5-DP. › Pressure transducers were installed in artesian wells CM_MW4-SH and CM_MW4-DP in 2021 Q4.	Table CM-02 Drawing CM-02 Figure CM-07
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – The vertical hydraulic gradient between CM_MW5-SH/DP was 0.01 to 0.06 m/m downward in 2021, consistent with previous measurements. Both CM_MW-04-SH and CM_MW4-DP were observed to be under flowing artesian conditions in 2021 which is indicative of an upward gradient from bedrock deposits to the water table in this location. › **Lateral Hydraulic Gradient:** – The lateral hydraulic gradient in the lower Corbin Creek valley (Corbin Pond area) is steeper than in the Michel Creek valley with an estimated gradient of approximately 0.03 m/m as measured between CM_MW5-SH and CM_MW6-SH. – The horizontal hydraulic gradient in the lower Corbin Creek valley is steeper than in the Michel Creek valley with an estimated gradient of approximately 0.03 m/m as measured between CM_MW5-SH and CM_MW9.	Table CM-02 Drawing CM-02
Chemistry	2021 SSGMP/RGMP Order Constituents Results	› Concentrations greater than primary screening criteria: – Dissolved selenium: CM_MW5-SH (Q1 to Q4). – Sulphate (Q1). › All other OC were less than the primary screening criteria.	Table C Tables CM-03 to -05 Drawings CM-06 to -09 Figures CM-09 to -11
	Non-Order Mine-Related and Naturally Occurring Constituents	› Concentrations greater than primary screening criteria: – Chloride: CM_MW4-SH (Q1 to Q4) and CM_MW4-DP (Q1 to Q4). – Fluoride: CM_MW10 (Q1 to Q3). – Sodium: CM_MW4-SH (Q1 to Q4) and CM_MW4-DP (Q1 to Q4). – Barium: CM_MW5-DP (Q1 to Q4). – Lithium: CM_MW4-SH (Q1 to Q4), CM_MW4-DP (Q1 to Q4), MW5-SH (Q1 to Q4), CM_MW5-DP (Q1 to Q4), and CM_MW10 (Q1 to Q4). › Lithium was the only concentration greater than primary screening criteria identified in an overburden monitoring well (CM_MW5-SH). › All other constituents were less than the primary screening criteria.	Tables CM-03 to -05
	Mann-Kendall Trend Analysis	› Trend analysis indicates the concentration of dissolved selenium at CM_MW5-SH has been increasing over the six-year period of record. Concentrations of all other OC have been non-trending, stable or decreasing in all wells in the Lower Corbin Creek Valley.	Table D Attachment III

Notes:
[a] – Other relevant monitoring wells are those in the area that are under evaluation for potential inclusion in the SSGMP and/or RGMP.
[b] – Other relevant surface water stations and seep monitoring locations are as determined in the 2021 SSGMP Update (SNC-Lavalin, 2021a), and represent a sub-set of the surface water and seepage monitoring locations present at CMm and within Study Area 11.

A summary of results for OC compared to primary screening criteria for Corbin Creek watershed is presented in Table C below.

Table C: Summary of OC Compared to Primary Screening Criteria in the Corbin Creek Watershed

Parameter[1,2,3] / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Corbin Pond																
CM_MW6-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW6-DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower Corbin Creek Valley																
CM_MW5-SH	-	-	-	-	596	-	-	-	-	-	-	-	18.5	11.8	10.4	13.6
CM_MW5-DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW4-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW4-DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSR AW	400				1,280 – 4,290[4]				0.5 – 4[4]				20			
CSR IW	n/a				n/a				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			

Notes:

1 Primary screening criteria are CSR standards for **Aquatic Life (AW),** Drinking Water (DW), Livestock (LW), and *Irrigation (IW)*.

2 '–' denotes result less than primary screening criteria for given constituents.

3, Where a duplicate was collected, the higher concentration is provided in table. If more than one sample collected in a quarter, the higher of the two samples is provided in the table.

4, Standard varies with hardness.

Mann-Kendall trend analyses were completed for data from the Corbin Creek Watershed with seven or more sampling events and a summary of the results are presented in Table D (Attachment III).

Table D: Summary of Mann-Kendall Trend Analysis for OC in the Corbin Creek Watershed

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
Corbin Pond				
CM_MW6-SH	-	Decreasing	-	Stable
CM_MW6-DP	No Trend	No Trend	-	Decreasing
Lower Corbin Creek Valley				
CM_MW5-SH	Decreasing	***Stable***	Decreasing	***Increasing***
CM_MW5-DP	No Trend	Decreasing	-	Stable
CM_MW4-DP	No Trend	-	-	-
CM_MW10	-	Stable	-	-

[1] Where OC were greater than the primary screening criteria in 2021, the trend result is ***italics***. Where the OC were greater than the secondary screening criteria for selenium during at least one event in 2021, the result is ***shaded and italics***. Where increasing trends are noted, the cell is shaded yellow.

'–' denotes Mann-Kendall trend analysis was not completed as concentrations were consistently less than or marginally greater than the detection limit.

1.4.1 Discussion

In 2021, groundwater samples from the Corbin Creek Watershed (CM_MW5-SH/DP, CM_MW4-SH/DP, CM_MW6-SH/DP, and CM_MW10) remain less than the primary screening criteria for all OC, with the exception of dissolved selenium at CM_MW5-SH, where an increasing trend was identified. Trends (where available) and concentrations are consistent with historical data at all wells in the Corbin Creek Watershed.

Selenium to sulphate ratio plots for the Corbin Creek Watershed are provided as Figures CM-06 and -12, which indicate groundwater samples from all monitoring wells in the Corbin Creek Watershed plot in the area of natural non-contact water, except for CM_MW5-SH, which plots in the zone indicative of some mine influence. CM_MW6-DP is completed in bedrock and based on water quality and observed upward gradients, reflects background water chemistry (Appendix VII).

In addition to CM_MW5-SH, surface water from Corbin Creek (CM_CC1), North Ditch (CM_ND2), and pond discharges (CM_CCPD and CM_SPD) are also indicative of mine-influence. Concentrations of OC in groundwater at CM_MW5-SH are generally lower than Corbin Creek surface water and exhibit temporal seasonal trends, suggesting the potential sources of OC at CM_MW5-SH are infiltration into the groundwater from Corbin Creek (Figures CM-09 to -11).

Surface water in Corbin Creek and groundwater from CM_MW5-SH are both calcium-magnesium sulphate type waters, whereas other groundwater samples appear to follow a natural transition with depth to sodium-potassium bicarbonate and sodium-chloride type waters in bedrock (Figure CM-08). CM_MW6-SH is completed in unconsolidated sand and is inferred to be more indicative of bedrock type groundwater. This may be the result of an upwards vertical gradient in this location from bedrock deposits to valley fill (Table CM-02). In contrast, CM_MW5-DP, which is completed in bedrock, interpreted to be more indicative of surface water which may be the result of a downwards vertical gradient in this location from valley fill to bedrock deposits (Drawing CM-05).

All non-order exceedances identified on Tables CM-03 and -04 were observed in non-mine influenced monitoring wells suggesting they may be naturally occurring. Specifically, chloride and sodium are believed to be naturally occurring in the predominantly marine shales of the Fernie Formation. Also, lithium concentrations were greater than the CSR DW standard in all wells in the Corbin Creek Watershed. The Background Assessment (BGA) completed by SNC-Lavalin (2020) also indicated that chloride and sodium, fluoride, dissolved barium, lithium, and manganese are not considered mine-related parameters in groundwater and are likely naturally occurring in the Elk Valley.

1.5 Study Area 11 and Michel Creek Watershed

A summary of 2021 groundwater monitoring and sampling results for the Study Area 11 and Michel Creek Watershed is presented in Table E with references to supporting information (Drawings, Figures, Tables, and Appendices).

Table E: Summary of 2021 Groundwater Monitoring and Sampling Results for Study Area 11 and Michel Creek Watershed

Hydrogeological Information		Description	Reference
CMm Footprint Area – Michel Creek Drainage			
Monitoring Location	Relevant CMm SSGMP/RGMP Wells	CM_MW7-SH/DP, CM_MW8	Drawing CM-01 Tables CM-01 SNC-Lavalin, 2021a SRK, 2021
	Relevant Monitoring Wells from Other Programs[a]	n/a	
	Relevant Surface Water Monitoring Stations[b]	n/a	
	Relevant Seep Monitoring Locations[b]	CM_37PIT-SEEP-E	
Physical Hydrogeology	Groundwater Elevation Trends	› Groundwater elevations within the CMm mine footprint were measured quarterly at CM_MW7-SH/DP and CM_MW8, which are all completed in deeper bedrock units (sandstone interpreted to be Kootenay Group) ranging from 47.5 meters below ground surface (mBGS) to 104 mBGS. › Groundwater elevations at these wells in 2021 were similar to the range of measurements over the five-year period of record and illustrated seasonality with several meters of fluctuation (about 4 m range for CM_MW7-SH/DP and 10 m for CM_MW8) between spring freshet and winter low water levels. › Groundwater levels in CM_MW7-SH and CM_MW7-DP are generally similar to each other often with a slight upward gradient.	Table CM-02 Drawing CM-02 Figure CM-14
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – Vertical gradients at CM_MW7-SH/DP were predominantly upward, with gradients ranging from 0.002 to 0.02 m/m. The largest gradient occurred during Q1. › **Lateral Hydraulic Gradient:** – Lateral hydraulic gradient could not be calculated; however, groundwater flow is inferred to follow topography.	Table CM-02 Drawing CM-02
Chemistry	2021 SSGMP/RGMP Order Constituents Results	› Concentrations greater than primary screening criteria: – Sulphate: CM_MW7-DP (Q1 to Q4). › All other OC were less than the primary screening criteria.	Table F Tables CM-03 and -04 Drawings CM-06 to -09 Figures CM-16 to -18
	Non-Order Mine-Related and Naturally Occurring Constituents	› Concentrations greater than primary screening criteria: – Lithium: CM_MW7-DP (Q1 to Q4) and CM_MW8 (Q1 to Q4). – Manganese: CM_MW7-SH (Q2) and CM_MW7-DP (Q1 to Q4). – Strontium: CM_MW8 (Q1 to Q4). › Dissolved lithium, manganese and strontium concentrations are inferred to originate from natural sources. Strontium exceedance is observed in the deepest well at CMm (CM_MW8) completed between 98 and 104 mBGS. › All other constituents were less than the primary screening criteria.	Tables CM-03 and -04
	Mann-Kendall Trend Analysis	› Concentrations of all OC have been non-trending, stable or decreasing.	Table G Attachment III
Michel Creek Watershed Above Corbin Creek Confluence			
Monitoring Location	Relevant CMm SSGMP/RGMP Wells	CM_MW2-SH, CM_MW3-SH/DP	Drawing CM-01 Table CM-01 SNC-Lavalin, 2021a SRK, 2021
	Relevant Monitoring Wells from Other Programs[a]	n/a	
	Relevant Surface Water Monitoring Stations[b]	CM_MC1, CM_MC4, CM_MC5, CM_MC6, CM_MC7, CM_WD	
	Relevant Seep Monitoring Locations[b]	CM_WD4, CM_WD18	
Physical Hydrogeology	Groundwater Elevation Trends	› Groundwater elevations in the Michel Creek valley bottom above the confluence with Corbin Creek were measured at CM_MW3-SH/DP (deep well completed in Fernie Fm) and CM_MW2-SH. › Groundwater elevations at these wells were within the range of measurements over the six-year period of record.	Table CM-02 Drawing CM-02 Figure CM-13

Table E (Cont'd): Summary of 2021 Groundwater Monitoring and Sampling Results for Study Area 11 and Michel Creek Watershed

Hydrogeological Information		Description	Reference
Physical Hydrogeology (Cont'd)	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – Vertical gradients at CM_MW3-SH/DP were predominantly upward, with a gradient of 0.03 m/m, except during freshet in Q2, where a downward gradient was calculated (0.001 m/m). › **Lateral Hydraulic Gradient:** – The lateral hydraulic gradient in the Michel Creek valley is more gradual than in the Corbin Creek valley with an estimated gradient of approximately 0.01 m/m as measured between CM_MW3-SH and CM_MW2-SH.	Table CM-02 Drawing CM-02 Figure CM-13
Chemistry	2021 SSGMP/RGMP Order Constituents Results	› Concentrations greater than primary screening criteria: – Sulphate: CM_MW2-SH (Q3). › All other OC were less than the primary screening criteria.	Table F Tables CM-03 and -04 Drawings CM-06 to -09 Figures CM-16 to -18
	Non-Order Mine-Related and Naturally Occurring Constituents	› Concentrations greater than primary screening criteria: – Chloride: CM_MW3-DP (Q1 to Q4). – Lithium: CM_MW2-SH (Q1 to Q4) and CM_MW3-DP (Q1 to Q4). – Sodium: CM_MW3-DP (Q1 to Q4). – Chloride and dissolved sodium concentrations exceeded primary screening criteria in bedrock monitoring well CM_MW3-DP (siltstone interpreted to be Fernie Formation) and are inferred to originate from natural bedrock sources. Dissolved lithium was identified in both bedrock wells and shallow overburden monitoring well CM_MW2-SH. › All other constituents were less than the primary screening criteria.	Tables CM-03 and -04
	Mann-Kendall Trend Analysis	› Concentrations of all other OC have been non-trending, stable or decreasing with the exceptions of sulphate, selenium, and nitrate at background monitoring well CM_MW3-SH.	Table G Attachment III
Michel Creek Watershed Below Corbin Creek Confluence (Study Area 11)			
Monitoring Location	Relevant CMm SSGMP/RGMP Wells (Study Area 11)	CM_MW1-OB/SH/DP, CM_MW_AG1A/B	Drawing CM-01 Table CM-01 SNC-Lavalin, 2021a SRK, 2021
	Relevant Monitoring Wells from Other Programs[a]	n/a	
	Relevant Surface Water Monitoring Stations[b]	CM_MC2, CM_LOIP, CM_AG1, CM_AG2	
	Relevant Seep Monitoring Locations[b]	n/a	
Physical Hydrogeology	Groundwater Elevation Trends	› Groundwater elevations in the Michel Creek valley bottom below Corbin Creek (Study Area 11 of RGMP) were measured at well nest CM_MW1-OB/SH/DP and well nest CM_MW_AG1A/B. › The pressure transducer data were compensated for atmospheric pressure variability using a barometric data logger deployed above the water column at CM_MW5-DP. › The groundwater elevations followed the previously characterized trend of seasonal variability and were similar to groundwater levels over the period of record.	Table CM-02 Drawing CM-02 Figure CM-20
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – The vertical hydraulic gradient measured between the deep bedrock (CM_MW1-DP, siltstone interpreted to be Fernie Fm) and intermediate bedrock (CM_MW1-SH, siltstone interpreted to be Fernie Fm) well ranged from 0.04 to 0.06 m/m (upward) in 2021, which is similar to previous measurements. – The vertical hydraulic gradient between the intermediate bedrock (CM_MW1-SH) and shallow gravel well (CM_MW1-OB) was 0.04 m/m (downward) in 2021. – The vertical hydraulic gradient between CM_MW_AG1A and CM_MW_AG1B was 0.1 m/m (upward) in 2021. › **Lateral Hydraulic Gradient:** – The horizontal hydraulic gradient in Study Area 11 is approximately 0.02 m/m as measured between CM_MW_AG1B and CM_MW1-OB.	Table CM-02 Drawing CM-02

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Table B (Cont'd): Summary of 2021 Groundwater Monitoring and Sampling Results for Corbin Creek Watershed

Hydrogeological Information		Description	Reference
Physical Hydrogeology	Groundwater Elevation Trends	› Groundwater elevations in lower Corbin Creek were continuously measured in valley-bottom gravel at CM_MW5-SH, and bedrock at CM_MW5-DP (siltstone interpreted to be Kootenay Group), CM_MW4-SH and CM_MW4-DP (siltstone interpreted to be Fernie Formation). › Groundwater level hydrographs followed similar pattern as the surface water (CM_CC1). Annual high-water levels occurred during the spring (April to June) generally corresponding with freshet, and annual lows during the winter (December to February). The annual range of groundwater levels was approximately 2.5 m for both wells in 2021, which is similar to previous years. › The pressure transducer data were compensated for atmospheric pressure variability using a barometric data logger deployed above the water column at CM_MW5-DP. › Pressure transducers were installed in artesian wells CM_MW4-SH and CM_MW4-DP in 2021 Q4.	Table CM-02 Drawing CM-02 Figure CM-07
	Hydraulic Gradients and Flow Direction	› **Vertical Hydraulic Gradient:** – The vertical hydraulic gradient between CM_MW5-SH/DP was 0.01 to 0.06 m/m downward in 2021, consistent with previous measurements. Both CM_MW-04-SH and CM_MW4-DP were observed to be under flowing artesian conditions in 2021 which is indicative of an upward gradient from bedrock deposits to the water table in this location. › **Lateral Hydraulic Gradient:** – The lateral hydraulic gradient in the lower Corbin Creek valley (Corbin Pond area) is steeper than in the Michel Creek valley with an estimated gradient of approximately 0.03 m/m as measured between CM_MW5-SH and CM_MW6-SH. – The horizontal hydraulic gradient in the lower Corbin Creek valley is steeper than in the Michel Creek valley with an estimated gradient of approximately 0.03 m/m as measured between CM_MW5-SH and CM_MW9.	Table CM-02 Drawing CM-02
Chemistry	2021 SSGMP/RGMP Order Constituents Results	› Concentrations greater than primary screening criteria: – Dissolved selenium: CM_MW5-SH (Q1 to Q4). – Sulphate (Q1). › All other OC were less than the primary screening criteria.	Table C Tables CM-03 to -05 Drawings CM-06 to -09 Figures CM-09 to -11
	Non-Order Mine-Related and Naturally Occurring Constituents	› Concentrations greater than primary screening criteria: – Chloride: CM_MW4-SH (Q1 to Q4) and CM_MW4-DP (Q1 to Q4). – Fluoride: CM_MW10 (Q1 to Q3). – Sodium: CM_MW4-SH (Q1 to Q4) and CM_MW4-DP (Q1 to Q4). – Barium: CM_MW5-DP (Q1 to Q4). – Lithium: CM_MW4-SH (Q1 to Q4), CM_MW4-DP (Q1 to Q4), MW5-SH (Q1 to Q4), CM_MW5-DP (Q1 to Q4), and CM_MW10 (Q1 to Q4). › Lithium was the only concentration greater than primary screening criteria identified in an overburden monitoring well (CM_MW5-SH). › All other constituents were less than the primary screening criteria.	Tables CM-03 to -05
	Mann-Kendall Trend Analysis	› Trend analysis indicates the concentration of dissolved selenium at CM_MW5-SH has been increasing over the six-year period of record. Concentrations of all other OC have been non-trending, stable or decreasing in all wells in the Lower Corbin Creek Valley.	Table D Attachment III

Notes:
[a] – Other relevant monitoring wells are those in the area that are under evaluation for potential inclusion in the SSGMP and/or RGMP.
[b] – Other relevant surface water stations and seep monitoring locations are as determined in the 2021 SSGMP Update (SNC-Lavalin, 2021a), and represent a sub-set of the surface water and seepage monitoring locations present at CMm and within Study Area 11.

A summary of results for OC compared to primary screening criteria for the Michel Creek watershed and Study Area 11 is presented in Table F below.

Table F: Summary of OC Compared to Primary Screening Criteria in Study Area 11 and the Michel Creek Watershed

Parameter[1,2,3] / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CMm Footprint																
CM_MW7-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW7-DP	-	-	-	-	1,100	1,120	1,090	1,100	-	-	-	-	-	-	-	-
CM_MW8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Michel Creek Watershed Above Corbin Creek Confluence																
CM_MW3-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW3-DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW2-SH	-	-	-	-	-	-	510	-	-	-	-	-	-	-	-	-
Michel Creek Watershed Below Corbin Creek Confluence																
CM_MW1-OB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW1-SH[4]	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-
CM_MW1-DP[4]	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-	NS	-
CM_MW_AG1A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW_AG1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSR AW	400				1,280 – 4,290[5]				0.5 – 4[5]				20			
CSR IW	n/a				n/a				5				20			
CSR LW	100				1,000				80				30			
CSR DW	10				500				5				10			

Notes:

1 Primary screening criteria applied are CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)*.

2 '–' denotes result less than the primary screening criteria for given constituents.

3 Where a duplicate was collected, the higher concentration is provided in table. If more than one sample collected in a quarter, the higher of the two samples is provided in the table.

4 CM_MW1-SH and CM_MW1-DP are sampled semi-annually, as per the 2020 RGMP Update.

5 Standard varies with hardness.

'NS' denotes no sample.

Mann-Kendall trend analyses were completed for data from wells with seven or more sampling events in the Michel Creek Watershed and in Study Areas 11 (Table G; Attachment III).

Table G: Summary of Mann-Kendall Trend Analysis for OC in Study Area 11 and the Michel Creek Watershed

Parameter[1,2] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
CMm Footprint				
CM_MW8	No Trend	Decreasing	Decreasing	-
CM_MW7-DP	Decreasing	***No Trend***	No Trend	Stable
CM_MW7-SH	Decreasing	Decreasing	Decreasing	-
Michel Creek Watershed above Corbin Creek Confluence				
CM_MW3-DP	-	No Trend	-	-
CM_MW3-SH	Increasing	Increasing	Stable	Increasing
CM_MW2-SH	No Trend	***No Trend***	No Trend	No Trend
Michel Creek Watershed below Corbin Creek Confluence				
CM_MW1-DP	Increasing	Decreasing	Probably Decreasing	Decreasing
CM_MW1-OB	Stable	Increasing	No Trend	No Trend
CM_MW1-SH	-	Decreasing	No Trend	No Trend

Notes:

[1] Where OC were greater than the primary screening criteria in 2021, the trend result is ***italics***. Where the OC were greater than the secondary screening criteria for selenium during at least one event in 2021, the result is ***shaded and italics***. Where increasing trends are noted, the cell is shaded yellow.

'–' denotes Mann-Kendall trend analysis was not completed as concentrations were consistently less than or marginally greater than the detection limit.

1.5.1 Discussion

The groundwater results for the Michel Creek watershed are grouped into two areas for discussion: Michel Creek watershed above the confluence with Corbin Creek and the CMm footprint area, and Michel Creek watershed below the confluence with Corbin Creek (Study Area 11 of RGMP).

Michel Creek Watershed Above the Confluence with Corbin Creek and CMm Footprint Area

In 2021, groundwater samples from the Michel Creek Watershed above the confluence with Corbin Creek (CM_MW2-SH, CM_MW3-SH/DP, CM_MW7-SH/DP, CM_MW8) remain less than primary screening criteria for all OC, with the exception of sulphate at both CM_MW2-SH and CM_MW7-DP. Trends (where available) and concentrations are consistent with historical data.

On a selenium to sulphate ratio plot for this area (Figure CM-19), all surface water samples from Michel Creek above Corbin Creek and groundwater samples from monitoring wells CM_MW3-SH and CM_MW3-DP plot in the region of natural non-contact water. Based on spatial location and magnitude of concentrations, monitoring wells CM_MW3-SH and CM_MW3-DP are considered to be background monitoring wells for shallow overburden and bedrock, respectively (Appendix VII). Surface water in the West ditch (CM_WD), which monitors water quality on the Western side of CMm, and seep CM_WD18 appear to be influenced by mining activity and possibly affected by microbial reduction. Monitoring well

CM_MW7-DP, which is installed in deeper bedrock (sandstone, inferred to be Kootenay Group) and CM_MW2-SH, which is installed in gravel may both be mine influenced, but affected by microbial reduction (Figure CM-19). Both wells had primary screening exceedances (Table E; Drawing CM-07) . Bedrock monitoring wells CM_MW7-SH and the much deeper CM_MW8 are likely subjected to microbial reduction and/or may potentially represent natural background groundwater quality (Figure CM-19).

Concentrations of OC in surface water from CM_WD (West ditch) are generally greater than concentrations in most monitoring wells and Michel Creek except for bedrock monitoring well CM_MW7-DP and seep CM_WD18 (Figures CM-16 to -18), suggesting the potential source of OC to shallow groundwater is from the spoils on the western side of CMm. Drawing CM-03 (cross-section) illustrates the topographical relationship and groundwater flow potential of CM_MW7-SH/DP, CM_MW2-SH, West ditch (CM_WD), seep (CM_WD18), and west spoils.

Statistical analysis suggests an increasing trend in nitrate, sulphate and selenium at CM_MW3-SH, however, OC concentrations remain at least one order of magnitude below primary screening standards (Tables CM-03 and -04). The Se:SO4 plot also suggests that CM_MW3-SH is non-mine influenced (Figure CM-19). A review of time-series data on Figures CM-16 to -18 show quarterly nitrate, sulphate and selenium concentrations (with seasonal variations) in this monitoring well closely track concentrations in Michel Creek near this location (CM_MC1). This suggests a hydraulic connection between shallow groundwater at CM_MW3-SH and surface water. Sulphate, nitrate, and selenium concentrations change seasonally at CM_MC1, and depending on the date when the quarterly grab sample was collected may influence statistical analysis. Although sulphate, nitrate and selenium concentrations are expected to fluctuate seasonally, Figures CM-16 to -18 shows no obvious increase in dissolved selenium, sulphate, or nitrate concentration at background monitoring well CM_MW3-SH. Based on these observations, monitoring wells CM_MW3-SH/DP are still considered as representative of background groundwater quality for the time being. However, these wells will be re-assessed in future BGAs as part of the RGMP update framework.

Most water samples in the Michel Creek watershed above the Corbin Creek confluence are calcium-magnesium type waters with an apparent transition with depth to sodium-potassium type water in background bedrock monitoring well CM_MW3-DP (Figure CM-15). Deep bedrock monitoring wells in the mine area (CM_MW7-SH, CM_MW7-DP and CM_MW8) are installed in sandstone that is inferred to be Kootenay Group, while background bedrock monitoring well CM_MW3-DP is installed in siltstone that is inferred to be Fernie Formation, which might produce the difference in water type.

All non-order exceedances identified on Tables CM-03 and -04 were mostly observed in non-mine influenced monitoring wells suggesting they are likely naturally occurring. Specifically, chloride and sodium are believed to be naturally occurring in the predominantly marine shales of the Fernie Formation. Also, lithium concentrations were greater than the CSR DW standard in all monitoring wells (except CM_MW3-SH and CM_MW7-SH) in the Michel Creek watershed above the confluence of Corbin Creek. The BGA completed by SNC-Lavalin (2020) indicated that chloride, dissolved barium, sodium and dissolved lithium are not considered mine-related parameters in groundwater and are naturally occurring in the Elk Valley groundwater system.

Michel Creek Watershed below Confluence with Corbin Creek

In 2021, groundwater samples from the Michel Creek Watershed below the confluence with Corbin Creek (CM_MW1-OB/SH/DP, CM_MW_AG1A/B) remain less than primary screening criteria for all OC. Trends (where available) and concentrations are consistent with historical data.

A selenium sulphate ratio and plot for the Michel Creek watershed below the confluence with Corbin Creek is provided as Figure CM-25. Figure CM-25 illustrates all surface water samples from Andy Good Creek and groundwater samples from monitoring wells CM_MW1-SH, CM_MW1-DP, and CM_MW_AG1B plot in the area of natural non-contact water. Surface water in the Michel Creek at CM_MC2, shallow overburden monitoring well CM_MW1-OB, and deep overburden well CM_MW_AG1A appear to be mixing with water that has been influenced by mining activity. Seep CM_MM-SEEP3 may be affected by microbial reduction.

Concentrations of OC in Michel Creek surface water from CM_MC2 are generally greater than concentrations in all monitoring wells except for monitoring well CM_MW1-OB where occasionally sulphate, selenium and nitrate-N concentrations were greater than CM_MC2. CM_MC2 and CM_MW1-OB also have similar water types (Figure CM-21), suggesting a hydraulic connection between shallow groundwater at CM_MW1-OB and surface water. Concentrations of OC in Corbin Creek surface water from CM_CC1 are greater than concentrations in all monitoring wells in the Michel Creek Watershed below the confluence with Corbin Creek. (Figures CM-22 to -24). This suggests that the potential source of OC is from surface water (Lower Corbin Creek) infiltrating into shallow groundwater. Comparing OC concentrations in Corbin Creek surface water (CM_CC1) to Michel Creek above (CM_MC4) and below (CM_MC2) the confluence with Corbin suggests Corbin Creek is the primary source of OC in Study Area 11 (Figures CM-22 to -24 and Diagram CM-01 in Attachment II; CM-1). OC concentrations are greater in Corbin Creek (CM_CC1) than downstream in Michel Creek (CM_MC2), and much greater than OC concentrations in Michel Creek above Corbin Creek (CM_MC4). Drawing CM-04 (cross-section) and Drawing CM-02 illustrates the groundwater flow relationship between Corbin Creek, CM_MW1-OB, and Michel Creek.

Most water samples in the Michel Creek watershed below the Corbin Creek confluence are calcium-magnesium type waters with an apparent transition with depth to sodium-potassium type water in bedrock (Fernie Formation) monitoring wells CM_MW1-SH and CM_MW1-DP (Figure CM-15 and -21). Michel Creek surface water below the Corbin Creek confluence (CM_MC2) is both calcium-magnesium sulphate bicarbonate and calcium-magnesium sulphate types, while monitoring well CM_MW1-OB is calcium-magnesium sulphate bicarbonate type water, which suggests that there is mixing of surface water with shallow groundwater at this location. Seep CM_MM-SEEP3 is also calcium-magnesium sulphate type water. All other shallow groundwater and surface water in Andy Good Creek is calcium--magnesium bicarbonate type, indicating that there is mixing of surface water with shallow groundwater in the Michel Creek Watershed, below the confluence with Corbin Creek.

Most non-order exceedances identified on Tables CM-03 and -04 were observed in non-mine influenced monitoring wells suggesting they are naturally occurring. Specifically, sodium is believed to be naturally occurring in the predominantly marine shales of the Fernie Formation. Also, lithium concentrations were greater than the CSR DW standard in all monitoring wells in the Michel Creek watershed below the confluence of Corbin Creek.

2 Recommendations

New recommendations identified in the CMm 2021 SSGMP and the RGMP report are presented in Table I below. Appendix II of the main report provides recommendations related to CMm from the 2020 RGMP Update (SNC-Lavalin, 2020) and the 2020 Annual Report (SNC-Lavalin, 2021b). Where previous recommendations were not addressed, they are provided in Table I below.

Table H: Summary of New Recommendations - CMm SSGMP and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Program	
CMm SSGMP	Complete hydraulic conductivity testing at CM_MW4-SH/DP.
	Install transducers in monitoring wells CM_MW6-DP/SH, CM_MW7-DP/SH, CM_MW8, CM_MW9, and CM_MW10 to understand groundwater-surface water interaction and groundwater recharge.
Regional Groundwater Monitoring Program	
Study Area 11	No new recommendations.

Table I: Summary of Existing Recommendations - CMm SSGMP and RGMP

Program	Recommendation
Site-Specific Groundwater Monitoring Program	
CMm SSGMP	It is unlikely CM_MW9 will ever be successfully developed, therefore development efforts on CM_MW9 should cease. Continue collecting quarterly groundwater levels to verify the minimal water seepage into the well.
	Complete a flow accretion study on relevant water courses (Corbin Creek from Corbin Pond to confluence with Michel Creek, Michel Creek from upgradient of CM_MC1 to downstream of confluence with Andy Good Creek, and the lower portion of Andy Good Creek). Survey continuous water level monitoring stations at CM_CC1, CM_MC1 and CM_SPD relative to sea level. Establish continuous level monitoring at CM_MC2.
	Complete hydraulic conductivity testing at CM_MW7-DP/SH and CM_MW8.
	Update sampling frequency of monitoring wells CM_MW4-SH, CM_MW4-DP, CM_MW5-DP, CM_MW6-SH, CM_MW6-DP, CM_MW7-SH and CM_MW8 to twice per year. OC are below primary screening levels in these monitoring wells, there is a relatively long period of record and trends are stable or decreasing according to Mann-Kendall statistical analysis.
Regional Groundwater Monitoring Program	
Study Area 11	Complete a flow and load accretion study on Michel Creek, lower Corbin Creek, and lower Andy Good Creek to help assess the adequacy of the existing groundwater monitoring network. Then assess if additional groundwater monitoring well(s) are required and/or if existing monitoring wells should be replaced/abandoned.

3 References

British Columbia Ministry of Environment and Climate Change Strategy. 2019a. Contaminated Sites Regulation (CSR), B.C. Reg. 375/96, includes amendments up to B.C. Reg. 179/2021. July 7, 2021.

George, H. W., Gorman, W. A., VanDine, D. F. 1986. Late Quaternary Geology and Geomorphology of the Elk Valley, Southeastern British Columbia. Canadian Journal of Earth Sciences, pp. 741-751.

GSC (Geological Survey of Canada). 1996, Coal Mountain Map-Area, Open File 3158.

O'Neill (O'Neill Hydro-Geotechnical Engineering). 2016. *CMO 6 Peninsula Pit 3D Pore Water Pressure Model*. Final. September 27, 2016.

SNC-Lavalin. 2020. *2020 Regional Groundwater Monitoring Program Update*. Report prepared for Teck Coal *Limited*. Dated December 4, 2020.

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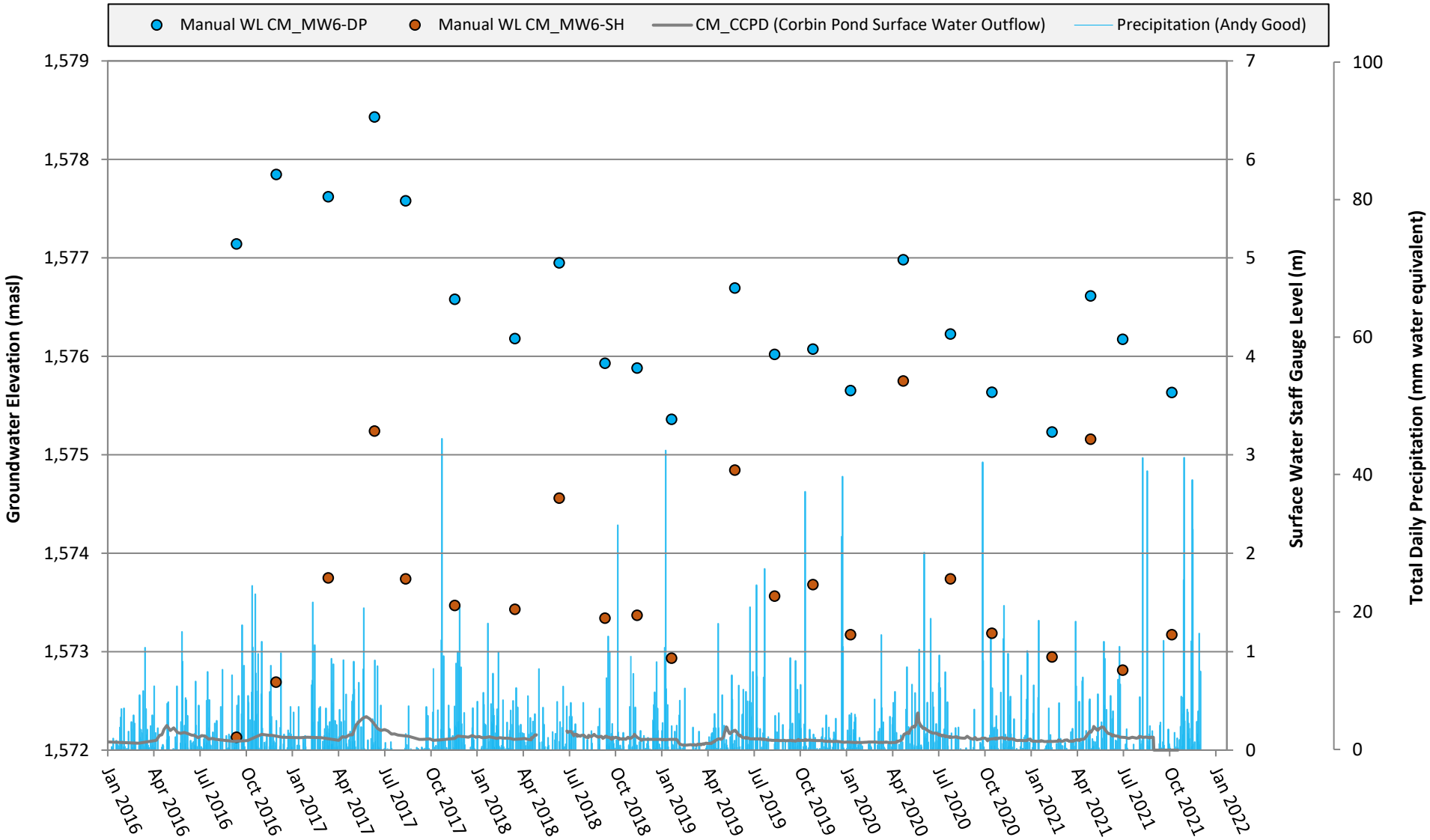
SRK Consulting Inc. 2018. *Coal Mountain Operations Site Specific Groundwater Monitoring Plan 2018 Update*. Prepared for Teck Coal Limited SRK. Project No. 1CT017.199. Dated October 31, 2018.

SRK Consulting Inc. 2021. *Elk Valley Seep Monitoring: 2021 Annual Report*. Report prepared for Teck Coal Limited. Dated December 2021.

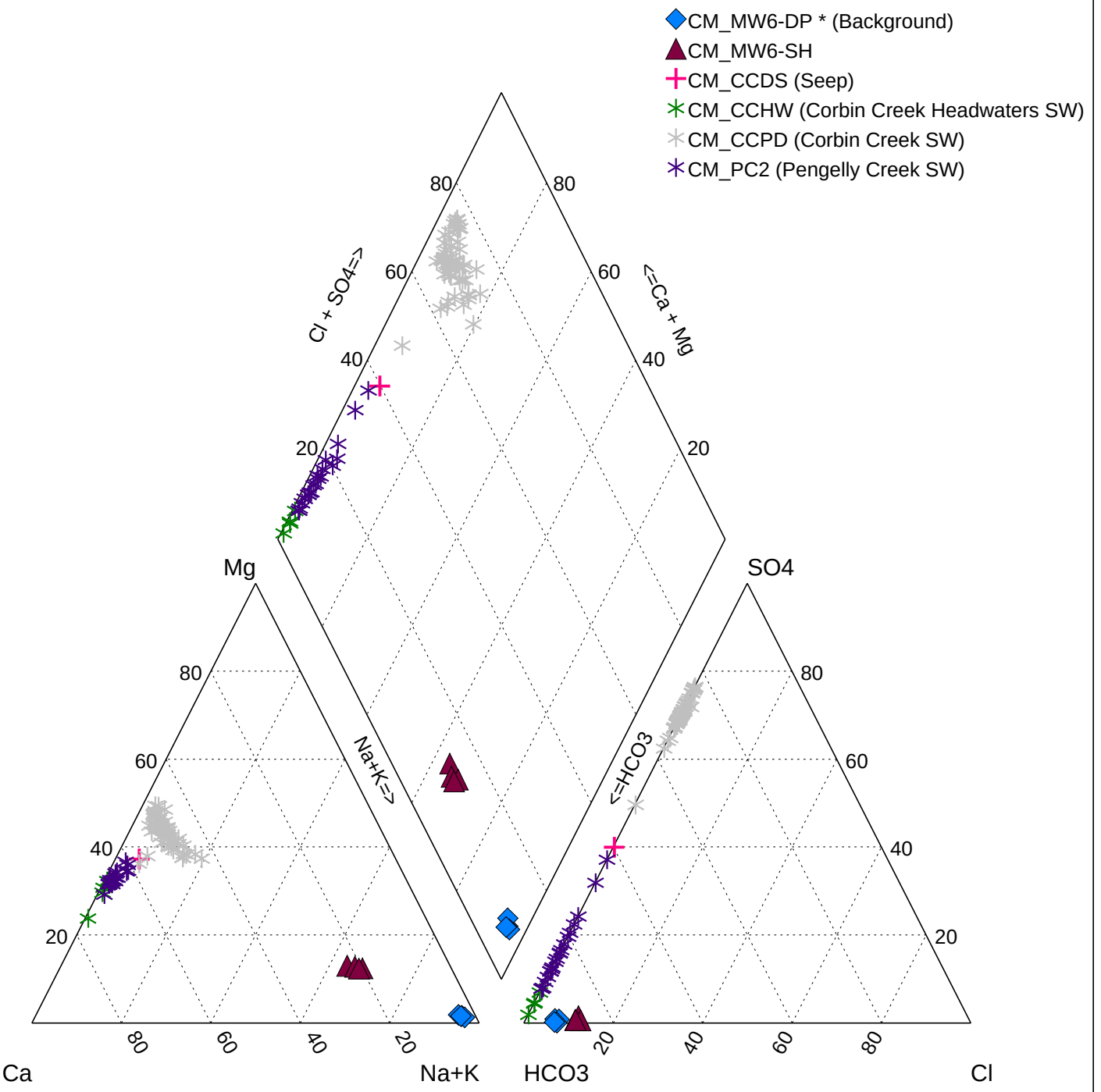
Teck Coal Ltd. 2013. *2013 Life of Mine Plan*: Coal Mountain Operations. July 16, 2013.

Figures:

Figure CM-01: Corbin Pond - Hydrograph



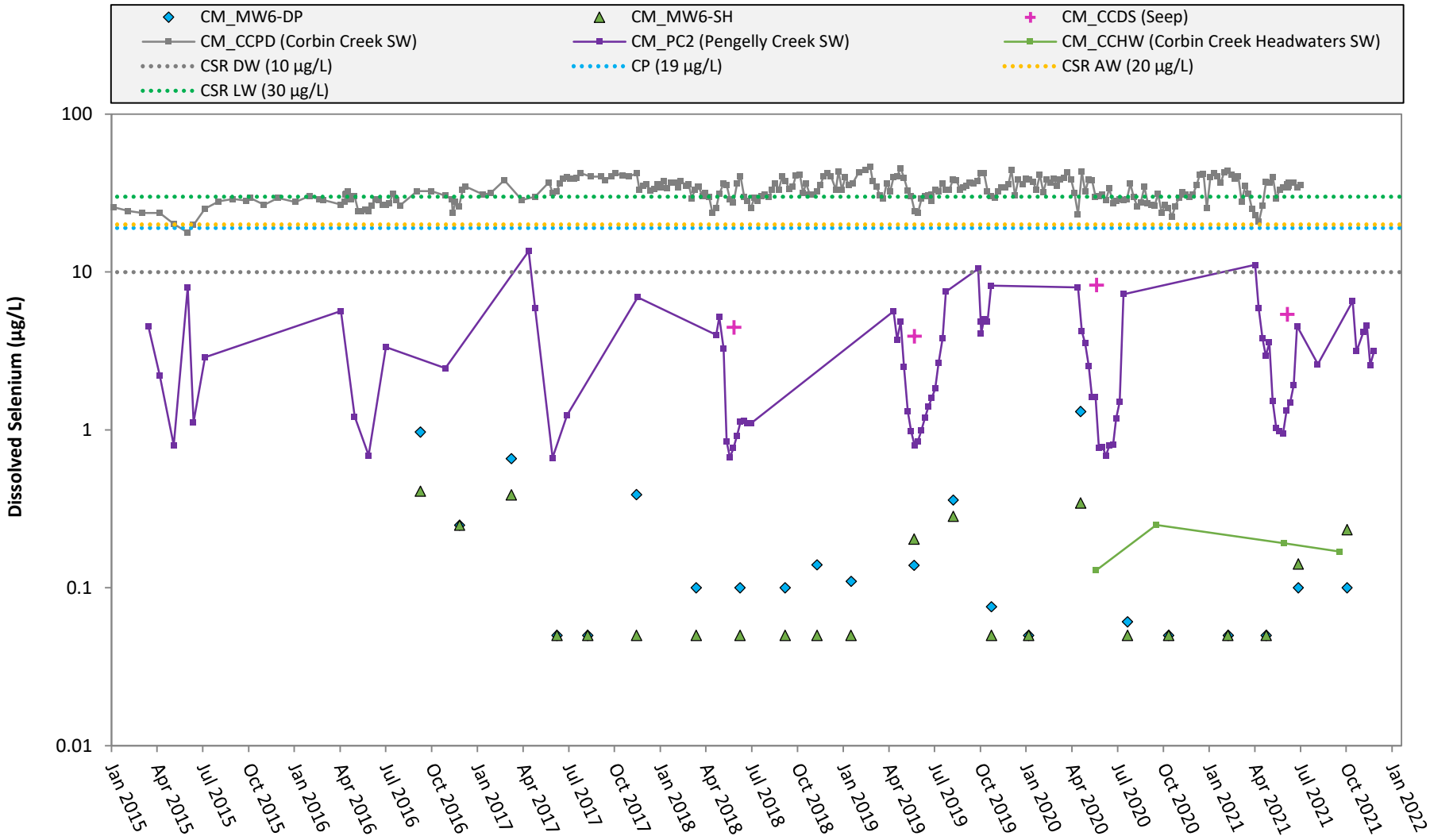
Note: Precipitation data presented for Environment Canada Sparwood station November 2016 to April 2017.



* Bedrock Monitoring Well

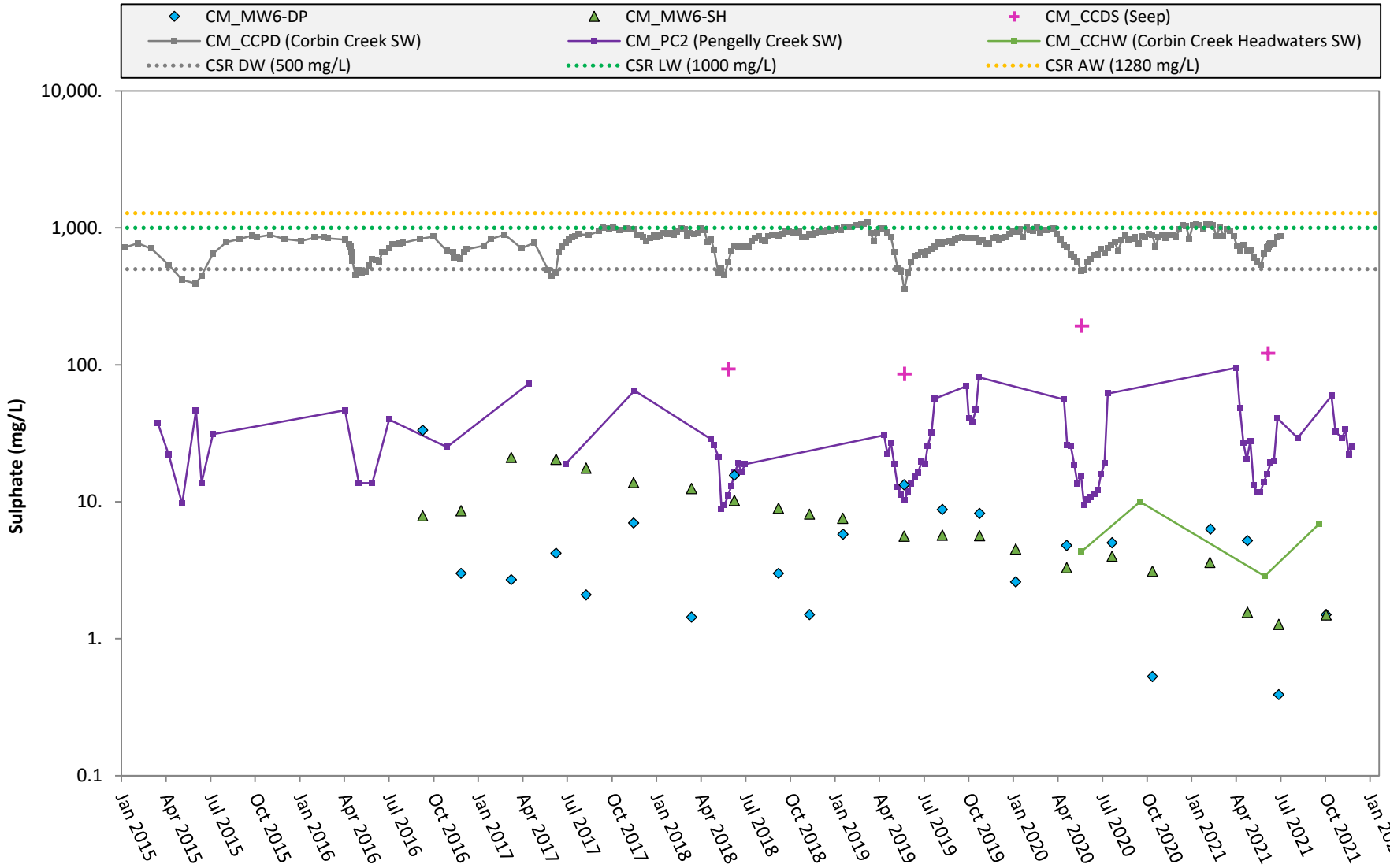
DESCRIPTION: Figure CM-02: Corbin Pond - Piper Diagram		
	PROJECT: 2021 RGMP SSGMP Annual Report	PROJECT NO: 635544
	CLIENT: Teck Coal Limited	DATE: 2022-03-05

Figure CM-03: Corbin Pond - Dissolved Selenium



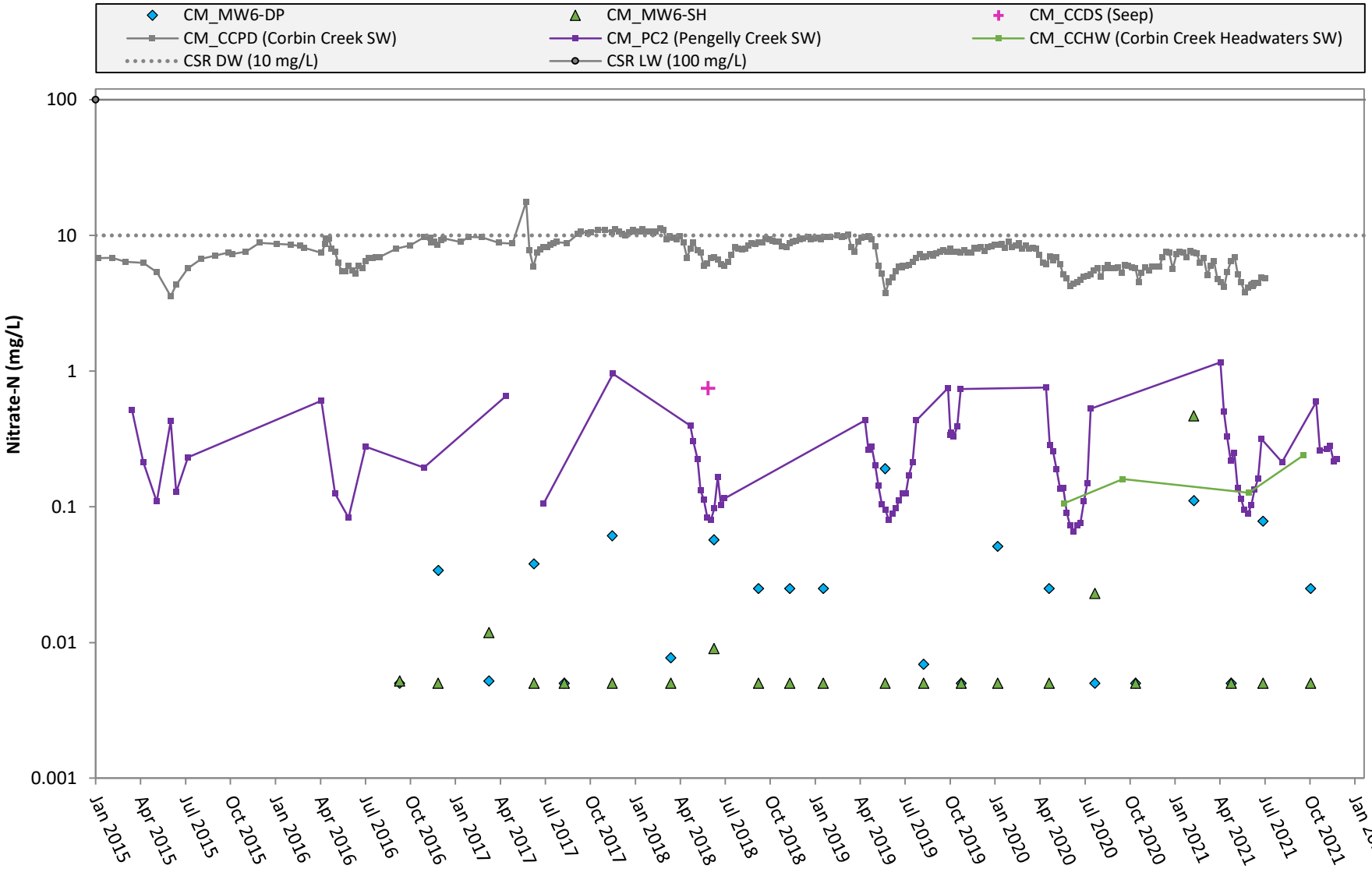
Notes: For concentrations measured below the method detection limit, the method detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure CM-04: Corbin Pond - Sulphate



Note: Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure CM-05: Corbin Pond - Nitrate-N



Note: For concentrations measured below the method detection limit, the method detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure CM-06: Corbin Pond - Se:SO_4 (S)

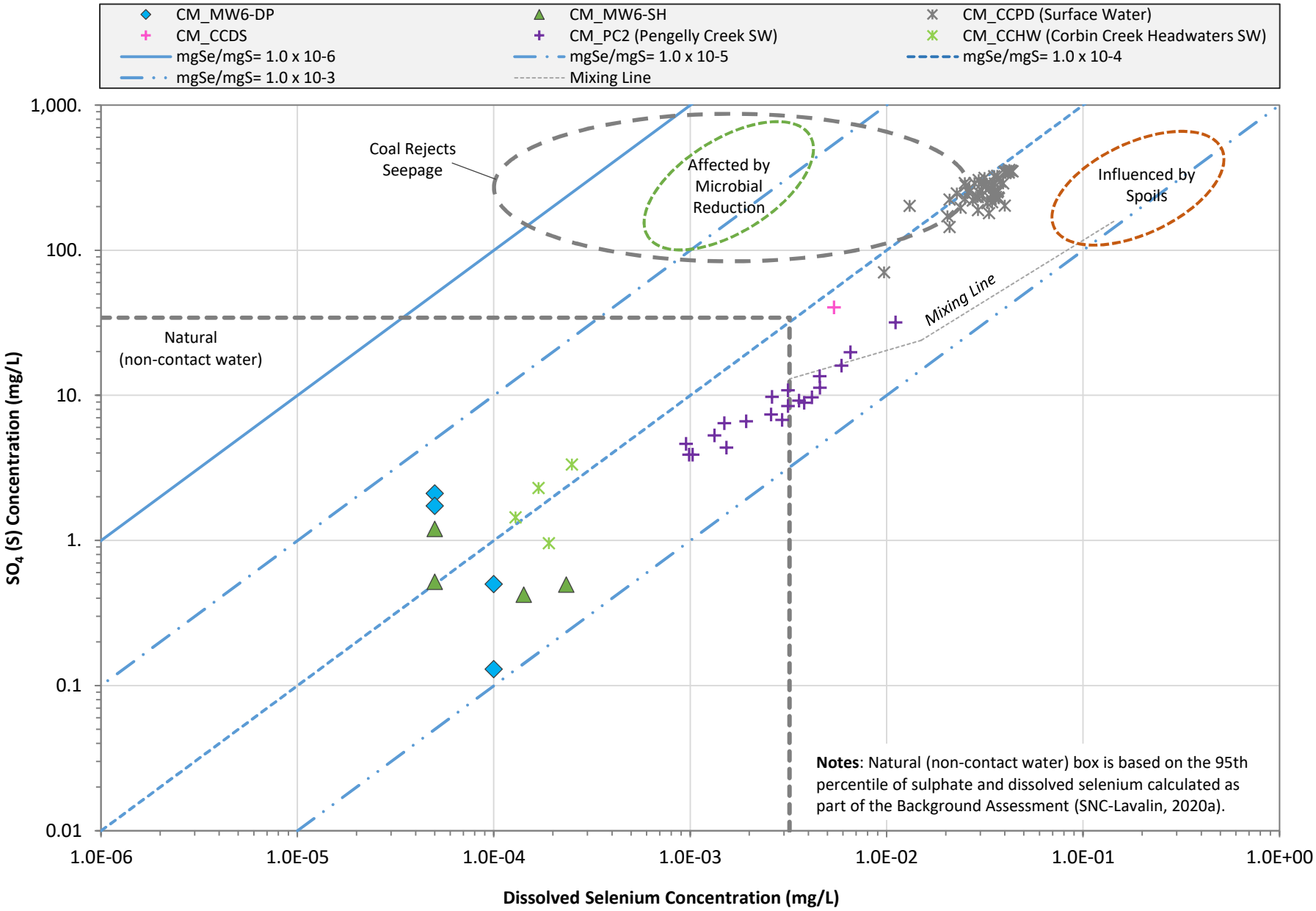
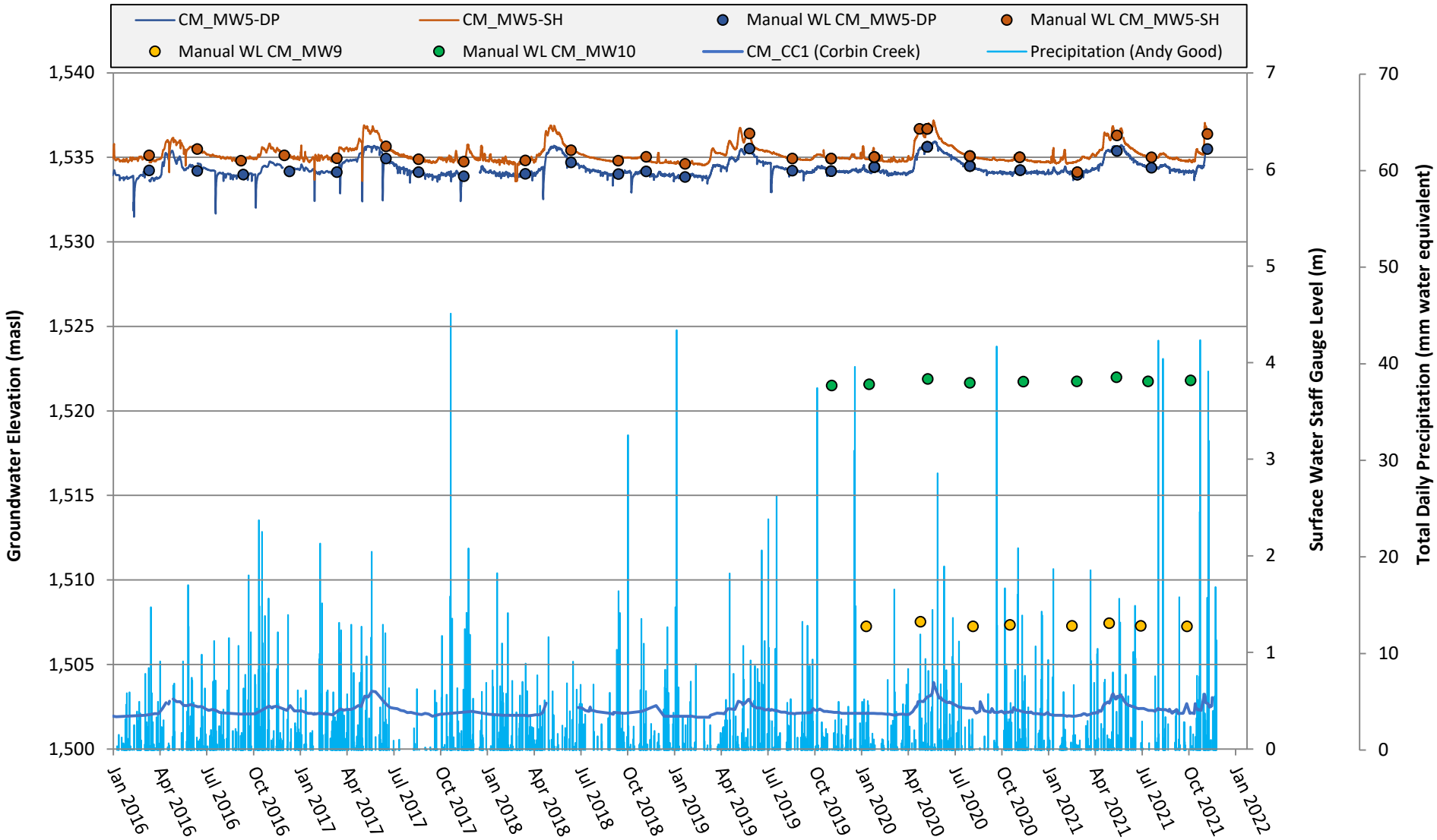
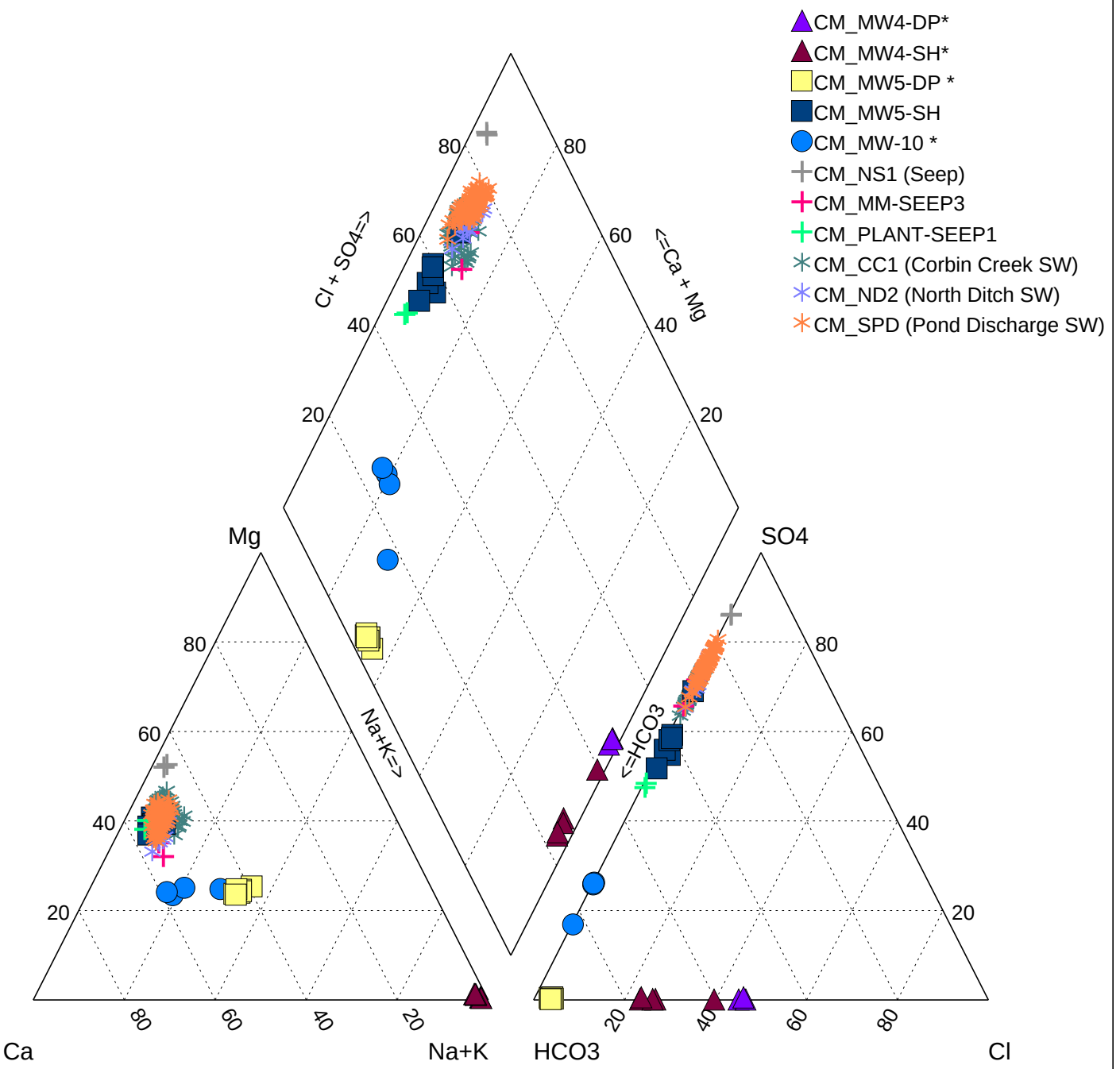


Figure CM-07: Lower Corbin Creek Valley - Hydrograph



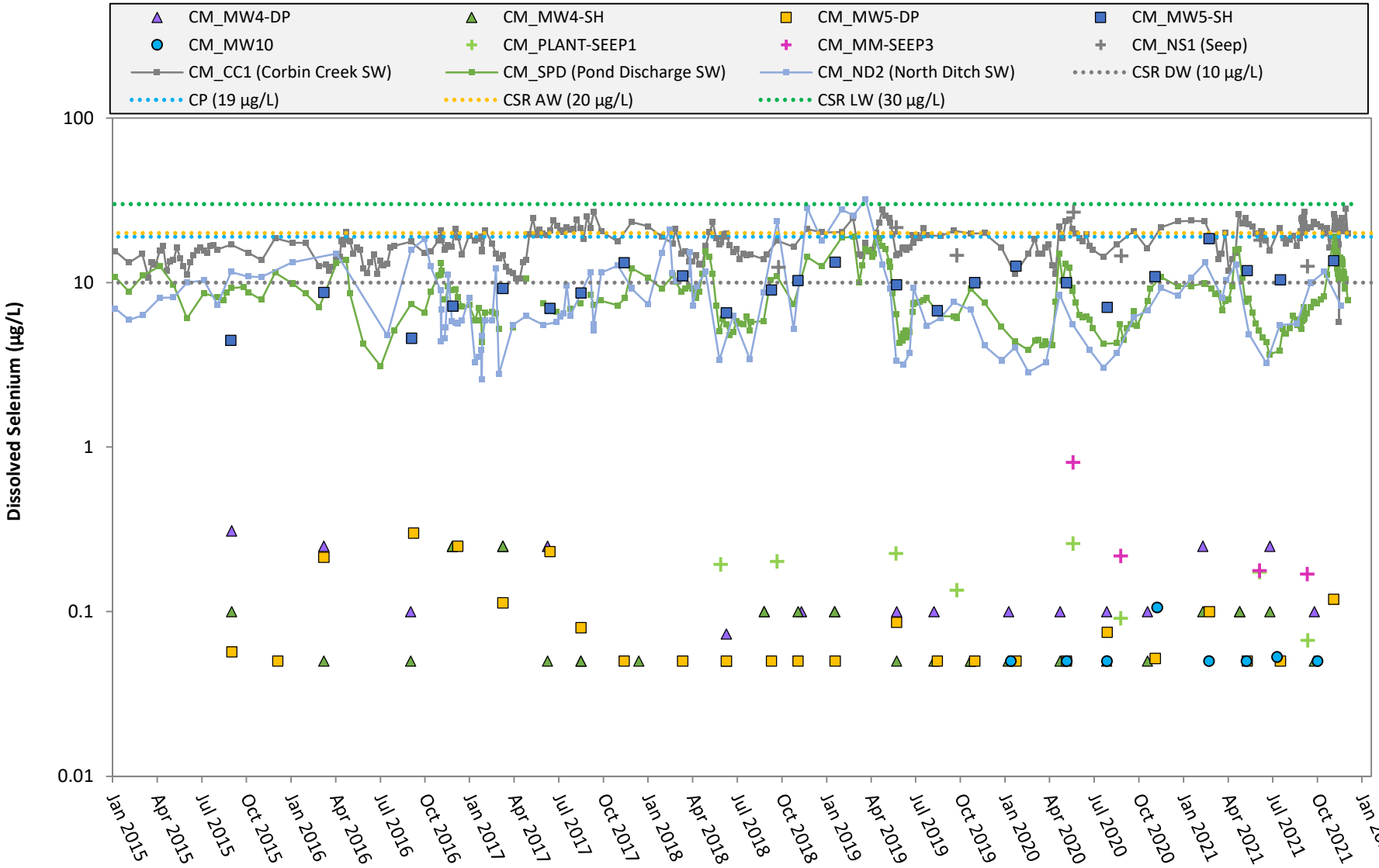
Notes: Precipitation data presented for Environment Canada Sparwood station November 2016 to April 2017. Continuous water level data was compensated using barologger installed at CM_BARO (CM_MW5). Select data points were removed where values were not considered to be representative of actual conditions.



* Bedrock Monitoring Well

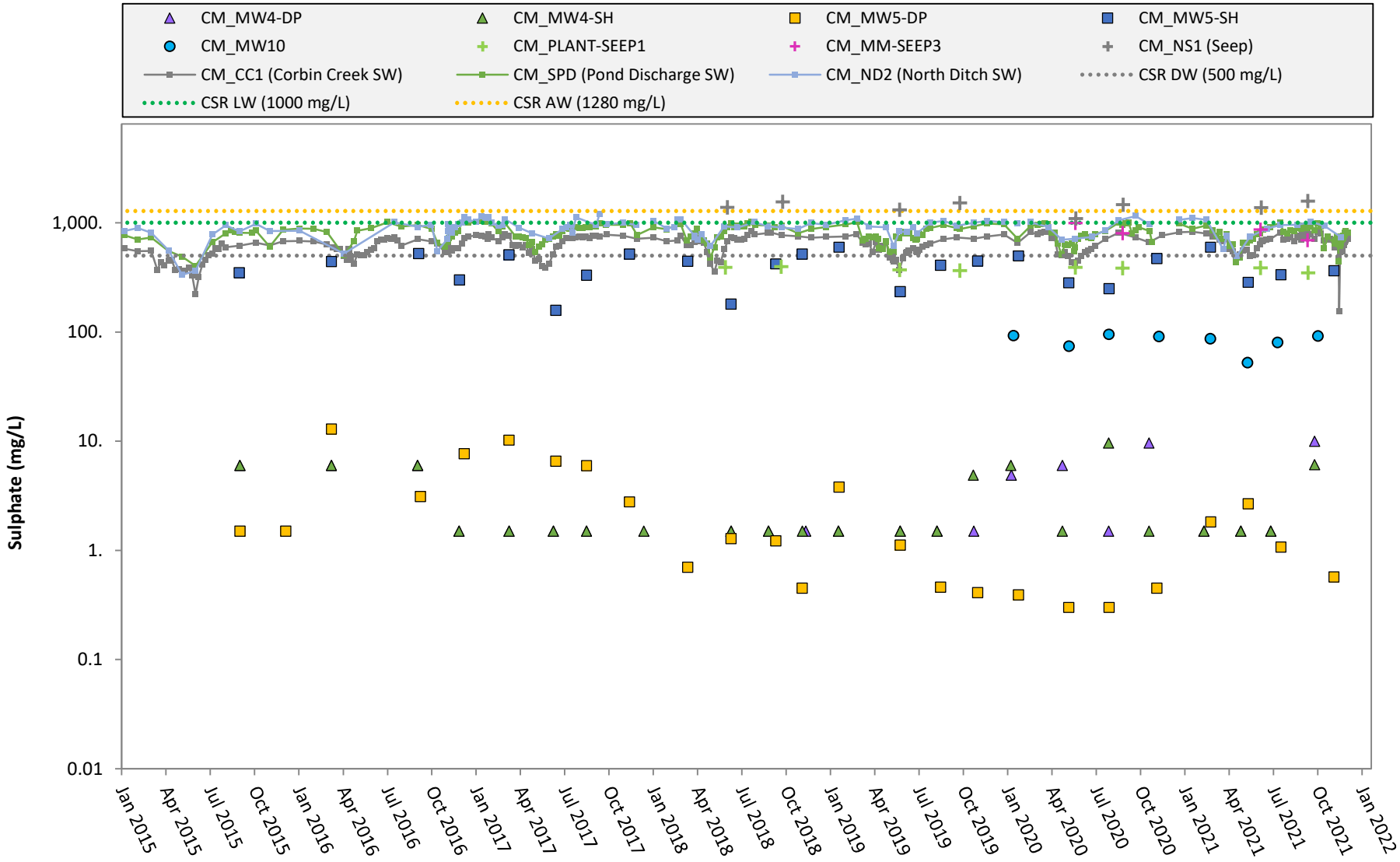
DESCRIPTION: Figure CM-08: Lower Corbin Creek - Piper Diagram		
	PROJECT: 2021 RGMP SSGMP Annual Report	PROJECT NO: 635544
	CLIENT: Teck Coal Limited	DATE: 2022-03-05

Figure CM-09: Lower Corbin Creek Valley - Dissolved Selenium



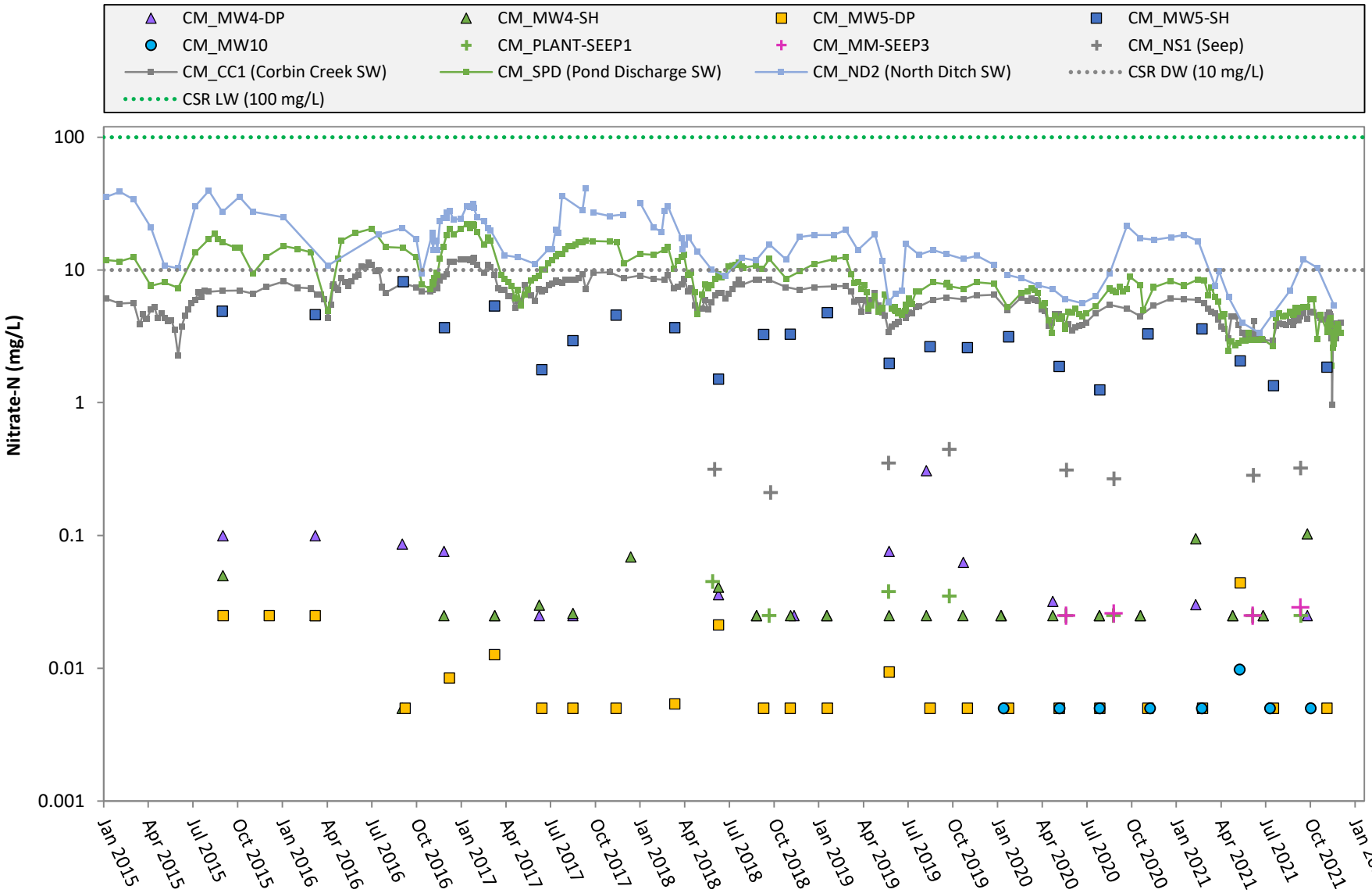
Notes: For concentrations measured below the method detection limit, the method detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure CM-10: Lower Corbin Creek Valley - Sulphate



Note: For concentrations measured below the method detection limit, the method detection limit (0.3 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure CM-11: Lower Corbin Creek Valley - Nitrate-N



Note: For concentrations measured below the method detection limit, the method detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure CM-12: Lower Corbin Creek Valley - Se:SO_4 (S)

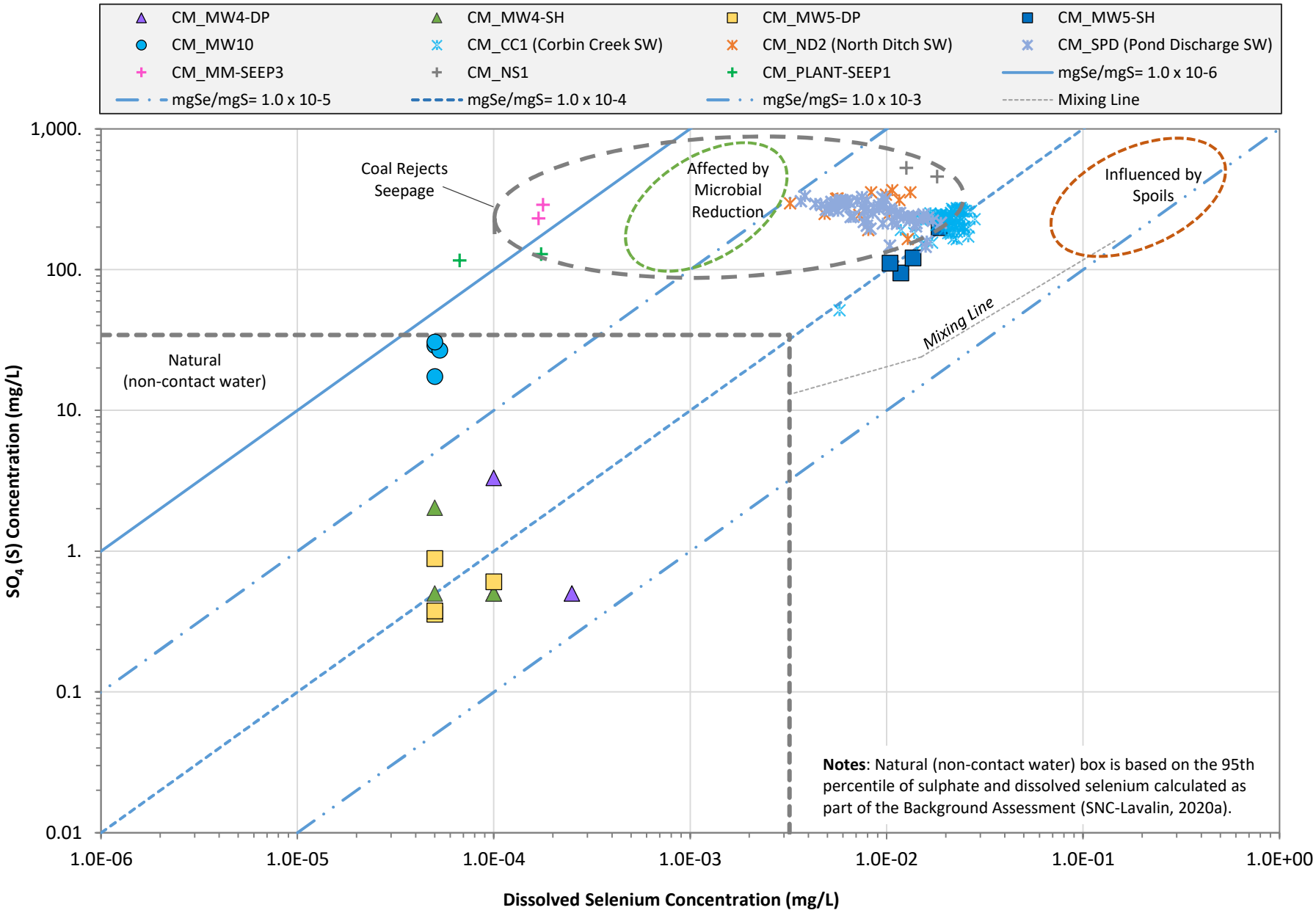
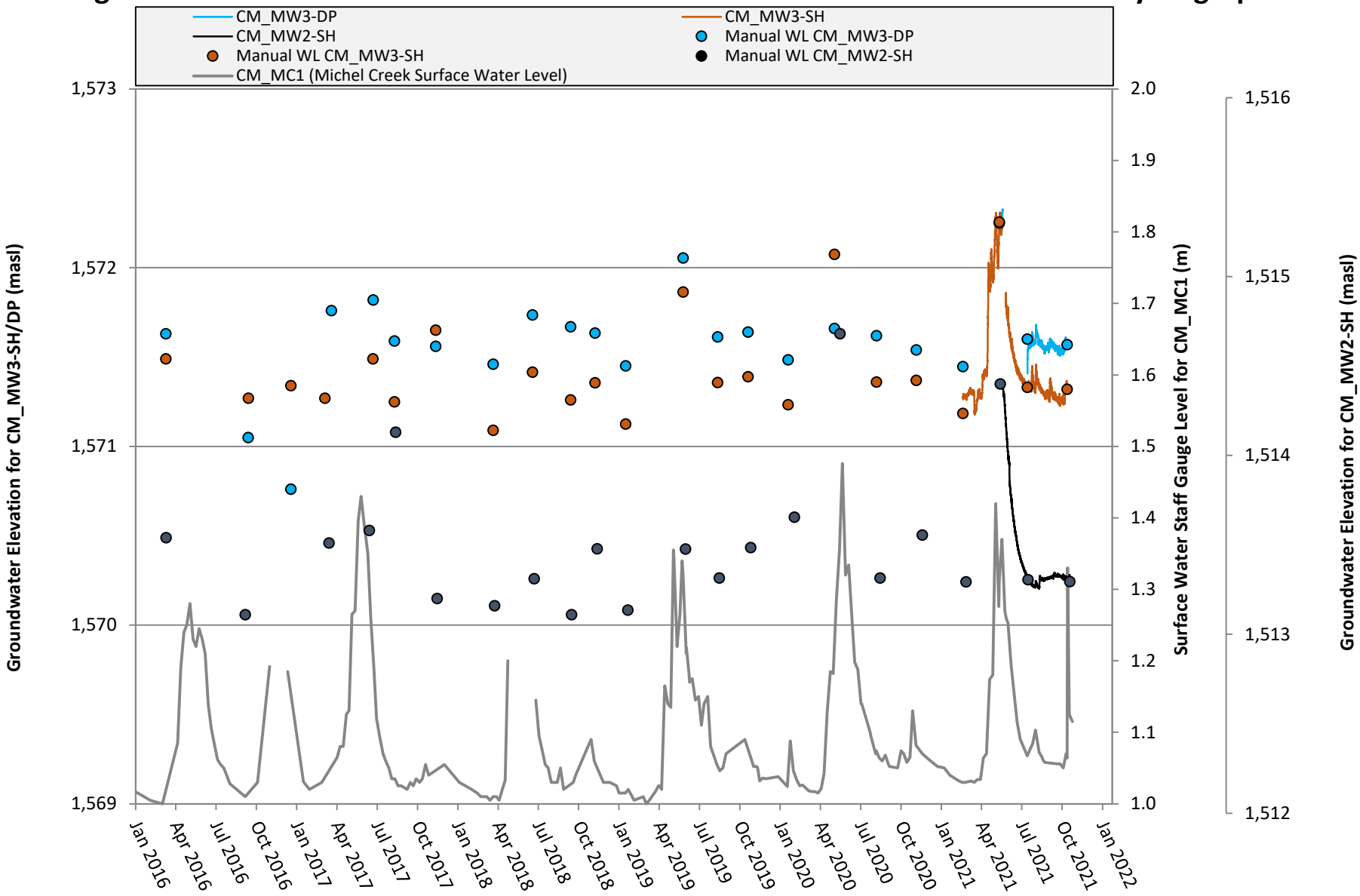
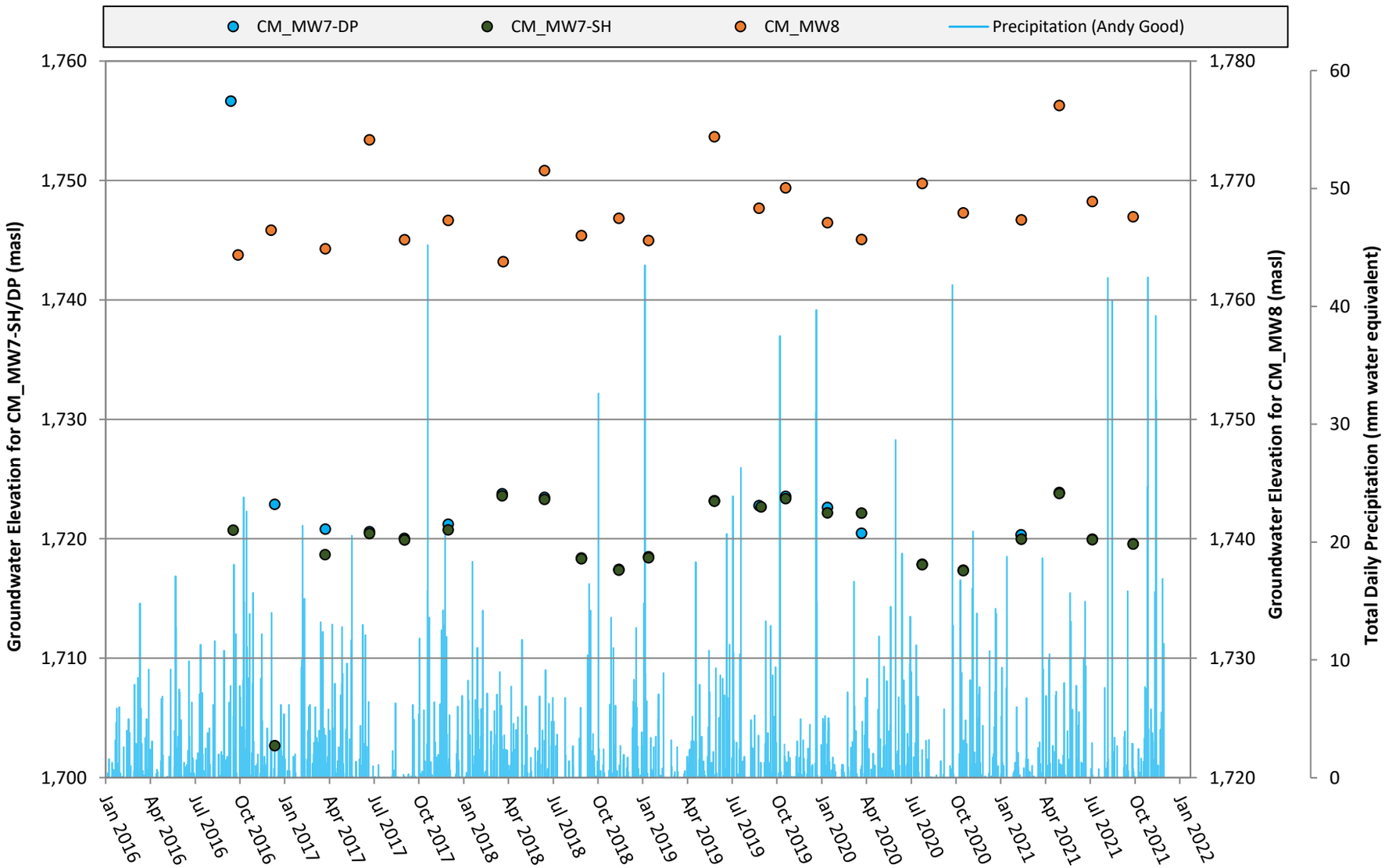


Figure CM-13: Michel Creek Watershed above Confluence with Corbin Creek - Hydrograph

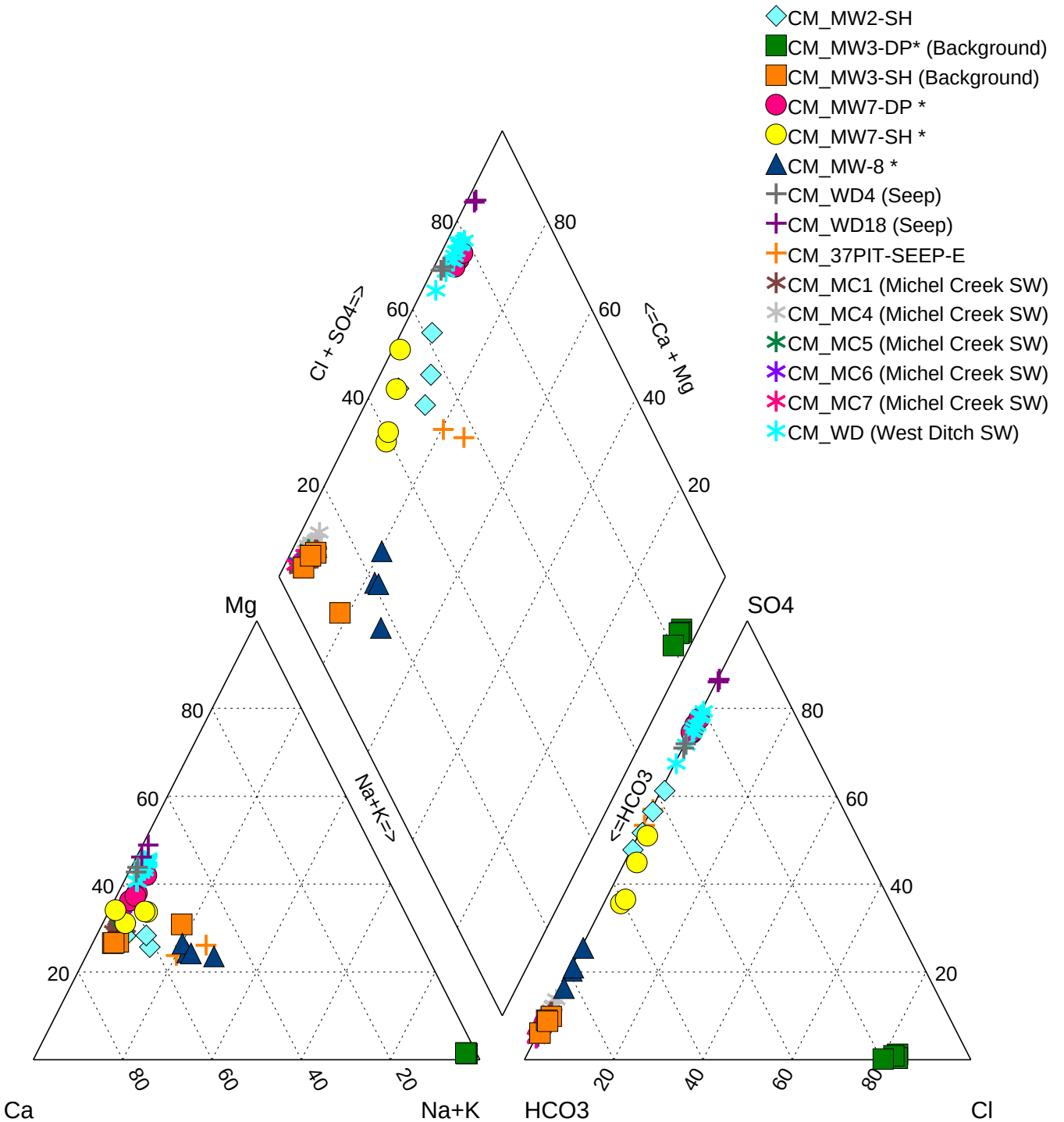


Note: Continuous water level data was compensated using barologger installed at CM_BARO (CM_MW5). Select data points were removed where values were not considered to be representative of actual conditions.

Figure CM-14: Coal Mountain Mine Footprint above Michel Creek - Hydrograph



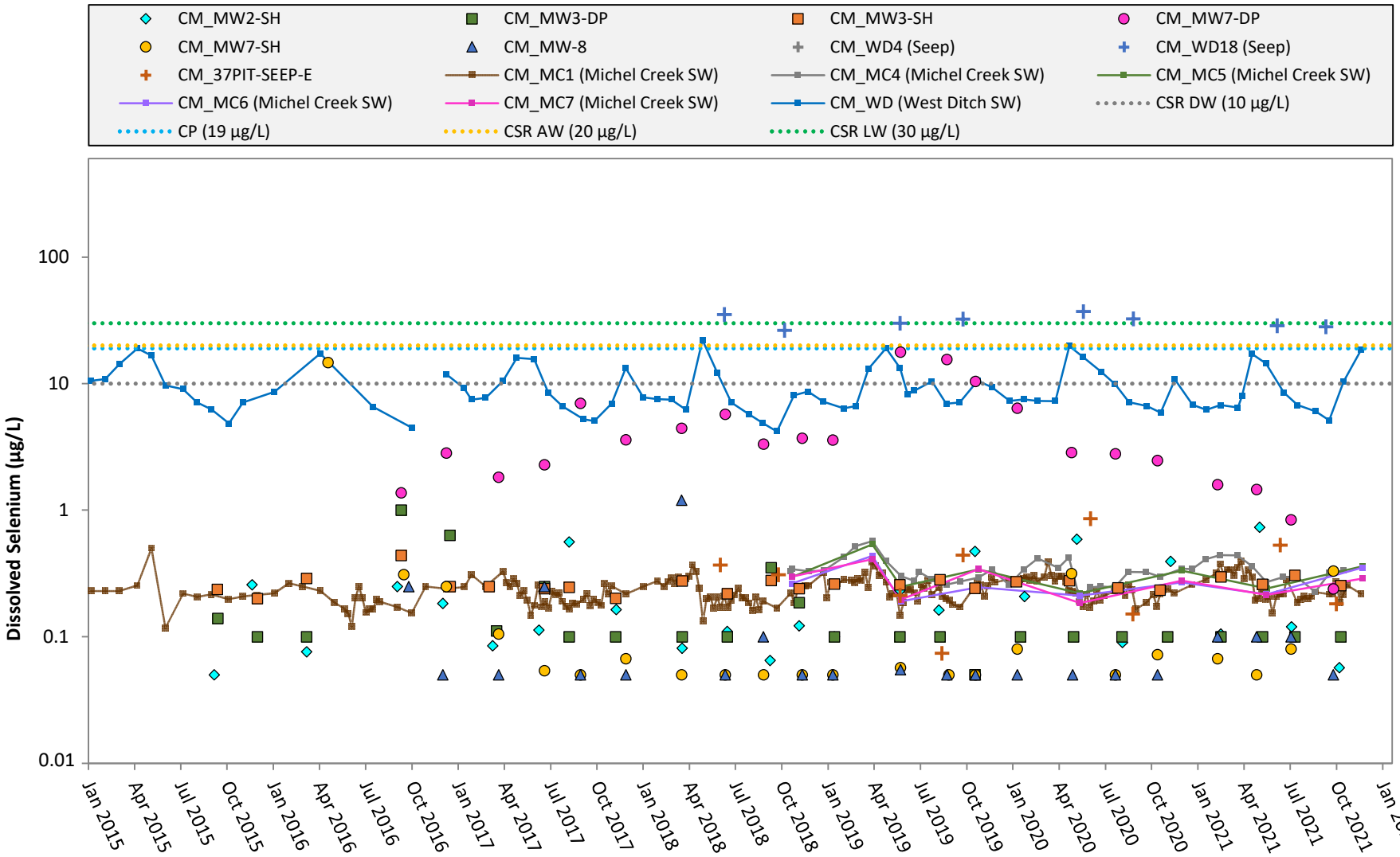
Note: Precipitation data presented for Environment Canada Sparwood station November 2016 to April 2017.



* Bedrock Monitoring Well

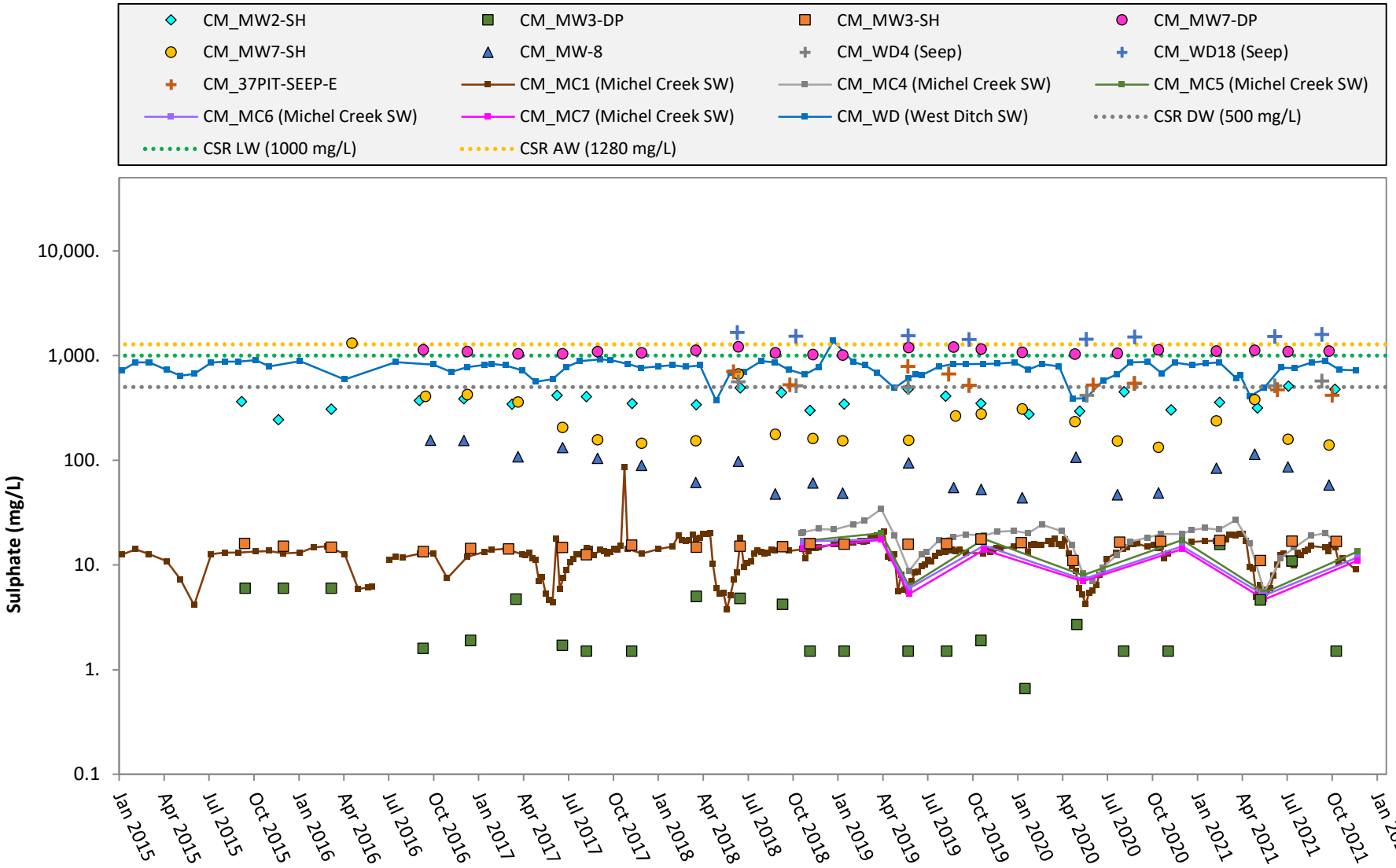
DESCRIPTION: Figure CM-15: Michel Creek above Confluence with Corbin Creek - Piper Diagram		
	PROJECT: 2021 RGMP SSGMP Annual Report	PROJECT NO: 635544
	CLIENT: Teck Coal Limited	DATE: 2022-01-28

Figure CM-16: Michel Creek Watershed above Confluence with Corbin Creek - Dissolved Selenium



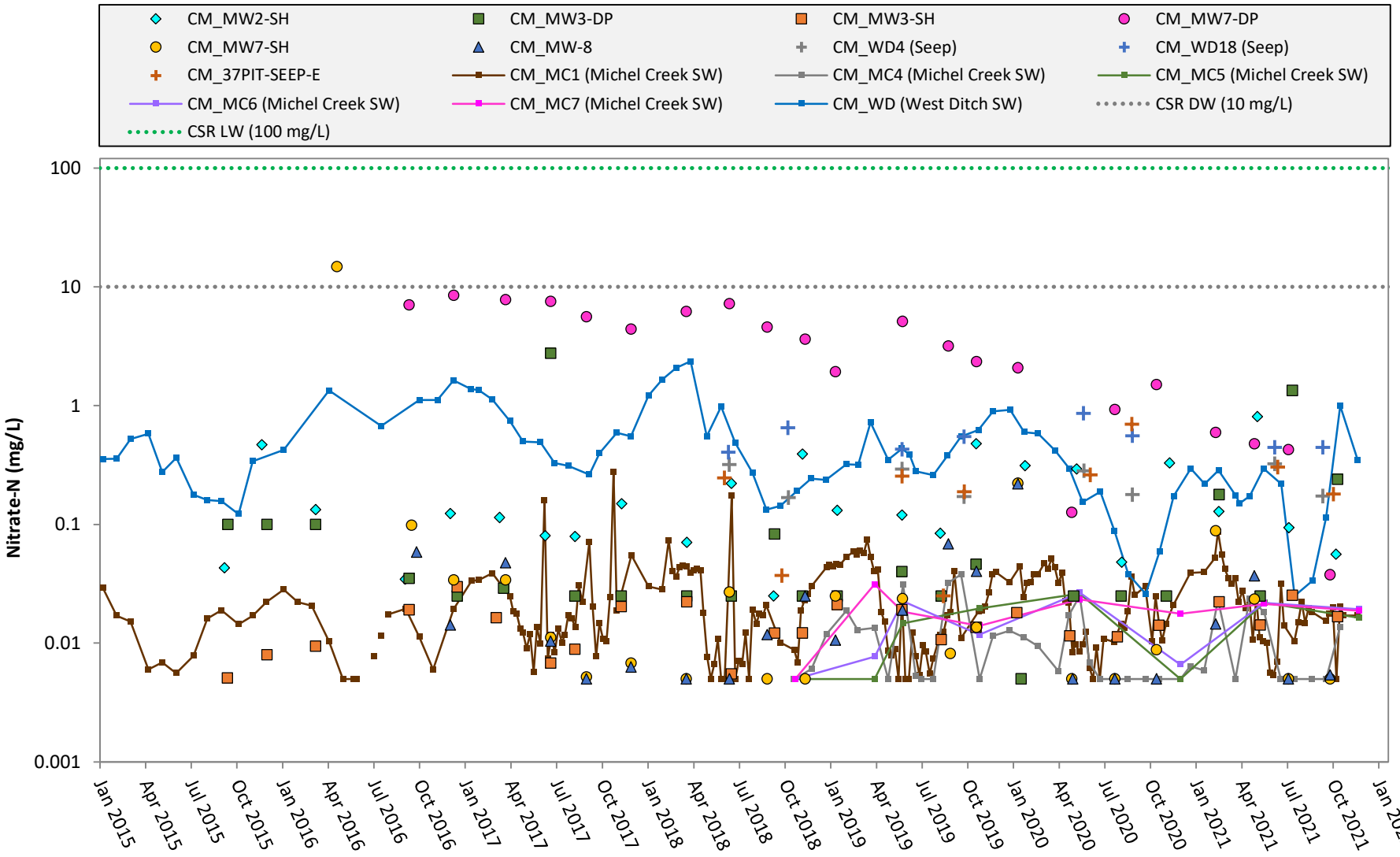
Notes: For concentrations measured below the method detection limit, the method detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria. CM_WD4 and CM_WD18 drain into Corbin Creek, and are included here for comparison purposes for GW which may be reporting to Michel Creek.

Figure CM-17: Michel Creek Watershed above Confluence with Corbin Creek - Sulphate



Note: Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria. CM_WD4 and CM_WD18 drain into Corbin Creek, and are included here for comparison purposes for GW which may be reporting to Michel Creek.

Figure CM-18: Michel Creek Watershed above Confluence with Corbin Creek - Nitrate-N



Note: For concentrations measured below the method detection limit, the method detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria. CM_WD4 and CM_WD18 drain into Corbin Creek, and are included here for comparison purposes for GW which may be reporting to Michel Creek.

Figure CM-19: Michel Creek Watershed above Confluence with Corbin Creek - Se:SO_4 (S)

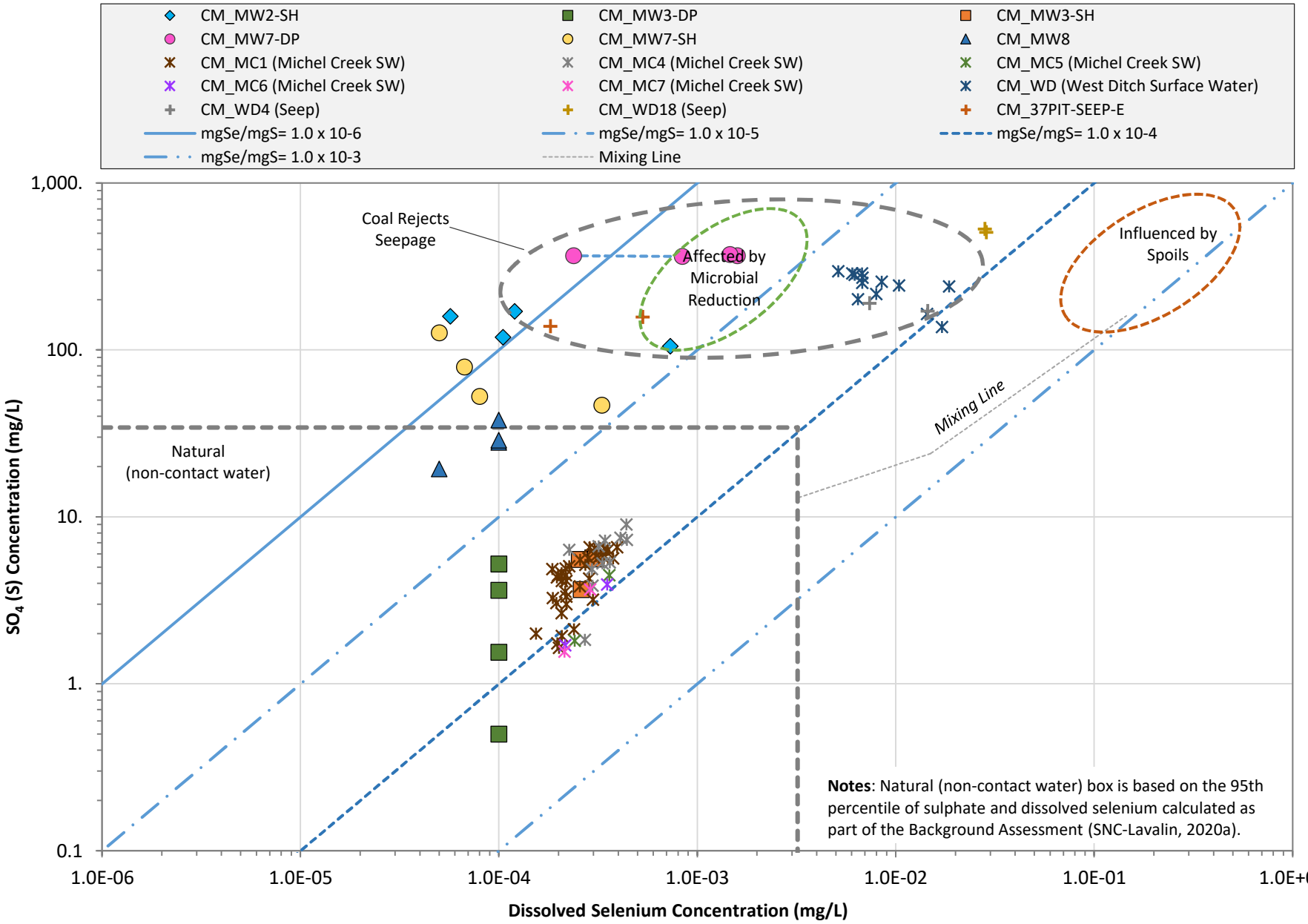
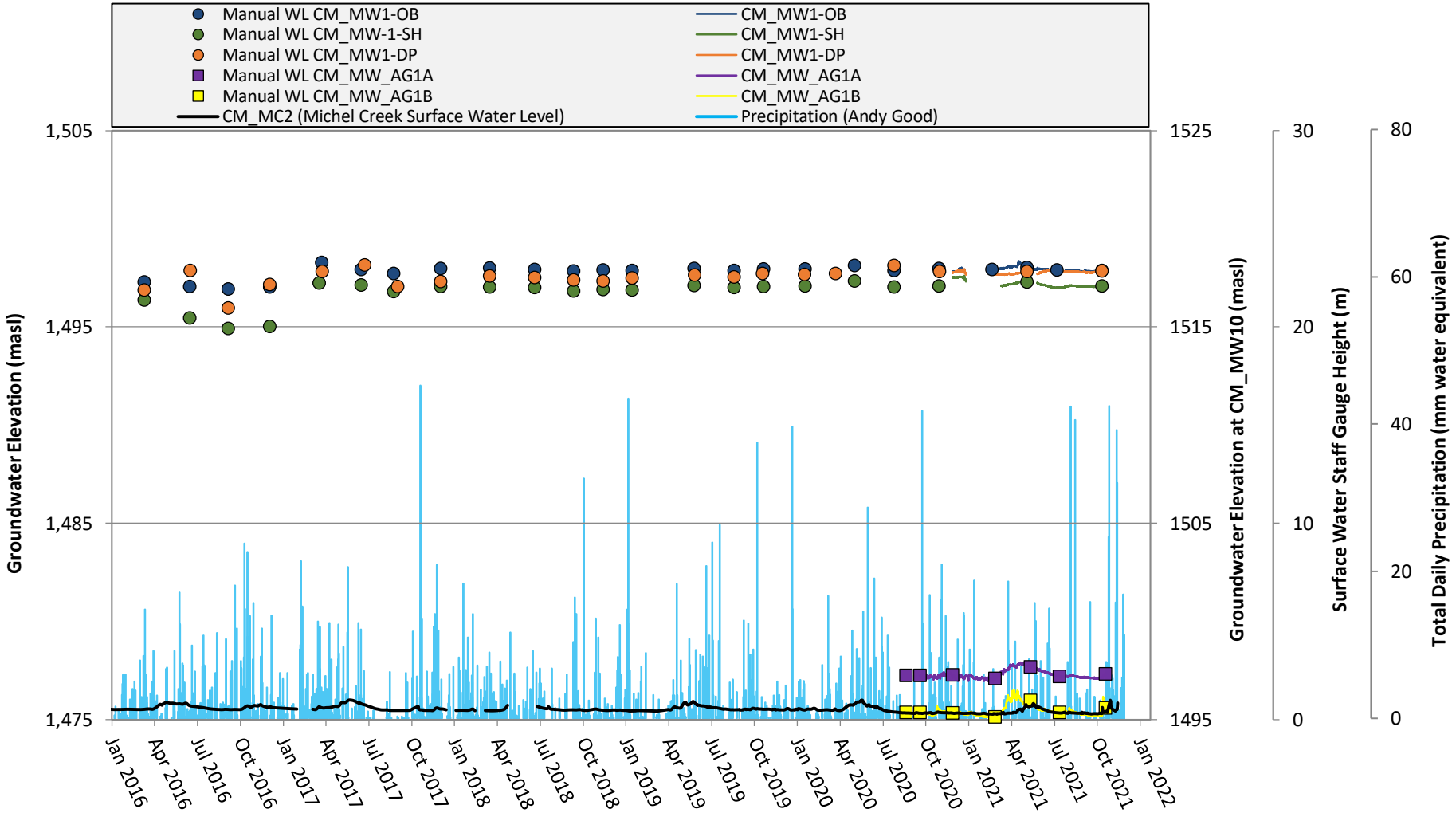
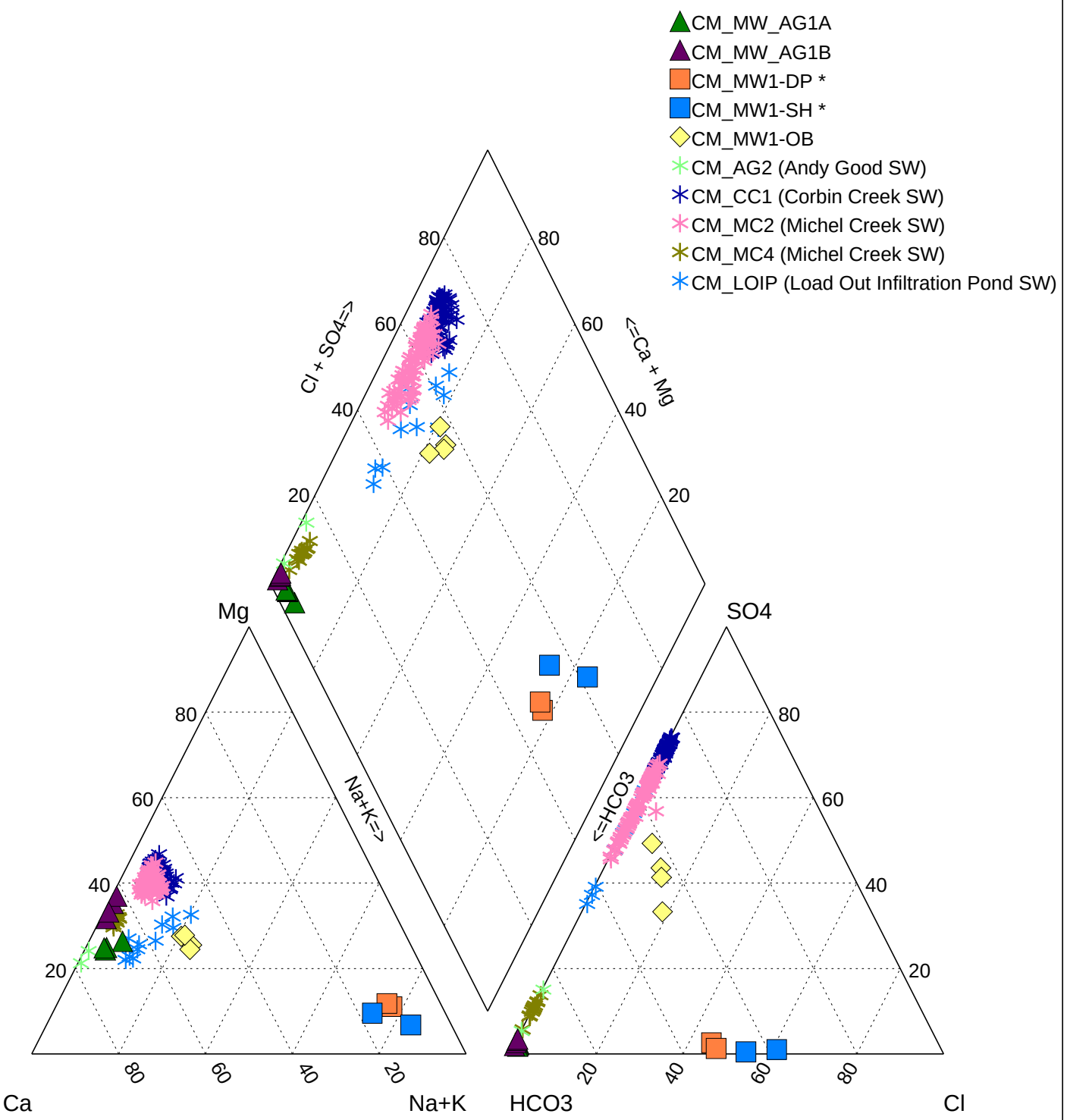


Figure CM-20: Michel Creek Watershed below Confluence with Corbin Creek



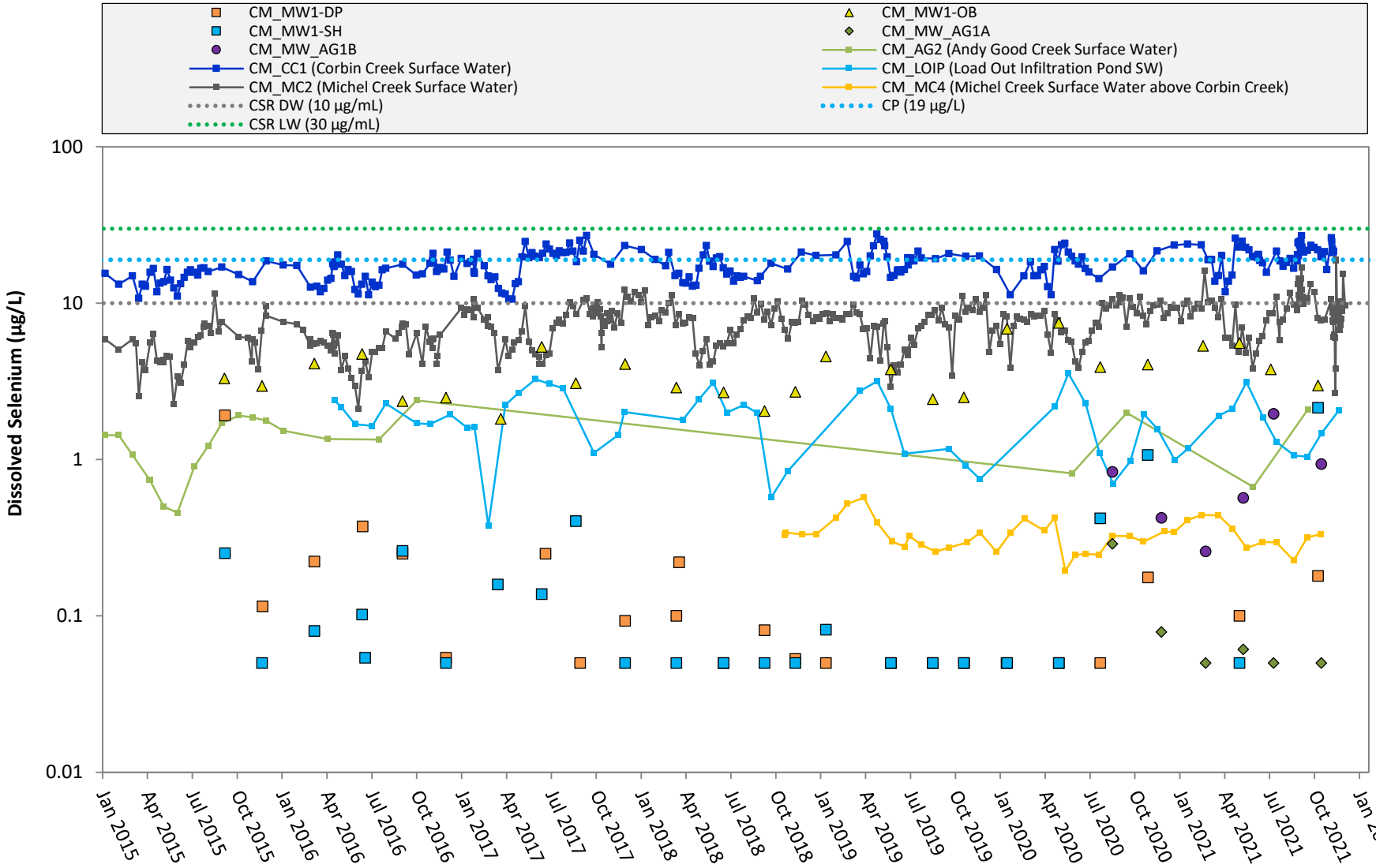
Note: Precipitation data presented for Environment Canada Sparwood station November 2016 to April 2017. Continuous water level data was compensated using barologger installed at CM_BARO (CM_MW5). Select data points were removed where values were not considered to be representative of actual conditions.



* Bedrock Monitoring Well

DESCRIPTION: Figure CM-21: Michel Creek below Confluence with Corbin Creek - Piper Diagram		
	PROJECT: 2021 RGMP SSGMP Annual Report	PROJECT NO: 635544
	CLIENT: Teck Coal Limited	DATE: 2022-03-08

Figure CM-22: Michel Creek Watershed below Confluence with Corbin Creek - Dissolved Selenium Concentrations



Notes: For concentrations measured below the method detection limit, the method detection limit (0.05 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria. The compliance point "CP" corresponds to location CM_MC2.

Figure CM-23: Michel Creek Watershed below Confluence with Corbin Creek - Sulphate Concentrations

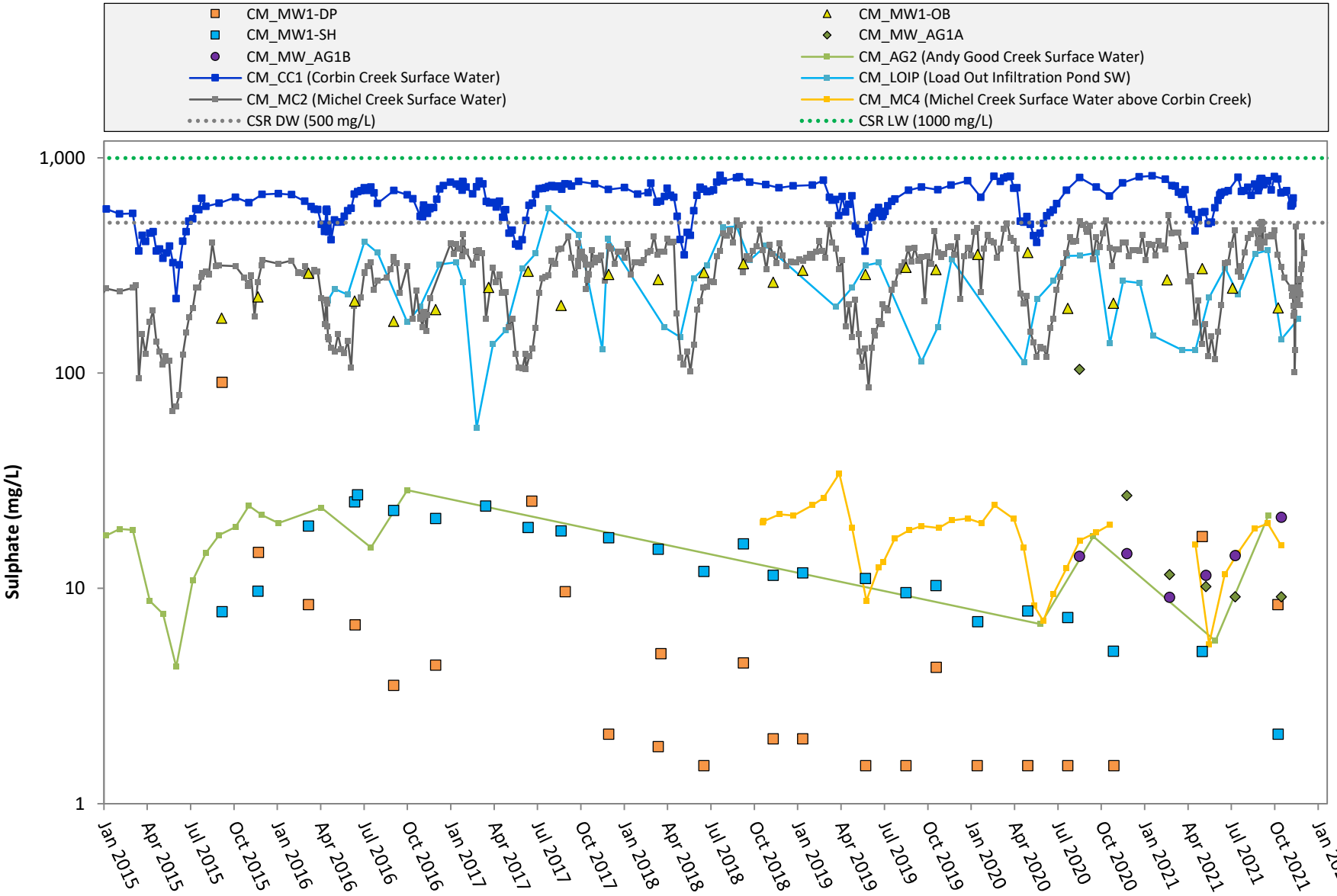
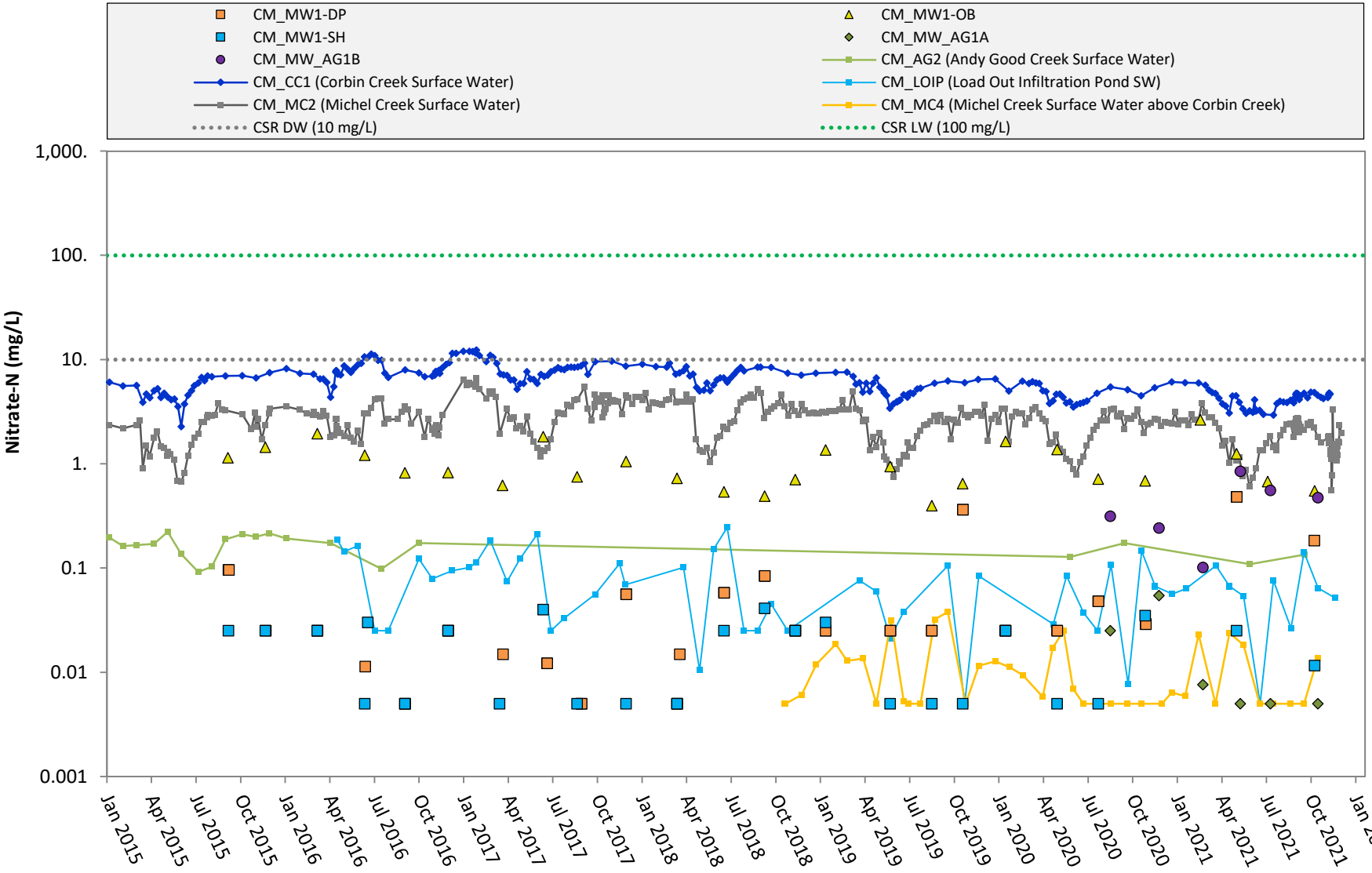
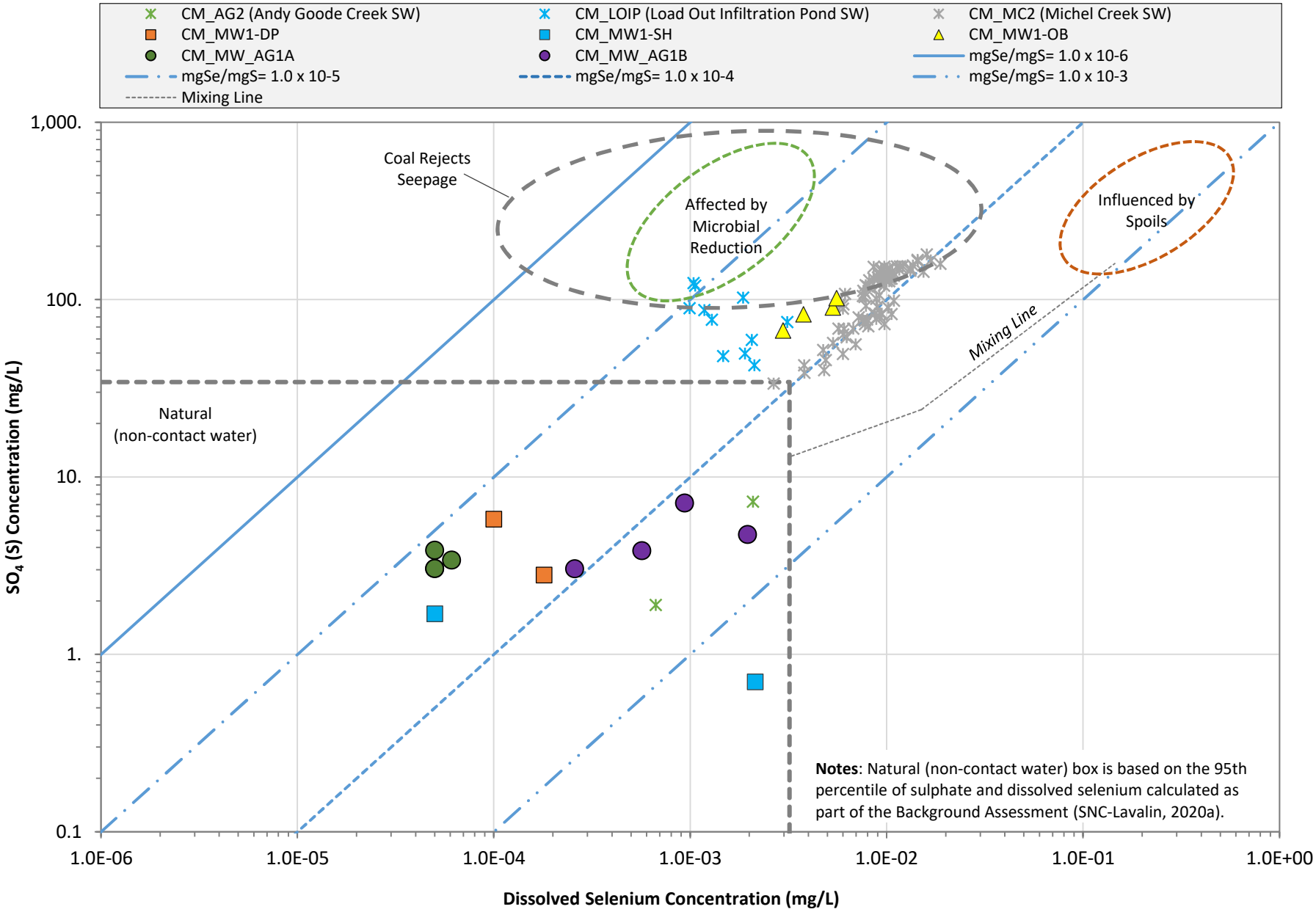


Figure CM-24: Michel Creek Watershed below Confluence with Corbin Creek - Nitrate-N Concentrations



Note: For concentrations measured below the method detection limit, the method detection limit (0.005 mg/L) was utilized for plotting purposes. Logarithmic scale has been applied on distribution of concentrations relative to applicable screening criteria.

Figure CM-25: Michel Creek Watershed below Confluence with Corbin Creek - Se:SO_4 (S)



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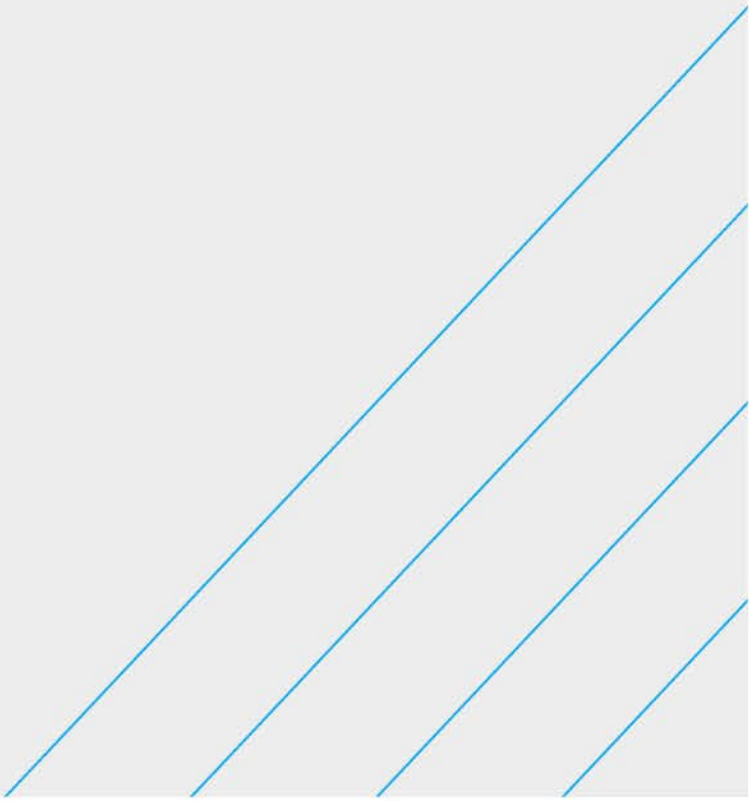


TABLE CM-01: Summary of Well Installation Details and Hydrogeological Information (CMm)

Area	Well ID	Monitoring Program[a]	Well Type	Logs (Y/N)	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation	Stick Up Height	Drilled Depth	Well Diameter	Top of Screen Depth	Bottom of Screen Depth	Screened Formation	Depth to Bedrock	Hydraulic Conductivity
					Easting	Northing	masl	masl	m	mbgs	mm	mbgs	mbgs		mbgs	m/s
Corbin Creek Valley	CM_MW4-SH	SSGMP	Monitoring	Y	668566	5487348	1512.40	1513.32[c]	0.92	28.5	51	16.0	19.0	Bedrock	3.2	-
	CM_MW4-DP	SSGMP	Monitoring	Y	668566	5487348	1512.40	1513.32[c]	0.92	28.5	51	25.1	28.2	Bedrock	3.2	-
	CM_MW5-SH	SSGMP	Monitoring	Y	669476	5487365	1541.00	1541.88	0.98	25.9	51	7.1	10.1	Gravel	-	1.5E-04
	CM_MW5-DP	SSGMP	Monitoring	Y	669476	5487365	1541.00	1541.90	1.00	25.9	51	22.8	25.9	Bedrock	18.0	2.5E-06
	CM_MW6-SH	SSGMP	Monitoring	Y	670118	5486464	1579.66	1580.53	0.87	41.7	51	17.7	20.7	Sand	-	2.0E-06
	CM_MW6-DP[b]	SSGMP, RGMP	Monitoring	Y	670118	5486464	1579.66	1580.53	0.87	41.7	51	38.7	41.7	Bedrock	21.8	< 1E-07
	CM_MW9	SSGMP	Monitoring	Y	668563	5487346	1510.27	1510.27	0.88	3.7	51	1.5	2.4	Sand/Silt	2.4	-
	CM_MW10	SSGMP	Monitoring	Y	668582	5487630	1535.27	1535.27	0.93	23.9	51	21.0	22.6	Weathered bedrock	20.7	1.2E-07
Michel Creek Valley	CM_MW1-OB	SSGMP, RGMP	Monitoring	Y	667957	5487526	1500.44	1501.21	0.77	37.3	51	2.9	4.5	Gravel	-	1.2E-04
	CM_MW1-SH[f]	SSGMP, RGMP	Monitoring	Y	667957	5487526	1500.44	1501.23	0.79	37.3	51	20.4	23.5	Bedrock	18.0	2.0E-07
	CM_MW1-DP[f]	SSGMP, RGMP	Monitoring	Y	667957	5487526	1500.44	1501.19	0.74	37.3	51	34.3	37.4	Bedrock	18.0	6.0E-06
	CM_MW2-SH	SSGMP	Monitoring	Y	668327	5486758	1515.56	1516.45	0.89	4.9	51	2.9	4.4	Gravel	8.0	8.2E-05
	CM_MW7-SH	SSGMP	Monitoring	Y	668833	5485920	1755.77	1756.55	0.78	78.3	51	47.5	50.6	Bedrock	31.7	3E-05
	CM_MW7-DP	SSGMP	Monitoring	Y	668833	5485920	1755.77	1756.56	0.79	78.3	51	64.8	67.5	Bedrock	31.7	3E-05
	CM_MW8	SSGMP	Monitoring	Y	668878	5484957	1847.31	1848.00	0.69	104.0	51	98.0	104.0	Bedrock	2.1	5E-09
	CM_MW3-SH[b]	SSGMP, RGMP	Monitoring	Y	668237	5482854	1573.40	1574.21	0.75	27.4	51	3.6	6.7	Clay and Gravel	6.7	3.9E-04
	CM_MW3-DP[b]	SSGMP, RGMP	Monitoring	Y	668237	5482854	1573.40	1574.16	0.76	27.4	51	13.3	16.3	Bedrock	-	1.0E-07
	CM_MW_AG1A[d,e]	SSGMP, RGMP	Monitoring	Y	667334	5488250	1477.75	1478.65	0.90	18.3	50	16.2	18.1	Silty gravel sand	-	6.1E-04
	CM_MW_AG1B[d,e]	SSGMP, RGMP	Monitoring	Y	667330	5488244	1477.61	1478.55	0.94	27.5	50	1.5	3.0	Sand	-	1.5E-05

Notes:

a: SSGMP denotes CMm Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.

b: Monitoring wells are assessed as part of the Regional Background Assessment as per the 2020 RGMP Update.

c: Measurement reference point is top of steel casing for all measurements at this monitoring well.

d: Monitoring wells added to the RGMP Program as per the 2020 RGMP Update.

e: Monitoring wells added to the SSGMP Program as per the 2021 SSGMP Update.

f: Monitored semi-annually.

masl denotes metres above sea level.

mbgs denotes metres below ground surface.

TOC denotes top of pipe casing.

"-" denotes data not available.

TABLE CM-02: Summary of Groundwater Levels and Sampling Information (CMm)

Area	Well ID	Ground Elevation	TOC Elevation (masl)		Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	PVC	Steel Casing	m	yyyy-mm-dd	mbtoc	masl		yyyy-mm-dd	m/m	Direction	Quarter	
Corbin Creek Valley	CM_MW4-SH	1512.40	-	1513.32	0.92	2021-02-25	Artesian	>1513.32	CM_MW4-SH and CM_MW4-DP	2021-02-25	-	-	Q4	Discharge Spigot
						2021-05-13	Artesian	>1513.32		2021-05-13	-	-		
						2021-07-14	Artesian	>1513.32		2021-07-14	-	-		
						2021-10-13	Artesian	>1513.32		2021-10-13	-	-		
	CM_MW4-DP	1512.40	-	1513.32	0.92	2021-02-25	Artesian	>1513.32	-	-	-	-	Q4	Discharge Spigot
						2021-05-13	Artesian	>1513.32						
						2021-07-14	Artesian	>1513.32						
						2021-10-13	Artesian	>1513.32						
	CM_MW5-SH	1541.00	1541.88	1542.00	0.88	2021-03-11	7.75	1534.13	CM_MW5-SH and CM_MW5-DP	2021-03-11	-0.011	Downward	Q1, Q2, Q3, Q4	Bladder Pump
						2021-05-28	5.59	1536.29		2021-05-28	-0.058	Downward		
						2021-08-04	6.88	1535.00		2021-08-04	-0.039	Downward		
						2021-11-22	5.50	1536.38		2021-11-22	-0.057	Downward		
	CM_MW5-DP	1541.00	1541.90	1542.00	0.90	2021-03-11	7.94	1533.97	-	-	-	-	Q1, Q2, Q3, Q4	Bladder Pump
						2021-05-28	6.52	1535.39						
						2021-08-04	7.51	1534.39						
						2021-11-22	6.41	1535.49						
	CM_MW6-SH	1579.66	1580.53	1580.54	0.87	2021-02-24	7.59	1572.95	CM_MW6-SH and CM_MW6-DP	2021-02-24	0.109	Upward	-	Bladder Pump
						2021-05-12	5.38	1575.16		2021-05-12	0.069	Upward		
						2021-07-15	7.72	1572.81		2021-07-15	0.160	Upward		
						2021-10-21	7.36	1573.17		2021-10-21	0.117	Upward		
	CM_MW6-DP	1579.66	1580.53	1580.54	0.87	2021-02-24	5.30	1575.23	-	-	-	-	-	Bladder Pump
						2021-05-12	3.92	1576.61						
						2021-07-15	4.36	1576.17						
						2021-10-21	4.90	1575.63						
	CM_MW9	1510.30	1510.27	-	0.88	2021-03-01	2.98	1507.29	-	-	-	-	-	-
						2021-05-13	2.83	1507.44						
						2021-07-14	2.99	1507.28						
						2021-10-13	3.01	1507.26						
	CM_MW10	1535.27	1536.20	-	0.93	2021-03-10	13.53	1522.67	-	-	-	-	-	-
						2021-05-27	13.28	1522.92						
						2021-07-28	13.52	1522.68						
						2021-10-20	13.46	1522.74						

Notes:
TOC denotes top of pipe casing.
masl denotes metres above sea level.
mbtoc denotes meters below top of casing.
"-" denotes data not available.
Quarter is represented as Q1, Q2, Q3, Q4.

TABLE CM-02: Summary of Groundwater Levels and Sampling Information (CMm)

Area	Well ID	Ground Elevation	TOC Elevation (masl)		Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Date of Static Water Level Measurement	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	PVC	Steel Casing	m	yyyy-mm-dd	mbtoc	masl		yyyy-mm-dd	m/m	Direction	Quarter	
Michel Creek Valley	CM_MW1-OB	1500.44	1501.21	1501.29	0.77	2021-03-05	3.30	1497.91	CM_MW1-OB and CM_MW1-SH	2021-03-05	-	-	Q2, Q3, Q4	Bladder Pump
						2021-05-19	3.19	1498.02		2021-05-19	-0.041	Downward		
						2021-07-22	3.33	1497.88		2021-07-22	-	-		
						2021-10-27	3.35	1497.86		2021-10-27	-0.044	Downward		
	CM_MW1-SH	1500.44	1501.23	1501.29	0.79	2021-05-19	3.96	1497.27	CM_MW1-SH and CM_MW1-DP	2021-05-19	0.039	Upward	Q2, Q3, Q4	Bladder Pump
						2021-10-27	4.16	1497.07		2021-10-27	0.055	Upward		
	CM_MW1-DP	1500.44	1501.19	1501.29	0.74	2021-05-19	3.38	1497.80	-	-	-	-	Q2, Q3, Q4	Hydrasleeve
						2021-10-27	3.35	1497.83						
	CM_MW2-SH	1515.56	1516.45	1516.46	0.89	2021-03-03	3.15	1513.29	-	-	-	-	Q2, Q3	-
						2021-05-20	2.05	1514.40						
						2021-07-22	3.14	1513.31						
						2021-10-25	3.15	1513.30						
	CM_MW7-SH	1755.77	1756.55	1756.63	0.78	2021-02-25	36.60	1719.95	CM_MW7-SH and CM_MW7-DP	2021-02-25	0.021	Upward	-	Hydrasleeve
						2021-05-14	32.77	1723.79		2021-05-14	0.005	Upward		
						2021-07-21	36.64	1719.91		2021-07-21	0.002	Upward		
						2021-10-13	37.02	1719.53		2021-10-13	0.001	Upward		
	CM_MW7-DP	1755.77	1756.56	1756.63	0.79	2021-02-25	36.25	1720.31	-	-	-	-	-	Hydrasleeve
						2021-05-14	32.68	1723.88						
						2021-07-21	36.61	1719.95						
						2021-10-13	37.00	1719.56						
	CM_MW8	1847.31	1848.00	1847.99	0.69	2021-02-25	81.30	1766.70	-	-	-	-	-	Hydrasleeve
						2021-05-14	71.72	1776.27						
						2021-07-21	79.76	1768.24						
						2021-10-13	81.05	1766.95						
	CM_MW3-SH	1573.40	1574.21	1574.21	0.75	2021-03-04	3.03	1571.19	CM_MW3-SH and CM_MW3-DP	2021-03-04	0.027	Upward	Q2, Q3, Q4	Bladder Pump
						2021-05-26	1.96	1572.26		2021-05-26	-0.001	Downward		
						2021-07-29	2.88	1571.33		2021-07-29	0.028	Upward		
						2021-10-28	2.89	1571.32		2021-10-28	0.026	Upward		
	CM_MW3-DP	1573.40	1574.16	1574.21	0.76	2021-03-04	2.71	1571.45	-	-	-	-	Q3, Q4	Bladder Pump
						2021-05-26	1.91	1572.25						
						2021-07-29	2.56	1571.60						
						2021-10-28	2.59	1571.57						
	CM_MW_AG1A	1477.75	1478.65	-	0.90	2021-03-11	1.57	1477.08	CM_MW_AG1A and CM_MW_AG1B	2021-03-11	0.136	Upward	Q1, Q2, Q3, Q4	Peristaltic
						2021-05-27	0.98	1477.67		2021-05-27	0.117	Upward		
						2021-07-28	1.46	1477.20		2021-07-28	0.127	Upward		
						2021-11-03	1.34	1477.31		2021-11-03	0.119	Upward		
	CM_MW_AG1B	1477.61	1478.55	-	0.94	2021-03-11	3.41	1475.14	-	-	-	-	Q1, Q2, Q3, Q4	Peristaltic
						2021-05-27	2.59	1475.96						
						2021-07-28	3.19	1475.37						
						2021-11-03	2.96	1475.59						

Notes:
TOC denotes top of pipe casing.
masl denotes metres above sea level.
mbtoc denotes meters below top of casing.
"-" denotes data not available.
Quarter is represented as Q1, Q2, Q3, Q4.

TABLE CM-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (CMm)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	**Sample ID**	**Sample Date (yyyy mm dd)**	**Field Temperature**	**pH (field)**	**Dissolved Oxygen**	**Field Conductivity**	**Field ORP**	**pH**	**Hardness**	**Conductivity**	**Total Suspended Solids**	**Total Dissolved Solids**	**Turbidity**	**Total Alkalinity**	**Bicarbonate**	**Carbonate**	**Hydroxide**	**Bromide**	**Chloride**	**Fluoride**	**Sulphate**	**Ammonia Nitrogen**	**Nitrate Nitrogen**	**Nitrite Nitrogen**	**Kjeldahl Nitrogen-N**	**Ortho-Phosphate**	**Phosphorus, Total**	**Total Organic Carbon**	**Dissolved Organic Carbon**
			C	**pH**	**mg/L**	**µS/cm**	**mV**	**pH**	**mg/L**	**µS/cm**	**mg/L**	**mg/L**	**ntu**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
BC Standard																													
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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.5[c]	400	0.2-2[d]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Corbin Creek Valley Watershed (+ denotes Study Area 11)																													
CM_MW4-SH	CM_MW4-SH_WG_2021-01-11_N	2021 02 25	4.29	7.81	3.41	1,562	-17.4	8.33	28.7	1,500	1.4	900	1.18	635	759	7.3	< 1.0	0.532	*164*	0.336	< 1.50	0.423	0.0949	< 0.0050	0.437	0.0099	0.0100	< 0.50	< 0.50
	CM_MW4-SH_WG_2021-04-12_N	2021 05 13	5.9	7.94	1.94	2,517	-0.4	8.88	24.1	2,470	4.1	1,370	13.6	806	852	64.9	< 1.0	1.33	*376*	0.342	< 1.50	0.502	< 0.0250	< 0.0050	0.427	0.0086	0.0196	1.12	0.61
	CM_MW4-SH_WG_2021-07-12_N	2021 07 14	10.9	8.2	1.62	1,493	9.8	8.45	25.6	1,400	< 1.0	860	1.06	575	678	11.5	< 2.0	< 0.250	*144*	0.530	< 1.50	0.440	0.0250	< 0.0050	0.613	0.0110	0.0113	2.57	3.34
	CM_MW4-SH_WG_2021-10-11_N	2021 10 13	6.8	8.35	1.68	1,580	3.8	8.25	31.0	1,500	< 1.0	949	1.37	648	927	9.2	< 2.0	0.712	*169*	0.300	6.10	0.440	0.103	0.0180	0.456	0.0101	0.0117	< 0.50	< 0.50
CM_MW4-DP	CM_MW4-DP_WG_2021-01-11_N	2021 02 25	3.21	7.83	3.81	3,207	-49.1	8.31	31.1	3,050	1.4	1,810	7.36	951	1,140	7.0	< 1.0	1.90	*550*	0.319	< 1.50	0.657	0.0302	< 0.0050	0.584	0.0102	0.0105	< 0.50	< 0.50
	CM_MW4-DP_WG_2021-04-12_N	2021 05 13	5	7.92	2.27	1,459	-42.2	8.81	27.1	1,440	1.3	849	1.13	625	674	43.8	< 1.0	0.485	*135*	0.304	< 1.50	0.446	< 0.0250	< 0.0050	0.398	0.0079	0.0072	0.53	0.77
	CM_MW4-DP_WG_2021-07-12_N	2021 07 14	9.3	8.11	1.57	3,059	-36	8.42	29.1	2,860	3.0	1,780	10.5	831	987	13.4	< 2.0	1.40	*514*	0.336	< 1.50	0.578	< 0.0250	0.0052	0.779	0.0100	0.0154	-	2.30
	CM_MW4-DP_WG_2021-10-11_N	2021 10 13	6	8.34	3.7	3,105	-5.2	8.82	33.5	3,290	3.2	1,890	8.05	929	1,000	63.5	< 2.0	2.14	*561*	0.300	9.94	0.638	< 0.0250	0.0183	0.611	0.0104	0.0178	0.56	0.56
CM_MW5-SH	CM_MW5-SH_WG_2021-01-11_N	2021 03 11	6.4	7.14	8.48	1,461	189.4	8.19	795	1,390	1.2	1,100	< 0.10	272	332	< 1.0	< 1.0	< 0.250	3.72	0.199	596	< 0.0050	3.60	< 0.0050	0.386	0.0040	0.0035	< 0.50	< 0.50
	CM_MW5-SH_WG_2021-04-12_N	2021 05 28	4.92	7.12	6.34	966.4	194	8.05	494	929	< 1.0	625	< 0.10	229	279	< 1.0	< 1.0	< 0.050	9.92	0.144	284	< 0.0050	2.07	< 0.0010	0.522	0.0033	0.0023	< 0.50	0.96
	CM_MW5-SH_WG_2021-07-12_N	2021 08 04	6.5	7.48	3.65	965	69.5	8.31	541	925	< 1.0	650	0.19	235	282	1.9	< 1.0	< 0.250	3.57	0.196	334	< 0.0050	1.35	< 0.0050	0.215	0.0021	0.0034	0.84	0.93
	CM_MW5-SH_WG_2021-11-22_N	2021 11 22	7.35	6.67	3.54	1,100	156	7.68	625	1,080	1.1	807	0.11	288	351	< 1.0	< 1.0	< 0.250	10.2	0.196	364	< 0.0050	1.86	< 0.0050	0.212	0.0053	0.0031	0.56	0.62
CM_MW5-DP	CM_MW5-DP_WG_2021-01-11_N	2021 03 11	5.2	7.49	0.15	765.6	-109.6	8.10	273	725	3.3	412	10.9	437	533	< 1.0	< 1.0	< 0.050	10.8	0.287	1.82	0.612	< 0.0050	0.0010	0.530	< 0.0010	0.0038	< 0.50	< 0.50
	CM_MW5-DP_WG_2021-04-12_N	2021 05 28	5.1	7.33	0.12	775.6	-83.6	8.08	298	748	2.9	412	12.9	445	543	< 1.0	< 1.0	< 0.050	12.7	0.251	2.66	0.735	0.0439	0.0029	0.793	< 0.0010	< 0.0020	0.53	2.24
	CM_MW5-DP_WG_2021-07-12_N	2021 08 04	9.58	7.24	1.03	770	-117	8.10	314	650	2.4	434	14.6	388	473	< 1.0	< 1.0	< 0.050	11.9	0.297	1.07	0.668	< 0.0050	< 0.0010	0.721	< 0.0010	0.0033	0.52	0.60
	CM_MW5-DP_WG_2021-11-22_N	2021 11 22	6.7	6.9	0.9	751	-109	7.84	296	747	3.5	419	15.9	448	546	< 1.0	< 1.0	< 0.050	11.9	0.314	0.57	0.620	0.0050	< 0.0010	0.659	< 0.0010	< 0.0020	< 0.50	< 0.50
CM_MW6-SH	CM_MW6-SH_WG_2021-01-11_N	2021 02 24	2.26	7.73	3.44	439	-112.7	8.08	83.4	413	< 1.0	270	1.09	214	262	< 1.0	< 1.0	0.084	20.2	*1.27*	3.61	0.0211	0.468	< 0.0010	< 0.050	< 0.0010	< 0.0020	2.14	2.09
	CM_MW6-SH_WG_2021-04-12_N	2021 05 12	6.1	7.78	0.52	435	-125.6	8.27	77.9	429	< 1.0	257	1.12	205	250	< 1.0	< 1.0	0.065	18.5	*1.38*	1.56	0.0191	< 0.0050	< 0.0010	< 0.050	0.0018	0.0021	2.35	4.39
	CM_MW6-SH_WG_2021-07-12_N	2021 07 15	8.46	7.47	2.07	439	-177	8.11	80.4	409	< 1.0	253	1.18	194	236	< 2.0	< 2.0	0.081	19.9	*1.69*	1.27	< 0.0050	< 0.0050	< 0.0010	0.202	0.0037	0.0062	-	2.41
	CM_MW6-SH_WG_2021-10-11_N	2021 10 21	6.56	7.79	0.76	439	-157	8.47	78.3	422	1.3	248	1.36	210	246	4.9	< 2.0	0.078	19.0	*1.56*	1.49	0.0384	< 0.0050	< 0.0010	0.069	0.0019	0.0110	2.29	2.44
CM_MW6-DP	CM_MW6-DP_WG_2021-01-11_N	2021 02 24	1.3	8.44	0.11	1,305	-105.1	8.36	32.6	1,200	15.8	798	16.1	702	836	9.8	< 1.0	0.086	35.1	0.341	6.32	0.748	0.111	0.0011	0.678	0.0235	0.0379	1.93	2.76
	CM_MW6-DP_WG_2021-04-12_N	2021 05 12	6.45	8.17	0.35	1,267	-157.1	8.55	36.2	1,190	1.1	713	0.83	629	731	18.0	< 1.0	0.101	36.6	0.410	5.20	0.307	< 0.0050	< 0.0010	0.272	< 0.0010	0.0070	1.91	3.04
	CM_MW6-DP_WG_2021-07-12_N	2021 07 15	16.3	8.27	0.16	1,287	-87.4	8.53	29.5	1,230	2.2	796	1.58	674	785	18.4	< 2.0	0.089	38.0	0.577	0.39	0.552	0.0781	< 0.0010	0.596	0.0407	0.0352	2.54	4.54
	CM_MW6-DP_WG_2021-10-11_N	2021 10 21	7.7	8.22	2.14	1,291	-177.3	8.51	37.0	1,260	4.3	798	2.81	694	809	11.2	< 2.0	< 0.250	35.1	0.279	< 1.50	0.533	< 0.0250	< 0.0050	0.492	0.0168	0.0320	< 0.50	< 0.50
CM_MW10	CM_MW10_WG_2021-01-11_N	2021 03 10	2.4	7.64	0.42	658.5	-85.6	8.24	306	600	7.5	355	24.3	252	308	< 1.0	< 1.0	< 0.050	0.65	*1.01*	86.8	0.0193	< 0.0050	0.0014	0.103	< 0.0010	0.0149	0.58	0.80
	CM_MW10_WG_2021-04-12_N	2021 05 27	6.8	7.52	0.51	580.4	-89.1	8.27	227	545	4.1	311	12.1	263	321	< 2.0	< 2.0	< 0.050	0.51	*1.04*	52.2	0.0355	0.0098	< 0.0010	< 0.050	< 0.0010	0.0054	1.45	2.35
	CM_MW10_WG_2021-07-12_N	2021 07 28	9.6	7.42	1.36	599	-99.7	8.20	265	559	5.6	375	26.5	239	291	< 1.0	< 1.0	< 0.050	0.45	*1.01*	80.4	0.0334	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0104	0.96	3.11
	CM_MW10_WG_2021-10-11_N	2021 10 20	4.4	7.71	0.38	600	-124	8.15	301	643	3.5	398	32.7	270	329	< 1.0	< 1.0	< 0.050	0.46	0.901	91.8	0.0380	< 0.0050	< 0.0010	0.057	0.0024	0.0090	0.86	2.96
	CM_NNP_WS_2021-10-11_N	Duplicate	-	-	-	-	-	8.18	302	650	3.9	391	33.4	275	335	< 1.0	< 1.0	< 0.050	0.46	0.878	92.7	0.0304	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0104	0.70	1.03
	QA/QC RPD%		-	-	-	-	-	0	0	1	*	2	2	2	2	*	*	*	*	3	1	22	*	*	*	*	*	*	*
Michel Creek Valley Watershed (+ denotes Study Area 11)																													
CM_MW1-OB+	CM_MW1-OB_WG_2021-01-11_N	2021 03 05	3.3	7.32	6.89	1,152	228.6	8.24	519	1,090	< 1.0	710	1.50	279	341	< 1.0	< 1.0	< 0.250	60.1	< 0.100	271	0.0228	2.64	0.0111	0.481	< 0.0010	0.0025	0.98	1.09
	CM_NNP2_WG_2021-01-11_N	Duplicate	-	-	-	-	-	8.23	519	1,080	< 1.0	758	1.13	291	355	< 1.0	< 1.0	< 0.250	59.7	< 0.100	265	< 0.0050	1.17	0.0053	0.564	< 0.0010	0.0041	1.22	1.12
	QA/QC RPD%		-	-	-	-	-	0	0	1	*	7	28	4	4	*	*	*	1	*	*2*	*	77	71	16	*	*	*	*
	CM_MW1-OB_WG_2021-04-12_N	2021 05 19	3.55	7.05	8.2	1,179	220	8.11	505	1,080	< 1.0	755	0.21	274	334	< 1.0	< 1.0	< 0.250	37.6	< 0.100	306	< 0.0050	1.25	< 0.0050	0.310	0.0016	< 0.0020	0.70	0.91
	CM_MW1-OB_WG_2021-07-12_N	2021 07 22	9.3	7.18	6.12	1,110	98.1	8.09	450	1,050	< 1.0	720	0.26	276	336	< 1.0	< 1.0	< 0.250	63.5	< 0.100	248	0.0063	0.673	< 0.0050	0.086	0.0023	0.0023	2.43	2.25
	CM_MW1-OB_WG_2021-10-11_N	2021 10 27	6.97	7.26	5.3	1,097	129	7.66	475	1,090	1.5	692	1.24	301	367	< 1.0	< 1.0	< 0.250	83.0	< 0.100	201	< 0.0050	0.549	< 0.0050	< 0.100	0.0034	0.0038	0.69	0.82

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

< Denotes concentration less than indicated detection limit.

- 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.

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with Hardness.

[c] Standard varies with pH and Temperature. Temperature assumed 10C.

[d] Standard varies with Chloride.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

TABLE CM-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (CMm)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulphate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Phosphorus, Total	Total Organic Carbon	Dissolved Organic Carbon
			C	pH	mg/L	µS/cm	mV	pH	mg/L	µS/cm	mg/L	mg/L	ntu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BC Standard																													
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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.5[c]	400	0.2-2[d]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Michel Creek Valley Watershed (+ denotes Study Area 11)																													
CM_MW1-SH+	CM_MW1-SH_WG_2021-04-12_N	2021 05 19	6.2	7.98	0.07	1,144	-156.1	8.42	96.9	1,080	< 1.0	559	2.60	200	235	4.3	< 1.0	0.636	*228*	0.810	5.09	0.0273	< 0.0250	< 0.0050	0.058	0.0051	0.0069	0.63	1.45
	CM_NNP_WS_2021-04-12_N	Duplicate	-	-	-	-	-	8.42	95.4	1,150	< 1.0	579	2.18	208	244	4.9	< 1.0	0.805	*249*	0.898	2.60	0.0219	< 0.0250	< 0.0050	0.098	0.0057	0.0056	0.52	0.77
	QA/QC RPD%		-	-	-	-	-	0	2	6	*	4	18	4	4	*	*	23	9	10	65	*	*	*	*	11	*	*	*
	CM_MW1-SH_WG_2021-10-11_N	2021 10 27	5.5	8.68	0.38	877	-191.7	8.18	123	966	2.0	513	1.57	204	248	< 1.0	< 1.0	0.701	*174*	0.770	2.10	0.0557	0.0116	< 0.0010	0.187	0.0061	0.0100	0.88	2.24
CM_MW1-DP+	CM_MW1-DP_WG_2021-04-12_N	2021 05 19	6.6	7.81	0.8	1,371	-136.7	8.44	147	1,310	163	668	91.3	366	427	9.6	< 1.0	0.593	*225*	0.204	17.4	0.723	0.481	< 0.0050	0.983	0.0024	0.0805	1.96	1.88
	CM_MW1-DP_WG_2021-10-11_N	2021 10 27	5.8	8.63	4.74	1,314	-111.7	8.23	154	1,330	124	718	72.6	356	434	< 1.0	< 1.0	2.93	*230*	0.108	8.38	0.612	0.183	< 0.0050	0.693	0.0099	0.167	3.69	2.97
CM_MW2-SH	CM_MW2-SH_WG_2021-01-11_N	2021 03 03	3.5	7.17	4.45	1,250	171.4	7.95	692	1,130	2.4	872	0.73	342	417	< 1.0	< 1.0	< 0.250	2.92	0.122	357	< 0.0050	0.128	0.0065	< 0.050	< 0.0010	0.0024	0.79	2.37
	CM_MW2-SH_WG_2021-04-12_N	2021 05 20	3	6.79	2.25	1,118	123.7	7.99	645	1,070	< 1.0	777	0.12	354	432	< 1.0	< 1.0	< 0.250	1.96	< 0.100	315	< 0.0050	0.809	< 0.0050	0.077	< 0.0010	< 0.0020	1.31	2.61
	CM_NNP2_WS_2021-04-12_N	Duplicate	-	-	-	-	-	8.04	616	1,070	< 1.0	757	0.15	346	422	< 1.0	< 1.0	< 0.250	2.00	< 0.100	314	0.0144	0.418	< 0.0050	0.086	< 0.0010	< 0.0020	0.83	1.23
	QA/QC RPD%		-	-	-	-	-	1	5	0	*	3	*	2	2	*	*	*	2	*	0	*	64	*	*	*	*	*	*
	CM_MW2-SH_WG_2021-07-12_N	2021 07 22	8	7.04	2.58	1,365	132.8	8.15	762	1,320	< 1.0	1,060	0.15	328	400	< 1.0	< 1.0	< 0.250	4.60	< 0.100	510	< 0.0050	0.0940	< 0.0050	< 0.050	0.0014	< 0.0020	2.37	2.47
	CM_MW2-SH_WG_2021-10-11_N	2021 10 25	6.96	7.05	1.99	1,349	180	7.37	700	1,350	1.0	971	0.24	374	456	< 2.0	< 2.0	< 0.250	2.99	< 0.100	476	< 0.0050	0.0560	< 0.0050	< 0.050	0.0017	0.0054	1.30	1.88
CM_MW7-SH	CM_MW7-SH_WG_2021-01-11_N	2021 02 25	3.59	7.21	12.1	972	-54.6	7.65	553	902	405	613	226	286	349	< 1.0	< 1.0	< 0.250	10.8	0.199	237	0.133	0.0881	0.0074	0.413	< 0.0010	0.0905	7.25	2.02
	CM_MW7-SH_WG_2021-04-12_N	2021 05 14	13.7	7.42	3.01	1,151	-81.5	7.60	968	1,110	40.2	879	38.7	296	441	< 2.0	< 2.0	< 0.050	11.2	0.159	380	0.106	0.0235	< 0.0010	0.291	< 0.0010	0.0158	3.09	1.78
	CM_MW7-SH_WG_2021-07-12_N	2021 07 21	12	7.64	2.77	842	-74.7	7.82	355	779	90.6	522	45.0	279	340	< 1.0	< 1.0	0.064	12.5	0.212	158	0.0890	< 0.0050	< 0.0010	0.105	< 0.0010	0.0195	3.73	2.51
	CM_MW7-SH_WG_2021-10-11_N	2021 10 13	6.6	7.7	6.32	808	-36.9	8.09	388	705	49.6	495	24.2	233	284	< 2.0	< 2.0	0.064	12.5	0.195	140	0.0803	< 0.0050	0.0012	0.104	0.0014	0.0146	3.67	2.18
CM_MW7-DP	CM_MW7-DP_WG_2021-01-11_N	2021 02 25	3.27	7	9.27	2,322	20.1	7.49	1,550	2,160	2.5	1,860	0.41	387	472	< 1.0	< 1.0	< 0.250	3.99	< 0.100	1,100	0.637	0.595	0.0250	0.242	0.0052	0.0026	< 0.50	< 0.50
	CM_MW7-DP_WG_2021-04-12_N	2021 05 14	12.5	7.09	4.95	1,195	11.6	7.92	1,450	1,860	3.5	1,750	0.99	293	436	< 2.0	< 2.0	< 0.250	1.69	< 0.100	1,120	0.0076	0.478	< 0.0050	0.238	0.0030	0.0033	1.21	< 0.50
	CM_MW7-DP_WG_2021-07-12_N	2021 07 21	11.3	7.26	2.98	2,299	45	7.53	1,340	2,160	21.6	1,870	10.6	384	469	< 1.0	< 1.0	< 0.250	1.29	< 0.100	1,090	0.0164	0.425	< 0.0050	0.205	0.0020	0.0077	1.02	< 0.50
	CM_MW7-DP_WG_2021-10-11_N	2021 10 13	6.2	7.9	8.29	2,276	76.6	8.01	1,330	1,580	14.6	1,980	6.30	322	393	< 2.0	< 2.0	< 0.250	3.72	< 0.100	1,100	0.0150	0.0376	0.0135	< 0.050	0.0012	0.0217	3.76	< 0.50
CM_MW8	CM_MW8_WG_2021-01-11_N	2021 02 25	3.6	7.29	12.92	742	-81.1	7.97	327	679	307	448	170	339	414	< 1.0	< 1.0	< 0.050	1.47	0.258	83.8	0.981	0.0145	< 0.0010	1.07	< 0.0010	0.216	6.79	0.61
	CM_MW8_WG_2021-04-12_N	2021 05 14	13.2	7.29	5.13	758	-50.6	8.14	338	638	3.3	464	15.0	280	417	< 2.0	< 2.0	< 0.050	1.27	0.203	114	0.971	0.0367	< 0.0010	1.32	< 0.0010	0.0092	1.21	1.70
	CM_MW8_WG_2021-07-12_N	2021 07 21	12.5	7.51	4.66	722	-73	8.04	307	716	7.0	450	20.9	335	408	< 1.0	< 1.0	< 0.050	1.29	0.239	86.2	0.970	< 0.0050	< 0.0010	0.910	< 0.0010	0.0091	1.07	0.94
	CM_NNP_WS_2021-07-12_N	Duplicate	-	-	-	-	-	7.96	266	679	6.5	422	21.0	339	414	< 1.0	< 1.0	< 0.050	1.65	0.251	62.8	0.878	< 0.0050	< 0.0010	0.894	< 0.0010	0.0140	1.58	1.59
	QA/QC RPD%		-	-	-	-	-	1	14	5	7	6	0	1	1	*	*	*	24	5	31	10	*	*	2	*	*	*	*
	CM_MW8_WG_2021-10-11_N	2021 10 13	4.4	7.61	7.38	693.7	-44.8	8.36	267	648	3.0	401	19.3	307	360	7.3	< 2.0	< 0.050	1.72	0.226	58.0	0.814	0.0054	0.0029	0.908	0.0012	0.0252	2.96	1.98
CM_MW3-SH	CM_MW3-SH_WG_2021-01-11_N	2021 03 04	3.1	7.27	8.49	329.6	206.2	8.31	176	309	< 1.0	148	< 0.10	161	190	3.1	< 1.0	< 0.050	1.40	0.085	17.1	< 0.0050	0.0223	< 0.0010	< 0.050	0.0020	< 0.0020	0.56	0.57
	CM_MW3-SH_WG_2021-04-12_N	2021 05 26	2.6	7.6	12.41	345.5	109.9	7.95	187	344	< 1.0	177	0.15	176	214	< 1.0	< 1.0	< 0.050	0.62	0.089	11.0	0.0154	0.0142	< 0.0010	0.090	0.0022	< 0.0020	1.67	1.91
	CM_MW3-SH_WG_2021-07-12_N	2021 07 29	7.11	7.51	3.18	336	179	8.02	178	320	< 1.0	197	0.49	176	214	< 1.0	< 1.0	< 0.050	0.70	0.080	16.8	< 0.0050	0.0253	< 0.0010	< 0.050	0.0038	0.0046	0.96	1.19
	CM_MW3-SH_WG_2021-10-11_N	2021 10 28	4.5	8.38	5.41	330	52.6	7.87	172	333	< 1.0	280	0.27	179	218	< 1.0	< 1.0	< 0.050	1.16	0.095	16.7	0.0070	0.0167	< 0.0010	< 0.050	0.0034	0.0030	< 0.50	< 0.50
CM_MW3-DP	CM_MW3-DP_WG_2021-01-11_N	2021 03 04	4.89	8.14	0.35	2,917	-139	8.27	51.4	2,700	5.0	1,340	0.68	208	254	< 1.0	< 1.0	2.78	*784*	0.370	15.7	0.682	0.178	< 0.0050	0.059	0.0018	0.0123	< 0.50	< 0.50
	CM_MW3-DP_WG_2021-04-12_N	2021 05 26	5.69	7.77	0.43	3,071	-114.5	7.92	50.6	2,780	1.7	1,470	0.52	212	259	< 1.0	< 1.0	2.51	*780*	0.505	4.64	0.542	< 0.0250	< 0.0050	0.544	0.0036	0.0108	0.66	1.31
	CM_MW3-DP_WG_2021-07-12_N	2021 07 29	6.1	8.29	0.17	2,691	-116	8.10	47.6	2,590	4.8	1,440	8.52	208	254	< 1.0	< 1.0	2.50	*732*	0.336	10.9	0.585	1.34	< 0.0050	< 0.050	< 0.0010	0.0186	0.80	0.59
	CM_MW3-DP_WG_2021-10-11_N	2021 10 28	3.45	8.47	0.54	2,720	-141	7.70	47.1	2,550	9.4	1,410	5.48	226	275	< 1.0	< 1.0	2.33	*663*	0.393	< 1.50	0.556	0.240	0.0711	0.666	< 0.0010	0.0184	0.85	< 0.50

All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit.
- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH and Temperature. Temperature assumed 10C.
[d] Standard varies with Chloride.

TABLE CM-03: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (CMm)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	**Sample ID**	**Sample Date (yyyy mm dd)**	**C Field Temperature**	**pH (field)**	**Dissolved Oxygen**	**Field Conductivity**	**Field ORP**	**pH**	**Hardness**	**Conductivity**	**Total Suspended Solids**	**Total Dissolved Solids**	**Turbidity**	**Total Alkalinity**	**Bicarbonate**	**Carbonate**	**Hydroxide**	**Bromide**	**Chloride**	**Fluoride**	**Sulphate**	**Ammonia Nitrogen**	**Nitrate Nitrogen**	**Nitrite Nitrogen**	**Kjeldahl Nitrogen-N**	**Ortho-Phosphate**	**Phosphorus, Total**	**Total Organic Carbon**	**Dissolved Organic Carbon**
			C	**pH**	**mg/L**	**µS/cm**	**mV**	**pH**	**mg/L**	**µS/cm**	**mg/L**	**mg/L**	**ntu**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
BC Standard																													
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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.5[c]	400	0.2-2[d]	n/a	n/a	n/a	n/a	n/a
CSR Irrigation Watering (IW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CSR Livestock Watering (LW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	1	1,000	n/a	100	10	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Michel Creek Valley Watershed (+ denotes Study Area 11)																													
CM_MW_AG1A+	CM_MW_AG1A_WG_2021-01-11_N	2021 03 11	4.3	7.3	0.51	903	-92.3	7.99	444	770	19.8	510	70.9	486	593	< 1.0	< 1.0	0.069	3.37	0.125	11.6	0.0313	0.0076	0.0012	0.162	< 0.0010	0.0175	2.15	2.41
	CM_MW_AG1A_WG_2021-04-12_N	2021 05 27	8.2	7.07	0.18	905	-74.3	7.98	470	787	17.6	524	89.2	485	592	< 2.0	< 2.0	0.068	3.21	0.085	10.2	0.0289	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	2.92	2.47
	CM_MW_AG1A_WG_2021-07-12_N	2021 07 28	10.2	7.18	0.4	887	-71.6	7.93	470	715	16.0	462	89.8	440	537	< 1.0	< 1.0	0.062	3.43	0.086	9.14	0.0319	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0051	2.33	2.49
	CM_NNP2_WS_2021-07-12_N	Duplicate	-	-	-	-	-	7.97	475	715	15.6	488	96.4	440	536	< 1.0	< 1.0	0.066	3.56	0.083	9.54	0.0454	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0063	2.36	2.37
	QA/QC RPD%		-	-	-	-	-	1	1	0	3	5	7	0	0	*	*	*	4	*	4	35	*	*	*	*	*	*	*
	CM_MW_AG1A_WG_2021-10-11_N	2021 11 03	6.3	6.69	0.21	880	-105.9	7.94	512	835	16.3	484	85.5	504	615	< 1.0	< 1.0	0.053	3.64	0.079	9.14	0.0404	< 0.0050	< 0.0010	0.642	0.0013	0.0053	2.70	3.01
CM_MW_AG1B+	CM_MW_AG1B_WG_2021-01-11_N	2021 03 11	2.8	7.16	4.78	1,040	138.9	7.75	582	746	4.7	519	1.14	469	572	< 1.0	< 1.0	< 0.050	0.55	0.066	9.10	0.0810	0.101	< 0.0010	0.146	0.0025	0.0053	1.10	0.99
	CM_NNP_WS_2021-01-11_N	Duplicate	-	-	-	-	-	7.65	581	787	< 1.0	550	0.54	506	617	< 1.0	< 1.0	< 0.250	0.94	< 0.100	16.0	0.0135	0.163	< 0.0050	0.105	0.0013	0.0038	1.29	1.31
	QA/QC RPD%		-	-	-	-	-	1	0	5	*	6	71	8	8	*	*	*	52	*	55	*	47	*	*	*	*	*	*
	CM_MW_AG1B_WG_2021-04-12_N	2021 05 27	6.9	7.02	6.76	823	99.9	7.87	462	726	< 1.0	418	0.23	433	528	< 2.0	< 2.0	< 0.050	0.69	0.070	11.5	< 0.0050	0.845	< 0.0010	0.088	0.0041	0.0024	1.74	1.86
	CM_MW_AG1B_WG_2021-07-12_N	2021 07 28	14.1	7	3.11	990	65.7	7.70	559	751	< 1.0	537	0.72	451	550	< 1.0	< 1.0	< 0.050	0.54	0.075	14.2	< 0.0050	0.557	< 0.0010	< 0.050	0.0021	0.0035	1.34	1.88
	CM_MW_AG1B_WG_2021-10-11_N	2021 11 03	7.6	6.54	3.76	1,055	81.4	7.70	662	1,010	2.5	596	1.36	615	750	< 1.0	< 1.0	< 0.250	0.70	< 0.100	21.4	< 0.0050	0.473	< 0.0050	0.100	0.0038	0.0038	1.45	1.52
	CM_NNP2_WS_2021-10-11_N	Duplicate	-	-	-	-	-	7.70	678	1,020	2.0	614	1.08	620	756	< 1.0	< 1.0	< 0.250	0.66	< 0.100	22.9	< 0.0050	0.443	< 0.0050	0.070	0.0038	0.0045	1.23	1.34
	QA/QC RPD%		-	-	-	-	-	0	2	1	*	3	23	1	1	*	*	*	6	*	7	*	7	*	*	*	*	*	*
Blanks																													
Field Blanks																													
CM_MW_AG1B	CM_NNT_WS_2021-01-11_N	2021 03 11	-	-	-	-	-	5.60	< 0.60	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
CM_MW1-SH	CM_NNT_WS_2021-04-12_N	2021 05 19	-	-	-	-	-	5.34	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 2.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
CM_MW8	CM_NNT_WS_2021-07-12_N	2021 07 21	-	-	-	-	-	5.50	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
CM_MW10	CM_NNT_WS_2021-10-11_N	2021 10 20	-	-	-	-	-	5.79	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
Trip Blanks																													
	CM_TRP_WG_2021-01-11_N	2021 03 05	-	-	-	-	-	5.52	< 0.60	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	CM_TRP_WS_2021-04-12_N	2021 05 20	-	-	-	-	-	4.22	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0460	< 0.0050	< 0.0010	0.064	< 0.0010	< 0.0020	< 0.50	< 0.50
	CM_TRP_WS_2021-07-12_N	2021 07 28	-	-	-	-	-	5.32	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0209	0.0518	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	CM_TRP_WS_2021-10-11_N	2021 11 03	-	-	-	-	-	5.09	< 0.50	< 2.0	< 1.5	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.10	< 0.020	< 0.30	0.0124	< 0.0050	< 0.0010	0.587	< 0.0010	< 0.0020	< 0.50	< 0.50

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with Hardness.

[c] Standard varies with pH and Temperature. Temperature assumed 10C.

[d] Standard varies with Chloride.

TABLE CM-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (CMm)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Dissolved Metals																														
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[f]
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[b]	n/a	10[d]	40	20-90	n/a	40-160[b]	n/a	n/a	n/a	0.25	10,000	250-1,500[b]	n/a	20	0.5-15[b]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[b]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[d]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[c]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[d]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[d]	20[e]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[g]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Corbin Creek Valley Watershed (+ denotes Study Area 11)																																		
CM_MW4-SH	CM_MW4-SH_WG_2021-01-11_N	2021 02 25	28.7	2.6	< 0.20	< 0.20	325	< 0.0400	< 0.100	322	< 0.0100	7.38	< 0.20	< 0.200	< 0.40	83	< 0.100	481	2.50	4.59	< 0.0050	0.669	< 1.00	1.02	< 0.100	0.023	341	868	< 0.020	< 0.20	< 0.60	< 0.020	< 1.00	< 2.0
	CM_MW4-SH_WG_2021-04-12_N	2021 05 13	24.1	8.4	< 0.20	< 0.20	448	< 0.040	< 0.100	444	< 0.0100	7.17	< 0.20	< 0.20	< 0.40	56	< 0.100	1,040	1.50	3.29	< 0.0050	0.624	< 1.00	1.14	< 0.100	< 0.020	616	959	< 0.020	< 0.20	< 0.60	< 0.020	< 1.00	6.3
	CM_MW4-SH_WG_2021-07-12_N	2021 07 14	25.6	5.4	< 0.20	< 0.20	315	< 0.040	< 0.100	349	< 0.0100	6.37	< 0.20	< 0.20	< 0.40	89	< 0.100	420	2.35	4.33	< 0.0050	0.788	< 1.00	1.04	< 0.100	< 0.020	345	725	< 0.020	< 0.20	< 0.60	< 0.020	< 1.00	< 2.0
	CM_MW4-SH_WG_2021-10-11_N	2021 10 13	31.0	1.7	< 0.10	< 0.10	326	< 0.020	< 0.050	337	< 0.0050	7.81	< 0.10	< 0.10	< 0.20	100	< 0.050	520	2.79	5.09	< 0.0050	0.703	< 0.50	1.13	< 0.050	< 0.010	392	890	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	1.1
CM_MW4-DP	CM_MW4-DP_WG_2021-01-11_N	2021 02 25	31.1	< 5.0	< 0.50	< 0.50	580	< 0.100	< 0.250	392	< 0.0250	8.91	< 0.50	< 0.500	< 1.00	87	< 0.250	1,170	2.16	3.41	< 0.0050	0.406	< 2.50	1.34	< 0.250	0.062	696	1,360	< 0.050	< 0.50	< 1.50	< 0.050	< 2.50	< 5.0
	CM_MW4-DP_WG_2021-04-12_N	2021 05 13	27.1	2.4	< 0.20	< 0.20	342	< 0.040	< 0.100	396	< 0.0100	7.14	< 0.20	< 0.20	< 0.40	80	< 0.100	527	2.26	4.44	< 0.0050	0.680	< 1.00	1.01	< 0.100	< 0.020	369	819	< 0.020	< 0.20	< 0.60	< 0.020	< 1.00	< 2.0
	CM_MW4-DP_WG_2021-07-12_N	2021 07 14	29.1	5.9	< 0.50	< 0.50	563	< 0.100	< 0.250	430	< 0.0250	8.20	< 0.50	< 0.50	< 1.00	82	< 0.250	1,060	2.09	3.66	< 0.0050	0.334	< 2.50	1.36	< 0.250	< 0.050	706	1,160	< 0.050	< 0.50	< 1.50	< 0.050	< 2.50	< 5.0
	CM_MW4-DP_WG_2021-10-11_N	2021 10 13	33.5	4.3	< 0.20	< 0.20	614	< 0.040	< 0.100	396	< 0.0100	9.42	< 0.20	< 0.20	< 0.40	100	< 0.100	1,180	2.42	4.11	< 0.0050	0.253	< 1.00	1.50	< 0.100	< 0.020	791	1,380	< 0.020	< 0.20	< 0.60	< 0.020	< 1.00	< 2.0
CM_MW5-SH	CM_MW5-SH_WG_2021-01-11_N	2021 03 11	795	< 1.0	0.25	0.25	95.8	< 0.020	< 0.050	40	0.0486	175	0.29	< 0.10	0.24	< 10	< 0.050	30.4	87.0	< 0.10	< 0.0050	1.60	1.86	2.52	18.5	< 0.010	30.4	528	0.049	< 0.10	< 0.30	4.06	< 0.50	2.5
	CM_MW5-SH_WG_2021-04-12_N	2021 05 28	494	< 1.0	0.22	0.19	64.0	< 0.020	< 0.050	35	0.0267	112	0.25	< 0.10	0.34	< 10	< 0.050	22.5	52.0	< 0.10	< 0.0050	1.42	1.07	1.72	11.8	< 0.010	22.3	334	0.035	< 0.10	< 0.30	2.56	< 0.50	1.7
	CM_MW5-SH_WG_2021-07-12_N	2021 08 04	541	< 1.0	0.27	0.19	61.8	< 0.020	< 0.050	40	0.0296	123	0.28	< 0.10	< 0.20	< 10	< 0.050	23.1	56.8	< 0.10	< 0.0050	1.83	1.60	2.07	10.4	< 0.010	13.7	389	0.039	< 0.10	< 0.30	2.93	< 0.50	2.0
	CM_MW5-SH_WG_2021-11-22_N	2021 11 22	625	< 1.0	0.25	0.25	78.0	< 0.020	< 0.050	44	0.0392	146	0.25	< 0.10	1.34	< 10	< 0.050	25.0	63.2	< 0.10	< 0.0050	1.32	1.29	2.10	13.6	< 0.010	17.6	448	0.047	< 0.10	< 0.30	2.76	< 0.50	5.0
CM_MW5-DP	CM_MW5-DP_WG_2021-01-11_N	2021 03 11	273	1.2	< 0.10	0.16	1,130	< 0.020	< 0.100	114	< 0.0050	66.3	< 0.10	< 0.10	< 0.20	1,000	< 0.050	62.5	26.0	47.4	< 0.0050	0.915	0.93	3.51	< 0.100	< 0.010	66.3	1,630	< 0.010	< 0.10	< 0.30	0.089	< 0.50	1.8
	CM_MW5-DP_WG_2021-04-12_N	2021 05 28	298	< 1.0	< 0.10	< 0.10	1,190	< 0.020	< 0.050	100	< 0.0050	76.5	< 0.10	< 0.10	< 0.20	927	< 0.050	66.5	26.1	34.1	< 0.0050	0.590	< 0.50	3.18	< 0.050	< 0.010	67.0	1,830	< 0.010	< 0.10	< 0.30	0.072	< 0.50	1.4
	CM_MW5-DP_WG_2021-07-12_N	2021 08 04	314	2.2	< 0.10	< 0.10	1,350	< 0.020	< 0.050	116	< 0.0050	79.3	< 0.10	< 0.10	< 0.20	1,210	< 0.050	68.3	28.2	39.4	< 0.0050	0.764	0.51	3.63	< 0.050	< 0.010	70.2	1,940	< 0.010	< 0.10	< 0.30	0.064	< 0.50	8.4
	CM_MW5-DP_WG_2021-11-22_N	2021 11 22	296	< 1.0	< 0.10	< 0.10	1,060	< 0.020	< 0.050	127	< 0.0050	77.3	< 0.10	< 0.10	< 0.20	1,200	< 0.050	67.9	25.0	41.2	< 0.0050	0.610	< 0.50	3.24	0.119	< 0.010	64.3	1,880	< 0.010	< 0.10	< 0.30	0.059	< 0.50	2.2
CM_MW6-SH	CM_MW6-SH_WG_2021-01-11_N	2021 02 24	83.4	2.8	< 0.10	0.66	128	< 0.0200	< 0.050	36	< 0.00500	21.3	< 0.10	0.10	< 0.20	181	< 0.050	41.6	7.33	*252*	< 0.0050	5.38	< 0.50	0.297	< 0.0500	< 0.010	67.9	210	< 0.010	< 0.10	< 0.30	0.497	< 0.50	< 1.0
	CM_MW6-SH_WG_2021-04-12_N	2021 05 12	77.9	2.7	< 0.10	0.68	133	< 0.020	< 0.050	38	< 0.0050	19.5	< 0.10	< 0.10	< 0.20	111	< 0.050	41.3	7.09	*255*	< 0.0050	5.47	< 0.50	0.301	< 0.050	< 0.010	68.8	215	< 0.010	< 0.10	< 0.30	0.447	< 0.50	< 1.0
	CM_MW6-SH_WG_2021-07-12_N	2021 07 15	80.4	3.1	< 0.10	0.77	147	< 0.020	< 0.050	39	< 0.0050	19.8	0.10	< 0.10	< 0.20	216	< 0.050	40.7	7.52	*271*	< 0.0050	5.22	< 0.50	0.337	0.142	< 0.010	77.1	210	< 0.010	< 0.10	< 0.30	0.454	< 0.50	< 1.0
	CM_MW6-SH_WG_2021-10-11_N	2021 10 21	78.3	4.0	< 0.10	0.64	137	< 0.020	< 0.050	38	< 0.0050	19.6	< 0.10	< 0.10	< 0.20	180	< 0.050	40.6	7.12	*275*	< 0.0050	4.11	< 0.50	0.323	0.234	< 0.010	72.6	214	< 0.010	< 0.10	< 0.30	0.372	< 0.50	< 1.0
CM_MW6-DP	CM_MW6-DP_WG_2021-01-11_N	2021 02 24	32.6	4.0	< 0.10	0.71	316	< 0.0200	< 0.050	248	< 0.00500	8.60	< 0.10	< 0.100	< 0.20	88	< 0.050	386	2.69	66.4	< 0.0050	1.57	< 0.50	2.06	< 0.0500	< 0.020	306	1,040	< 0.010	0.11	< 0.30	0.759	< 0.50	< 1.0
	CM_MW6-DP_WG_2021-04-12_N	2021 05 12	36.2	2.8	< 0.10	0.35	324	< 0.020	< 0.050	308	< 0.0050	9.71	< 0.10	< 0.10	< 0.20	44	< 0.050	399	2.90	32.8	< 0.0050	2.90	< 0.50	1.84	< 0.050	< 0.010	285	983	< 0.010	0.11	< 0.30	0.712	< 0.50	< 1.0
	CM_MW6-DP_WG_2021-07-12_N	2021 07 15	29.5	6.8	< 0.20	0.70	274	< 0.040	< 0.100	290	< 0.0100	7.99	< 0.20	< 0.20	< 0.40	< 20	< 0.100	412	2.32	63.7	< 0.0050	1.61	< 1.00	1.88	< 0.100	< 0.020	337	882	< 0.020	< 0.20	< 0.60	0.593	< 1.00	< 2.0
	CM_MW6-DP_WG_2021-10-11_N	2021 10 21	37.0	5.7	< 0.20	0.53	396	< 0.040	< 0.100	316	< 0.0100	10.1	< 0.20	< 0.20	< 0.40	250	< 0.100	421	2.87	74.2	< 0.0050	1.51	< 1.00	1.91	< 0.100	< 0.020	333	1,150	< 0.020	< 0.20	< 0.60	0.399	< 1.00	3.2
CM_MW10	CM_MW10_WG_2021-01-11_N	2021 03 10	306	1.2	< 0.10	1.48	134	< 0.020	< 0.050	22	< 0.0050	87.1	< 0.10	0.48	< 0.20	1,110	< 0.050	13.2	21.5	83.5	< 0.0050	3.94	0.64	0.770	< 0.050	< 0.010	32.5	268	< 0.010	< 0.10	< 0.30	1.41	< 0.50	< 1.0
	CM_MW10_WG_2021-04-12_N	2021 05 27	227	1.1	< 0.10	1.71	213	< 0.020	< 0.050	22	< 0.0050	59.4	< 0.10	0.34	< 0.20	734	0.102	14.2	19.2	61.2	< 0.0050	5.58	0.83	0.790	< 0.050	< 0.010	41.7	265	< 0.010	< 0.10	< 0.30	2.42	< 0.50	24.0
	CM_MW10_WG_2021-07-12_N	2021 07 28	265	2.0	< 0.10	3.09	256	< 0.020	< 0.050	25	< 0.0050	72.5	< 0.10	0.51	< 0.20	2,060	< 0.050	13.5	20.3	77.5	< 0.0050	4.44	< 0.50	0.816	0.053	< 0.010	31.3	275	< 0.010	< 0.10	< 0.30	0.712	< 0.50	1.2
	CM_MW10_WG_2021-10-11_N	2021 10 20	301	1.0	< 0.10	4.02	188	< 0.020	< 0.050	22	< 0.0050	85.4	< 0.10	0.60	< 0.20	2,860	< 0.050	11.5	21.3	74.7	< 0.0050	3.95	0.58	0.782	< 0.050	< 0.010	28.5	279	< 0.010	< 0.10	< 0.30	0.353	< 0.50	< 1.0
	CM_NNP_WS_2021-10-11_N	Duplicate	302	1.1	< 0.10	3.90	188	< 0.020	< 0.050	21	< 0.0050	84.5	< 0.10	0.59	< 0.20	2,780	< 0.050	12.4	22.2	77.8	< 0.0050	4.08	0.59	0.777	< 0.050	< 0.010	27.3	280	< 0.010	< 0.10	< 0.30	0.379	< 0.50	< 1.0
	QA/QC RPD%		0	*	*	3	0	*	*	*	*	1	*	2	*	3	*	8	4	4	*	3	*	1	*	*	4	0	*	*	*	7	*	*
Michel Creek Valley Watershed (+ denotes Study Area 11)																																		
CM_MW1-OB+	CM_MW1-OB_WG_2021-01-11_N	2021 03 05	519	< 1.0	< 0.10	0.12	80.6	< 0.020	< 0.050	27	0.0504	138	0.45	< 0.10	1.53	< 10	< 0.050	17.2	42.4	0.12	< 0.0050	0.302	0.51	1.76	5.33	< 0.010	74.5	322	0.012	< 0.10	< 0.30	1.25	< 0.50	50.1
	CM_NNP2_WG_2021-01-11_N	Duplicate	519	< 1.0	< 0.10	0.11	83.9	< 0.020	< 0.050	27	0.0492	138	0.50	< 0.10	1.62	< 10	< 0.050	17.2	42.4	0.19	< 0.0050	0.294	0.51	1.74	5.40	< 0.010	71.8	330	0.012	< 0.10	< 0.30	1.29	< 0.50	44.0
	QA/QC RPD%		0	*	*	*	4	*	*	*	2	0	*	*	6	*	*	0	0	*	*	3	*	1	1	*	4	2	*	*	*	3	*	13
	CM_MW1-OB_WG_2021-04-12_N	2021 05 19	505	1.4	< 0.10	0.11	46.7	< 0.020	< 0.050	31	0.0658	132	0.48	< 0.10	2.19	< 10	0.082	18.1	42.6	0.24	< 0.0050	0.210	< 0.50	1.66	5.56	< 0.010	59.4	327	0.018	< 0.10	< 0.30	1.08	< 0.50	24.8
	CM_MW1-OB_WG_2021-07-12_N	2021 07 22	450	1.1	0.17	0.19	89.5	< 0.020	< 0.050	40	0.0616	122	0.71	< 0.10	6.52	< 10	0.512	19.6	35.3	0.31	< 0.0050	0.384	0.51	1.99	3.77	0.012	64.6	365	0.023	< 0.10	< 0.30	1.22	< 0.50	63.9
	CM_MW1-OB_WG_2021-10-11_N	2021 10 27	475	2.2	0.18	0.14	79.9	< 0.020	< 0.050	34	0.0572	123	0.48	< 0.10	1.61	< 10	0.086	19.0	40.8	0.29	< 0.0050	0.309	< 0.50	1.86	2.97	< 0.010	58.0	322	0.013	< 0.10	< 0.30	1.16	< 0.50	13.4

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with Hardness.

[c] Standard varies with pH.

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

[e] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

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

[g] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

TABLE CM-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (CMm)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Dissolved Metals																														
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc[f]
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[b]	n/a	10[d]	40	20-90	n/a	40-160[b]	n/a	n/a	n/a	0.25	10,000	250-1,500[b]	n/a	20	0.5-15[b]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[b]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[d]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[c]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[d]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[d]	20[e]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[g]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Michel Creek Valley Watershed (+ denotes Study Area 11)																																		
CM_MW1-SH+	CM_MW1-SH_WG_2021-04-12_N	2021 05 19	96.9	4.2	< 0.10	1.92	571	< 0.020	< 0.050	55	< 0.0250	22.4	< 0.10	0.10	< 0.20	217	< 0.050	22.6	9.94	120	< 0.0050	*69.6*	< 0.50	1.01	< 0.050	< 0.010	231	308	< 0.010	< 0.10	< 0.30	0.637	< 0.50	< 1.0
	CM_NNP_WS_2021-04-12_N	Duplicate	95.4	3.6	< 0.10	1.95	558	< 0.020	< 0.050	55	< 0.0300	22.1	< 0.10	< 0.10	< 0.20	302	< 0.050	22.2	9.76	120	< 0.0050	*69.1*	< 0.50	1.00	< 0.050	< 0.010	236	302	< 0.010	< 0.10	< 0.30	0.620	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	2	2	*	*	0	*	1	*	*	*	33	*	2	2	0	*	1	*	1	*	*	2	2	*	*	*	3	*	*
	CM_MW1-SH_WG_2021-10-11_N	2021 10 27	123	5.2	< 0.10	1.76	514	< 0.020	< 0.050	47	< 0.0050	31.4	0.23	< 0.10	< 0.20	230	< 0.050	19.2	10.8	127	< 0.0050	*42.7*	< 0.50	0.947	2.14	< 0.010	158	269	< 0.010	0.16	< 0.30	0.586	< 0.50	1.5
CM_MW1-DP+	CM_MW1-DP_WG_2021-04-12_N	2021 05 19	147	4.4	< 0.20	1.95	**10,600**	< 0.040	< 0.100	232	< 0.0100	30.0	< 0.20	< 0.20	< 0.40	604	< 0.100	615	17.5	107	< 0.0050	4.35	< 1.00	4.90	< 0.100	< 0.020	229	2,410	< 0.020	< 0.20	< 0.60	0.439	< 1.00	4.9
	CM_MW1-DP_WG_2021-10-11_N	2021 10 27	154	7.4	< 0.20	1.90	**11,100**	< 0.040	< 0.100	217	< 0.0100	31.5	< 0.20	< 0.20	< 0.40	772	< 0.100	674	18.3	101	< 0.0050	4.00	< 1.00	4.88	0.182	0.066	220	2,350	< 0.020	< 0.20	< 0.60	0.366	< 1.00	14.1
CM_MW2-SH	CM_MW2-SH_WG_2021-01-11_N	2021 03 03	692	< 1.0	< 0.10	< 0.10	97.4	< 0.0200	< 0.050	46	0.119	195	0.18	< 0.100	7.21	< 10	0.050	37.8	49.7	0.12	< 0.0050	0.116	0.58	1.62	0.105	< 0.010	47.4	519	< 0.010	< 0.10	< 0.30	0.203	< 0.50	7.8
	CM_MW2-SH_WG_2021-04-12_N	2021 05 20	645	1.2	< 0.10	< 0.10	90.0	< 0.020	< 0.050	39	0.119	184	0.25	< 0.10	0.39	< 10	< 0.050	28.8	45.1	< 0.10	< 0.0050	0.125	0.50	1.35	0.732	< 0.010	16.0	519	< 0.010	< 0.10	< 0.30	0.190	< 0.50	1.3
	CM_NNP2_WS_2021-04-12_N	Duplicate	616	< 1.0	< 0.10	< 0.10	86.4	< 0.020	< 0.050	37	0.121	173	0.26	< 0.10	0.32	< 10	< 0.050	27.7	44.8	< 0.10	< 0.0050	0.126	< 0.50	1.34	0.702	< 0.010	16.3	528	< 0.010	< 0.10	< 0.30	0.185	< 0.50	1.1
	QA/QC RPD%		5	*	*	*	4	*	*	*	2	6	*	*	*	*	*	4	1	*	*	*	*	1	4	*	2	2	*	*	*	3	*	*
	CM_MW2-SH_WG_2021-07-12_N	2021 07 22	762	< 1.0	< 0.10	< 0.10	124	< 0.020	< 0.050	43	0.163	213	0.23	< 0.10	0.32	< 10	< 0.050	27.9	55.9	< 0.10	< 0.0050	0.134	< 0.50	1.78	0.120	< 0.010	23.3	639	< 0.010	< 0.10	< 0.30	0.214	< 0.50	1.8
	CM_MW2-SH_WG_2021-10-11_N	2021 10 25	700	< 1.0	< 0.10	< 0.10	114	< 0.020	< 0.050	38	0.152	191	0.16	< 0.10	0.63	< 10	< 0.050	26.7	54.1	< 0.10	< 0.0050	0.134	0.61	1.71	0.057	< 0.010	38.9	632	0.012	< 0.10	< 0.30	0.199	< 0.50	2.5
CM_MW7-SH	CM_MW7-SH_WG_2021-01-11_N	2021 02 25	553	1.2	0.13	1.32	29.4	< 0.0200	< 0.050	17	< 0.00500	149	< 0.10	0.44	< 0.20	2,330	< 0.050	6.5	44.0	156	< 0.0050	1.16	1.72	1.71	0.067	< 0.010	12.4	468	< 0.010	< 0.10	< 0.30	0.610	< 0.50	< 1.0
	CM_MW7-SH_WG_2021-04-12_N	2021 05 14	968	1.0	< 0.10	1.62	43.4	< 0.020	< 0.050	18	< 0.0050	254	< 0.10	1.07	< 0.20	4,000	< 0.050	6.9	81.1	*275*	< 0.0050	0.684	1.60	2.06	< 0.050	< 0.010	4.84	691	< 0.010	< 0.10	< 0.30	0.594	< 0.50	< 1.0
	CM_MW7-SH_WG_2021-07-12_N	2021 07 21	355	< 1.0	< 0.10	1.40	27.6	< 0.020	< 0.050	16	< 0.0050	89.9	< 0.10	0.44	< 0.20	1,730	< 0.050	5.4	31.8	151	< 0.0050	0.710	< 0.50	1.57	0.080	< 0.010	14.6	402	< 0.010	< 0.10	< 0.30	0.494	< 0.50	< 1.0
	CM_MW7-SH_WG_2021-10-11_N	2021 10 13	388	1.1	< 0.10	1.35	26.6	< 0.020	< 0.050	19	< 0.0050	98.3	< 0.10	0.32	< 0.20	1,420	< 0.050	6.7	34.6	136	< 0.0050	0.995	< 0.50	1.56	0.330	< 0.010	14.6	430	< 0.010	< 0.10	< 0.30	0.498	< 0.50	< 1.0
CM_MW7-DP	CM_MW7-DP_WG_2021-01-11_N	2021 02 25	1,550	22.0	0.43	< 0.20	14.4	< 0.0400	< 0.100	52	0.0920	387	< 0.20	0.48	0.78	< 20	< 0.100	55.5	141	*208*	< 0.0050	0.280	15.2	2.58	1.59	< 0.020	24.2	913	< 0.020	0.24	< 0.60	4.85	< 1.00	17.3
	CM_MW7-DP_WG_2021-04-12_N	2021 05 14	1,450	2.8	0.28	< 0.20	13.9	< 0.040	< 0.100	56	0.0622	350	< 0.20	0.92	< 0.40	< 20	< 0.100	62.9	139	*467*	< 0.0050	0.153	14.7	2.79	1.46	< 0.020	27.5	880	< 0.020	< 0.20	< 0.60	4.61	< 1.00	13.6
	CM_MW7-DP_WG_2021-07-12_N	2021 07 21	1,340	< 2.0	0.23	< 0.20	14.4	< 0.040	< 0.100	52	0.0625	329	< 0.20	0.30	< 0.40	< 20	< 0.100	54.4	127	*322*	< 0.0050	0.178	15.4	2.52	0.839	< 0.020	25.3	841	< 0.020	< 0.20	< 0.60	4.55	< 1.00	14.8
	CM_MW7-DP_WG_2021-10-11_N	2021 10 13	1,330	2.6	< 0.20	< 0.20	12.4	< 0.040	< 0.100	53	0.0308	299	< 0.20	1.36	< 0.40	44	< 0.100	51.8	142	*556*	< 0.0050	0.112	12.3	2.67	0.238	< 0.020	26.1	754	< 0.020	< 0.20	< 0.60	4.07	< 1.00	8.2
CM_MW8	CM_MW8_WG_2021-01-11_N	2021 02 25	327	2.5	< 0.20	0.35	110	< 0.0400	< 0.100	241	< 0.0100	89.9	< 0.20	< 0.200	< 0.40	2,190	< 0.100	61.9	25.0	142	< 0.0050	0.423	< 1.00	2.95	0.100	< 0.020	41.1	6,050	< 0.020	< 0.20	< 0.60	0.351	< 1.00	< 2.0
	CM_MW8_WG_2021-04-12_N	2021 05 14	338	3.5	0.20	< 0.20	83.1	< 0.040	< 0.100	266	< 0.0100	90.6	< 0.20	0.24	< 0.40	757	< 0.100	60.8	27.2	102	< 0.0050	0.476	< 1.00	2.92	< 0.100	< 0.020	37.4	5,700	< 0.020	0.22	< 0.60	0.205	< 1.00	3.4
	CM_MW8_WG_2021-07-12_N	2021 07 21	307	2.7	< 0.20	0.23	97.6	< 0.040	< 0.100	260	< 0.0100	84.1	< 0.20	0.30	< 0.40	1,130	< 0.100	58.6	23.5	127	< 0.0050	0.639	< 1.00	2.73	< 0.100	< 0.020	40.8	5,730	< 0.020	< 0.20	< 0.60	0.293	< 1.00	< 2.0
	CM_NNP_WS_2021-07-12_N	Duplicate	266	2.3	< 0.20	0.22	106	< 0.040	< 0.100	266	< 0.0100	73.3	< 0.20	0.33	< 0.40	1,380	< 0.100	61.6	20.1	143	< 0.0050	0.719	< 1.00	2.66	< 0.100	< 0.020	44.1	5,390	< 0.020	< 0.20	< 0.60	0.378	< 1.00	< 2.0
	QA/QC RPD%		14	*	*	*	8	*	*	2	*	14	*	*	*	20	*	5	16	12	*	12	*	3	*	*	8	6	*	*	*	25	*	*
	CM_MW8_WG_2021-10-11_N	2021 10 13	267	3.6	< 0.10	0.28	102	< 0.020	< 0.050	243	< 0.0050	71.6	0.16	0.27	< 0.20	1,600	< 0.050	64.3	21.4	154	< 0.0050	0.637	< 0.50	2.79	< 0.050	< 0.010	47.6	5,180	< 0.010	0.15	< 0.30	0.396	< 0.50	< 1.0
CM_MW3-SH	CM_MW3-SH_WG_2021-01-11_N	2021 03 04	176	1.7	< 0.10	0.12	78.8	< 0.0200	< 0.050	20	0.0070	50.6	0.25	< 0.100	1.96	< 10	< 0.050	7.9	12.2	3.98	< 0.0050	0.819	< 0.50	0.713	0.297	< 0.010	4.34	268	< 0.010	< 0.10	< 0.30	0.208	< 0.50	3.8
	CM_MW3-SH_WG_2021-04-12_N	2021 05 26	187	2.5	< 0.10	< 0.10	79.6	< 0.020	< 0.050	17	0.0070	54.0	0.14	< 0.10	0.52	< 10	< 0.050	6.1	12.6	< 0.10	< 0.0050	0.539	< 0.50	0.612	0.260	< 0.010	3.67	276	< 0.010	< 0.10	< 0.30	0.200	< 0.50	< 1.0
	CM_MW3-SH_WG_2021-07-12_N	2021 07 29	178	< 1.0	< 0.10	0.10	78.9	< 0.020	< 0.050	21	0.0081	51.4	0.22	< 0.10	0.90	< 10	0.197	7.1	12.1	1.12	< 0.0050	0.707	< 0.50	0.672	0.306	< 0.010	3.66	269	< 0.010	< 0.10	< 0.30	0.183	< 0.50	2.9
	CM_MW3-SH_WG_2021-10-11_N	2021 10 28	172	11.8	< 0.10	0.11	81.6	< 0.020	< 0.050	21	0.0068	48.4	0.24	< 0.10	0.58	< 10	0.068	8.0	12.4	2.61	< 0.0050	0.815	< 0.50	0.718	0.254	< 0.010	4.27	269	< 0.010	< 0.10	< 0.30	0.220	< 0.50	1.8
CM_MW3-DP	CM_MW3-DP_WG_2021-01-11_N	2021 03 04	51.4	7.2	< 0.20	0.67	835	< 0.0400	< 0.100	479	< 0.0100	12.5	< 0.20	< 0.200	< 0.40	20	< 0.100	1,490	4.90	30.0	< 0.0050	1.83	< 1.00	2.39	< 0.100	< 0.020	608	1,130	< 0.020	< 0.20	< 0.60	0.358	< 1.00	< 2.0
	CM_MW3-DP_WG_2021-04-12_N	2021 05 26	50.6	4.4	< 0.20	1.73	824	< 0.040	< 0.100	494	< 0.0100	12.5	< 0.20	< 0.20	0.83	< 20	0.536	1,390	4.70	46.6	< 0.0050	4.83	< 1.00	2.49	< 0.100	< 0.020	631	1,250	< 0.020	< 0.20	< 0.60	0.960	< 1.00	12.9
	CM_MW3-DP_WG_2021-07-12_N	2021 07 29	47.6	6.9	< 0.20	0.43	809	< 0.040	< 0.100	491	< 0.0100	11.5	< 0.20	< 0.20	< 0.40	45	< 0.100	1,340	4.60	23.2	< 0.0050	0.803	< 1.00	2.16	< 0.100	< 0.050	545	1,080	< 0.020	< 0.20	< 0.60	0.184	< 1.00	< 2.0
	CM_MW3-DP_WG_2021-10-11_N	2021 10 28	47.1	9.6	< 0.20	0.35	772	< 0.040	< 0.100	469	< 0.0100	11.8	< 0.20	< 0.20	0.48	54	< 0.100	1,340	4.29	18.5	< 0.0050	0.750	< 1.00	2.16	< 0.100	< 0.020	541	1,090	< 0.020	< 0.20	< 0.60	0.162	< 1.00	2.1

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

< Denotes concentration less than indicated detection limit.

- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with Hardness.

[c] Standard varies with pH.

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

[e] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

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

[g] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

TABLE CM-04: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (CMm)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness	Dissolved Metals																														
			mg/L	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 mg/L	Chromium µg/L	Cobalt µg/L	Copper µg/L	Iron µg/L	Lead µg/L	Lithium µg/L	Magnesium mg/L	Manganese µg/L	Mercury µg/L	Molybdenum µg/L	Nickel µg/L	Potassium mg/L	Selenium µg/L	Silver µg/L	Sodium mg/L	Strontium µg/L	Thallium µg/L	Tin µg/L	Titanium µg/L	Uranium µg/L	Vanadium µg/L	Zinc[f] µg/L
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[b]	n/a	10[d]	40	20-90	n/a	40-160[b]	n/a	n/a	n/a	0.25	10,000	250-1,500[b]	n/a	20	0.5-15[b]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[b]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[d]	50	200	5,000	200	2,500	n/a	200	1	10	200	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	10	100	1,000-5,000[c]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[d]	1,000	300	n/a	100	5,000	n/a	n/a	2	50	1,000	n/a	30	n/a	n/a	n/a	n/a	n/a	n/a	200	100	2,000
CSR Drinking Water (DW)			n/a	9,500	6	10	1,000	8	n/a	5,000	5	n/a	50[d]	20[e]	1,500	6,500	10	8	n/a	1,500	1	250	80	n/a	10	20	200	2,500	n/a	2,500	n/a	20	20	3,000
Health-based Value (HBV)[g]			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	2,400	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Michel Creek Valley Watershed (+ denotes Study Area 11)																																		
CM_MW_AG1A+	CM_MW_AG1A_WG_2021-01-11_N	2021 03 11	444	< 1.0	< 0.10	2.51	1,340	< 0.020	< 0.050	27	< 0.0050	127	< 0.10	0.22	< 0.20	*6,510*	< 0.050	19.8	30.8	193	< 0.0050	1.37	< 0.50	1.23	< 0.050	< 0.010	16.3	703	< 0.010	< 0.10	< 0.30	1.56	< 0.50	1.1
	CM_MW_AG1A_WG_2021-04-12_N	2021 05 27	470	1.0	< 0.10	1.74	1,570	< 0.020	< 0.050	25	< 0.0050	139	< 0.10	0.16	< 0.20	*6,950*	< 0.050	20.8	29.9	148	< 0.0050	1.10	< 0.50	1.13	0.061	< 0.020	10.2	793	< 0.010	< 0.10	< 0.30	0.924	< 0.50	1.1
	CM_MW_AG1A_WG_2021-07-12_N	2021 07 28	470	< 1.0	< 0.10	1.70	1,640	< 0.020	< 0.050	28	< 0.0050	140	< 0.10	0.15	< 0.20	*6,970*	< 0.050	22.3	29.2	147	< 0.0050	1.12	< 0.50	1.17	< 0.050	< 0.010	10.1	731	< 0.010	< 0.10	< 0.30	1.04	< 0.50	2.9
	CM_NNP2_WS_2021-07-12_N	Duplicate	475	< 1.0	< 0.10	1.69	1,630	< 0.020	< 0.050	28	< 0.0050	141	< 0.10	0.14	0.21	*6,970*	0.058	22.9	29.9	146	< 0.0050	1.13	< 0.50	1.16	0.113	< 0.010	10.3	727	< 0.010	< 0.10	< 0.30	1.04	< 0.50	1.4
	QA/QC RPD%		1	*	*	1	1	*	*	*	*	1	*	*	*	0	*	3	2	1	*	1	*	1	*	*	2	1	*	*	*	0	*	*
	CM_MW_AG1A_WG_2021-10-11_N	2021 11 03	512	1.2	< 0.10	1.63	1,870	< 0.020	< 0.050	26	< 0.0050	152	< 0.10	0.14	< 0.20	*7,100*	< 0.050	22.0	32.3	139	< 0.0050	1.04	< 0.50	1.13	< 0.050	< 0.010	9.75	825	< 0.010	< 0.10	< 0.30	0.867	< 0.50	< 1.0
CM_MW_AG1B+	CM_MW_AG1B_WG_2021-01-11_N	2021 03 11	582	1.4	< 0.10	0.29	220	< 0.020	< 0.050	17	0.0573	150	0.19	< 0.10	0.22	< 10	< 0.050	2.4	50.4	0.59	< 0.0050	0.125	0.56	0.932	0.258	< 0.010	2.41	277	0.012	< 0.10	< 0.30	0.516	< 0.50	1.4
	CM_NNP_WS_2021-01-11_N	Duplicate	581	2.1	< 0.10	0.29	217	< 0.020	< 0.050	17	0.0516	148	0.22	< 0.10	0.22	< 10	< 0.050	2.4	51.3	0.58	< 0.0050	0.131	0.56	0.909	0.228	0.015	2.38	282	0.014	< 0.10	< 0.30	0.519	< 0.50	1.2
	QA/QC RPD%		0	*	*	*	1	*	*	*	10	1	*	*	*	*	*	*	2	2	*	*	*	2	*	*	1	2	*	*	*	1	*	*
	CM_MW_AG1B_WG_2021-04-12_N	2021 05 27	462	< 1.0	< 0.10	0.24	136	< 0.020	< 0.050	16	0.0434	116	0.39	< 0.10	0.37	< 10	< 0.050	1.8	41.9	0.20	< 0.0050	0.193	0.63	0.935	0.568	< 0.010	1.82	245	0.063	< 0.10	< 0.30	0.480	< 0.50	1.4
	CM_MW_AG1B_WG_2021-07-12_N	2021 07 28	559	< 1.0	< 0.10	0.30	244	< 0.020	< 0.050	30	0.0576	152	0.36	< 0.10	0.27	< 10	< 0.050	3.5	43.6	0.87	< 0.0050	0.174	0.68	1.25	1.96	< 0.010	2.57	301	0.033	< 0.10	< 0.30	0.554	< 0.50	1.9
	CM_MW_AG1B_WG_2021-10-11_N	2021 11 03	662	1.0	< 0.10	0.25	271	< 0.020	< 0.050	21	0.0560	176	0.31	< 0.10	0.22	< 10	< 0.050	3.0	54.0	0.64	< 0.0050	0.180	0.95	1.16	0.936	< 0.010	2.73	360	0.031	< 0.10	< 0.30	0.625	< 0.50	1.2
	CM_NNP2_WS_2021-10-11_N	Duplicate	678	1.1	< 0.10	0.24	259	< 0.020	< 0.050	22	0.0582	182	0.36	< 0.10	0.23	< 10	< 0.050	3.1	54.4	0.66	< 0.0050	0.190	0.96	1.14	1.05	< 0.010	2.68	358	0.032	< 0.10	< 0.30	0.641	< 0.50	1.1
	QA/QC RPD%		2	*	*	*	5	*	*	*	4	3	*	*	*	*	*	*	1	3	*	*	*	2	11	*	2	1	*	*	*	3	*	*
Blanks																																		
Field Blanks																																		
CM_MW_AG1B	CM_NNT_WS_2021-01-11_N	2021 03 11	< 0.60	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
CM_MW1-SH	CM_NNT_WS_2021-04-12_N	2021 05 19	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
CM_MW8	CM_NNT_WS_2021-07-12_N	2021 07 21	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
CM_MW10	CM_NNT_WS_2021-10-11_N	2021 10 20	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
Trip Blanks																																		
	CM_TRP_WG_2021-01-11_N	2021 03 05	< 0.60	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	2.2
	CM_TRP_WS_2021-04-12_N	2021 05 20	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0
	CM_TRP_WS_2021-07-12_N	2021 07 28	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	0.153	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	**169**
	CM_TRP_WS_2021-10-11_N	2021 11 03	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.20	< 10	< 0.050	< 1.0	< 0.0050	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 1.0

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

< Denotes concentration less than indicated detection limit.

\- 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
ITALIC	Concentration greater than CSR Irrigation Watering (IW) standard
UNDERLINE	Concentration greater than CSR Livestock Watering (LW) standard
SHADED	Concentration greater than CSR Drinking Water (DW) standard

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with Hardness.

[c] Standard varies with pH.

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

[e] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

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

[g] Ramboll calculated health-based values for these two parameters based on toxicity values (tolerable daily intakes; TDI) and drinking water allocation factors (DW AFs), documented in Appendix IV.

TABLE CM-05: Summary of Analytical Results Compared to Secondary Screening Criteria for Selenium (CMm)

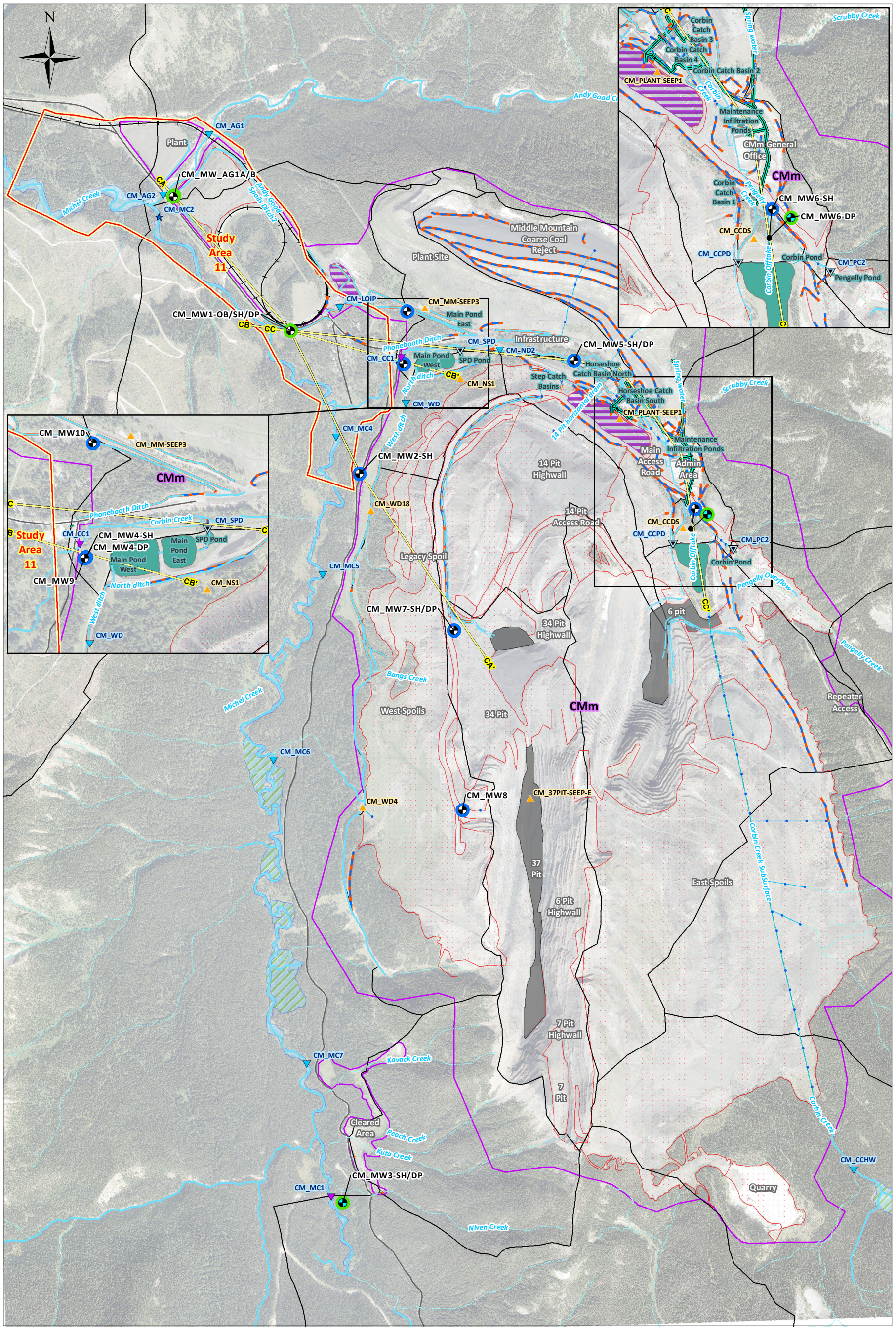
Sample Location	Sample ID	Sample Date (yyyy mm dd)	SPO/Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
SPO				n/a
Compliance Point			Michel Creek [CM_MC2 (E258937)]	19
Corbin Creek Valley Watershed (+ denotes Study Area 11)				
CM_MW5-SH	CM_MW5-SH_WG_2021-01-11_N	2021 03 11	CM_MC2 (E258937)	18.5
	CM_MW5-SH_WG_2021-04-12_N	2021 05 28	CM_MC2 (E258937)	11.8
	CM_MW5-SH_WG_2021-07-12_N	2021 08 04	CM_MC2 (E258937)	10.4
	CM_MW5-SH_WG_2021-11-22_N	2021 11 22	CM_MC2 (E258937)	13.6

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

SHADED Concentration greater than SPO by Area/Compliance Point by Area

Drawings:

CM-01: Sample Location Plan – Coal Mountain mine
CM-02: Groundwater Elevations from Q4 and Conceptual Regional Groundwater Flow – Coal Mountain mine
CM-03: Coal Mountain mine Inferred Geological Cross Section CA-CA'
CM-04: Coal Mountain mine Inferred Geological Cross Section CB-CB'
CM-05: Coal Mountain mine Inferred Geological Cross Section CC-CC'
CM-06: Coal Mountain mine Spatial Distribution of Nitrate Nitrogen in Groundwater
CM-07: Coal Mountain mine Spatial Distribution of Sulphate in Groundwater
CM-08: Coal Mountain mine Spatial Distribution of Dissolved Cadmium Groundwater
CM-09: Coal Mountain mine Spatial Distribution of Dissolved Selenium in Groundwater



Legend

Groundwater Stations[4]
- Monitoring Well
- Background well included in the RGMP
- Well included in the SSGMP
- Well included in both the RGMP and the SSGMP

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep

Site Features
- Secondary Road
- Rails
- Geological Cross Section
- Study Areas
- Tailings/Settling Pond
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface Ditch
- Potable Waterline
- Rock Drain
- Water Pipeline
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:20000 Scale)

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. Locations of overlapping wells have been adjusted for clarity.

References:
1. Information provided by Teck Coal Limited.

0 0.1 0.2 0.4 0.6 0.8 1 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

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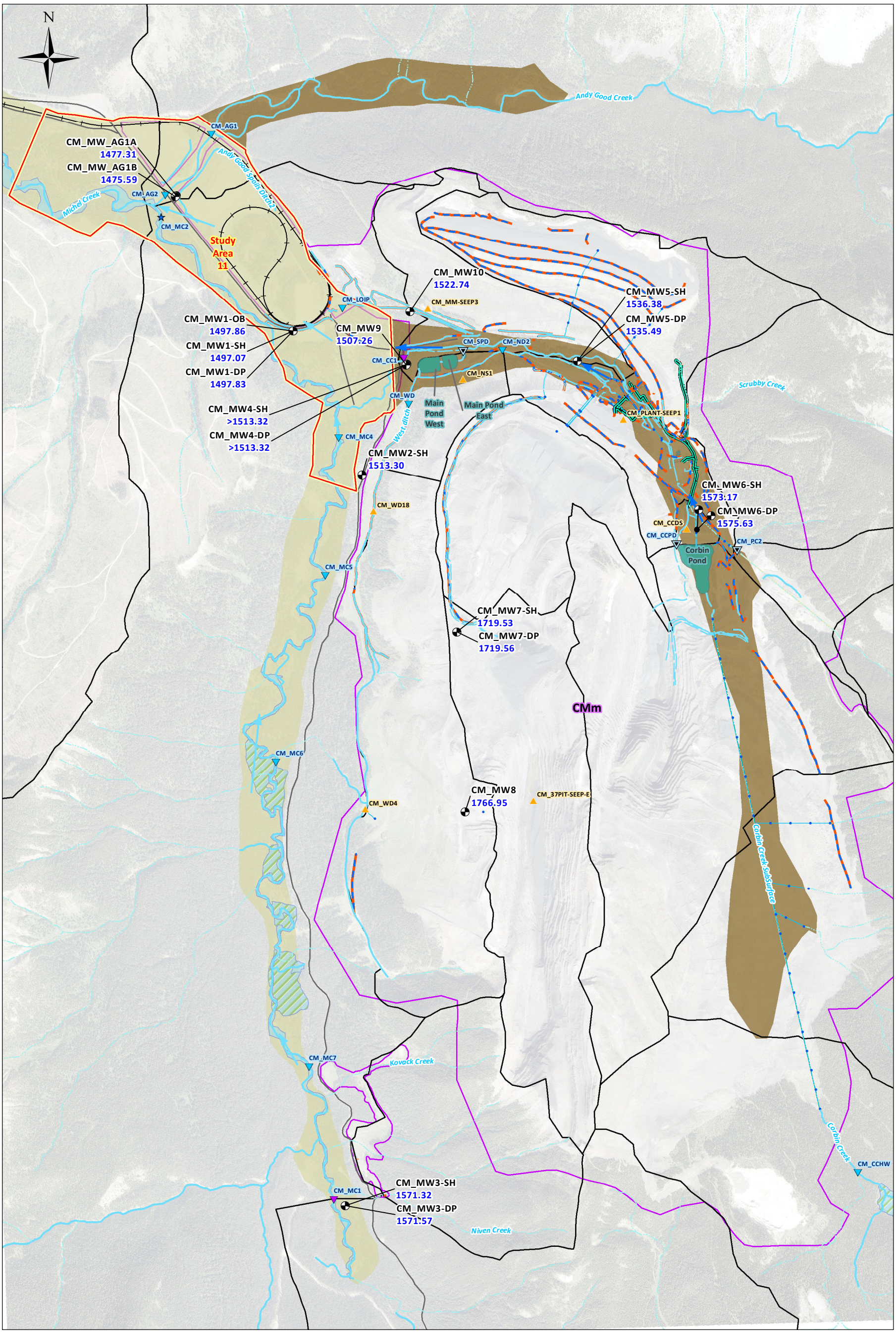
Coal Mountain Mine - Sample Location Plan

CHK'D: RS	DATE: 2022-03-18	SCALE: 1:20,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING CM-01

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-91-LocPlan_CMm.mxd



Legend

Groundwater Stations[5]
- Monitoring Well

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Secondary Road
- Rails
- Inferred Valley-bottom Flow Direction
- Inferred Upland or Tributary Valley-bottom Groundwater Flow
- Study Areas
- Tailings/Settling Pond
- Watersheds
- Interpreted Tributary Valley-bottom Extent
- Interpreted Main Valley-bottom Extent
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Potable Waterline
- Rock Drain
- Water Pipeline
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:20000 Scale)

1571.57 Groundwater Elevation Q4 (masl) - not used for contouring

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. Stations used to assess flow status are not shown on the map. Readers are referred to report references.
5. Overlapping wells adjusted for clarity.

References:
1. Information provided by Teck Coal Limited.

0 100 200 400 600 800 1,000 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Coal Mountain Mine Groundwater Elevations from Q4 2021 and Inferred Groundwater Flow Directions

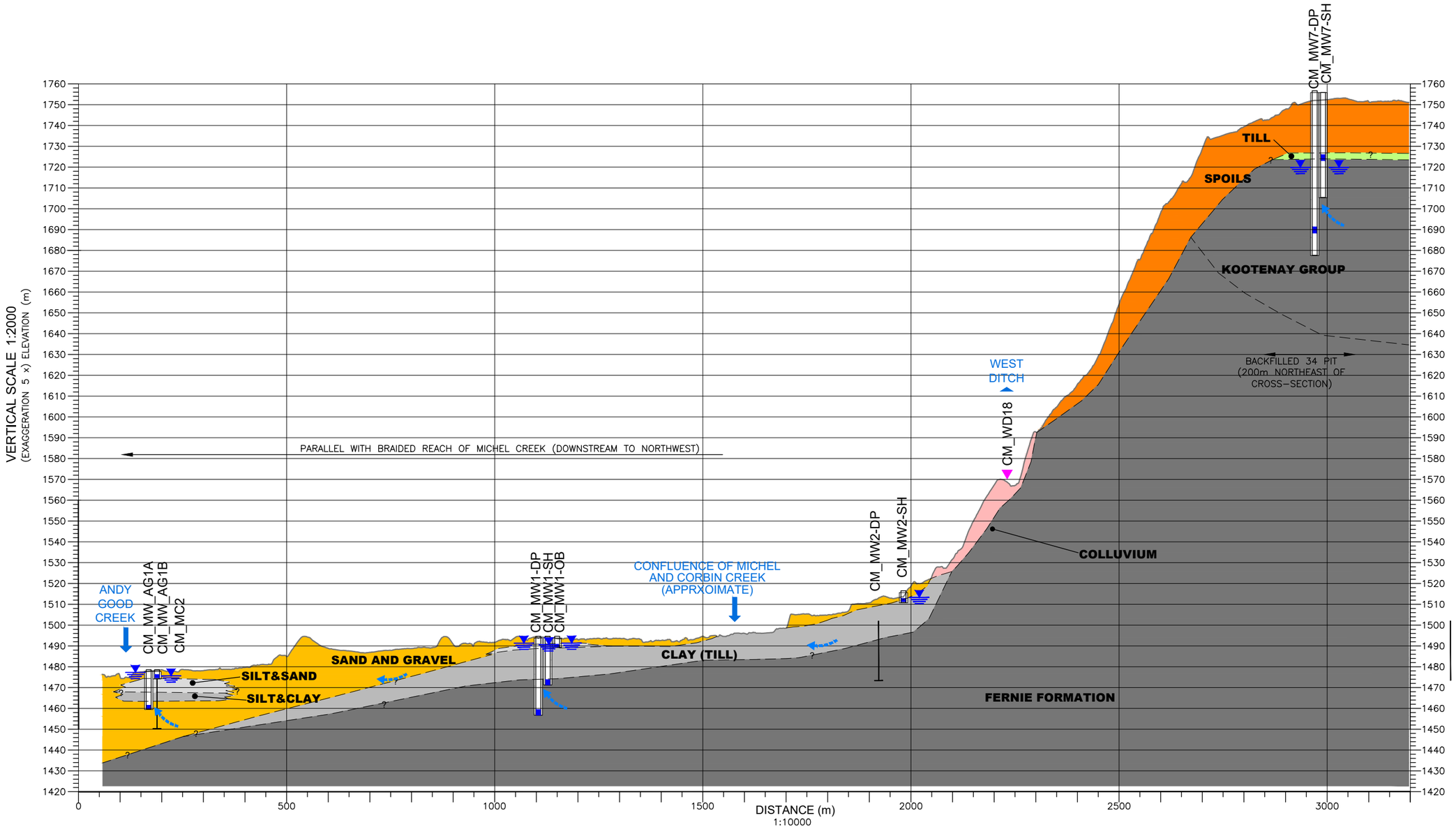
CHK'D: RS	DATE: 2022-03-17	SCALE: 1:20,000	Ref Num:
BY: CW	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING CM-02

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-92-GWElevFlow_CMm.mxd

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

CA
NORTHWEST

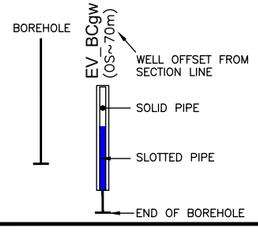
CA'
SOUTHEAST



LEGEND

- GRAVEL (SPOILS)
- SAND & GRAVEL (GLACIOFLUVIAL)
- COLLUVIUM
- SILT & SAND
- SILT & CLAY (GLACIOLACUSTRINE)
- SILT, SAND, GRAVEL (TILL)
- BEDROCK
- INFERRED STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)
- SEEP
- INFERRED GROUNDWATER FLOW DIRECTION

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.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-03-14	ISSUED TO CLIENT	AJK	MB

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
COAL MOUNTAIN OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

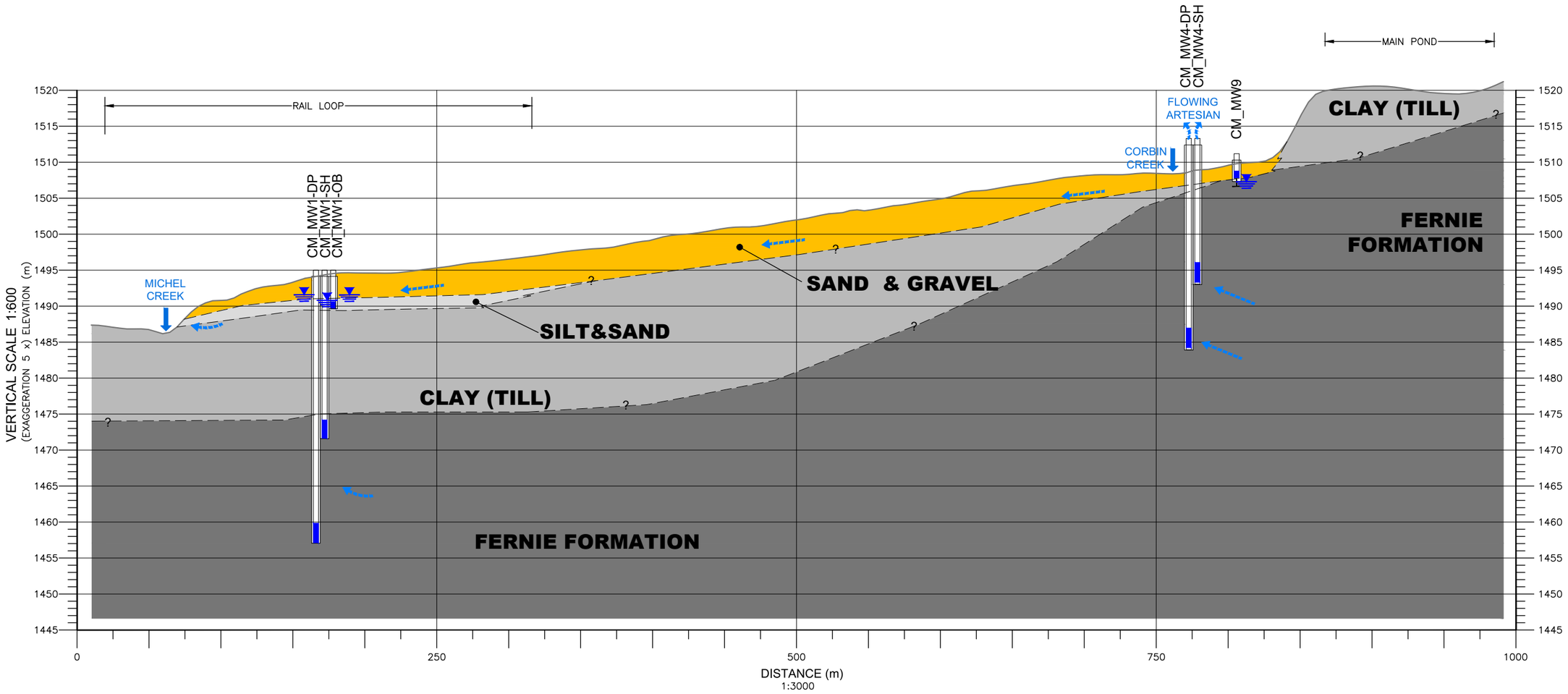
TITLE:
COAL MOUNTAIN MINE
INFERRED GEOLOGICAL CROSS SECTION CA-CA'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-08	DWG No: REV.: 0
CHK'D: MB	PLOT: 20220320.1738	CADFILE: 635544-X2R18	**DRAWING CM-03**

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG

CB
NORTHWEST

CB'
SOUTHEAST

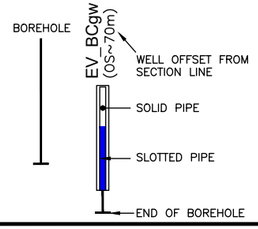


LEGEND

- GRAVEL (SPOILS)
- SAND & GRAVEL (GLACIOFLUVIAL)
- SILT & SAND
- SILT & CLAY (GLACIOLACUSTRINE)
- SILT, SAND, GRAVEL (TILL)
- BEDROCK

- INFERRED STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)
- INFERRED GROUNDWATER FLOW DIRECTION

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. 2021 Q3 MANUAL WATER LEVEL MEASUREMENT USED FOR CM_MW9. NO 2021 Q4 MEASUREMENT AVAILABLE.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-03-14	ISSUED TO CLIENT	AJK	MB

CLIENT NAME:
TECK COAL LIMITED
–

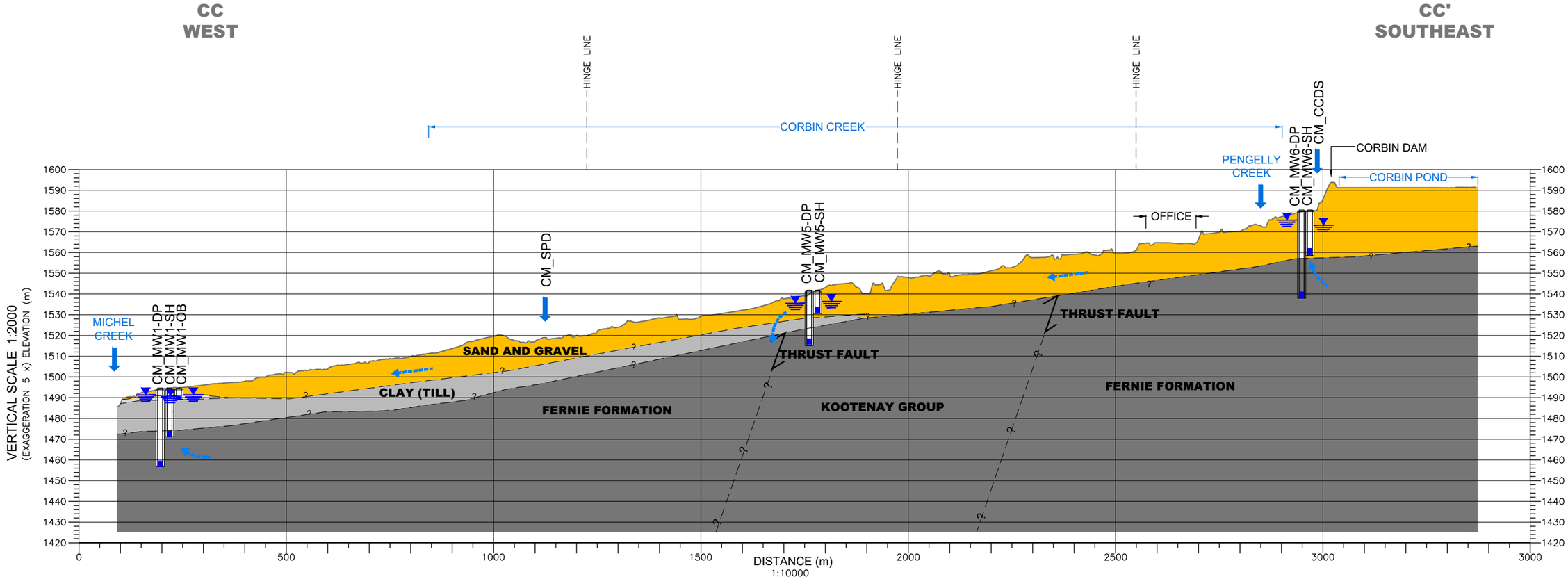
PROJECT LOCATION:
COAL MOUNTAIN OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
COAL MOUNTAIN MINE
INFERRED GEOLOGICAL CROSS SECTION CB-CB'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-08	DWG No: REV.: 0
CHK'D: MB	PLOT: 20220314.1530	CADFILE: 635544-X2R18	**DRAWING CM-04**

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG

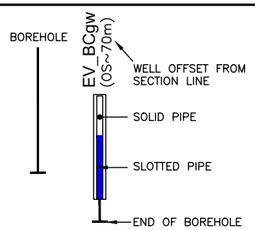


LEGEND

- **SAND & GRAVEL** (GLACIOFLUVIAL)
- **SILT & SAND**
- **SILT & CLAY** (GLACIOLACUSTRINE)
- **BEDROCK**

- INFERRED STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2021 Q4 MANUAL WATER LEVEL MEASUREMENT)
- INFERRED GROUNDWATER FLOW DIRECTION

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.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2022-03-14	ISSUED TO CLIENT	AJK	MB

CLIENT NAME:
TECK COAL LIMITED
–

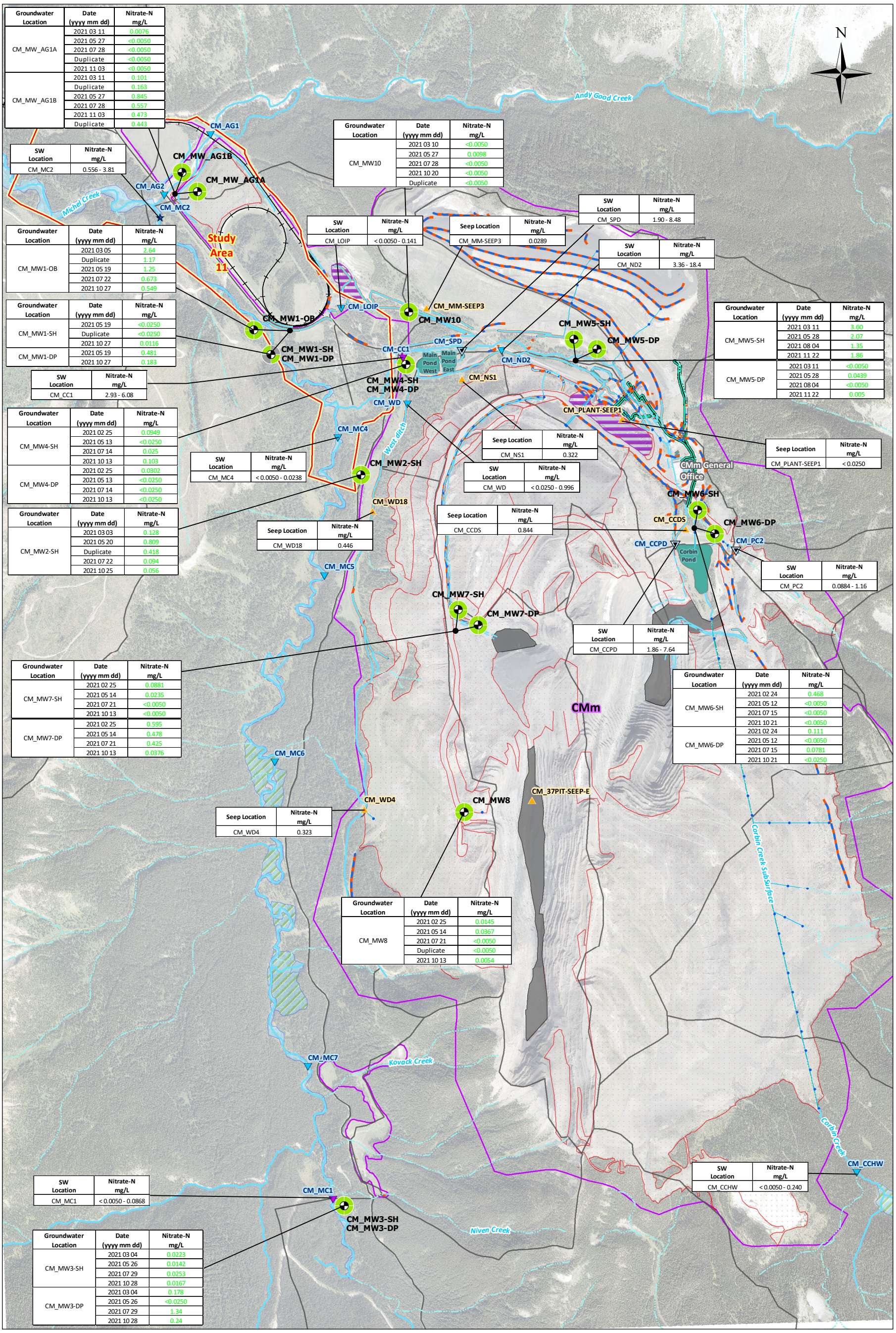
PROJECT LOCATION:
COAL MOUNTAIN OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
COAL MOUNTAIN MINE
INFERRED GEOLOGICAL CROSS SECTION CC-CC'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2022-02-08	DWG No: REV.: 0
CHK'D: MB	PLOT: 20220314.1530	CADFILE: 635544-X2R18	**DRAWING CM-05**

PATH: P:\CURRENT PROJECTS\TECK COAL LTD\SPO\635544\4.0 EXECUTION\4.5 GIS AND DRAWINGS\CAD\635544-X2R18.DWG



Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW_AG1A	2021 03 11	0.0076
	2021 05 27	<0.0050
	2021 07 28	<0.0050
	Duplicate	<0.0050
	2021 11 03	<0.0050
CM_MW_AG1B	2021 03 11	0.101
	Duplicate	0.163
	2021 05 27	0.845
	2021 07 28	0.557
	2021 11 03	0.473
	Duplicate	0.443

SW Location	Nitrate-N mg/L
CM_MC2	0.556 - 3.81

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW10	2021 03 10	<0.0050
	2021 05 27	0.0098
	2021 07 28	<0.0050
	2021 10 20	<0.0050
	Duplicate	<0.0050

SW Location	Nitrate-N mg/L
CM_LOIP	< 0.0050 - 0.141

Seep Location	Nitrate-N mg/L
CM_MM-SEEP3	0.0289

SW Location	Nitrate-N mg/L
CM_SPD	1.90 - 8.48

SW Location	Nitrate-N mg/L
CM_ND2	3.36 - 18.4

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW1-OB	2021 03 05	2.64
	Duplicate	1.17
	2021 05 19	1.25
	2021 07 22	0.673
	2021 10 27	0.549

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW1-SH	2021 05 19	<0.0250
	Duplicate	<0.0250
	2021 10 27	0.0116
CM_MW1-DP	2021 05 19	0.481
	2021 10 27	0.183

SW Location	Nitrate-N mg/L
CM_CC1	2.93 - 6.08

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW5-SH	2021 03 11	3.60
	2021 05 28	2.07
	2021 08 04	1.35
	2021 11 22	1.86
CM_MW5-DP	2021 03 11	<0.0050
	2021 05 28	0.0439
	2021 08 04	<0.0050
	2021 11 22	0.005

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW4-SH	2021 02 25	0.0949
	2021 05 13	<0.0250
	2021 07 14	0.025
	2021 10 13	0.103
CM_MW4-DP	2021 02 25	0.0302
	2021 05 13	<0.0250
	2021 07 14	<0.0250
	2021 10 13	<0.0250

SW Location	Nitrate-N mg/L
CM_MC4	< 0.0050 - 0.0238

Seep Location	Nitrate-N mg/L
CM_NS1	0.322

SW Location	Nitrate-N mg/L
CM_WD	< 0.0250 - 0.996

Seep Location	Nitrate-N mg/L
CM_PLANT-SEEP1	< 0.0250

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW2-SH	2021 03 03	0.128
	2021 05 20	0.809
	Duplicate	0.418
	2021 07 22	0.094
	2021 10 25	0.056

Seep Location	Nitrate-N mg/L
CM_WD18	0.446

Seep Location	Nitrate-N mg/L
CM_CCDS	0.844

SW Location	Nitrate-N mg/L
CM_PC2	0.0884 - 1.16

SW Location	Nitrate-N mg/L
CM_CCPD	1.86 - 7.64

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW7-SH	2021 02 25	0.0881
	2021 05 14	0.0235
	2021 07 21	<0.0050
	2021 10 13	<0.0050
CM_MW7-DP	2021 02 25	0.595
	2021 05 14	0.478
	2021 07 21	0.425
	2021 10 13	0.0376

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW6-SH	2021 02 24	0.468
	2021 05 12	<0.0050
	2021 07 15	<0.0050
	2021 10 21	<0.0050
CM_MW6-DP	2021 02 24	0.111
	2021 05 12	<0.0050
	2021 07 15	0.0781
	2021 10 21	<0.0250

Seep Location	Nitrate-N mg/L
CM_WD4	0.323

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW8	2021 02 25	0.0145
	2021 05 14	0.0367
	2021 07 21	<0.0050
	Duplicate	<0.0050
	2021 10 13	0.0054

SW Location	Nitrate-N mg/L
CM_MC1	< 0.0050 - 0.0868

Groundwater Location	Date (yyyy mm dd)	Nitrate-N mg/L
CM_MW3-SH	2021 03 04	0.0223
	2021 05 26	0.0142
	2021 07 29	0.0253
	2021 10 28	0.0167
CM_MW3-DP	2021 03 04	0.178
	2021 05 26	<0.0250
	2021 07 29	1.34
	2021 10 28	0.24

SW Location	Nitrate-N mg/L
CM_CCHW	< 0.0050 - 0.240

Legend

Groundwater Stations
- Monitoring Well

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep

Site Features
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Potable Waterline
- Rock Drain
- Water Pipeline
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:20000 Scale)

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Primary Screening Criteria	Nitrate-N mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

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. Locations of overlapping wells have been adjusted for clarity.
5. Nitrate-N = Nitrate Nitrogen
6. SW = Surface Water

References:
1. Data provided by Teck Coal Limited.

0 125 250 500 750 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

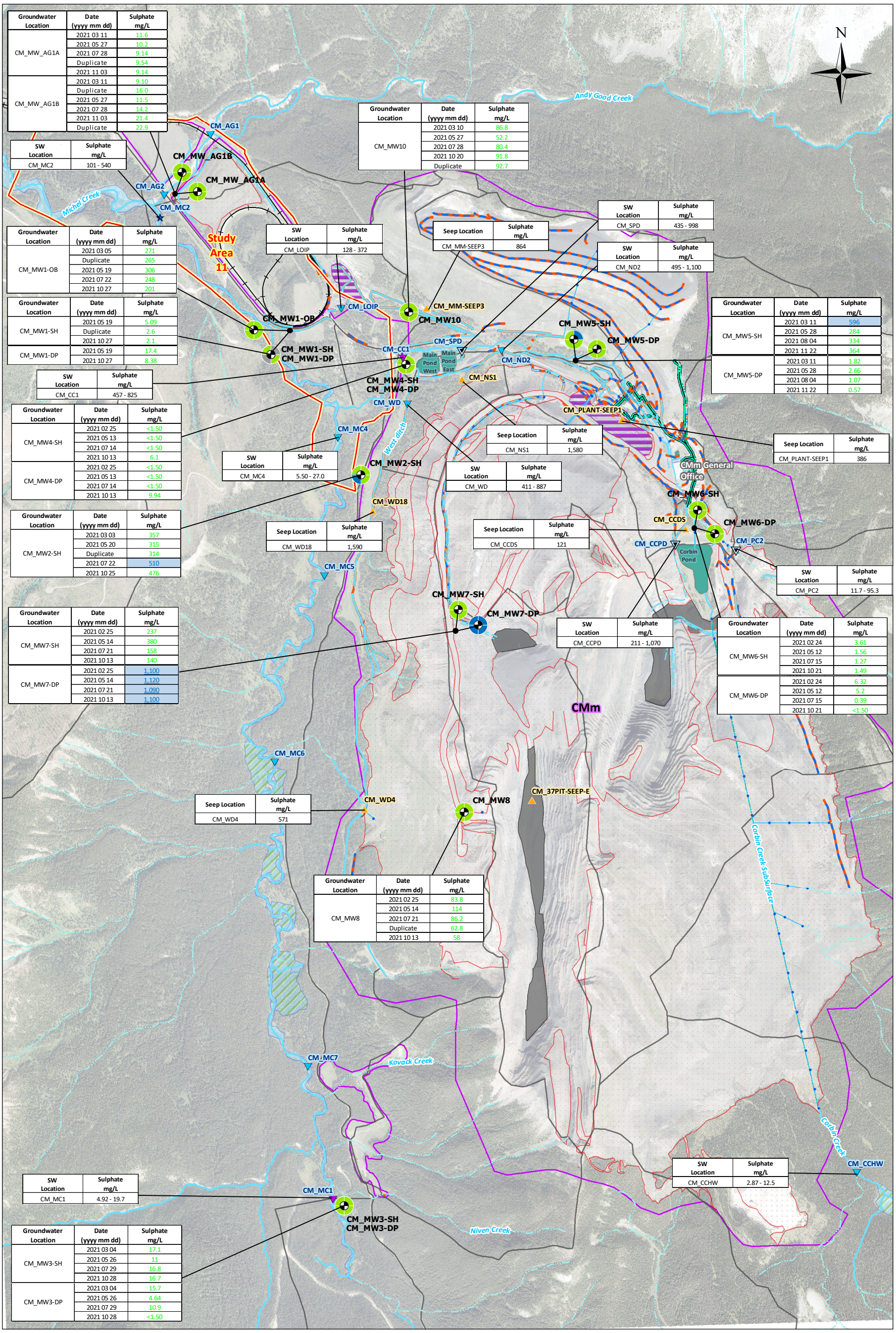
Coal Mountain Mine
Spatial Distribution of Nitrate Nitrogen in Groundwater

CHK'D: RS | DATE: 2022-03-08 | SCALE: 1:20,000
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

Ref Num: **DRAWING CM-06**

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-96-SpatialDist_N_CMm.mxd



Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW_AG1A	2021 03 11	11.6
	2021 05 27	10.2
	2021 07 28	9.14
	Duplicate	9.54
	2021 11 03	9.14
CM_MW_AG1B	2021 03 11	9.10
	Duplicate	16.0
	2021 05 27	11.5
	2021 07 28	14.2
	2021 11 03	21.4
	Duplicate	22.9

SW Location	Sulphate mg/L
CM_MC2	101 - 540

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW10	2021 03 10	86.8
	2021 05 27	52.2
	2021 07 28	80.4
	2021 10 20	91.8
	Duplicate	92.7

SW Location	Sulphate mg/L
CM_LOIP	128 - 372

Seep Location	Sulphate mg/L
CM_MM-SEEP3	864

SW Location	Sulphate mg/L
CM_SPD	435 - 998

SW Location	Sulphate mg/L
CM_ND2	495 - 1,100

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW1-OB	2021 03 05	271
	Duplicate	265
	2021 05 19	306
	2021 07 22	248
	2021 10 27	201

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW1-SH	2021 05 19	5.09
	Duplicate	2.6
	2021 10 27	2.1
CM_MW1-DP	2021 05 19	17.4
	2021 10 27	8.38

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW5-SH	2021 03 11	596
	2021 05 28	284
	2021 08 04	334
	2021 11 22	364
CM_MW5-DP	2021 03 11	1.82
	2021 05 28	2.66
	2021 08 04	1.07
	2021 11 22	0.57

SW Location	Sulphate mg/L
CM_CC1	457 - 825

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW4-SH	2021 02 25	<1.50
	2021 05 13	<1.50
	2021 07 14	<1.50
	2021 10 13	6.1
CM_MW4-DP	2021 02 25	<1.50
	2021 05 13	<1.50
	2021 07 14	<1.50
	2021 10 13	9.94

SW Location	Sulphate mg/L
CM_MC4	5.50 - 27.0

Seep Location	Sulphate mg/L
CM_NS1	1,580

SW Location	Sulphate mg/L
CM_WD	411 - 887

Seep Location	Sulphate mg/L
CM_PLANT-SEEP1	386

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW2-SH	2021 03 03	357
	2021 05 20	315
	Duplicate	314
	2021 07 22	510
	2021 10 25	476

Seep Location	Sulphate mg/L
CM_WD18	1,590

Seep Location	Sulphate mg/L
CM_CCDS	121

SW Location	Sulphate mg/L
CM_PC2	11.7 - 95.3

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW7-SH	2021 02 25	237
	2021 05 14	380
	2021 07 21	158
	2021 10 13	140
CM_MW7-DP	2021 02 25	1,100
	2021 05 14	1,120
	2021 07 21	1,090
	2021 10 13	1,100

SW Location	Sulphate mg/L
CM_CCPD	211 - 1,070

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW6-SH	2021 02 24	3.61
	2021 05 12	1.56
	2021 07 15	1.27
	2021 10 21	1.49
CM_MW6-DP	2021 02 24	6.32
	2021 05 12	5.2
	2021 07 15	0.39
	2021 10 21	<1.50

Seep Location	Sulphate mg/L
CM_WD4	571

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW8	2021 02 25	83.8
	2021 05 14	114
	2021 07 21	86.2
	Duplicate	62.8
	2021 10 13	58

SW Location	Sulphate mg/L
CM_CCHW	2.87 - 12.5

SW Location	Sulphate mg/L
CM_MC1	4.92 - 19.7

Groundwater Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW3-SH	2021 03 04	17.1
	2021 05 26	11
	2021 07 29	16.8
	2021 10 28	16.7
CM_MW3-DP	2021 03 04	15.7
	2021 05 26	4.64
	2021 07 29	10.9
	2021 10 28	<1.50

Legend

Groundwater Stations
- Monitoring Well

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep

Site Features
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Potable Waterline
- Rock Drain
- Water Pipeline
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:20000 Scale)

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Primary Screening Criteria	Sulphate mg/L
CSR Aquatic Life	1,280-4,290
CSR Irrigation Watering	n/a
CSR Livestock Watering	1,000
CSR Drinking Water	500

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Limited.

0 125 250 500 750 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

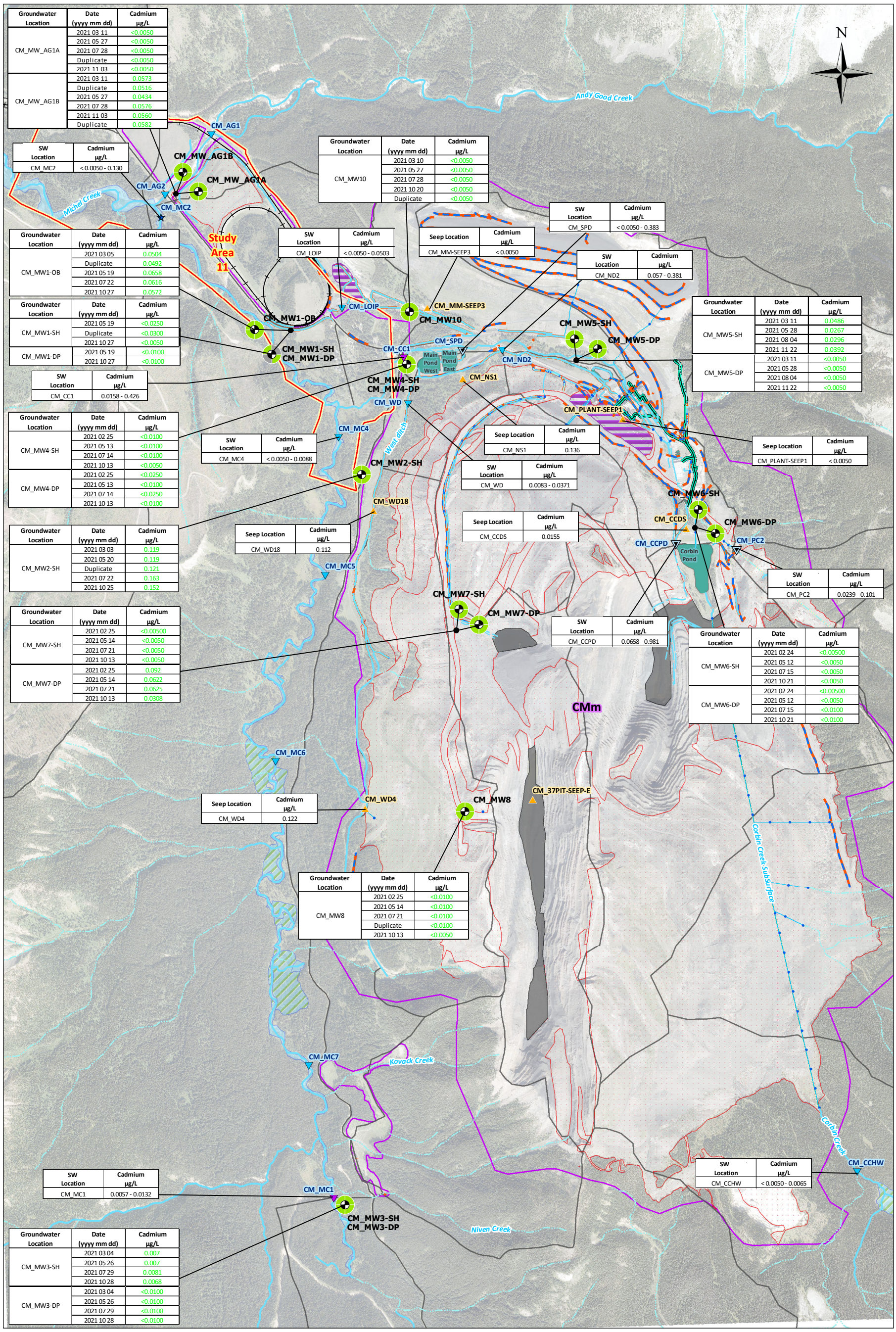
SNC·LAVALIN

Coal Mountain Mine
Spatial Distribution of Sulphate in Groundwater

CHK'D: RS | DATE: 2022-03-08 | SCALE: 1:20,000 | Ref Num: DRAWING CM-07
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-97-SpatialDist_SO4_CMm.mxd



Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW_AG1A	2021 03 11	<0.0050
	2021 05 27	<0.0050
	2021 07 28	<0.0050
	Duplicate	<0.0050
	2021 11 03	<0.0050
CM_MW_AG1B	2021 03 11	0.0573
	Duplicate	0.0516
	2021 05 27	0.0434
	2021 07 28	0.0576
	2021 11 03	0.0560
	Duplicate	0.0582

SW Location	Cadmium µg/L
CM_MC2	< 0.0050 - 0.130

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW10	2021 03 10	<0.0050
	2021 05 27	<0.0050
	2021 07 28	<0.0050
	2021 10 20	<0.0050
	Duplicate	<0.0050

SW Location	Cadmium µg/L
CM_SPD	< 0.0050 - 0.383

SW Location	Cadmium µg/L
CM_LOIP	< 0.0050 - 0.0503

Seep Location	Cadmium µg/L
CM_MM-SEEP3	< 0.0050

SW Location	Cadmium µg/L
CM_ND2	0.057 - 0.381

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW1-OB	2021 03 05	0.0504
	Duplicate	0.0492
	2021 05 19	0.0658
	2021 07 22	0.0616
	2021 10 27	0.0572

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW1-SH	2021 05 19	<0.0250
	Duplicate	<0.0300
	2021 10 27	<0.0050
CM_MW1-DP	2021 05 19	<0.0100
	2021 10 27	<0.0100

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW5-SH	2021 03 11	0.0486
	2021 05 28	0.0267
	2021 08 04	0.0296
	2021 11 22	0.0392
CM_MW5-DP	2021 03 11	<0.0050
	2021 05 28	<0.0050
	2021 08 04	<0.0050
	2021 11 22	<0.0050

SW Location	Cadmium µg/L
CM_CC1	0.0158 - 0.426

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW4-SH	2021 02 25	<0.0100
	2021 05 13	<0.0100
	2021 07 14	<0.0100
	2021 10 13	<0.0050
CM_MW4-DP	2021 02 25	<0.0250
	2021 05 13	<0.0100
	2021 07 14	<0.0250
	2021 10 13	<0.0100

SW Location	Cadmium µg/L
CM_MC4	< 0.0050 - 0.0088

Seep Location	Cadmium µg/L
CM_NS1	0.136

SW Location	Cadmium µg/L
CM_WD	0.0083 - 0.0371

Seep Location	Cadmium µg/L
CM_PLANT-SEEP1	< 0.0050

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW2-SH	2021 03 03	0.119
	2021 05 20	0.119
	Duplicate	0.121
	2021 07 22	0.163
	2021 10 25	0.152

Seep Location	Cadmium µg/L
CM_WD18	0.112

Seep Location	Cadmium µg/L
CM_CCDS	0.0155

SW Location	Cadmium µg/L
CM_PC2	0.0239 - 0.101

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW7-SH	2021 02 25	<0.00500
	2021 05 14	<0.0050
	2021 07 21	<0.0050
	2021 10 13	<0.0050
CM_MW7-DP	2021 02 25	0.092
	2021 05 14	0.0622
	2021 07 21	0.0625
	2021 10 13	0.0308

SW Location	Cadmium µg/L
CM_CCPD	0.0658 - 0.981

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW6-SH	2021 02 24	<0.00500
	2021 05 12	<0.0050
	2021 07 15	<0.0050
	2021 10 21	<0.0050
CM_MW6-DP	2021 02 24	<0.00500
	2021 05 12	<0.0050
	2021 07 15	<0.0100
	2021 10 21	<0.0100

Seep Location	Cadmium µg/L
CM_WD4	0.122

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW8	2021 02 25	<0.0100
	2021 05 14	<0.0100
	2021 07 21	<0.0100
	Duplicate	<0.0100
	2021 10 13	<0.0050

SW Location	Cadmium µg/L
CM_MC1	0.0057 - 0.0132

Groundwater Location	Date (yyyy mm dd)	Cadmium µg/L
CM_MW3-SH	2021 03 04	0.007
	2021 05 26	0.007
	2021 07 29	0.0081
	2021 10 28	0.0068
CM_MW3-DP	2021 03 04	<0.0100
	2021 05 26	<0.0100
	2021 07 29	<0.0100
	2021 10 28	<0.0100

SW Location	Cadmium µg/L
CM_CCHW	< 0.0050 - 0.0065

Legend

Groundwater Stations
- Monitoring Well

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep

Site Features
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Potable Waterline
- Rock Drain
- Water Pipeline
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:20000 Scale)

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

Green below the applicable screening criteria
Blue above the applicable screening criteria
Grey no sample collected

^ Dissolved phase of the parameter is shown in the spatial plot.

Primary Screening Criteria	Cadmium^ µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Limited.

0 125 250 500 750 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

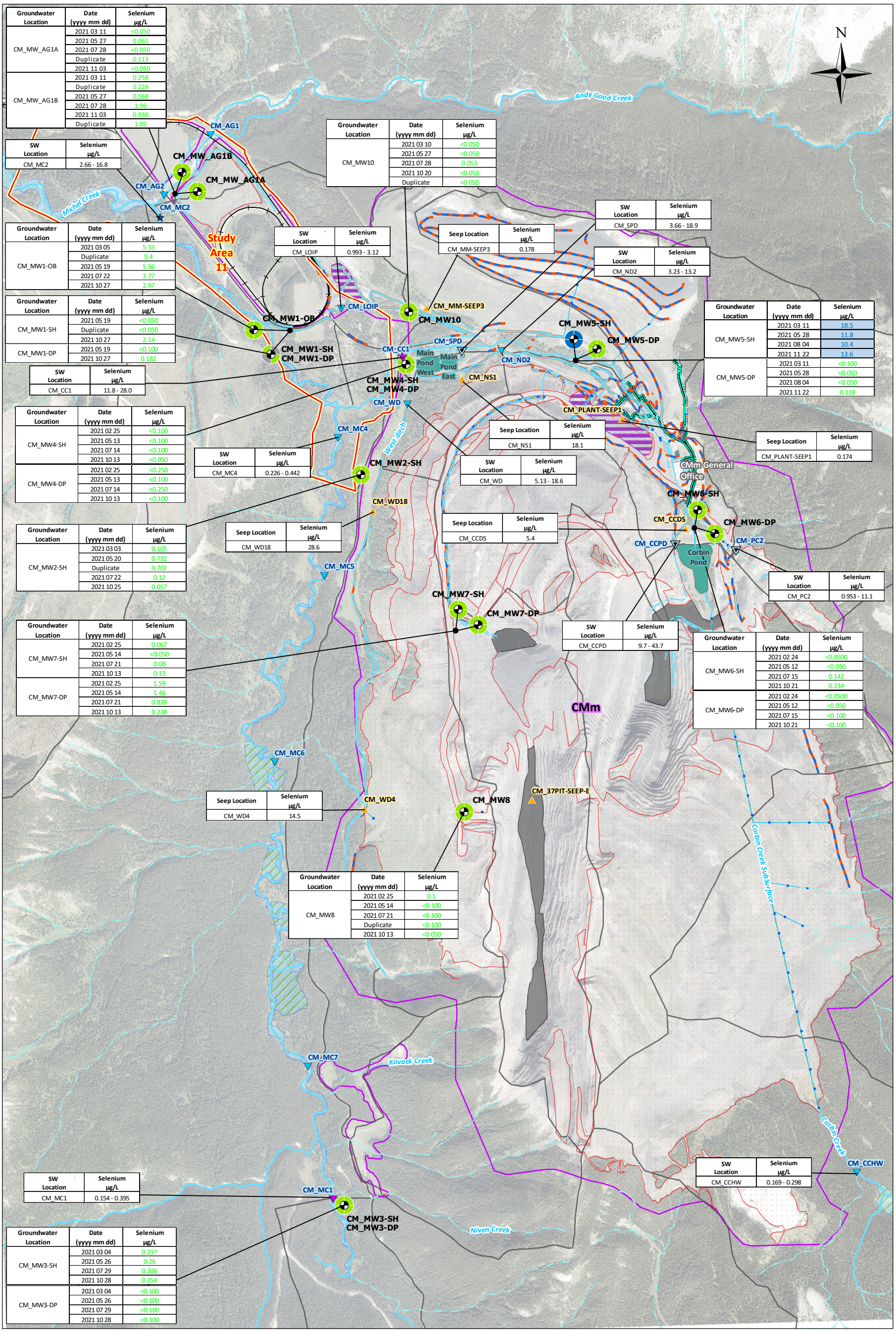
SNC·LAVALIN

Coal Mountain Mine
Spatial Distribution of Dissolved Cadmium in Groundwater

CHK'D: RS | DATE: 2022-03-08 | SCALE: 1:20,000 | Ref Num: DRAWING CM-08
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-98-SpatialDist_Cd_CMm.mxd



Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW_AG1A	2021 03 11	<0.050
	2021 05 27	0.061
	2021 07 28	<0.050
	Duplicate	0.113
	2021 11 03	<0.050
CM_MW_AG1B	2021 03 11	0.258
	Duplicate	0.228
	2021 05 27	0.568
	2021 07 28	1.96
	2021 11 03	0.936
	Duplicate	1.05

SW Location	Selenium µg/L
CM_MC2	2.66 - 16.8

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW10	2021 03 10	<0.050
	2021 05 27	<0.050
	2021 07 28	0.053
	2021 10 20	<0.050
	Duplicate	<0.050

SW Location	Selenium µg/L
CM_SPD	3.66 - 18.9

SW Location	Selenium µg/L
CM_LOIP	0.993 - 3.12

Seep Location	Selenium µg/L
CM_MM-SEEP3	0.178

SW Location	Selenium µg/L
CM_ND2	3.23 - 13.2

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW1-OB	2021 03 05	5.33
	Duplicate	5.4
	2021 05 19	5.56
	2021 07 22	3.77
	2021 10 27	2.97

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW1-SH	2021 05 19	<0.050
	Duplicate	<0.050
	2021 10 27	2.14
CM_MW1-DP	2021 05 19	<0.100
	2021 10 27	0.182

SW Location	Selenium µg/L
CM_CC1	11.8 - 28.0

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW5-SH	2021 03 11	18.5
	2021 05 28	11.8
	2021 08 04	10.4
	2021 11 22	13.6
CM_MW5-DP	2021 03 11	<0.100
	2021 05 28	<0.050
	2021 08 04	<0.050
	2021 11 22	0.119

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW4-SH	2021 02 25	<0.100
	2021 05 13	<0.100
	2021 07 14	<0.100
	2021 10 13	<0.050
CM_MW4-DP	2021 02 25	<0.250
	2021 05 13	<0.100
	2021 07 14	<0.250
	2021 10 13	<0.100

SW Location	Selenium µg/L
CM_MC4	0.226 - 0.442

Seep Location	Selenium µg/L
CM_NS1	18.1

SW Location	Selenium µg/L
CM_WD	5.13 - 18.6

Seep Location	Selenium µg/L
CM_PLANT-SEEP1	0.174

Seep Location	Selenium µg/L
CM_WD18	28.6

Seep Location	Selenium µg/L
CM_CCDS	5.4

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW2-SH	2021 03 03	0.105
	2021 05 20	0.732
	Duplicate	0.702
	2021 07 22	0.12
	2021 10 25	0.057

SW Location	Selenium µg/L
CM_PC2	0.953 - 11.1

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW7-SH	2021 02 25	0.067
	2021 05 14	<0.050
	2021 07 21	0.08
	2021 10 13	0.33
CM_MW7-DP	2021 02 25	1.59
	2021 05 14	1.46
	2021 07 21	0.839
	2021 10 13	0.238

SW Location	Selenium µg/L
CM_CCPD	9.7 - 43.7

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW6-SH	2021 02 24	<0.0500
	2021 05 12	<0.050
	2021 07 15	0.142
	2021 10 21	0.234
CM_MW6-DP	2021 02 24	<0.0500
	2021 05 12	<0.050
	2021 07 15	<0.100
	2021 10 21	<0.100

Seep Location	Selenium µg/L
CM_WD4	14.5

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW8	2021 02 25	0.1
	2021 05 14	<0.100
	2021 07 21	<0.100
	Duplicate	<0.100
	2021 10 13	<0.050

SW Location	Selenium µg/L
CM_CCHW	0.169 - 0.298

SW Location	Selenium µg/L
CM_MC1	0.154 - 0.395

Groundwater Location	Date (yyyy mm dd)	Selenium µg/L
CM_MW3-SH	2021 03 04	0.297
	2021 05 26	0.26
	2021 07 29	0.306
	2021 10 28	0.254
CM_MW3-DP	2021 03 04	<0.100
	2021 05 26	<0.100
	2021 07 29	<0.100
	2021 10 28	<0.100

Legend

Groundwater Stations
- Monitoring Well

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring
- Seep

Site Features
- Secondary Road
- Rails
- Study Areas
- Tailings/Settling Pond
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Watersheds
- Mine Permitted Areas

Water Features
- Stream + Stream Ditch
- Intermittent + Indefinite Stream
- Subsurface
- Ditch
- Potable Waterline
- Rock Drain
- Water Pipeline
- Lake/River Bed
- Wetted Area/Wetland (Based on 1:20000 Scale)

Green: below the applicable screening criteria
Blue: above the applicable screening criteria
Grey: no sample collected

Q4 Q1 Q3 Q2

symbol locations have been adjusted relative to well locations for visibility

^ Dissolved phase of the parameter is shown in the spatial plot.

Primary Screening Criteria	Selenium^ µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10

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. Locations of overlapping wells have been adjusted for clarity.
5. SW = Surface Water

References:
1. Data provided by Teck Coal Limited.

0 125 250 500 750 Meters

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

Coal Mountain Mine
Spatial Distribution of Dissolved Selenium in Groundwater

CHK'D: RS | DATE: 2022-03-08 | SCALE: 1:20,000 | Ref Num: DRAWING CM-09
BY: CW | COORD SYS: NAD 1983 UTM Zone 11N

Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-99-SpatialDist_Se_CMm.mxd

Attachment I: Borehole Logs

Attachment I: Borehole Logs

srk consulting

Teck

HOLE ID:	MW-1	COORDINATES:	667969 E 5487521 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1500.44
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1463.25
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	37.19
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.85
BORING DATE:	8/12/2015 to 8/13/2015	CASING STICKUP (magl):	0.85

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
0	Gravel and sand (GM); Some silt. Very dark brown, well graded, moist, sub-rounded, non-plastic, non-cohesive.	
2	Gravel (GW); Sandy, trace silt. Grayish brown, well graded, dry, sub-angular, non-plastic, non-cohesive.	Very fast drilling (through sand)
4	Gravel and sand (GM); Some silt. Very dark grayish brown, well graded, moist, rounded, non-plastic, non-cohesive.	
6	Silt and sand (ML); Gravelly. Very dark grayish brown, well graded, wet, sub-rounded, non-plastic, cohesive.	Hit very wet material, holding for 20 - 30 minutes to determine SWL
8	Clay (CH); Trace sand. Very dark grayish brown, wet, high-plasticity, cohesive.	Very wet, firm clay on drillbit at end of first run
10		Second run just wet clay (added about 50% of the water observed)
12		

14-Aug-15

14-Aug-15

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Teck

HOLE ID:	**MW-1**	COORDINATES:	667969 E 5487521 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1500.44
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1463.25
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	37.19
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.85
BORING DATE:	8/12/2015 to 8/13/2015	CASING STICKUP (magl):	0.85

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

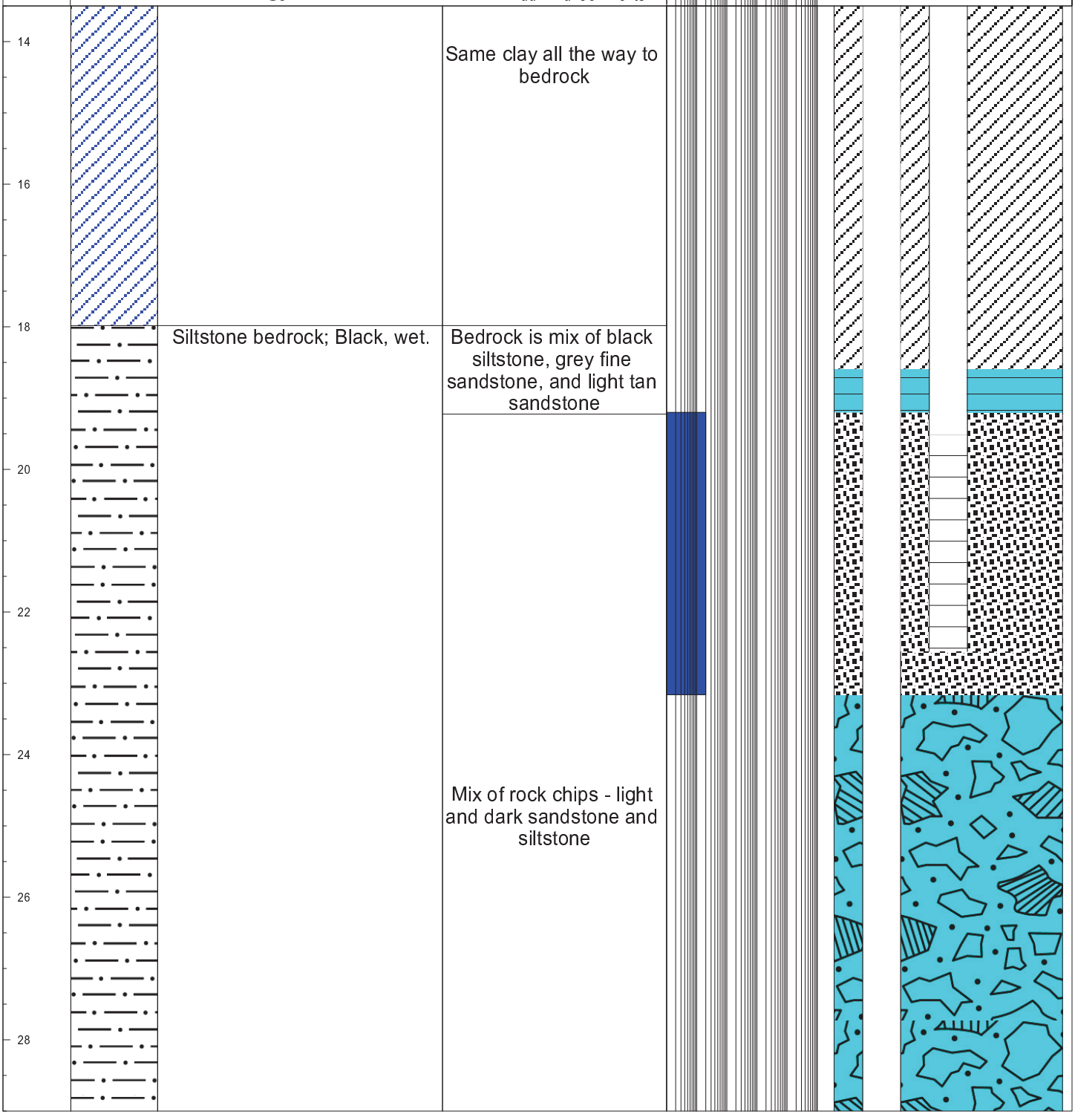
AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
14		Same clay all the way to bedrock
16		
18	Siltstone bedrock; Black, wet.	Bedrock is mix of black siltstone, grey fine sandstone, and light tan sandstone
20		
22		
24		Mix of rock chips - light and dark sandstone and siltstone
26		
28		



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Teck

HOLE ID:	MW-1	COORDINATES:	667969 E 5487521 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1500.44
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1463.25
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	37.19
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.85
BORING DATE:	8/12/2015 to 8/13/2015	CASING STICKUP (magl):	0.85

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

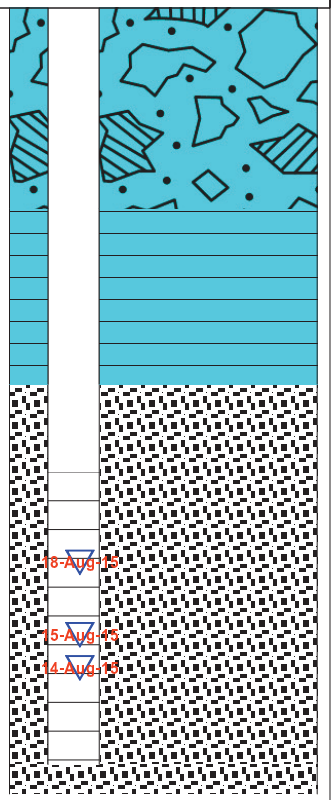
AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
30	Siltstone bedrock; Silty. Black, wet.	Layer of clayey bedrock at approximately 29.3 m
	Siltstone bedrock; Black, dry.	Switch to gray sandstone, dry
32		
34		
36		Intermittent dusty zones for last 3 m
38		Finished drilling to target potentially wet area



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Teck

HOLE ID:	**MW-2-S**	COORDINATES:	668335 E 5486754 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1515.56
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1510.68
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	4.88
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.9
BORING DATE:	8/14/2015 to 8/14/2015	CASING STICKUP (magl):	0.9

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

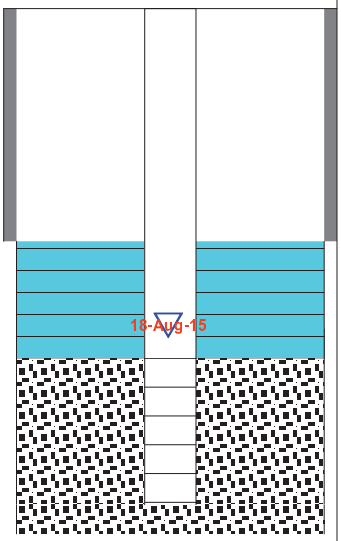
AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
0	Loam (OL-OH); Dark yellowish brown, dry. Loam (OL-OH); Very dark brown, moist.	Topsoil
2	Gravel and silt (GM); Some sand. Black, well graded, moist, sub-rounded, non-plastic, non-cohesive.	Silty gravel, moist
4	Clay and gravel (CL-CH); Some silt. Very dark brown, gap graded, wet, sub-rounded, medium-plasticity, cohesive.	
6		



srk consulting

Teck

HOLE ID:	**MW-2-D**	COORDINATES:	668274 E 5486775 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1502
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1473.4
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	28.6
LOGGED BY:	LC	STICKUP HEIGHT (magl):	-
BORING DATE:	8/13/2015 to 8/14/2015	CASING STICKUP (magl):	0.9

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
0	Loam (OL-OH); Some gravel. Very dark brown, poorly graded, moist, sub-rounded, non-plastic, non-cohesive.	Topsoil
2	Gravel and silt (GM); Some sand. Black, well graded, moist, sub-rounded, non-plastic, non-cohesive.	
4	Gravel and silt (GM); Some sand. Very dark brown, well graded, moist, sub-angular, non-plastic, non-cohesive.	Very fast drilling starting around 3.4 m - soft, wet clay around 4.6 m
6	Clay and gravel (CL-CH); Some silt. Very dark brown, gap graded, wet, sub-rounded, medium-plasticity, cohesive.	
8	Siltstone bedrock; Black, wet.	Fine sandstone to siltstone - fractured zone
10		Switched to open hole drilling
12		Lots of clay mixed in with rock chips (weathered bedrock)

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Teck

HOLE ID:	**MW-2-D**	COORDINATES:	668274 E 5486775 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1502
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1473.4
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	28.6
LOGGED BY:	LC	STICKUP HEIGHT (magl):	-
BORING DATE:	8/13/2015 to 8/14/2015	CASING STICKUP (magl):	0.9

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
14		Competent bedrock
16		Hitting large volumes of water (est. 50-60 gpm), put in casing to 16.8 m
18		Switched to open hole drilling
20		Mud, very wet
22		Flow increased dramatically over this run to 60 gpm
24		
26		Still in fracture zone. Flow stable but stopped once hole was cased. Decision made to plug hole
28		

srk consulting

Teck

HOLE ID:	MW-3	COORDINATES:	668230 E 5482814 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1573.4
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1545.97
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	27.43
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.81
BORING DATE:	8/11/2015 to 8/12/2015	CASING STICKUP (magl):	0.81

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
0	Clay and gravel (CL-CH); Some sand. Very dark grayish brown, gap graded, wet, sub-rounded, medium-plasticity, cohesive.	
2	Gravel and sand (GM); Some silt. Dark brown, well graded, moist, sub-rounded, non-plastic, non-cohesive.	Drilling slow, going through clay with cobbles/gravel, clay quite firm
4	Clay and gravel (CH); Some sand. Very dark grayish brown, gap graded, moist, sub-rounded, high-plasticity, cohesive.	Fines cohesive, but not whole sample
6	Gravel and silt (GM); Very dark grayish brown, gap graded, dry, sub-rounded, non-plastic, non-cohesive.	Hit bedrock, very dry and dusty
8	Siltstone bedrock; Black, dry.	
10		
12		

19-Aug-15

19-Aug-15

19-Aug-15

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Teck

HOLE ID:	MW-3	COORDINATES:	668230 E 5482814 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1573.4
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1545.97
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	27.43
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.81
BORING DATE:	8/11/2015 to 8/12/2015	CASING STICKUP (magl):	0.81

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

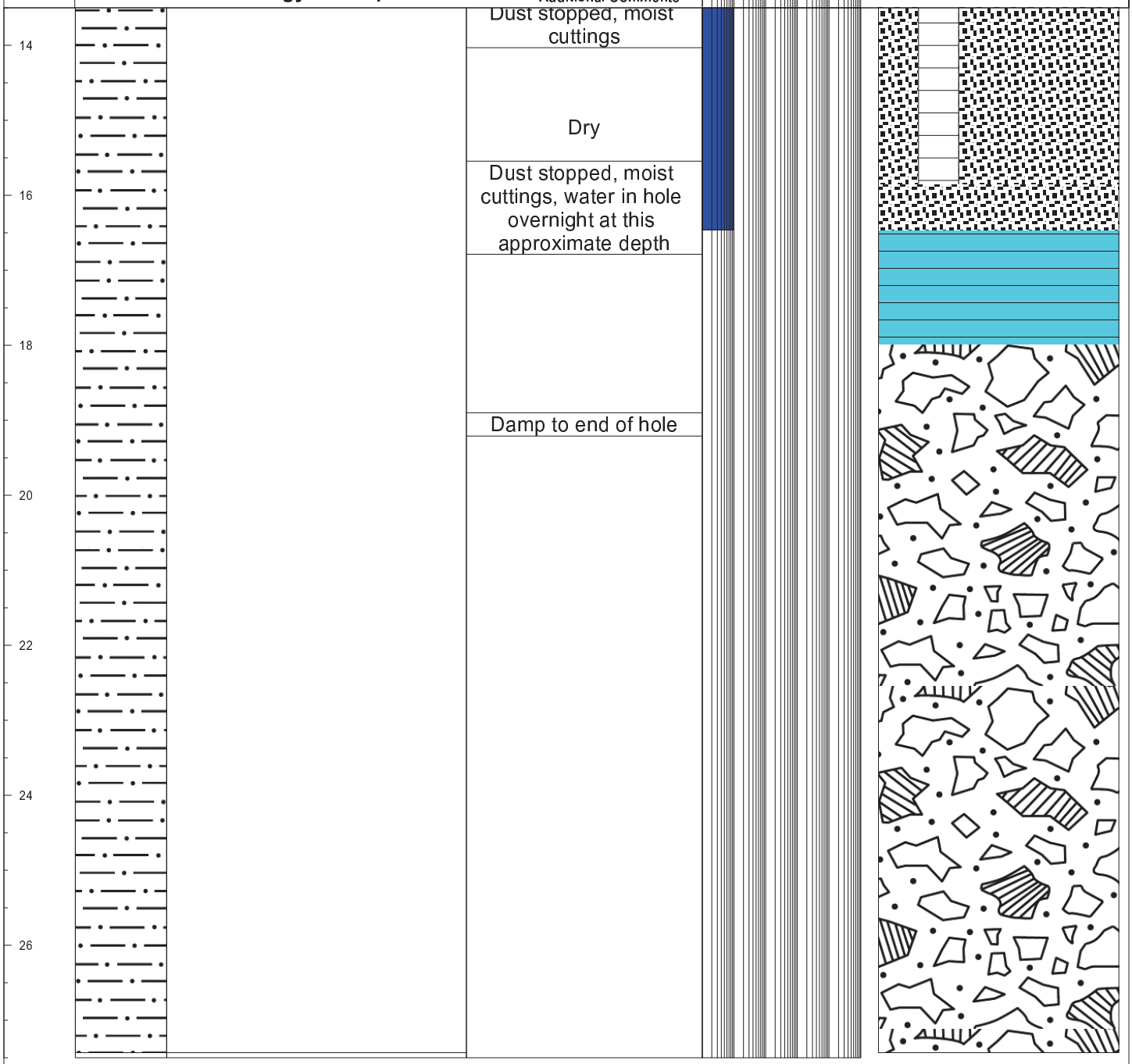
AREA: **Michel Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
14		Dust stopped, moist cuttings
		Dry
16		Dust stopped, moist cuttings, water in hole overnight at this approximate depth
18		
		Damp to end of hole
20		
22		
24		
26		



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Teck

HOLE ID:	**MW-4**	COORDINATES:	668527 E 5487347 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1512.4
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1483.9
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	28.5
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.92
BORING DATE:	8/11/2015 to 8/11/2015	CASING STICKUP (magl):	0.92

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Corbin Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
0	Gravel (GW); Sandy, trace silt. Very dark brown, well graded, moist, angular, non-plastic, non-cohesive.	Road fill
2	Gravel and sand (GW); Very dark brown, well graded, moist, sub-angular, non-plastic, non-cohesive.	
	Gravel (GW-GP); Some sand. Dark grayish brown, gap graded, moist, rounded, non-plastic, non-cohesive.	Possibly weathered
4	Sand (SM); Silty, some gravel. Dark grayish brown, well graded, moist, sub-rounded, non-plastic, non-cohesive.	Some siltstone present
	Sandstone bedrock; Dark gray, dry.	
6	Sandstone bedrock; Dark gray, moist.	Drilling like bedrock. Switching to open hole to confirm after first casing
8		
10		Some siltstone present
12	Siltstone bedrock; Black, dry.	Continuing through rock, open hole. Moist but not wet. Waiting for 1 hr to check WLs.
		No water after 1 hr open hole. About 0.5 m collapse.
		Switch from grey fine

19-Aug-15 -1.84 mags 1514.24 masl

19-Aug-15 -1.73 mags 1514.13 masl

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Teck

HOLE ID:	**MW-4**	COORDINATES:	668527 E 5487347 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1512.4
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1483.9
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	28.5
LOGGED BY:	LC	STICKUP HEIGHT (magl):	0.92
BORING DATE:	8/11/2015 to 8/11/2015	CASING STICKUP (magl):	0.92

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Corbin Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
14		sandstone to black siltstone
16		Very dusty and dry Dust diminishing
18	Siltstone bedrock; Black, moist.	Becomes moist - hit water
20		
22		
24		
26		
28		

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Teck

HOLE ID:	MW-5	COORDINATES:	669503 E 5487382 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1541
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1515.09
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	25.91
LOGGED BY:	LC	STICKUP HEIGHT (magl):	1
BORING DATE:	8/10/2015 to 8/10/2015	CASING STICKUP (magl):	1

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

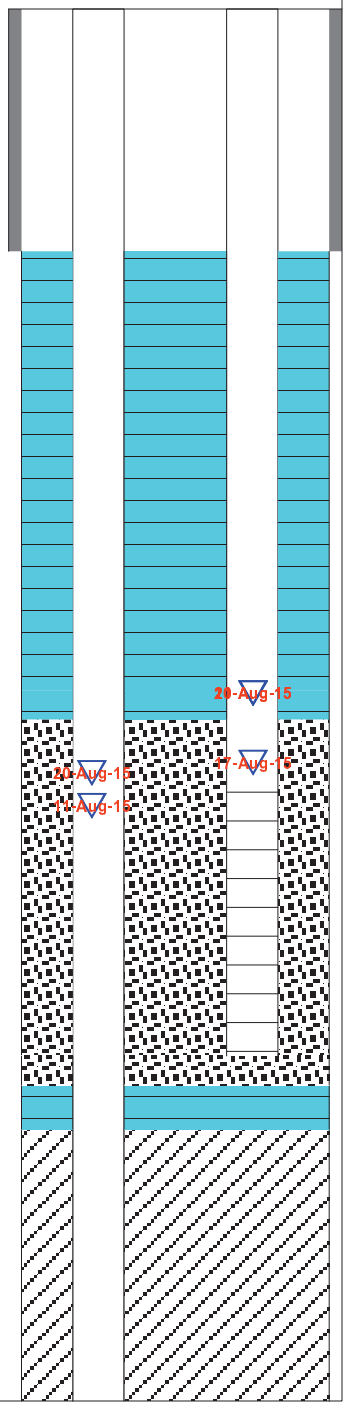
AREA: **Corbin Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
0	Loam (OL-OH); Sandy. Black, well graded, moist, sub-rounded, non-plastic, non-cohesive. Sharp contact.	
4	Gravel (GW); Some sand, trace silt. Brown, well graded, dry, rounded, non-plastic, non-cohesive.	Well-graded alluvial sandy gravel under organics layer
6	Gravel (GW); Some sand, trace silt. Brown, well graded, moist, rounded, non-plastic, non-cohesive.	
8	Gravel (GW); Trace sand. Brown, well graded, moist, sub-rounded, non-plastic, non-cohesive.	Coarse gravel, 1-3 cm in diameter
10	Gravel (GW); Trace sand. Brown, well graded, wet, sub-angular, non-plastic, non-cohesive.	Wet coarse gravel (very wet before 10 m)
		When restarted after welding 3rd casing, lots of water
12		Cave during casing pull
	Clay (CL-CH); Some cobbles, some gravel. Brown, gap	Hit wet clay layer with some cobbles



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Teck

HOLE ID:	**MW-5**	COORDINATES:	669503 E 5487382 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.098	GROUND ELEV (masl):	1541
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1515.09
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	25.91
LOGGED BY:	LC	STICKUP HEIGHT (magl):	1
BORING DATE:	8/10/2015 to 8/10/2015	CASING STICKUP (magl):	1

PROJECT: Phase 1 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Corbin Creek**

Lithological Symbol: CL-Clay, LO-Loam, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Screen, PVC, Pellets, Cave, Chips, Chips/Backfill, Backfill, Casing

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
14	graded, wet, sub-rounded, medium-plasticity, cohesive. Gradual contact.	
16		
18	Clay (CL-CH); Some cobbles, some gravel. Brown, gap graded, wet, sub-angular, low-plasticity, non-cohesive.	Sloppy Hit wet boulder/bedrock
	Siltstone bedrock; Black, wet.	Rock chips present
20	Siltstone bedrock; Very dark brown, moist.	In rock, but weathered and dry
		Weathered
22	Siltstone bedrock; Black, wet.	Unweathered bedrock, wet, going to switch to drilling open hole Fresh rock
24		Adding water while drilling
26		End of hole - sloppy on bottom

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Teck

HOLE ID:	CM_MW6	COORDINATES:	670117.9 E 5486463.5 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1579.66
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1478.30336
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	41.69664
LOGGED BY:	EH/KK	STICKUP HEIGHT (magl):	0.83/0.83
BORING DATE:	4/26/2016 to 4/27/2016	CASING STICKUP (magl):	0.88

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

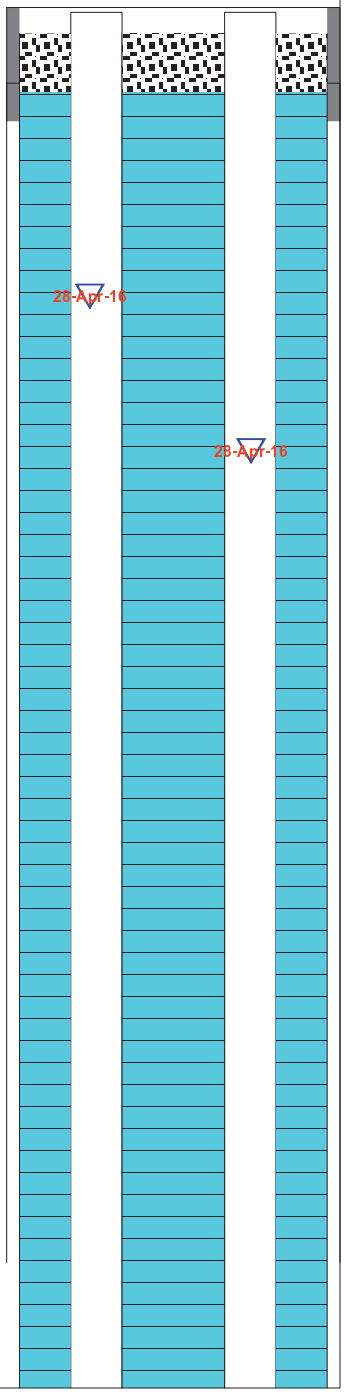
AREA: **Corbin Dam**

Lithological Symbol: CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
0 – 3	Sand - Till (SW); Some gravel, little silt, trace clay. Dark brown, moist, sub-rounded to sub-angular, low plastic, cohesive fi	Lots of boulders and cobbles. Colour changes to dark yellowish brown, becomes drier.
3 – 5		
5 – 7	Sand - Till (SW); Some gravel, little silt, trace clay. Dark brown, wet, sub-rounded to sub-angular, low plastic, cohesive fine	Hit water. Increased boulders and cobbles.
7 – 9		
9 – 11		Changes colour to very dark grey.
11 – 13		



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Teck

HOLE ID:	CM_MW6	COORDINATES:	670117.9 E 5486463.5 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1579.66
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1478.30336
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	41.69664
LOGGED BY:	EH/KK	STICKUP HEIGHT (magl):	0.83/0.83
BORING DATE:	4/26/2016 to 4/27/2016	CASING STICKUP (magl):	0.88

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Corbin Dam**

Lithological Symbol: CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
15		Strong sulfur smell.
17		
19		Bit plugging slightly, had to start drilling with water.
21		
23	Siltstone bedrock; Dark grey, dry.	Casing shoe chirping and higher pitch to bit, chips are consistent. Bedrock interpreted to be here. Chips go dry.
25		
27		
29		

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Teck

HOLE ID:	CM_MW6	COORDINATES:	670117.9 E 5486463.5 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1579.66
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1478.30336
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	41.69664
LOGGED BY:	EH/KK	STICKUP HEIGHT (magl):	0.83/0.83
BORING DATE:	4/26/2016 to 4/27/2016	CASING STICKUP (magl):	0.88

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **Corbin Dam**

Lithological Symbol: CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
39	Siltstone bedrock; Dark grey, wet.	Chips become wet.
41		Total depth 41.70 mbgs - drilling ceased as depth target reached.

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Teck

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

HOLE ID:	**CM_MW7**
LOCATION:	CMO
PROJECT NO:	1CT017.114
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.
DRILLING TYPE:	Air Rotary
LOGGED BY:	DM/EH
BORING DATE:	4/20/2016 to 4/22/2016

COORDINATES:	668833 E 5485919.6 N
DATUM:	UTM Zone 11
GROUND ELEV (masl):	1755.77
COLLAR DIP:	-90
EOH ELEV. (masl):	1668.72736
TOTAL DEPTH (mbgs):	78.27264
STICKUP HEIGHT (magl):	0.81/0.81
CASING STICKUP (magl):	0.86
AREA:	**34 Pit**

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Geophysics

Gamma (API-GR) 0 50 100 150

Caliper (mm) 90 140 190 240 290

Resistivity (ohm-m) 0 250 500 750 1000

Density Comp (g/cc) 0 0.25 0.5 0.75 1

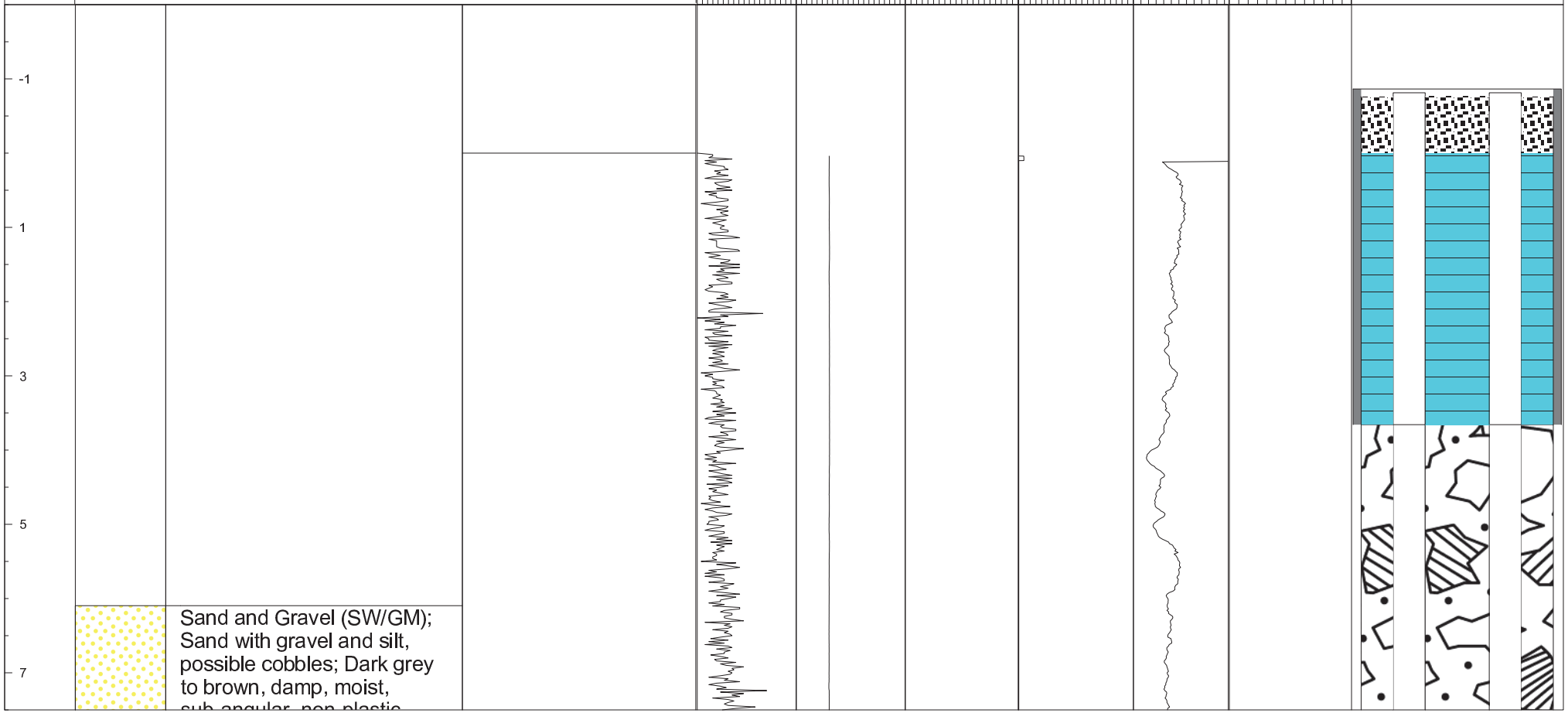
Comp Density (g/cc) 0 2 4

BHC-DELT (usec/m) 0 500 1000

Well Installation

Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
7	Sand and Gravel (SW/GM); Sand with gravel and silt, possible cobbles; Dark grey to brown, damp, moist, sub-angular, non-plastic	



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Teck

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

HOLE ID:	**CM_MW7**
LOCATION:	CMO
PROJECT NO:	1CT017.114
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.
DRILLING TYPE:	Air Rotary
LOGGED BY:	DM/EH
BORING DATE:	4/20/2016 to 4/22/2016
COORDINATES:	668833 E 5485919.6 N
DATUM:	UTM Zone 11
GROUND ELEV (masl):	1755.77
COLLAR DIP:	-90
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AREA:	**34 Pit**

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Geophysics

Gamma (API-GR) 0 50 100 150

Caliper (mm) 90 140 190 240 290

Resistivity (ohm-m) 0 250 500 750 1000

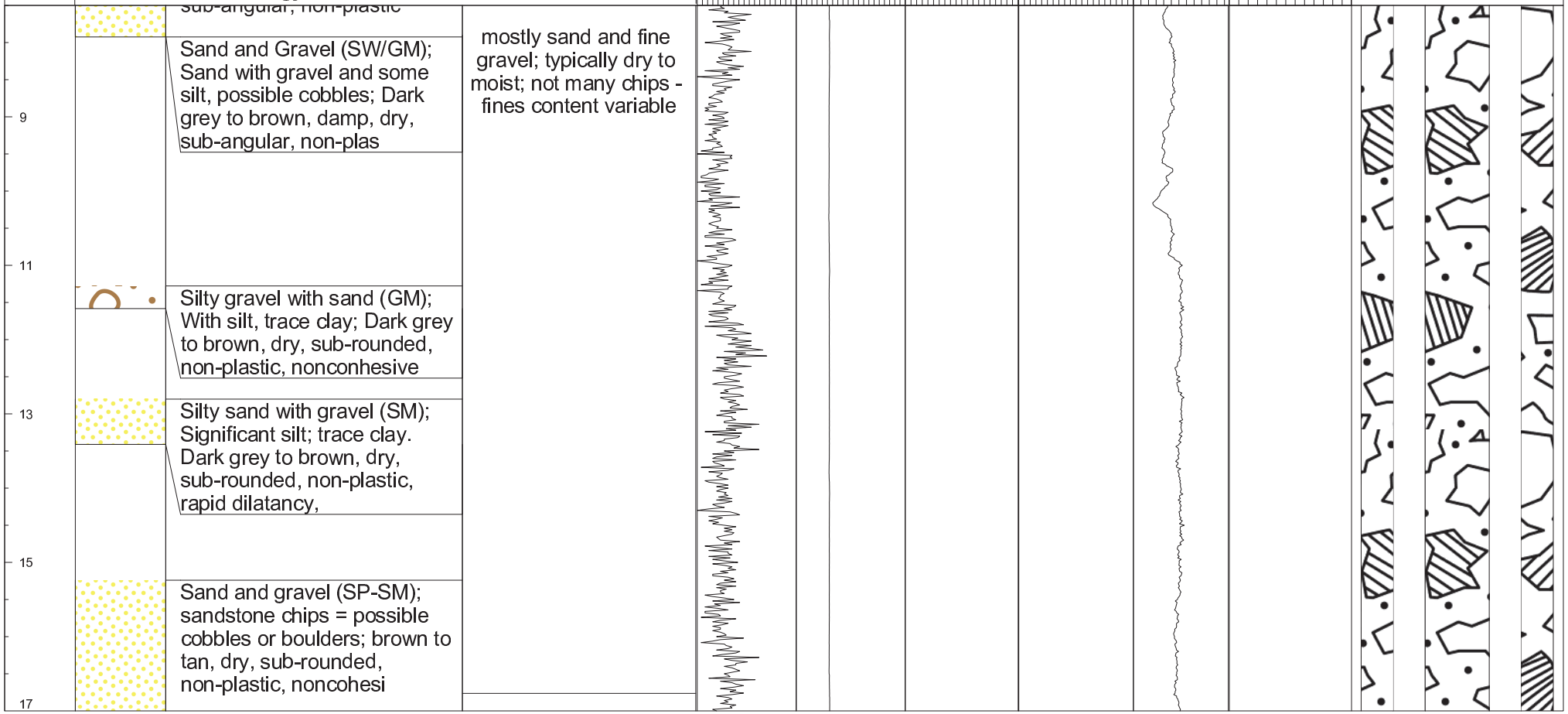
Density Comp (g/cc) 0 0.25 0.5 0.75 1

Comp Density (g/cc) 0 2 4

BHC-DELT (usec/m) 0 500 1000

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
	sub-angular, non-plastic	
9	Sand and Gravel (SW/GM); Sand with gravel and some silt, possible cobbles; Dark grey to brown, damp, dry, sub-angular, non-plas	mostly sand and fine gravel; typically dry to moist; not many chips - fines content variable
11	Silty gravel with sand (GM); With silt, trace clay; Dark grey to brown, dry, sub-rounded, non-plastic, nonconhesive	
13	Silty sand with gravel (SM); Significant silt; trace clay. Dark grey to brown, dry, sub-rounded, non-plastic, rapid dilatancy,	
15	Sand and gravel (SP-SM); sandstone chips = possible cobbles or boulders; brown to tan, dry, sub-rounded, non-plastic, noncohesi	
17		



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Teck

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

HOLE ID:	**CM_MW7**
LOCATION:	CMO
PROJECT NO:	1CT017.114
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.
DRILLING TYPE:	Air Rotary
LOGGED BY:	DM/EH
BORING DATE:	4/20/2016 to 4/22/2016

COORDINATES:	668833 E 5485919.6 N
DATUM:	UTM Zone 11
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COLLAR DIP:	-90
EOH ELEV. (masl):	1668.72736
TOTAL DEPTH (mbgs):	78.27264
STICKUP HEIGHT (magl):	0.81/0.81
CASING STICKUP (magl):	0.86 AREA: **34 Pit**

Lithological Symbol: CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Geophysics: Gamma (API-GR) 0 50 100 150; Caliper (mm) 90 140 190 240 290; Resistivity (ohm-m) 0 250 500 750 1000; Density Comp (g/cc) 0 0.25 0.5 0.75 1; Comp Density (g/cc) 0 2 4; BHC-DELT (usec/m) 0 500 1000

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
17		
19		similar to above; variable moisture; suspect cobbles getting pushed to sides
21		
23	Boulders or cobbles	
25		

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Teck

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

HOLE ID:	**CM_MW7**
LOCATION:	CMO
PROJECT NO:	1CT017.114
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.
DRILLING TYPE:	Air Rotary
LOGGED BY:	DM/EH
BORING DATE:	4/20/2016 to 4/22/2016

COORDINATES:	668833 E 5485919.6 N
DATUM:	UTM Zone 11
GROUND ELEV (masl):	1755.77
COLLAR DIP:	-90
EOH ELEV. (masl):	1668.72736
TOTAL DEPTH (mbgs):	78.27264
STICKUP HEIGHT (magl):	0.81/0.81
CASING STICKUP (magl):	0.86

AREA: **34 Pit**

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Geophysics: Gamma (API-GR) 0 50 100 150; Caliper (mm) 90 140 190 240 290; Resistivity (ohm-m) 0 250 500 750 1000; Density Comp (g/cc) 0 0.25 0.5 0.75 1; Comp Density (g/cc) 0 2 4; BHC-DELT (usec/m) 0 500 1000

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
27		
29	Sand and gravel (SP-SM); brown to tan, dry, sub-rounded, non-plastic, noncohesive	
	Sandy silt (till?); some gravel, light grey, dry, sub-rounded, non-plastic, noncohesive	
31	Weathered bedrock - silt size and rock flour, orange-brown to brown, dry	
	Sandstone bedrock, light grey to tan, dry	
33		possibly rock flour and ground up bedrock - difficult to be certain
35		

27-Apr-16

27-Apr-16

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Teck

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

HOLE ID:	**CM_MW7**
LOCATION:	CMO
PROJECT NO:	1CT017.114
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.
DRILLING TYPE:	Air Rotary
LOGGED BY:	DM/EH
BORING DATE:	4/20/2016 to 4/22/2016

COORDINATES:	668833 E 5485919.6 N
DATUM:	UTM Zone 11
GROUND ELEV (masl):	1755.77
COLLAR DIP:	-90
EOH ELEV. (masl):	1668.72736
TOTAL DEPTH (mbgs):	78.27264
STICKUP HEIGHT (magl):	0.81/0.81
CASING STICKUP (magl):	0.86
AREA:	**34 Pit**

Depth (m)

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Lithology Description

Drilling Notes and Additional Comments

Sandstone bedrock, grey to tan, wet

Geophysics

Gamma (API-GR) 0 50 100 150

Caliper (mm) 90 140 190 240 290

Resistivity (ohm-m) 0 250 500 750 1000

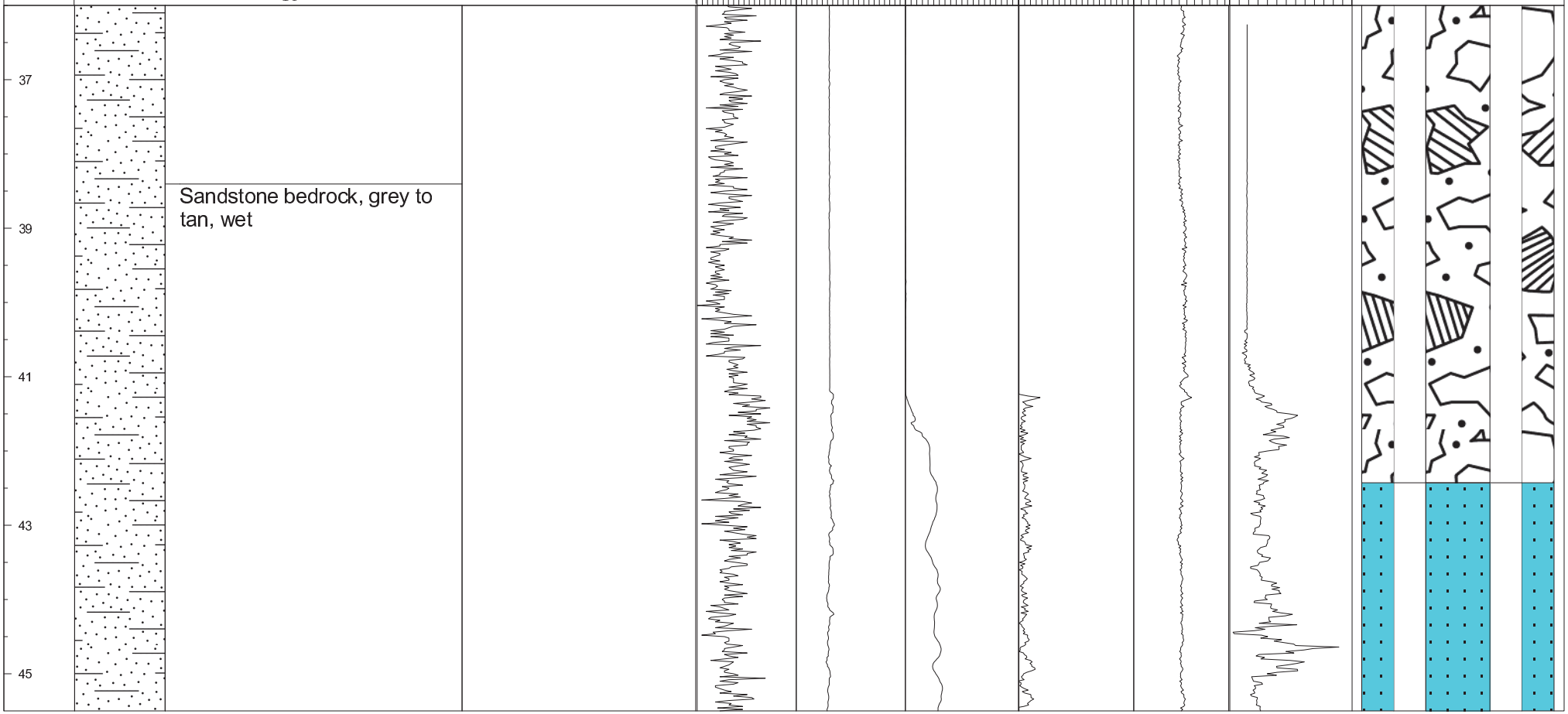
Density Comp (g/cc) 0 0.25 0.5 0.75 1

Comp Density (g/cc) 0 2 4

BHC-DELT (usec/m) 0 500 1000

Well Installation

Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout



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Teck

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

HOLE ID:	**CM_MW7**
LOCATION:	CMO
PROJECT NO:	1CT017.114
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.
DRILLING TYPE:	Air Rotary
LOGGED BY:	DM/EH
BORING DATE:	4/20/2016 to 4/22/2016

COORDINATES:	668833 E 5485919.6 N
DATUM:	UTM Zone 11
GROUND ELEV (masl):	1755.77
COLLAR DIP:	-90
EOH ELEV. (masl):	1668.72736
TOTAL DEPTH (mbgs):	78.27264
STICKUP HEIGHT (magl):	0.81/0.81
CASING STICKUP (magl):	0.86

AREA: **34 Pit**

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Geophysics

Gamma (API-GR) 0 50 100 150

Caliper (mm) 90 140 190 240 290

Resistivity (ohm-m) 0 250 500 750 1000

Density Comp (g/cc) 0 0.25 0.5 0.75 1

Comp Density (g/cc) 0 2 4

BHC-DELT (usec/m) 0 500 1000

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m): 47, 49, 51, 53, 55

Lithology Description

Drilling Notes and Additional Comments

first indication of water

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Teck

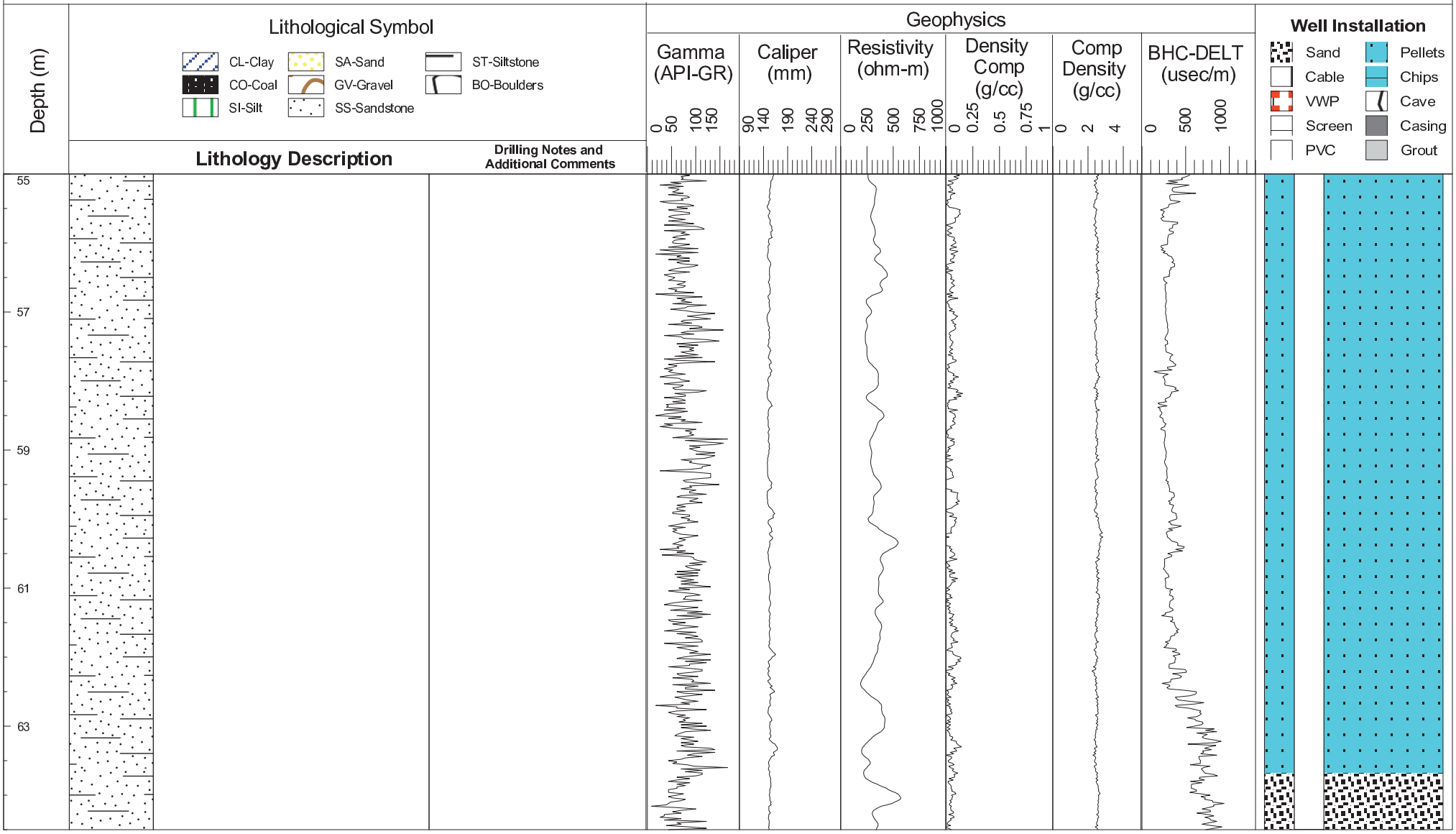
PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

HOLE ID:	**CM_MW7**
LOCATION:	CMO
PROJECT NO:	1CT017.114
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.
DRILLING TYPE:	Air Rotary
LOGGED BY:	DM/EH
BORING DATE:	4/20/2016 to 4/22/2016

COORDINATES:	668833 E 5485919.6 N
DATUM:	UTM Zone 11
GROUND ELEV (masl):	1755.77
COLLAR DIP:	-90
EOH ELEV. (masl):	1668.72736
TOTAL DEPTH (mbgs):	78.27264
STICKUP HEIGHT (magl):	0.81/0.81
CASING STICKUP (magl):	0.86

AREA: **34 Pit**



srk consulting

Teck

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

HOLE ID:	**CM_MW7**
LOCATION:	CMO
PROJECT NO:	1CT017.114
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.
DRILLING TYPE:	Air Rotary
LOGGED BY:	DM/EH
BORING DATE:	4/20/2016 to 4/22/2016

COORDINATES:	668833 E 5485919.6 N
DATUM:	UTM Zone 11
GROUND ELEV (masl):	1755.77
COLLAR DIP:	-90
EOH ELEV. (masl):	1668.72736
TOTAL DEPTH (mbgs):	78.27264
STICKUP HEIGHT (magl):	0.81/0.81
CASING STICKUP (magl):	0.86

AREA: **34 Pit**

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Geophysics

Gamma (API-GR) 0 50 100 150

Caliper (mm) 90 140 190 240 290

Resistivity (ohm-m) 0 250 500 750 1000

Density Comp (g/cc) 0 0.25 0.5 0.75 1

Comp Density (g/cc) 0 2 4

BHC-DELT (usec/m) 0 500 1000

Well Installation

Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m) 65 67 69 71 73

Lithology Description

Drilling Notes and Additional Comments

Hydraulic conductivity of sand filter is 3.2 x 10^5 m/s

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Teck

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

HOLE ID:	**CM_MW7**
LOCATION:	CMO
PROJECT NO:	1CT017.114
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.
DRILLING TYPE:	Air Rotary
LOGGED BY:	DM/EH
BORING DATE:	4/20/2016 to 4/22/2016

COORDINATES:	668833 E 5485919.6 N
DATUM:	UTM Zone 11
GROUND ELEV (masl):	1755.77
COLLAR DIP:	-90
EOH ELEV. (masl):	1668.72736
TOTAL DEPTH (mbgs):	78.27264
STICKUP HEIGHT (magl):	0.81/0.81
CASING STICKUP (magl):	0.86
AREA:	**34 Pit**

Depth (m)

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Lithology Description

Drilling Notes and Additional Comments

Geophysics

Gamma (API-GR) 0 50 100 150

Caliper (mm) 90 140 190 240 290

Resistivity (ohm-m) 0 250 500 750 1000

Density Comp (g/cc) 0 0.25 0.5 0.75 1

Comp Density (g/cc) 0 2 4

BHC-DELT (usec/m) 0 500 1000

Well Installation

Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

75

77

79

Total depth 78.3 mbgs - drilling ceased as depth target reached

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Teck

HOLE ID:	**CM_MW8**	COORDINATES:	668878.2 E 5484957 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1847.31
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1729.98
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	104.02
LOGGED BY:	EH	STICKUP HEIGHT (magl):	0.68
BORING DATE:	4/23/2016 to 4/26/2016	CASING STICKUP (magl):	0.72

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **37 Pit**

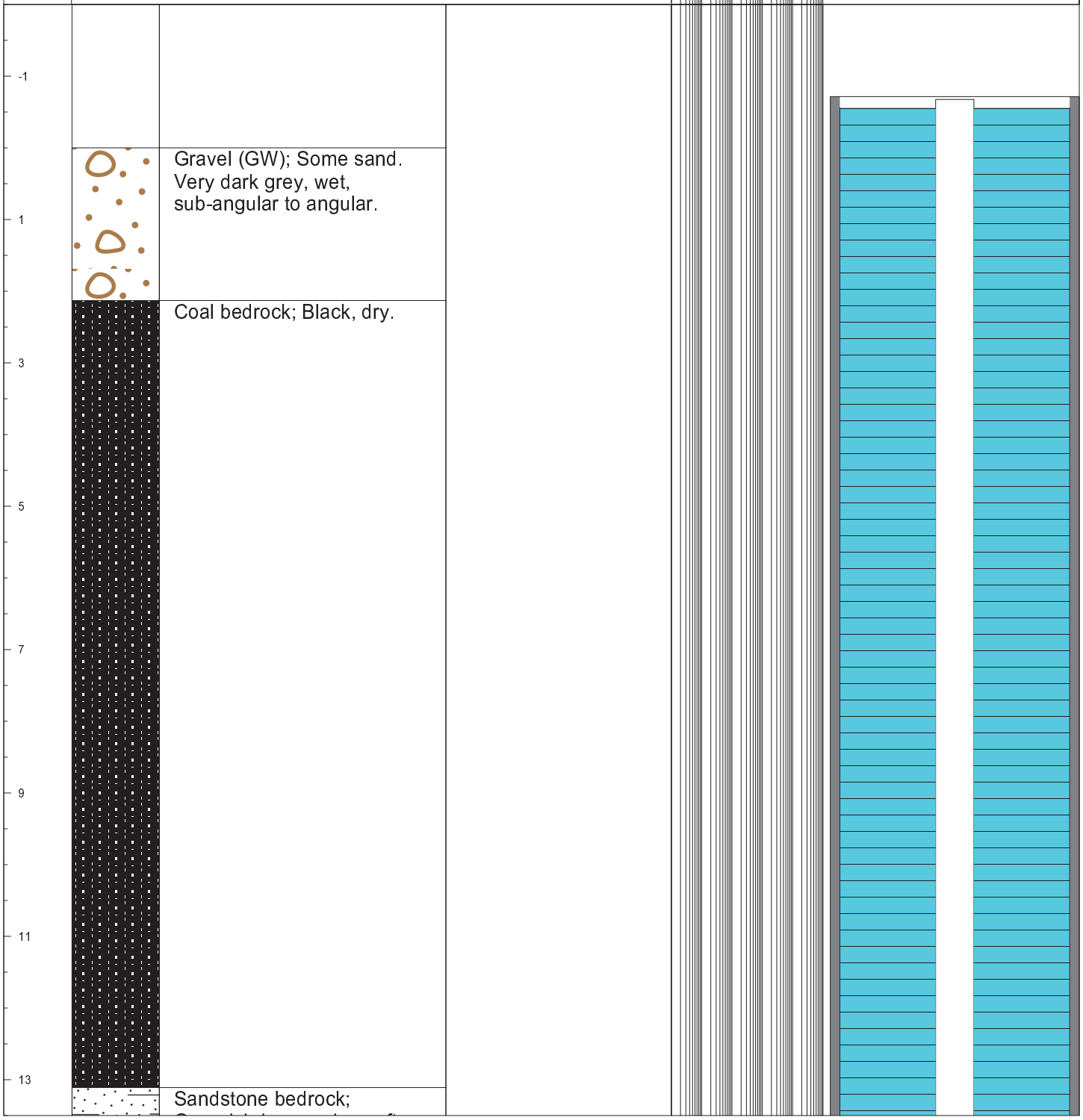
Depth (m)

Lithological Symbol: CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Lithology Description	Drilling Notes and Additional Comments
Gravel (GW); Some sand. Very dark grey, wet, sub-angular to angular.	
Coal bedrock; Black, dry.	
Sandstone bedrock;	



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Teck

HOLE ID:	CM_MW8	COORDINATES:	668878.2 E 5484957 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1847.31
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1729.98
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	104.02
LOGGED BY:	EH	STICKUP HEIGHT (magl):	0.68
BORING DATE:	4/23/2016 to 4/26/2016	CASING STICKUP (magl):	0.72

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **37 Pit**

Lithological Symbol: CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
	Orangish-brown, dry, soft.	
15		
17		
19		
21		
	Sandstone bedrock; Orangish-brown, wet, soft.	Cuttings moist.
23		Cuttings wet.
25		Bit plugging slightly, had to start drilling with water.
27		
	Sandstone bedrock; Orangish-brown, dry, soft.	Drilling with water ceases.
29		

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Teck

HOLE ID:	CM_MW8	COORDINATES:	668878.2 E 5484957 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1847.31
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1729.98
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	104.02
LOGGED BY:	EH	STICKUP HEIGHT (magl):	0.68
BORING DATE:	4/23/2016 to 4/26/2016	CASING STICKUP (magl):	0.72

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **37 Pit**

Depth (m)

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s)

1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation

Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Lithology Description

Drilling Notes and Additional Comments

Cuttings dry.

29, 31, 33, 35, 37, 39, 41, 43

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Teck

HOLE ID:	CM_MW8	COORDINATES:	668878.2 E 5484957 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1847.31
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1729.98
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	104.02
LOGGED BY:	EH	STICKUP HEIGHT (magl):	0.68
BORING DATE:	4/23/2016 to 4/26/2016	CASING STICKUP (magl):	0.72

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **37 Pit**

Lithological Symbol: CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
45		
47	Sandstone bedrock; Light brown, dry.	
49		
51		
53		
55		
57		
59		

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Teck

HOLE ID:	CM_MW8	COORDINATES:	668878.2 E 5484957 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1847.31
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1729.98
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	104.02
LOGGED BY:	EH	STICKUP HEIGHT (magl):	0.68
BORING DATE:	4/23/2016 to 4/26/2016	CASING STICKUP (magl):	0.72

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **37 Pit**

Depth (m)

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s)

1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation

Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Lithology Description

Drilling Notes and Additional Comments

61, 63, 65, 67, 69, 71, 73, 75

27-Apr-16

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Teck

HOLE ID:	CM_MW8	COORDINATES:	668878.2 E 5484957 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1847.31
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1729.98
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	104.02
LOGGED BY:	EH	STICKUP HEIGHT (magl):	0.68
BORING DATE:	4/23/2016 to 4/26/2016	CASING STICKUP (magl):	0.72

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **37 Pit**

Lithological Symbol: CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s): 1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation: Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Depth (m)	Lithology Description	Drilling Notes and Additional Comments
77		
79		
81		
83	Sandstone bedrock; Light brown, wet.	Cuttings wet.
85		
87		
89		
91		Producing roughly 7 GPM.

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Teck

HOLE ID:	CM_MW8	COORDINATES:	668878.2 E 5484957 N
LOCATION:	CMO	DATUM:	UTM Zone 11
PROJECT NO:	1CT017.114	GROUND ELEV (masl):	1847.31
DRILLING CONTRACTOR:	AquaPro Drilling Ltd.	COLLAR DIP:	-90
		EOH ELEV. (masl):	1729.98
DRILLING TYPE:	Air Rotary	TOTAL DEPTH (mbgs):	104.02
LOGGED BY:	EH	STICKUP HEIGHT (magl):	0.68
BORING DATE:	4/23/2016 to 4/26/2016	CASING STICKUP (magl):	0.72

PROJECT: Phase 2 Groundwater Monitoring

CLIENT: Teck Coal Ltd. - CMO

AREA: **37 Pit**

Depth (m)

Lithological Symbol

CL-Clay, CO-Coal, SI-Silt, SA-Sand, GV-Gravel, SS-Sandstone, ST-Siltstone, BO-Boulders

Hydraulic Conductivity (m/s)

1E-8, 1E-7, 1E-6, 1E-5, 0.0001, 0.001

Well Installation

Sand, Cable, VWP, Screen, PVC, Pellets, Chips, Cave, Casing, Grout

Lithology Description

Drilling Notes and Additional Comments

91
93
95
97
99
101
103
105

Total depth 104.02 mbgs - drilling ceases as depth target reached.

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Teck

PROJECT: Coal Mountain Operation
CLIENT: Coal Mountain Operation

DRILLHOLE ID: CM_MW09
LOCATION: Coal Mountain
PROJECT NO: 1CT017.239
DRILL TYPE: Sonic
HOLE SIZE: 6"
CONTRACTOR: Mud bay Drilling
LOGGED BY: RB

DRILLING DATE: 07-Nov-19 **TO:** 07-Nov-19
COORDINATES: 668562.6 E 5487345.8 N
DATUM: UTM Zone 11N; NAD 83
GROUND EL (masl): 1510.3
TOTAL DEPTH (m): 3.66 **DIP:** 90°
WATER LEVEL (mbgs): 2

Drillhole Log

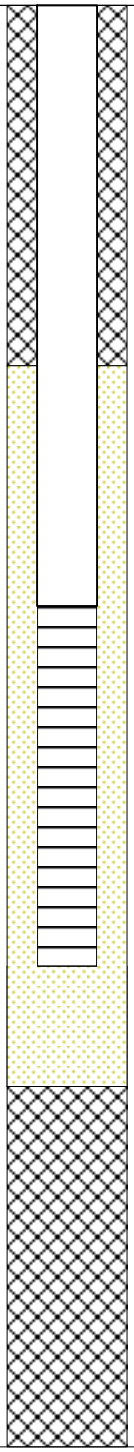
Lithologic Symbol

Ash | Clay | Sand | Boulder/Cobbles | Bedrock
Organics | Silt | Gravel | Weathered Bedrock | No Recovery

Depth (m)	Depth (ft)	Graphic	USCS	Soil Description	Additional Comments	Elevation [masl]
0	0			ORGANICS - black, silt w/ sand and gravel, non-plastic		
				SAND - olive grey, sand, some silt w/ gravel, angular to sub-rounded, particle size up to 60 mm, fines are non-plastic	Sample appears dry	1509.6
1						
			GW		Driller notes water strike	1508.8
2	5					
				WEATHERED BEDROCK - mottled, silt with sand, friable dense silt		1508
3	10			WEATHERED BEDROCK - olive grey and mottled in places, clay w/ gravel and sand, fines are non-plastic	Drilling becomes harder	1507.2

Standpipe Piezometer Installation

Stickup (m): 0.88



Notes:
Coordinates and elevation were measured via differential GPS

Installation Legend

Bentonite Chips | Sand | PVC | Screen | Sump | Casing | Cement
Bentonite Pellets | Slough

srk consulting

Teck

PROJECT: Coal Mountain Operation
CLIENT: Coal Mountain Operation

DRILLHOLE ID: CM_MW10
LOCATION: Coal Mountain
PROJECT NO: 1CT017.239
DRILL TYPE: Sonic
HOLE SIZE: 6/7"
CONTRACTOR: Mud bay Drilling
LOGGED BY: RB/NL

DRILLING DATE: 04-Nov-19 **TO:** 07-Nov-19
COORDINATES: 668582.2 E 5487629.7 N
DATUM: UTM Zone 11N; NAD 83
GROUND EL (masl): 1535.3
TOTAL DEPTH (m): 23.9 **DIP:** 90°
WATER LEVEL (mbgs): 13

Drillhole Log

Lithologic Symbol

Ash | Clay | Sand | Boulder/Cobbles | Bedrock
Organics | Silt | Gravel | Weathered Bedrock | No Recovery

Depth (m)	Depth (ft)	Graphic	USCS	Soil Description	Additional Comments	Elevation [masl]
0	0		ML	SANDY SILT W/ GRAVEL - loose, dark gray, 15% cobbles, few silt, >50% sand, non-plastic (ML), moist, noncohesive	Organic matter noted beneath road fill	1535.2
1	5		CL	LEAN CLAY W/ GRAVEL - dense, olive gray, fine grain ,few gravel, few sand, low plasticity (CL), moist, cohesive		1534.4
2						1533.6
3	10			GRAVELLY LEAN CLAY W/ SAND - dense, light brown, trace cobble, few gravel, >50% fines, medium plasticity (CL), dry, cohesive		1532.8
4						1532
	15					1531.2
5				LEAN CLAY W/ GRAVEL - loose to medium dense, yellowing orange, trace cobble, little gravel, >50% fines, wet to moist, low plasticity (CL), cohesive		1530.4
				BOULDER		1529.6
6	20		ML	SILT W/ GRAVEL - dense, light brown, trace cobble, little gravel, >50% fines, nonplastic (ML), moist, noncohesive		1528.8
7				SILTY GRAVEL W/ SAND - loose, light gray, some sand, >50% coarse grained sediments, few cobbles, dry, nonplastic (ML), noncohesive		1528
	25		CL	LEAN CLAY W/ GRAVEL - dense, light brown, few gravel, >50% fine, moist, medium plasticity (CL), cohesive		1527.2
8						1526.4
9	30					1525.6
10				BOULDER		
			GW	WELL GRADED SAND & GRAVEL - loose, light brown, >50% coarse-grained sediment, 15-25% gravel, moist, nonplastic, noncohesive	Sample appears dry	1524.8
	35			LEAN CLAY W/ GRAVEL - dense, light brown, few gravel, >50% fine, moist, medium plasticity (CL), cohesive		1524
11						1523.2
12	40					1522.4
13			CL	LEAN CLAY W/ GRAVEL - dense, light brown, few gravel, >50% fine, moist, medium plasticity (CL), cohesive, observed more pebbles/boulders than 10.668m to 12.964m		1521.6
14	45			LEAN CLAY W/ GRAVEL - dense, light brown, few gravel, >50% fine, moist, medium plasticity (CL), cohesive		1520.8
15				CLAYEY SAND W/ GRAVEL - medium dense, light gray, trace cobbles, some gravel, >50% sand, moist, medium plasticity (CL), cohesive		1520
	50				Sample appears dry	
16						1519.2
	55					1518.4
17			CH	FAT CLAY W/ SAND - dense, olive gray, trace cobbles, some gravel, >50% fine, moist, high plasticity, cohesive		1517.6
18			GP	POORLY GRADED GRAVEL W/ SAND - loose, olive gray, >95% sand, moist, nonplastic, noncohesive		
	60					1516.8
19			CH	FAT CLAY W/ SAND - dense, olive gray, trace cobble, some gravel >50% fine, moist, high plasticity, cohesive		1516
20	65					1515.2
21			ML	GRAVELLY SILT W/ SAND - loose, few cobble, some gravel, >50% sand, wet, nonplastic, noncohesive	7" override drilled to 21.3 m	1514.4
	70			WEATHERED BEDROCK	Driller notes water strike	1513.6
22					Outer casing becomes stuck; casing sheared.	1512.8
23	75					1512

Standpipe Piezometer Installation

Stickup (m): 0.93

Notes:
Coordinates and elevation were measured via differential GPS

Installation Legend

Bentonite Chips | Sand | PVC | Screen | Sump | Casing | Cement
Bentonite Pellets | Slough

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : CM_BH_AG1A

PAGE 1 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2020 09 01	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1477.754	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1478.653	Date Drilled:	2020 08 19
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5488250.082	Easting: 667334.031	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: CM_MW_AG1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
0	SAND, fine grained, dark brown, loose, dry.						
1	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular to angular, poorly graded, grey, loose, dry.						
2	SAND, fine to medium grained, some silt, trace gravel, fine, subangular, poorly graded, brown, loose, moist. At 2.1 m - wet.						
3	SILT and SAND, fine grained sand, poorly graded, brown, loose, wet.						
4							
5							
6	SAND, fine grained, some silt, poorly graded, brown, loose, wet, heaving.						
7							
8							
9	SILT and SAND, fine grained sand, poorly graded, brown, very stiff, wet.						
10							

BENTONITE

BENTONITE

NOTES

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : CM_BH_AG1A

PAGE 2 OF 2

Drilling Contractor	Owen's Drilling	Date Monitored	2020 09 01	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1477.754	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1478.653	Date Drilled:	2020 08 19
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5488250.082	Easting: 667334.031	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: CM_MW_AG1A

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SILT and CLAY, brown, firm, wet.						
11							
12							
13							
14							
14	SILTY GRAVEL, fine to coarse gravel, some sand, fine grained, medium dense, brown, wet.						
15	SILTY, GRAVELLY SAND, fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, brown, medium dense, wet.						
16							
17							
18							
18	Bottom of hole at 18.3 m.						
19							
20							

BENTONITE
SAND
CM_MW_AG1A

NOTES

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : CM_BH_AG1B

PAGE 1 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2020 09 01	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1477.614	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1478.551	Date Drilled:	2020 08 14
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5488243.909	Easting: 667329.527	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale
Soil Vapour (ppm)
10^1 10^2 10^3 10^4

Solid PVC
Slotted PVC

Well Name 1: CM_MW_AG1B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery
0	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular to angular, well graded, grey, loose, dry.			AG1B-01		
1						
2	SAND, fine to medium grained, some silt, trace gravel, fine, subangular, poorly graded, brown, loose, moist. At m 2.1 m - wet.			AG1B-02		
3	SILT and SAND, fine grained sand, poorly graded, brown, loose, wet.			AG1B-03		
4						
5				AG1B-04		
6	SAND, fine grained, some silt, poorly graded, brown, loose, wet, heaving.					
7				AG1B-05		
8				AG1B-06		
9	SILT and SAND, fine grained sand, poorly graded, brown, very stiff, wet.					
10				AG1BA-07		

BENTONITE
CM_MW_AG1B
SAND
BENTONITE

NOTES
Bolded sample denotes sample analyzed.
*Denotes blind field duplicate.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : CM_BH_AG1B

Drilling Contractor	Owen's Drilling	Date Monitored	2020 09 01	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1477.614	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1478.551	Date Drilled:	2020 08 14
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5488243.909	Easting: 667329.527	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: CM_MW_AG1B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
10	SILT and CLAY, brown, firm, wet.						
11				AG1B-08			
12							
13				AG1B-09			
14							
	SILTY GRAVEL, fine to coarse gravel, some sand, fine grained, brown, medium dense, wet.			AG1B-10			
15							
	SILT and SAND, fine grained, poorly graded, brown, soft, wet.						
16				AG1B-11			
17							
				AG1B-12			
	SILTY SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, subrounded to subangular, brown, medium dense, wet.						
18							
19				AG1B-13			
20							

BENTONITE
SAND
BENTONITE
SAND

NOTES
Bolded sample denotes sample analyzed.
*Denotes blind field duplicate.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

FINAL

SNC·LAVALIN

Client
Teck Coal Limited

Location
Regional Groundwater Monitoring

Borehole No. : CM_BH_AG1B

PAGE 3 OF 3

Drilling Contractor	Owen's Drilling	Date Monitored	2020 09 01	Project Number:	631283
Drilling Method	Odex	Ground Surface Elev. (m)	1477.614	Borehole Logged By:	MTB
Borehole Dia. (m)	0.13	Top of Casing Elev. (m)	1478.551	Date Drilled:	2020 08 14
Pipe/Slotted Pipe Dia. (m)	0.05/0.05	Northing: 5488243.909	Easting: 667329.527	Log Typed By:	AS

Drilling Legend
- Sample Interval
- Odex

Water/NAPL Levels
- Water Level 1
- Water Level 2
- NAPL
- NAPL

Reading within indicated scale
Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name 1: CM_MW_AG1B

Depth in Metres	Soil Description	Stratigraphy Plot	Sample Interval Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm) 10^1 10^2 10^3 10^4
20	At 20.1 m - boulder.						
	SAND and GRAVEL, fine to coarse grained sand, fine to coarse gravel, angular to subangular, grey, very dense, dry.			AG1B-14			
21							
22							
23				AG1B-15			
24							
25							
26				AG1B-16			
27	Bottom of hole at 27.5 m.						
28							
29							
30							

SAND

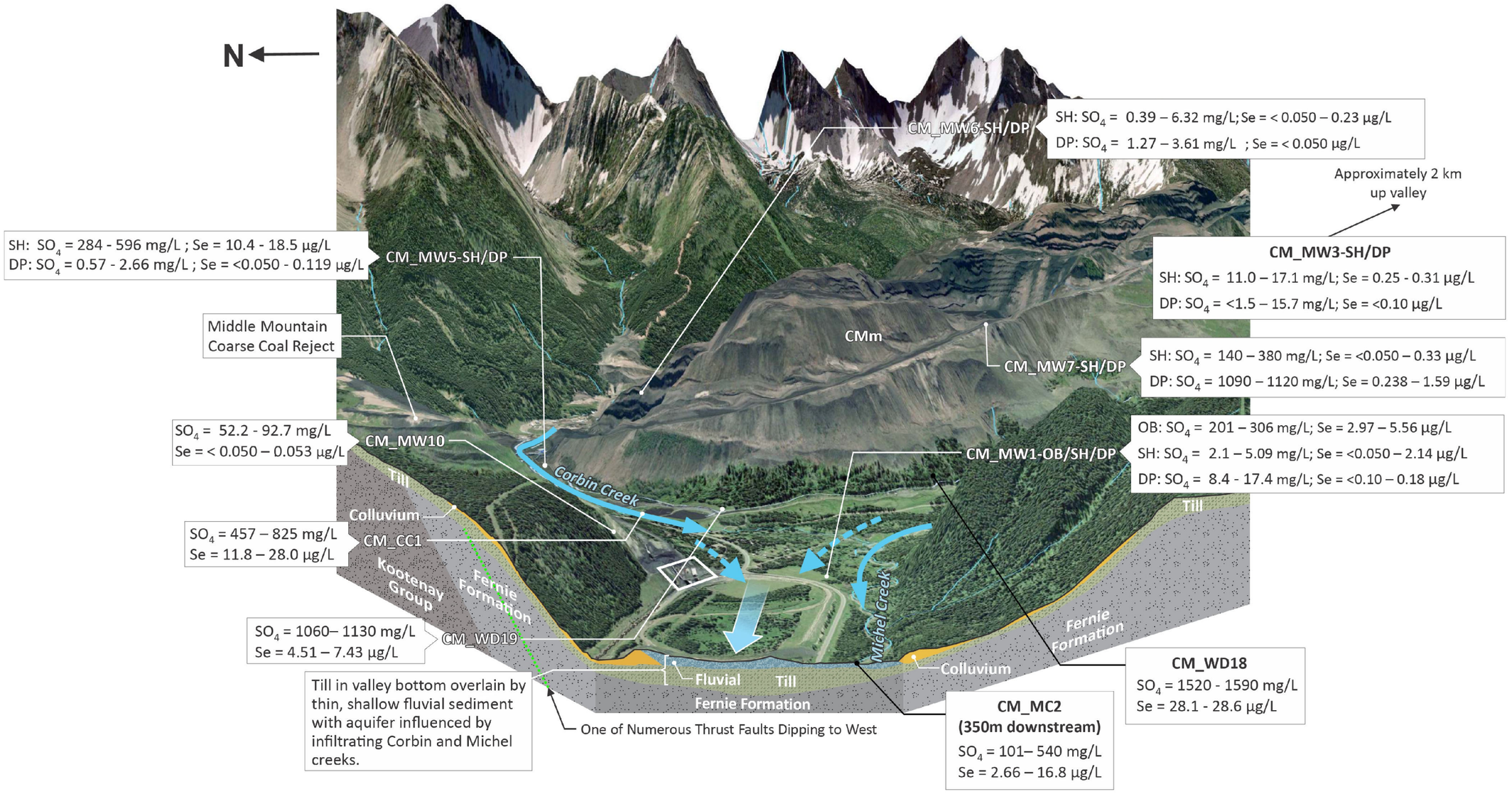
BENTONITE

NOTES
Bolded sample denotes sample analyzed.
*Denotes blind field duplicate.

QA/QC: LLH 2020 10 19 Print Date:2020-12-02

Attachment II: Block Diagrams

Diagram CM-01: Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at CMm



Flow Legend

- Main Stem Down-Valley Groundwater
- Upland or Tributary Groundwater
- Surface Water

Notes:
1. Original in colour.
2. All concentrations shown are for 2020 minimum and maximum unless otherwise stated.
3. Subsurface geology is not to scale.
4. Vertical exaggeration 2x for topographic profile.

References:
1. Graphics from Brick Tudor Studios, LLC.
2. Bedrock geology derived from Monahan, 2000, BC Government.

Revisions:
0 - CW - 20220215 - DRAFT - MB

CLIENT: Teck Coal Limited

PROJECT LOCATION: Elk Valley, BC

SNC·LAVALIN

Block Diagram Showing 3D Conceptual Hydrogeology and Transport Pathways of Order Constituents at CMm

BY: CW	SCALE:	DATE: 2022-03-07	REF No:
CHK'D: MB	Proj Coord Sys:		**DIAGRAM CM-01**

MXD Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\GIS\Map Series\635544_2021 RGMP SSGMP Annual Report\635544-BlockDiagram_CM1.mxd

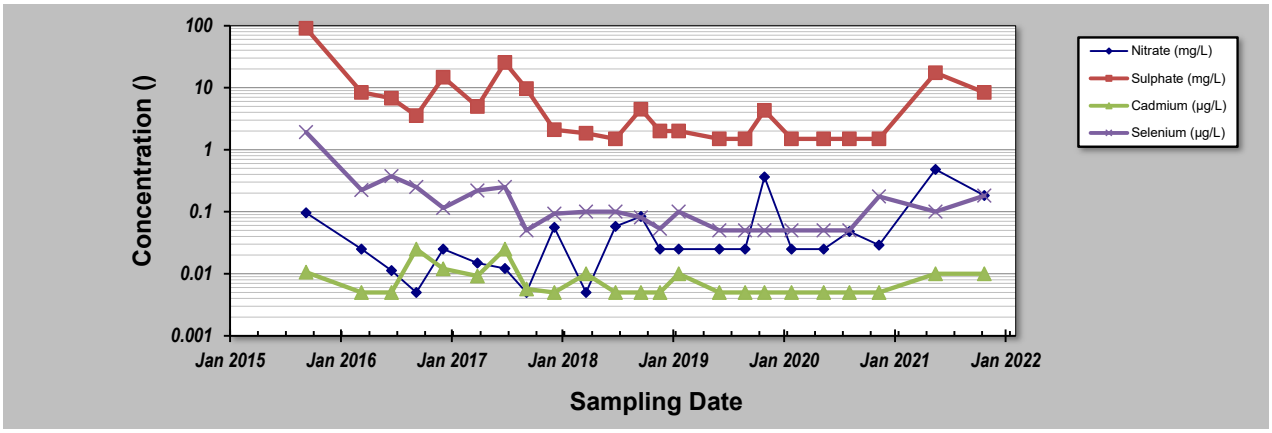
Project Path: \\Sli4395\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\635544_SSGMP_RGMP_AnnualReport_2021

Attachment III: Mann-Kendall Analyses

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW1-DP
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	CM_MW1-DP CONCENTRATION						
1	9-Sep-15	0.096	90.6	0.0106	1.92			
2	10-Mar-16	0.025	8.4	0.005	0.223			
3	17-Jun-16	0.0113	6.77	0.005	0.374			
4	7-Sep-16	0.005	3.54	0.025	0.25			
5	5-Dec-16	0.025	14.7	0.012	0.115			
6	28-Mar-17	0.0149	4.97	0.0092	0.22			
7	27-Jun-17	0.0122	25.4	0.025	0.25			
8	6-Sep-17	0.005	9.64	0.0057	0.05			
9	7-Dec-17	0.056	2.1	0.005	0.093			
10	22-Mar-18	0.005	1.84	0.01	0.1			
11	27-Jun-18	0.058	1.5	0.005	0.1			
12	19-Sep-18	0.084	4.5	0.005	0.081			
13	21-Nov-18	0.025	2	0.005	0.053			
14	22-Jan-19	0.025	2	0.01	0.1			
15	5-Jun-19	0.025	1.5	0.005	0.05			
16	29-Aug-19	0.025	1.5	0.005	0.05			
17	1-Nov-19	0.363	4.3	0.005	0.05			
18	29-Jan-20	0.025	1.5	0.005	0.05			
19	14-May-20	0.025	1.5	0.005	0.05			
20	7-Aug-20	0.048	1.5	0.005	0.05			
21	13-Nov-20	0.029	1.5	0.005	0.176			
22	19-May-21	0.481	17.4	0.01	0.1			
23	27-Oct-21	0.183	8.38	0.01	0.182			
24								
25								
Coefficient of Variation:		1.65	1.98	0.69	1.89			
Mann-Kendall Statistic (S):		84	-103	-52	-111			
Confidence Factor:		98.6%	99.7%	91.0%	99.9%			
Concentration Trend:		Increasing	Decreasing	Prob. Decreasing	Decreasing			



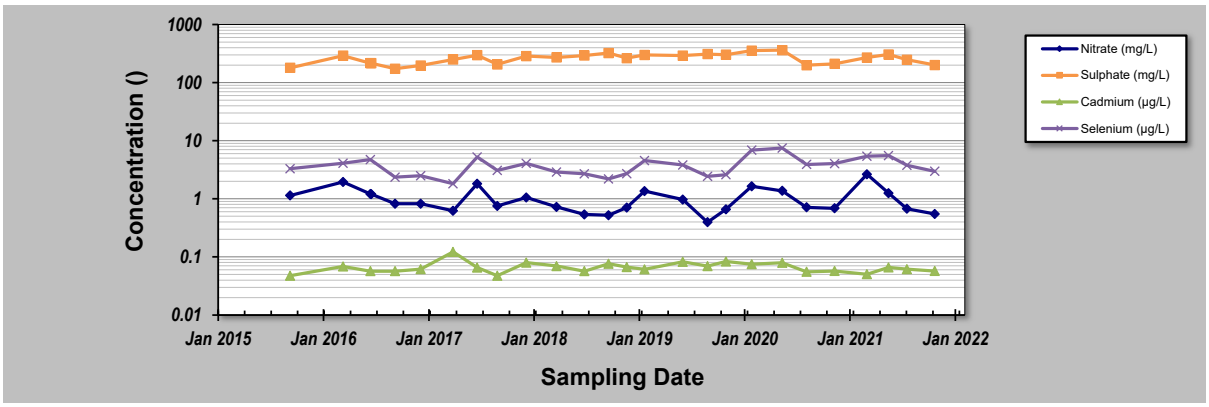
Notes:

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:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW1-OB
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	CM_MW1-OB CONCENTRATION						
1	8-Sep-15	1.14	180	0.0474	3.3			
2	10-Mar-16	1.95	291	0.0685	4.1			
3	13-Jun-16	1.21	216	0.057	4.73			
4	16-Jun-16	1.2	216					
5	7-Sep-16	0.82	174	0.057	2.36			
6	5-Dec-16	0.824	197	0.0613	2.49			
7	27-Mar-17	0.622	250	0.122	1.82			
8	19-Jun-17	1.82	297	0.0653	5.24			
9	28-Aug-17	0.751	206	0.0474	3.07			
10	7-Dec-17	1.05	287	0.0799	4.07			
11	22-Mar-18	0.726	272	0.0695	2.89			
12	27-Jun-18	0.538	293	0.0569	2.69			
13	19-Sep-18	0.52	324	0.0761	2.2			
14	21-Nov-18	0.707	264	0.0668	2.71			
15	22-Jan-19	1.36	300	0.0611	4.56			
16	4-Jun-19	0.97	292	0.0824	3.82			
17	29-Aug-19	0.396	310	0.0691	2.43			
18	1-Nov-19	0.657	303	0.0833	2.6			
19	29-Jan-20	1.64	356	0.0749	6.87			
20	14-May-20	1.37	363	0.0791	7.47			
21	7-Aug-20	0.713	200	0.0555	3.9			
22	12-Nov-20	0.686	211	0.0573	4.04			
23	5-Mar-21	2.64	271	0.0504	5.4			
24	19-May-21	1.25	306	0.0658	5.56			
25	22-Jul-21	0.673	248	0.0616	3.77			
26	27-Oct-21	0.549	201	0.0572	2.97			
27								
28								
29								
30								
Coefficient of Variation:		0.51	0.20	0.23	0.38			
Mann-Kendall Statistic (S):		-59	82	10	54			
Confidence Factor:		89.8%	96.3%	58.2%	89.1%			
Concentration Trend:		Stable	Increasing	No Trend	No Trend			



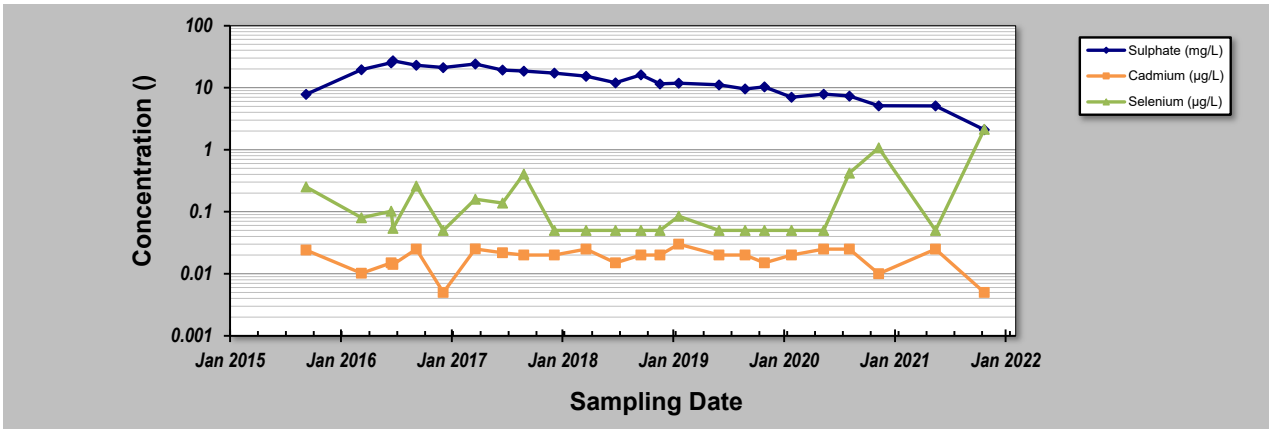
Notes:

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:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW1-SH
Conducted By:	MTB		

Parameter (units)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	CM_MW1-SH CONCENTRATION						
1	9-Sep-15	7.8	0.0241	0.252				
2	10-Mar-16	19.5	0.0102	0.08				
3	16-Jun-16	25.2	0.015	0.102				
4	22-Jun-16	27.2	0.0141	0.054				
5	7-Sep-16	23	0.025	0.26				
6	5-Dec-16	21.1	0.005	0.05				
7	21-Mar-17	24.1	0.0251	0.159				
8	19-Jun-17	19.2	0.0218	0.138				
9	28-Aug-17	18.5	0.02	0.404				
10	7-Dec-17	17.2	0.02	0.05				
11	22-Mar-18	15.3	0.025	0.05				
12	27-Jun-18	12	0.015	0.05				
13	19-Sep-18	16.1	0.02	0.05				
14	21-Nov-18	11.5	0.02	0.05				
15	22-Jan-19	11.8	0.03	0.085				
16	4-Jun-19	11.1	0.02	0.05				
17	29-Aug-19	9.54	0.02	0.05				
18	1-Nov-19	10.3	0.015	0.05				
19	29-Jan-20	7	0.02	0.05				
20	14-May-20	7.86	0.025	0.05				
21	7-Aug-20	7.32	0.025	0.421				
22	12-Nov-20	5.1	0.01	1.07				
23	19-May-21	5.09	0.025	0.05				
24	27-Oct-21	2.1	0.005	2.14				
25								
Coefficient of Variation:		0.51	0.35	1.92				
Mann-Kendall Statistic (S):		-212	9	-24				
Confidence Factor:		>99.9%	57.8%	71.4%				
Concentration Trend:		Decreasing	No Trend	No Trend				



Notes:

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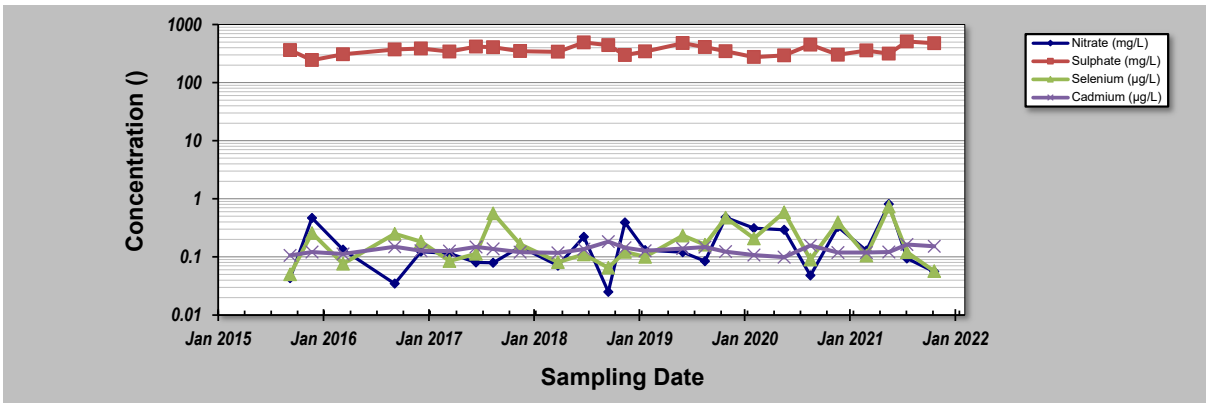
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology 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:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW2-SH
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)	Cadmium (µg/L)			
Sampling Event	Sampling Date	CM_MW2-SH CONCENTRATION						
1	8-Sep-15	0.043	363	0.05	0.106			
2	23-Nov-15	0.468	244	0.258	0.121			
3	10-Mar-16	0.133	307	0.076	0.112			
4	6-Sep-16	0.0346	372	0.25	0.149			
5	6-Dec-16	0.123	386	0.183	0.127			
6	15-Mar-17	0.114	343	0.085	0.126			
7	15-Jun-17	0.08	417	0.113	0.148			
8	14-Aug-17	0.079	406	0.562	0.137			
9	16-Nov-17	0.149	348	0.164	0.12			
10	27-Mar-18	0.0705	339	0.081	0.117			
11	25-Jun-18	0.221	491	0.11	0.136			
12	18-Sep-18	0.025	442	0.065	0.183			
13	15-Nov-18	0.391	298	0.122	0.144			
14	24-Jan-19	0.131	344	0.1	0.127			
15	4-Jun-19	0.12	478	0.232	0.139			
16	20-Aug-19	0.0842	409	0.162	0.147			
17	31-Oct-19	0.478	347	0.473	0.123			
18	6-Feb-20	0.312	275	0.208	0.107			
19	21-May-20	0.293	294	0.589	0.0991			
20	20-Aug-20	0.048	450	0.09	0.157			
21	24-Nov-20	0.328	302	0.395	0.119			
22	3-Mar-21	0.128	357	0.105	0.119			
23	20-May-21	0.809	315	0.732	0.121			
24	22-Jul-21	0.094	510	0.12	0.163			
25	25-Oct-21	0.056	476	0.057	0.152			
26								
27								
28								
29								
30								
Coefficient of Variation:		0.96	0.19	0.87	0.15			
Mann-Kendall Statistic (S):		38	36	36	32			
Confidence Factor:		80.4%	79.1%	79.1%	76.3%			
Concentration Trend:		No Trend	No Trend	No Trend	No Trend			



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.

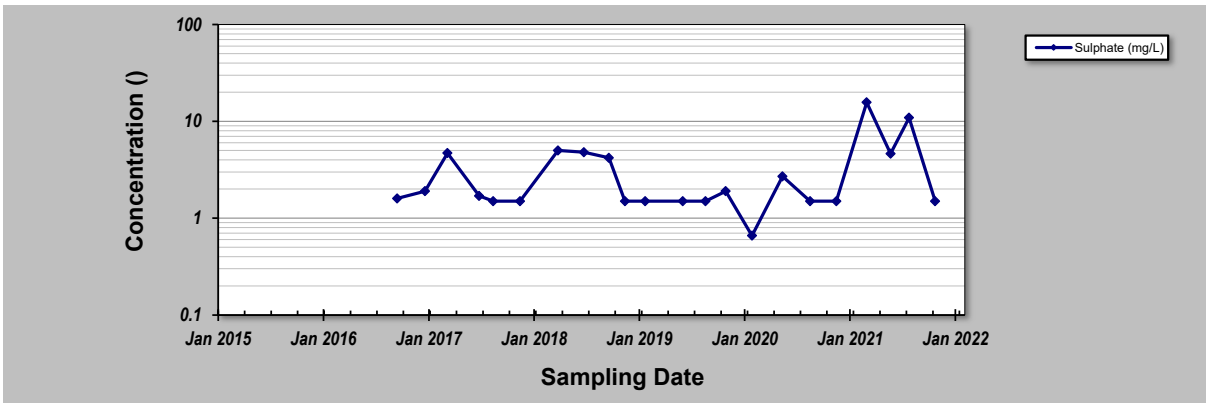
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 15-Feb-22
Facility Name: Teck Coal Regional Groundwater - CMm
Conducted By: MTB

Job ID: 635544
Location CM_MW3-DP

Parameter (units) Sulphate (mg/L)

Sampling Event	Sampling Date	CM_MW3-DP CONCENTRATION						
1	14-Sep-15							
2	3-Dec-15							
3	10-Mar-16							
4	14-Sep-16	1.6						
5	20-Dec-16	1.9						
6	8-Mar-17	4.7						
7	26-Jun-17	1.7						
8	14-Aug-17	1.5						
9	15-Nov-17	1.5						
10	27-Mar-18	5						
11	25-Jun-18	4.8						
12	20-Sep-18	4.2						
13	15-Nov-18	1.5						
14	24-Jan-19	1.5						
15	4-Jun-19	1.5						
16	22-Aug-19	1.5						
17	31-Oct-19	1.9						
18	30-Jan-20	0.66						
19	15-May-20	2.7						
20	19-Aug-20	1.5						
21	18-Nov-20	1.5						
22	4-Mar-21	15.7						
23	26-May-21	4.64						
24	29-Jul-21	10.9						
25	28-Oct-21	1.5						
26								
27								
28								
29								
30								
Coefficient of Variation:		1.06						
Mann-Kendall Statistic (S):		-4						
Confidence Factor:		53.3%						
Concentration Trend:		No Trend						



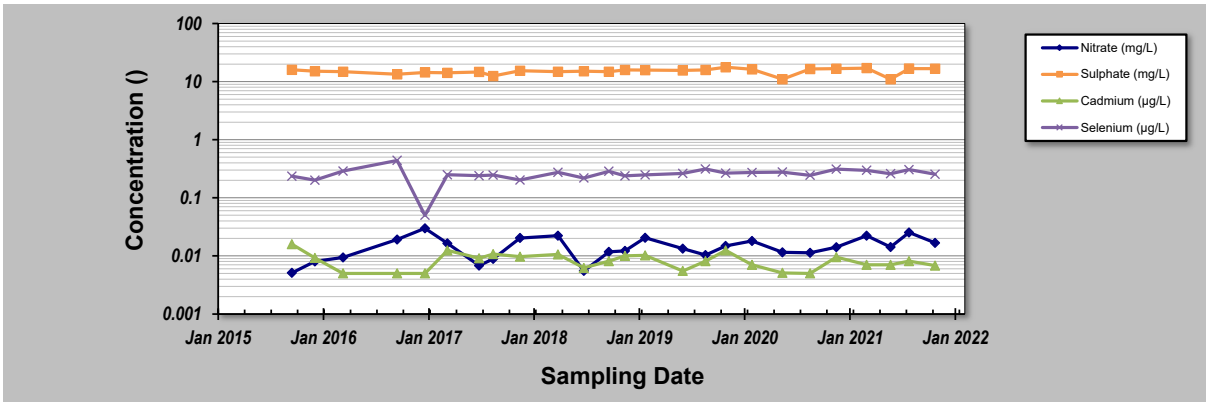
Notes:

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:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW3-SH
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	CM_MW3-SH CONCENTRATION						
1	14-Sep-15	0.0051	16	0.0159	0.236			
2	3-Dec-15	0.008	15.1	0.0092	0.201			
3	10-Mar-16	0.0094	14.8	0.005	0.288			
4	14-Sep-16	0.0191	13.4	0.005	0.44			
5	20-Dec-16	0.0298	14.4	0.005	0.05			
6	8-Mar-17	0.0164	14.2	0.0124	0.249			
7	26-Jun-17	0.0068	14.7	0.0091	0.24			
8	14-Aug-17	0.0089	12.5	0.0107	0.246			
9	15-Nov-17	0.0203	15.4	0.0097	0.202			
10	27-Mar-18	0.0223	14.8	0.0106	0.275			
11	25-Jun-18	0.0055	15.1	0.0062	0.219			
12	20-Sep-18	0.0117	14.8	0.0081	0.286			
13	15-Nov-18	0.0122	15.9	0.01	0.239			
14	24-Jan-19	0.0205	15.8	0.0102	0.248			
15	4-Jun-19	0.0133	15.6	0.0055	0.263			
16	22-Aug-19	0.0103	15.9	0.0081	0.313			
17	31-Oct-19	0.0148	17.7	0.0124	0.266			
18	30-Jan-20	0.018	16.3	0.007	0.272			
19	15-May-20	0.0115	11	0.0051	0.277			
20	19-Aug-20	0.0113	16.5	0.005	0.244			
21	18-Nov-20	0.0141	16.7	0.0095	0.312			
22	4-Mar-21	0.0223	17.1	0.007	0.297			
23	26-May-21	0.0142	11	0.007	0.26			
24	29-Jul-21	0.0253	16.8	0.0081	0.306			
25	28-Oct-21	0.0167	16.7	0.0068	0.254			
26								
27								
28								
29								
30								
Coefficient of Variation:		0.43	0.11	0.33	0.25			
Mann-Kendall Statistic (S):		79	117	-47	90			
Confidence Factor:		96.6%	99.7%	85.7%	98.2%			
Concentration Trend:		Increasing	Increasing	Stable	Increasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
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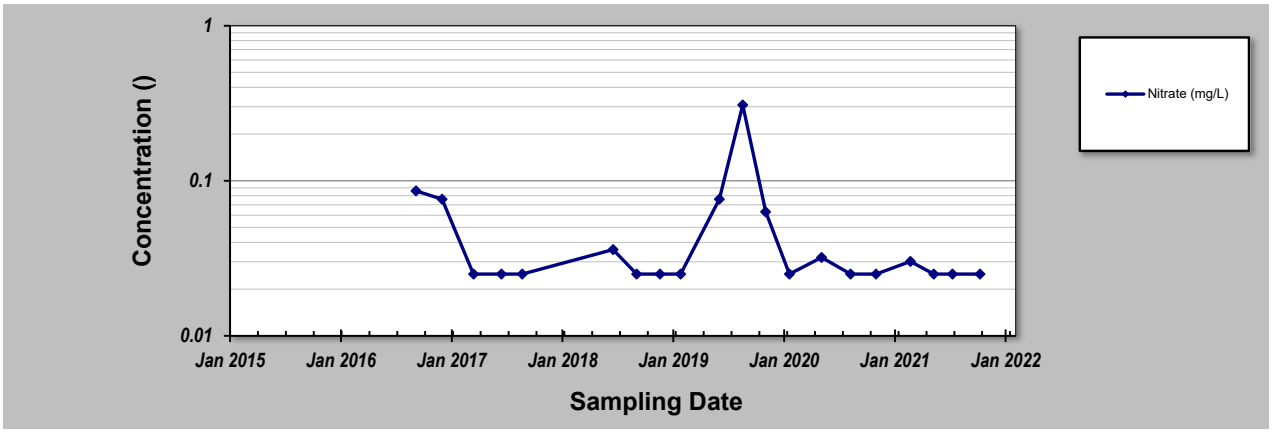
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW4-DP
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)						

Sampling Event	Sampling Date	CM_MW4-DP CONCENTRATION						
1	6-Sep-16	0.086						
2	1-Dec-16	0.076						
3	15-Mar-17	0.025						
4	15-Jun-17	0.025						
5	23-Aug-17	0.025						
6	19-Jun-18	0.036						
7	5-Sep-18	0.025						
8	21-Nov-18	0.025						
9	28-Jan-19	0.025						
10	5-Jun-19	0.076						
11	21-Aug-19	0.308						
12	5-Nov-19	0.063						
13	22-Jan-20	0.025						
14	7-May-20	0.032						
15	11-Aug-20	0.025						
16	3-Nov-20	0.025						
17	25-Feb-21	0.0302						
18	13-May-21	0.025						
19	14-Jul-21	0.025						
20	13-Oct-21	0.025						
21								
22								
23								
24								
25								
Coefficient of Variation:		1.27						
Mann-Kendall Statistic (S):		-37						
Confidence Factor:		87.7%						
Concentration Trend:		No Trend						



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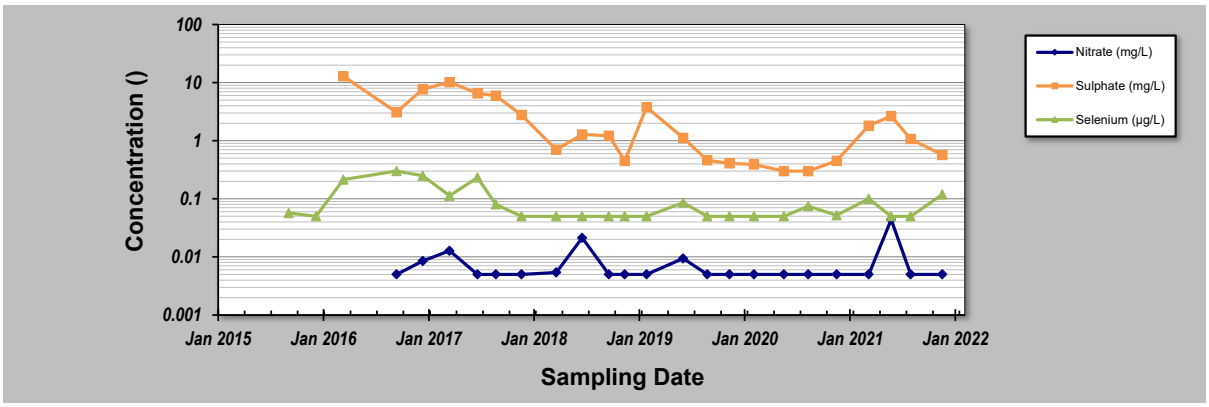
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 15-Feb-22
Facility Name: Teck Coal Regional Groundwater - CMm
Conducted By: MTB

Job ID: 635544
Location CM_MW5-DP

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	CM_MW5-DP CONCENTRATION						
1	3-Sep-15			0.057				
2	7-Dec-15			0.05				
3	11-Mar-16		12.9	0.214				
4	12-Sep-16	0.005	3.1	0.3				
5	12-Dec-16	0.0085	7.66	0.25				
6	15-Mar-17	0.0127	10.2	0.113				
7	20-Jun-17	0.005	6.53	0.232				
8	23-Aug-17	0.005	5.97	0.08				
9	20-Nov-17	0.005	2.78	0.05				
10	21-Mar-18	0.0054	0.7	0.05				
11	19-Jun-18	0.0213	1.28	0.05				
12	20-Sep-18	0.005	1.22	0.05				
13	14-Nov-18	0.005	0.45	0.05				
14	29-Jan-19	0.005	3.78	0.05				
15	5-Jun-19	0.0094	1.12	0.086				
16	28-Aug-19	0.005	0.46	0.05				
17	13-Nov-19	0.005	0.41	0.05				
18	6-Feb-20	0.005	0.39	0.05				
19	20-May-20	0.005	0.3	0.05				
20	12-Aug-20	0.005	0.3	0.075				
21	19-Nov-20	0.005	0.45	0.052				
22	11-Mar-21	0.005	1.82	0.1				
23	28-May-21	0.0439	2.66	0.05				
24	4-Aug-21	0.005	1.07	0.05				
25	22-Nov-21	0.005	0.57	0.119				
26								
27								
28								
29								
30								
Coefficient of Variation:		1.07	1.21	0.79				
Mann-Kendall Statistic (S):		-27	-135	-54				
Confidence Factor:		76.6%	>99.9%	89.1%				
Concentration Trend:		No Trend	Decreasing	Stable				



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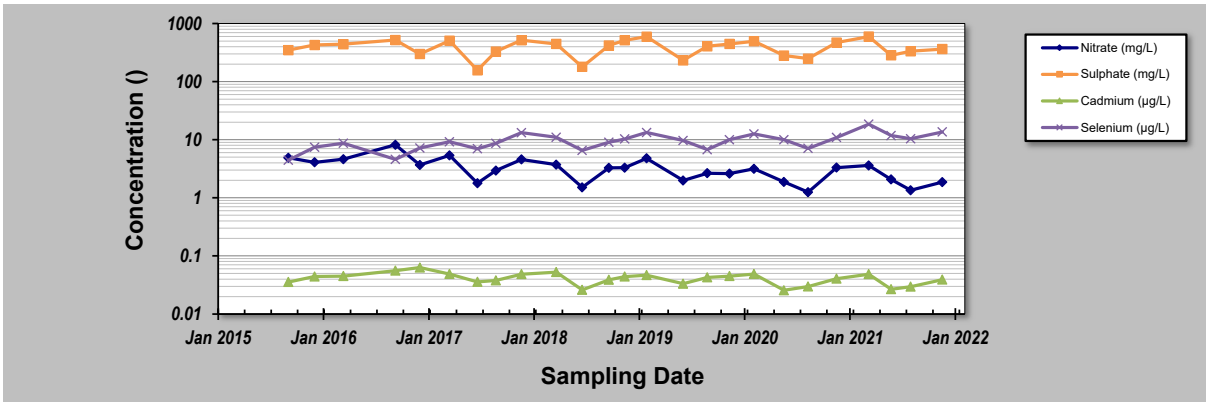
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	04-Mar-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW5-SH
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	CM_MW5-SH CONCENTRATION						
1	2-Sep-15	4.89	349	0.0356	4.45			
2	2-Dec-15	4.08	428	0.0443	7.43			
3	11-Mar-16	4.62	441	0.0451	8.71			
4	8-Sep-16	8.18	521	0.056	4.59			
5	2-Dec-16	3.68	299	0.063	7.19			
6	15-Mar-17	5.37	508	0.049	9.22			
7	20-Jun-17	1.78	157	0.0359	6.99			
8	23-Aug-17	2.94	330	0.0379	8.65			
9	20-Nov-17	4.57	517	0.0487	13.2			
10	21-Mar-18	3.72	445	0.0527	11			
11	19-Jun-18	1.51	180	0.0261	6.55			
12	20-Sep-18	3.28	419	0.039	9.02			
13	14-Nov-18	3.3	516	0.0442	10.3			
14	29-Jan-19	4.78	595	0.0468	13.3			
15	5-Jun-19	1.99	233	0.0333	9.69			
16	28-Aug-19	2.65	406	0.0429	6.75			
17	13-Nov-19	2.61	445	0.0449	10			
18	6-Feb-20	3.15	497	0.0488	12.6			
19	20-May-20	1.88	281	0.0256	10			
20	12-Aug-20	1.25	249	0.0298	7.08			
21	19-Nov-20	3.31	470	0.0407	10.9			
22	11-Mar-21	3.6	596	0.0486	18.5			
23	28-May-21	2.07	284	0.0267	11.8			
24	4-Aug-21	1.35	334	0.0296	10.4			
25	22-Nov-21	1.86	364	0.0392	13.6			
26								
27								
28								
29								
30								
Coefficient of Variation:		0.48	0.31	0.23	0.32			
Mann-Kendall Statistic (S):		-136	-3	-72	137			
Confidence Factor:		99.9%	51.9%	95.1%	100.0%			
Concentration Trend:		Decreasing	Stable	Decreasing	Increasing			



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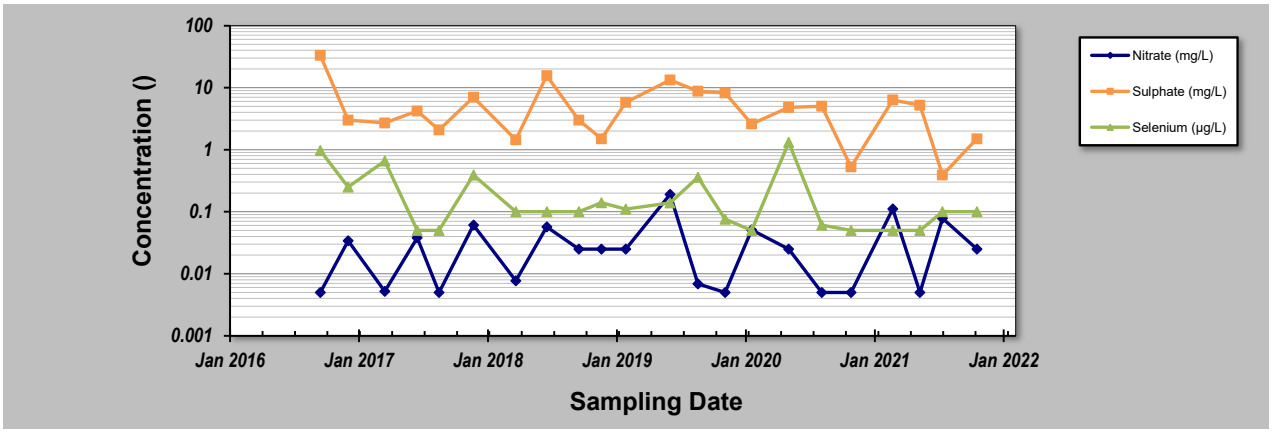
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW6-DP
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Selenium (µg/L)				
Sampling Event	Sampling Date	CM_MW6-DP CONCENTRATION						
1	13-Sep-16	0.005	33.3	0.97				
2	1-Dec-16	0.034	3	0.25				
3	15-Mar-17	0.0052	2.7	0.659				
4	15-Jun-17	0.038	4.2	0.05				
5	16-Aug-17	0.005	2.09	0.05				
6	22-Nov-17	0.061	7	0.39				
7	22-Mar-18	0.0077	1.44	0.1				
8	18-Jun-18	0.057	15.6	0.1				
9	17-Sep-18	0.025	3	0.1				
10	20-Nov-18	0.025	1.5	0.14				
11	28-Jan-19	0.025	5.8	0.11				
12	3-Jun-19	0.191	13.3	0.139				
13	21-Aug-19	0.0069	8.77	0.36				
14	6-Nov-19	0.005	8.22	0.076				
15	20-Jan-20	0.051	2.6	0.05				
16	4-May-20	0.025	4.8	1.31				
17	6-Aug-20	0.005	5.02	0.061				
18	28-Oct-20	0.005	0.53	0.05				
19	24-Feb-21	0.111	6.32	0.05				
20	12-May-21	0.005	5.2	0.05				
21	15-Jul-21	0.0781	0.39	0.1				
22	21-Oct-21	0.025	1.5	0.1				
23								
24								
25								
Coefficient of Variation:		1.23	1.16	1.38				
Mann-Kendall Statistic (S):		6	-37	-64				
Confidence Factor:		55.5%	84.3%	96.3%				
Concentration Trend:		No Trend	No Trend	Decreasing				



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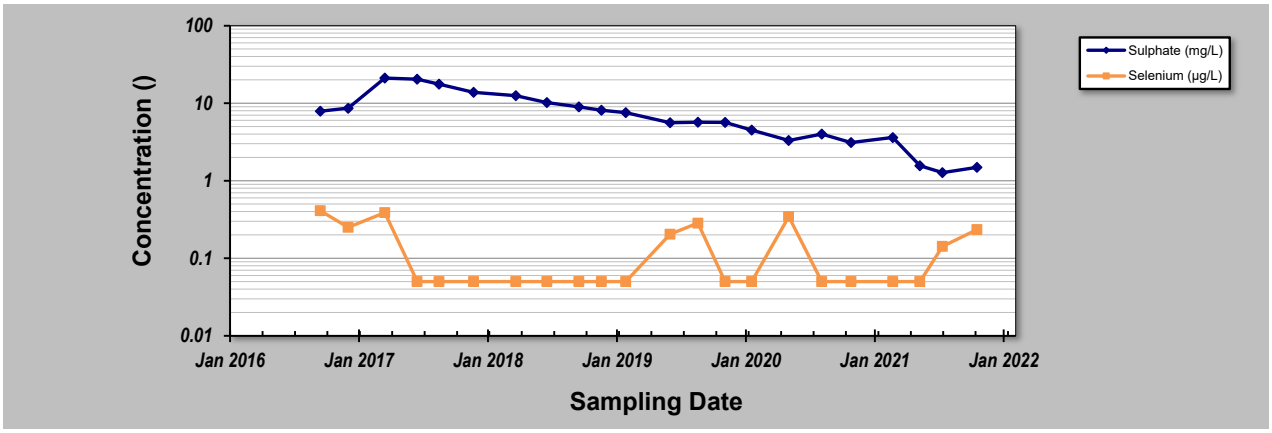
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW6-SH
Conducted By:	MTB		

Parameter (units)	Sulphate (mg/L)	Selenium (µg/L)					
Sampling Event	Sampling Date	CM_MW6-SH CONCENTRATION						
1	13-Sep-16	7.89	0.41					
2	1-Dec-16	8.61	0.25					
3	15-Mar-17	21.1	0.388					
4	15-Jun-17	20.4	0.05					
5	16-Aug-17	17.6	0.05					
6	22-Nov-17	13.8	0.05					
7	22-Mar-18	12.5	0.05					
8	18-Jun-18	10.2	0.05					
9	17-Sep-18	8.96	0.05					
10	20-Nov-18	8.12	0.05					
11	28-Jan-19	7.56	0.05					
12	3-Jun-19	5.61	0.204					
13	21-Aug-19	5.69	0.284					
14	6-Nov-19	5.65	0.05					
15	20-Jan-20	4.5	0.05					
16	4-May-20	3.3	0.345					
17	6-Aug-20	4	0.05					
18	28-Oct-20	3.11	0.05					
19	24-Feb-21	3.61	0.05					
20	12-May-21	1.56	0.05					
21	15-Jul-21	1.27	0.142					
22	21-Oct-21	1.49	0.234					
23								
24								
25								
Coefficient of Variation:		0.73	0.94					
Mann-Kendall Statistic (S):		-187	-16					
Confidence Factor:		>99.9%	66.2%					
Concentration Trend:		Decreasing	Stable					



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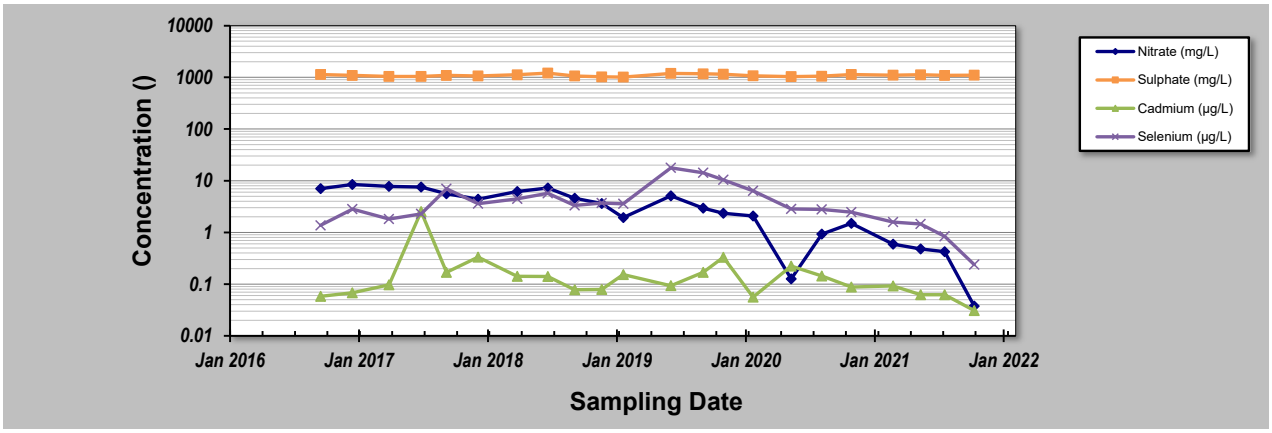
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW7-DP
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)	Selenium (µg/L)			
Sampling Event	Sampling Date	CM_MW7-DP CONCENTRATION						
1	14-Sep-16	7.05	1130	0.058	1.37			
2	13-Dec-16	8.48	1090	0.068	2.83			
3	27-Mar-17	7.77	1040	0.097	1.82			
4	26-Jun-17	7.53	1040	2.53	2.28			
5	6-Sep-17	5.59	1090	0.169	6.98			
6	5-Dec-17	4.4	1060	0.332	3.59			
7	26-Mar-18	6.18	1120	0.142	4.45			
8	21-Jun-18	7.22	1210	0.141	5.73			
9	5-Sep-18	4.58	1060	0.078	3.33			
10	21-Nov-18	3.62	1020	0.079	3.71			
11	21-Jan-19	1.93	1010	0.153	3.57			
12	5-Jun-19	5.11	1190	0.0933	17.8			
13	5-Sep-19	2.95	1170	0.169	14.2			
14	1-Nov-19	2.34	1150	0.33	10.4			
15	24-Jan-20	2.08	1070	0.056	6.38			
16	11-May-20	0.126	1030	0.224	2.85			
17	6-Aug-20	0.928	1050	0.144	2.79			
18	29-Oct-20	1.5	1130	0.088	2.47			
19	25-Feb-21	0.595	1100	0.092	1.59			
20	14-May-21	0.478	1120	0.0622	1.46			
21	21-Jul-21	0.425	1090	0.0625	0.839			
22	13-Oct-21	0.0376	1100	0.0308	0.238			
23								
24								
25								
Coefficient of Variation:		0.77	0.05	2.19	0.96			
Mann-Kendall Statistic (S):		-185	11	-46	-45			
Confidence Factor:		>99.9%	61.0%	89.6%	89.1%			
Concentration Trend:		Decreasing	No Trend	No Trend	Stable			



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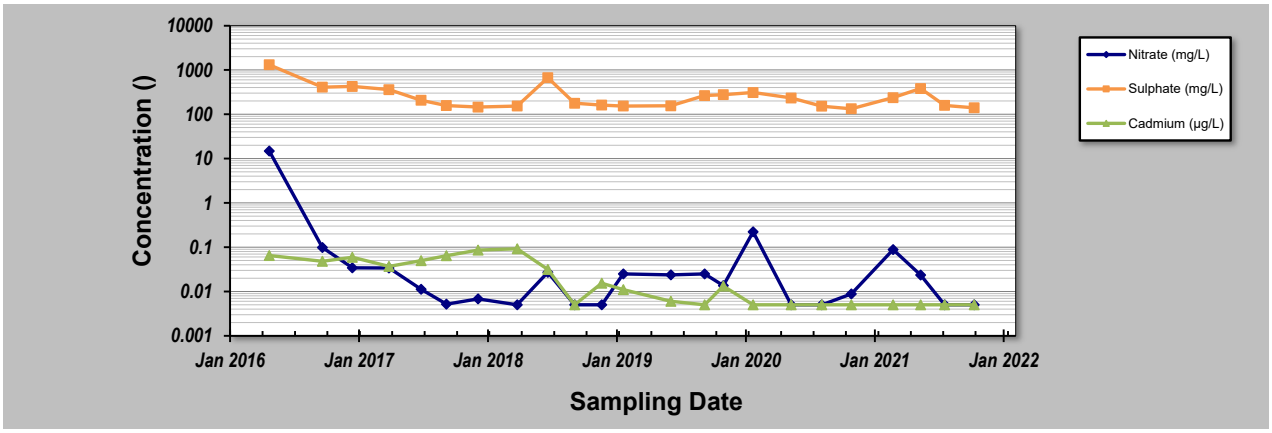
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW7-SH
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)				
Sampling Event	Sampling Date	CM_MW7-SH CONCENTRATION						
1	21-Apr-16	14.8	1310	0.065				
2	19-Sep-16	0.0984	408	0.048				
3	13-Dec-16	0.0341	424	0.059				
4	27-Mar-17	0.034	359	0.0368				
5	26-Jun-17	0.0112	206	0.0496				
6	6-Sep-17	0.0052	157	0.0645				
7	5-Dec-17	0.0068	145	0.086				
8	26-Mar-18	0.005	153	0.0917				
9	21-Jun-18	0.027	667	0.0314				
10	5-Sep-18	0.005	177	0.005				
11	21-Nov-18	0.005	161	0.0154				
12	21-Jan-19	0.025	153	0.011				
13	5-Jun-19	0.0237	155	0.006				
14	9-Sep-19	0.025	264	0.005				
15	1-Nov-19	0.0136	276	0.0133				
16	24-Jan-20	0.222	309	0.005				
17	11-May-20	0.005	233	0.005				
18	6-Aug-20	0.005	152	0.005				
19	29-Oct-20	0.0088	133	0.005				
20	25-Feb-21	0.0881	237	0.005				
21	14-May-21	0.0235	380	0.005				
22	21-Jul-21	0.005	158	0.005				
23	13-Oct-21	0.005	140	0.005				
24								
25								
Coefficient of Variation:		4.58	0.87	1.06				
Mann-Kendall Statistic (S):		-77	-72	-154				
Confidence Factor:		97.8%	97.0%	>99.9%				
Concentration Trend:		Decreasing	Decreasing	Decreasing				



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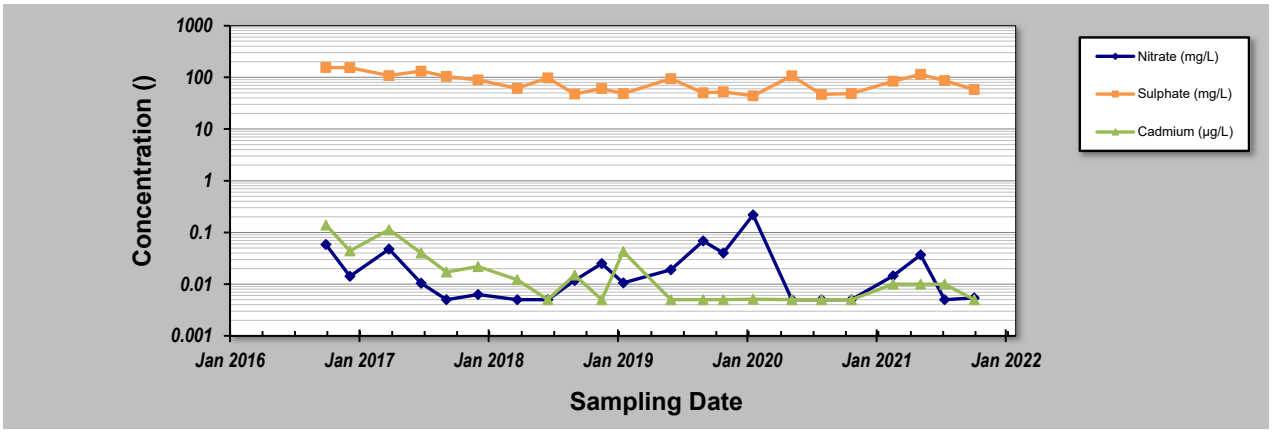
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW8
Conducted By:	MTB		

Parameter (units)	Nitrate (mg/L)	Sulphate (mg/L)	Cadmium (µg/L)				
Sampling Event	Sampling Date	CM_MW8 CONCENTRATION						
1	29-Sep-16	0.0584	155	0.139				
2	6-Dec-16	0.0142	154	0.0439				
3	27-Mar-17	0.0475	108	0.113				
4	26-Jun-17	0.0104	132	0.04				
5	6-Sep-17	0.005	104	0.0172				
6	5-Dec-17	0.0063	89	0.0218				
7	26-Mar-18	0.005	61.2	0.0122				
8	21-Jun-18	0.005	97.6	0.005				
9	5-Sep-18	0.0118	47.6	0.015				
10	21-Nov-18	0.025	60.4	0.005				
11	21-Jan-19	0.0106	48.4	0.0428				
12	5-Jun-19	0.0189	94.3	0.005				
13	5-Sep-19	0.0684	50.2	0.005				
14	1-Nov-19	0.0402	52.5	0.005				
15	24-Jan-20	0.219	43.9	0.0051				
16	13-May-20	0.005	107	0.005				
17	6-Aug-20	0.005	46.9	0.005				
18	29-Oct-20	0.005	48.5	0.005				
19	25-Feb-21	0.0145	83.8	0.01				
20	14-May-21	0.0367	114	0.01				
21	21-Jul-21	0.005	86.2	0.01				
22	13-Oct-21	0.0054	58	0.005				
23								
24								
25								
Coefficient of Variation:		1.65	0.42	1.49				
Mann-Kendall Statistic (S):		-20	-85	-106				
Confidence Factor:		70.2%	99.2%	99.9%				
Concentration Trend:		No Trend	Decreasing	Decreasing				



Notes:

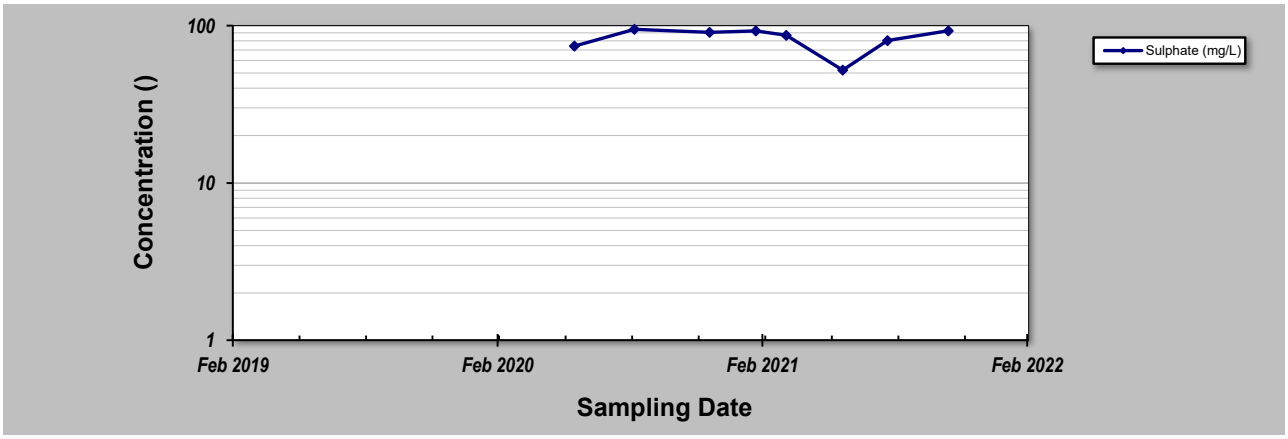
1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably 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:	15-Feb-22	Job ID:	635544
Facility Name:	Teck Coal Regional Groundwater - CMm	Location	CM_MW10
Conducted By:	MTB		

Parameter (units): Sulphate (mg/L)

Sampling Event	Sampling Date	CM_MW10 CONCENTRATION
1	21-May-20	74.1
2	12-Aug-20	94.8
3	24-Nov-20	90.7
4	27-Jan-21	92.6
5	10-Mar-21	86.8
6	27-May-21	52.2
7	28-Jul-21	80.4
8	20-Oct-21	92.7
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
Coefficient of Variation:		0.17
Mann-Kendall Statistic (S):		-2
Confidence Factor:		54.8%
Concentration Trend:		Stable



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